School of Education, Communication and Language Sciences

Deep language learning at a distance: Investigating the efficacy of a low-cost blended intervention in the small rural primary schools of Greece

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Abstract

The present research evaluates the impact of a blended remote learning intervention on the English as a Foreign Language attainment of 8-12-year-old children living in rural parts of Greece who, contrary to their urban counterparts, have no access to English language instruction in their schools. Most of the research on blended learning to date has been carried out in the context of higher and secondary education, and thus little is currently known about the practical feasibility and the parameters that might facilitate or impede academic success in a blended learning environment involving primary school children. Furthermore, there has been little systematic attention to the effectiveness of such educational interventions in low-income and resource-scarce settings. Importantly, this thesis moves beyond treating technology as a means by which to simply provide access to automated versions of conventional models of teaching, thus conceptualising 'quality language learning' as personalised, participatory, collaborative, guided learning, and deep content.

An embedded mixed methods design was used in this study. The primary aims of the research were addressed through a quasi-experimental design. Across eight small rural primary schools, forty-seven children accessed the intervention for forty-five minutes per week over 12 weeks. Additional data were collected, including qualitative semi-structured headteacher and parent interviews, children focus groups and informal observations, to further illuminate factors affecting outcomes.

The intervention was established as a significant predictor of gains in three out of five language areas assessed (vocabulary, grammar, and aural comprehension). Evidence from the qualitative strand regarding factors at the intervention level, teacher attributes, and individual child factors that appear to have influenced outcomes are discussed. On the basis of the findings of the present research, a model is proposed of the potential mechanisms underpinning the efficacy of the intervention within the intended contexts, accounting for individual differences and implementation factors.

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Glossary of Terms

BL	Blended Learning
CALL	Computer-Assisted Language Learning
CEFR	Common European Framework of Reference for Languages
CEI	*Ceibal En Ingles*
CFA	Confirmatory Factor Analysis
CLT	Communicative Language Teaching
CPH	Critical Period Hypothesis
CPM	Raven's Coloured Progressive Matrices Test
CSCL	Computer-Supported Collaborative Learning
EFA	Exploratory Factor Analysis
EFL	English as a Foreign Language
ESL	English as a Second Language
HL	Hybrid Learning
ICTs	Information and Communication Technologies
IDB	Inter-American Development Bank
IEP	Institute of Educational Policy
ILO	International Labour Organization
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
ISEI	International Socio-economic Index of Occupational Status
L1	First Language
L2	Second Language
OLPC	One Laptop Per Child
PAF	Principal Axis Factoring
PBLL	Project-based Language Learning
PEL	Parental Education Level
PjBL	Project-based Learning
POS	Parental Occupational Status
PSR	Pruned Speech Rate
SCT	Sociocultural Theory
SEM	Structural Equation Model/Modelling

SES	Socio-Economic Status
SLA	Second Language Acquisition
SOLE	Self-Organised Learning Environment
TELL	Technology-Enhanced Language Learning
TL	Target Language
VLE	Virtual Learning Environment
ZPD	Zone of Proximal Development
ZCD	Zone of Current Development

Chapter One: Introduction

1.1 Motivation and Intent

The inspiration for this doctoral research was my role as teacher of English as a Foreign Language (EFL) in a private language academy in my hometown—a working-class neighbourhood near Piraeus, Greece's largest port. In 2014, right at the peak of the Greek sovereign debt crisis, and two years after I had left my teaching job and moved overseas, I received a message from a former student of mine, asking me if I could point him in the direction of any online self-study resources that he could use to try and prepare himself to sit the Cambridge First Certificate in English (FCE) exam that year[1]. His mother had just lost her job and was no longer able to pay for tuition at the academy. He was 15 at the time and knew all too well how big a difference this qualification would make to his future career prospects in times of such uncertainty, and also that secondary schools had no provision for this kind of training. He had mentioned feedback and how he needed to be able to keep track of his progress—what he was doing well on, and what not so much so. But he hadn't been able to find anything online that would help guide him through the process, let alone anything that was available for free.

I had been teaching blended learning courses to corporate students (combining synchronous—taking place via Skype—and asynchronous instruction through a web-based learning platform) for a few years by that point, and I was struck there were no similar options available to support younger students in a more systematic way. There were, of course, online learning platforms available for free such as *Duolingo*, *busuu*, and *Memrise*, and I carefully examined the affordances and constraints of each, in relation to the needs of teenage learners of English in Greece. What I found was limitations in terms of their coverage of linguistic skills (e.g., favouring lexical or grammatical development, without adequate concentration on other areas such as free-text writing or listening skills; rather,

[1] The FCE exam certifies proficiency at level B2 of the Common European Framework of Reference (CEFR) and, in Greece, it is generally considered a prerequisite for a good job in both the public and private sectors. Children who start learning English around the age of seven will normally sit the FCE exam at 14 or 15 years.

they would all have to be used in conjunction to provide a more in-depth learning experience), addressing topics that were more suitable to adult learners, and misalignment with CEFR. Finally, none seemed apt to support learners through exam preparation in a more systematic way. I spent the next two years or so trying to learn everything there was to learn about online instructional design and language learning software. I was keen on developing an online resource which would not only effectively prepare users for said exam but would also take them through the entire course syllabus for a given CEFR level, as per Cambridge Assessment English requirements. What is more, it had to provide timely corrective feedback on users' responses and a form of progress visualisation to enable learners to keep track of their achievement against the course objectives. Finally, it had to be accessible to everyone with an Internet connection and appropriate electronic equipment and, for this, it had to be free.

After experimenting with various platforms, from creating a *Moodle* site to trying out *Schoology* and *Google Classroom*, I finally decided on *EdApp*, a microlearning-based learning management system (LMS) that had only been released earlier that year (i.e., 2015). *EdApp* is described in detail in Section 3.5.2, but it is worth noting here that what made it stand out from other eligible candidates was its highly appealing user interface, easy content authoring tool that required no coding skills, and built-in features such as gamification and learning analytics than enabled tracking and user behaviour insights. Other features that gave it an advantage over other platforms included a rich library of customisable templates for creating courses and activities, which could add variety and thus make online learning a more engaging process. Most importantly, each admin account came with a free trial which allowed free access to the content for a certain number of users and for an indefinite period of time. As will be discussed in Section 6.2.3, pricing has now been updated to provide unlimited access to all, at no cost.

It was while I was developing the online EFL courses on *EdApp* that I encountered the work of researchers at Newcastle University, including Sugata Mitra, James Stanfield, James Tooley, and Pauline Dixon, on Self-Organised Learning Environments (SOLEs). A SOLE is a learning environment either inside a school or any indoor setting where small groups of children work together to explore big and challenging open-ended questions aimed at triggering children's curiosity and thus set them off on their pursuit of a plausible explanation. A distinctive characteristic of SOLEs is that the collaborative enquiry

approach that underpins their design is Internet-based. This access to both authentic and purpose-built resources, together with the power of the 'collective expert' (Donato, 1994) are believed to be a powerful combination that can lead to high levels of self-organised learning, particularly in settings where teacher input is not available. SOLEs are discussed in greater detail in Section 2.5.6 of this thesis, but for now, suffice to say that by that point it had occurred to me that a significant flaw existed in my thinking around how to go about making EFL learning both accessible and relevant to the needs and interests of my former (and potentially other) teenage students who were keen to move forward but lacked the means: meaningful social interaction and peer collaboration in their educational pursuit.

It was around the same time that I also happened to come across a blog article written by a teacher who had spent over 20 years working in the country's small rural schools. His post was a condemning chronicle of the many ways in which educational policy had been marginalising rural children for decades. He was raising important questions regarding the ethics of systemic exclusion of these children from core areas of the national curriculum such as English, physical education, music, and the arts by completely lacking provision for the staffing of these schools with teachers of so-called 'specialist subject areas'[2]. On what grounds, he asked, do we expect 12-year-old children who have never heard a word of English to join secondary classrooms filled with peers who come with at least five years' worth of EFL learning experience? What is the role of the state in ensuring equitable learning opportunities between those students who have the means to seek out private alternatives in the absence of state provision for core learning domains in the primary years, and those who don't? Since the founding of the modern Greek state, he continued, small rural schools have encompassed the very identity of the hundreds of small and big villages scattered all around the country and which form the backbone of Greece; marginalisation of rural children as a means of economising was blatant educational racism (Kapsalakis, 2016).

That article had such a profound impact on me that I felt compelled to reframe my aims such that would allow me to address questions that had emerged at the intersection of all these experiences: How can we capitalise on the affordances of educational technology to

[2] The term is not reflective of the importance of these subjects in the national curriculum at the primary level, but rather the fact that, contrary to the 'generalist' teacher, these practitioners would be expected to have received additional training in their area of specialisation.

allow children—including those of small multigrade schools around the country—to access core areas of learning (in this case, English) in the absence of trained teachers? In fact, is there a way to help *accelerate* progress for these children who have suffered from long-standing systemic exclusion? That is, might we have to think beyond access towards redefining quality EFL learning such that it encompasses not only cognitive aspects of these children's development, but also social and emotional ways of learning? Can we create a learning environment that harnesses, to the extent possible, the power of collaborative enquiry, authenticity, and self-paced mastery? And, finally, can we do so in a financially sustainable way, considering it would have to be free, at least at the point of delivery?

These were the questions that eventually prompted me to pursue the present doctoral research, whose focus was later narrowed down to include small multigrade school children alone. The next section considers the current sociopolitical and educational context of the research in more detail, highlighting the need for greater intervention in rural education in Greece.

1.2 Why study foreign language learning in small, multigrade primary schools in Greece?

Greece's particular geographical morphology, namely the fact that four-fifths of the country are covered by mountains and 26 of its hundreds of islands are officially recognised as hard to reach, gives rise to numerous accessibility issues. The Hellenic Ministry of Education and Religious Affairs (henceforth Ministry of Education) has traditionally made efforts to ensure access to basic education even in the most isolated parts of the country, and regional authorities are required by law to provide free transport to primary pupils who reside more than 1.2 kilometres away from the nearest school unit (Eurydice, 2019). As such, it is not uncommon, in cases where it is made necessary by specific local circumstances, to have schools with fewer than five pupils. In fact, during the recruitment process of the present study I encountered schools in remote mountainous regions which operated with only one, or two pupils. This is because their extremely isolated locations render consolidation with nearby units an unviable option.

1.2.1 General characteristics of small multigrade schools

Oligothesia[3], or multigrade schools, are primary schools in rural or peri-urban areas which employ up to 5 teachers (i.e., there is not one teacher for each of the six year groups comprising primary schooling) and in which there are mixed classes (classes with children of different ages who are co-taught part of the school curriculum). The student population in multigrade schools does not exceed 150. 'Small' tend to be considered those schools with less than 30 pupils, although, in practice, *monothesia* and *dithesia* schools (see Footnote 3) rarely operate at full capacity, and, as a result, tend to host much smaller numbers of pupils. For the purposes of this thesis, the terms 'small rural schools' and 'small multigrade schools' are used interchangeably to refer to schools in rural or peri-urban areas across Greece that operate with up to two full-time teachers and 30 pupils; similarly, schools with six teachers and above are also referred to as 'urban schools'. Detailed descriptions of the schools that participated in the study are provided in Chapter Three.

In the school year 2018-19, out of a total of 4,295 primary schools[4], 1,044 (or 24.3%) had five or less teachers (Table 1). More than half of these schools would be considered small, having one or two teachers, while approximately 15 per cent operated with 15 pupils or less (Classification 1). This means that more than 12 per cent of all state-run mainstream primary schools in Greece are multigrade with a small number of pupils.

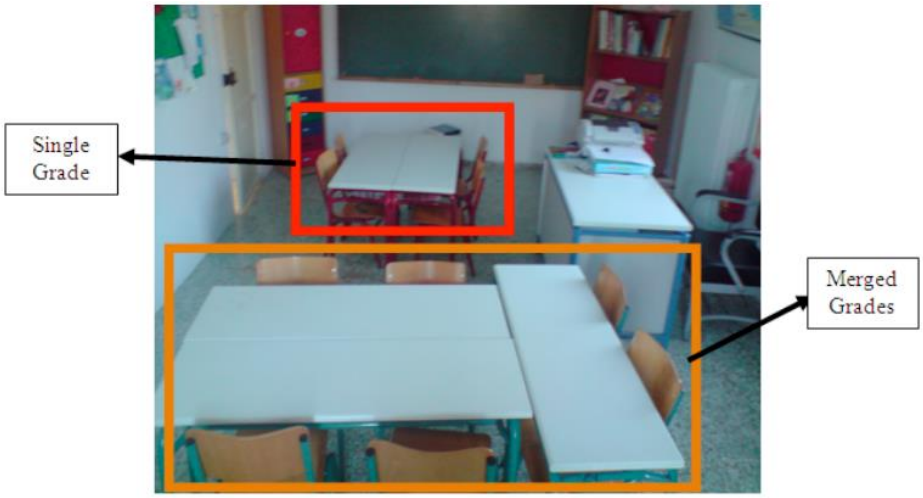
Table 1 General statistical data on multigrade schools in Greece, 2018-19

Total number of primary schools				4,295	
Total number of multigrade schools				1,044	
Percentage of primary schools				24.3	
Classification	1	2	3	4	5
Number of schools	152	384	213	202	93
Percentage	14.6	36.8	20.4	19.3	8.9
Number of teachers	210	814	749	1,011	601
Number of pupils	1,300	6,823	6,385	9,147	5,277

[3] Literally meaning 'with only a few positions.' The term refers to the number of teaching posts available in the school; as such, there are *monothesia* schools, which employ only one teacher; *dithesia*, which have enough capacity for up to two full-time teaching staff; *trithesia*, with three teachers, and so forth. In this sense, the number of pupils determines the number of teachers who work at the school, as well as its classification. Multigrade schools with up to 15 children have only one teacher, those with 16 to 30 children have two, and those with 31 to 45 have three (Hellenic Ministry of Education and Religious Affairs, 2020).
[4] Excluding special schools and afternoon 'reception' programmes for asylum-seeking children.

In contrast to other countries, all schools in Greece—including private and multigrade—teach the same curriculum developed centrally by the Ministry of Education, and use the same textbooks for its delivery. In cases where the number of pupils does not justify having one teacher per year group, two classes merge and are co-taught. The syllabus of one class is then taught to both classes in one school year, and the syllabus of the other is again taught to both classes the following year. Figure 1 shows a typical layout of a multigrade classroom, with one class at the back, and two merged classes with three desks at the front.

Figure 1 Atypical layout of a multigrade classroom (taken from Giannakos & Vlamos, 2012, p.133)



Rural schools with one or two teachers organise the daily timetable of lessons into three 90-minute blocks which are separated by 25-minute breaks. Although each block usually covers one subject, in some cases, pupils switch to a different subject after the first 45 minutes. As an example, Table 2 illustrates the weekly timetable for a class of Year 5/6 pupils in one of the participating schools during the year when fieldwork took place. As can be seen, children of both levels are co-taught every subject except mathematics (shaded), in which case each teaching hour instead is split into two periods, with the first 25' being dedicated to the Year 5 syllabus, followed by a 20-minute[5] instruction period focussed on Year 6. When either group is not actively being taught, they work independently on 'silent assignments' (more on this in the next section).

[5] Precise duration may vary to ensure fair time distribution between the two groups.

Table 2 Example of a weekly timetable for Year 5/6 in a small rural school in Greece

		TIMES	MON	TUE	WED	THU	FRI
1st	45’	08.10 - 08.35 | 08.35 - 08.55	Greek	Greek	Greek	Greek	Maths
2nd	45’	08.55 - 09.20 | 09.20 - 09.40	Greek	Greek	Greek	Greek	Maths
	25’	BREAK					
3rd	45’	10.05 - 10.30 | 10.30 - 10.50	Maths	History	Maths	History	Religious Education
4th	45’	10.50 - 11.15 | 11.15 - 11.35	Maths	Geography	Religious Education	Geography	Social Studies
	25’	BREAK					
5th	45’	12.00 - 12.45	Science	Art	Science	Flexible Zone	Flexible Zone
6th	45’	12.45 - 13.30	PE	Art	Science	PE	Flexible Zone

Due to the particular circumstances of small rural schools, where one or two teachers are responsible for all classes, there are more hours of teaching (5 extra hours per week) than in six-teacher, or urban, schools. That is, while the teaching hours in the latter amount to 225’ with breaks 45’ per day[6], the corresponding hours in small rural schools are 270’ and 50’, giving children one extra hour of class compared to their counterparts in regular schools. As a result, they finish school later than their urban peers every day.

1.2.2 The challenges and opportunities of multigrade teaching

Multigrade teaching that arises through necessity, e.g., due to a need to cater for areas with low population density where schools are widely scattered and enrolments low, is often considered to be a second-class education (Little, 2006). This is partly because the heterogeneity of multigrade classes means that such learning environments do not lend themselves to traditional models of whole-class instruction, but instead require teachers to simultaneously address the needs of children of different educational levels, ages and

[6] Teaching hours and breaks in six-teacher schools run in the following pattern: 50’-10, 45’-15’, 45’-10’, and 40’- end of school day.

interests in less time than is available to their monograde counterparts in urban settings. Whereas, for instance, in one-teacher schools, Years 3-4 and 5-6 spend 45' per week being co-taught the subject of history, the corresponding time in a six-teacher school with a maximum class size of 25 pupils is twice that (FEK 1324/2016, p. 16146).

Apart from curtailed time of active engagement with the pupils, multigrade teachers are also faced with the additional demand of having to manage pupils' difficulties when being taught content which may be too challenging for them. For example, as noted earlier, current provision means that Year 3 children are taught the Year 4 syllabus for an entire year, and, equally, Year 5 pupils study the syllabus of Year 6 (with the exception of mathematics). While exposure to work at different grade levels may benefit some learners by reinforcing and extending their learning opportunities (Berry, 2006), it is nonetheless likely that it will cause undue cognitive strain on others (Pistioli, 2011). This may subsequently affect their motivation and self-efficacy levels in a negative manner, and potentially hinder their academic achievement.

Another practical challenge facing multigrade teachers is planning and preparation for more than one class per teaching hour, which is a much more difficult and time-consuming task than planning and preparing for a single year group (Berry & Little, 2006). This is mainly because multigrade teachers have double, triple, or quadruple the planning load of their counterparts in urban settings, which has been shown to often demoralise the multigrade teacher, potentially leading to teacher demotivation and having a negative effect on pupil learning (Ames, 2006).

Related to this is perhaps one of the most daunting tasks that multigrade teachers are called upon to manage, that is 'silent assignments.' These are activities upon which pupils of one group are expected to be working while the teacher is busy giving direct instruction to another group. Individual seatwork is a valuable tool in the multigrade classroom as it can maximise opportunities for personalisation (Charitos, 2008). Yet successful engagement in independent work hinges on pupils' ability to take advantage of self-access materials such as dictionaries, manage their time effectively, identify errors and correct them, and seek help from a more advanced other when needed—including from peers. Given evidence that not all children are able to use self-regulatory strategies at the same level of efficiency (Veenman, Van Hout-Wolters & Afflerbach, 2006) and that in most cases children are not

capable of spontaneously regulating their learning (Schunk, 2001), it falls on the teacher to train primary school children to effectively regulate their learning through instructional guidance and explicit strategy instruction (Zimmerman, 2002; Dignath & Büttner, 2008). In the absence of this, it is likely that some of them will struggle more than others when confronted with the complex cognitive and behavioural requirements of independent seatwork.

In addition to opportunities for personalisation and self-regulation, increased pupil interaction is also recognised as something that is engendered by the multigrade classroom. In his investigation of multigrade teaching practices in the Turks and Caicos Islands, Berry (2006) found that all the multigrade teachers interviewed mentioned the importance of the judicious use of collaborative work in their classes. By contrast, he discovered that pupil interdependence was extremely uncommon in monograde classrooms and attributed the difference at least in part to the fact that learning in the latter settings is largely teacher-directed, with fewer chances for pupils to exercise a greater degree of autonomy.

1.2.3 Staffing, teacher training, and school governance

The responsibility for the recruitment of Greek rural teachers of primary education lies with central government which, due to a high degree of centralisation, usually appoints rural teachers according to fixed educational planning processes rather than the changing needs of rural communities (Saiti, 2005). In contrast to other developed nations such as the UK, the primary teacher selection and recruitment process operates a points-based system and does not involve a person specification tailored to each post that is available; rather, it relies on standard assessment criteria such as relevant educational qualifications (whereby a higher degree classification entails more points), professional development seminar attendance, foreign language skills, ICT certification (Word, Excel, Internet), teaching experience, disability, and family status (e.g., number of dependents; children under 25 and in compulsory military service or full-time studies at the time of appointment) (Law 4589/2019 - Chapter E). Although the pedagogical demands placed on teachers of small rural schools with multigrade classrooms vary significantly from those in urban schools, the selection process does not account for the skill differential. Importantly, no teacher preparation programme in Greece targets the specific training needs of teachers interested to work in this type of schools. Initial teacher education in Greek universities is by default

biased towards the instructional needs of urban schools, with embedded assumptions of classroom homogeneity rendering it irrelevant to the needs of educational environments where co-teaching is the norm. Lacking adequate skills to cope with the pedagogical demands of rural classroom settings, new teachers are forced to spend the first years of their professional careers in self-doubt and with minimal professional development opportunities, while often resorting to the outdated didactic models that they themselves were taught in (Oikonomopoulos & Mprouzos, 2017).

This is related to another important factor which affects the staffing of small rural schools: high teacher turnover. The teachers usually appointed to these schools are practitioners with little to no teaching experience. This is by necessity rather than choice, since experienced teachers with no ties to rural communities are unwilling to work in these schools due to a lack of incentives and negative perceptions about living standards (Karachaliou, 2017). For instance, the allowance related to work in rural schools is only 100 Euros (9.2% of base salary, before tax) per month. In addition, given that small rural schools by definition do not have a dedicated school leader, the most qualified teacher in a school receives an extra 150 Euros (13.7% of base salary, before tax) per month for the necessary overtime in assuming extra administrative duties in a school where there is no head teacher (Law 4547/2018, Article 19)[7]. By contrast, staff in four-teacher schools and above who take on similar duties receive a monthly salary premium of 250-300 Euros, depending on the size of the student population. The fact that there is no big difference in compensation between urban and rural areas—including difficult-access locations—therefore complicates efforts to attract and retain high-quality teachers.

1.2.4 Foreign language learning in small rural schools

As a country which relies heavily on tourism for its economic growth, and whose official language is not widely spoken outside its borders, Greece represents a context where people strongly believe in the necessity of mastering at least one foreign language which will allow them to communicate with speakers of other languages both at home and overseas. English, in particular, is thought to provide people with important educational, professional, and socioeconomic opportunities, and is thus the priority foreign language in education as well

[7] In the present thesis, the term 'head teachers' is used to refer to all participating teachers, as a way of recognising their expanded roles and range of responsibilities within the school unit.

as in society (Mattheoudakis & Alexiou, 2009). English has been taught in Greek primary schools since 1987. In terms of contact hours, as shown in Table 3, in regular schools (operating with six teachers and above), Year 1 and 2 children receive one hour of instruction each per week, whereas Years 3-6 receive three. By contrast, there is no provision for the teaching of English in schools with less than four teachers (Ministerial Decree 83939/D1/2017). As a result, parents who can afford it and have this option available to them, often turn to the private sector to fill this gap in state-provided schooling. Shadow education—as for-profit after-school tutoring is also referred to—is a thriving sector in Greece. Participation in private after-school classes of 15-year-olds is the highest amongst OECD countries (OECD, 2013), while average private spending on foreign language tuition per primary school student in 2016 was 258 Euros per year[8] (KEFiM, 2018). This is a particularly sizeable investment if one considers that the median equivalised household disposable income in 2014 was estimated at 9, 288 Euros per year (OECDb, 2018). The data are strengthened by evidence from the present study which revealed that, faced with educational exclusion from state provision, 78.7% of disadvantaged families were choosing to make enormous sacrifices to purchase after-school English tutoring for their children, in spite of the impact the economic crisis has had on household income.

Table 3 English weekly contact hours in small rural primary schools, compared to their urban counterparts

Classification / **Year group**	**1**	**2**	**3**	**4**	**5**	**6**
Six teachers+	1	1	3	3	3	3
Five teachers	1	1	3 (co-taught)		3	3
Four teachers	1	1	3 (co-taught)		3 (co-taught)	
One to three teachers	0	0	0	0	0	0

In recognition of the need to achieve greater equity in educational provision and student outcomes, the country has recently engaged in a series of reforms which aim to tackle some of its key educational policy challenges. Amongst some of the key initiatives developed as part of a three-year education plan (2017-19) was the extension of all-day provision to include small rural primary schools. In this type of school, children can stay on for

[8] Excluding school fees for private schools.

afternoon classes and benefit from homework support or an enhanced curriculum, which includes English classes, information and communication technology (ICT), art, drama, and physical education. The afternoon provision comprises two additional teaching hours (with breaks) per day and finishes at 4 p.m. Participation in the all-day primary school scheme is optional and contingent upon: (a) sufficient uptake (i.e., at least two thirds of the student population need to express interest in one-teacher schools, and a minimum of 10 in two- and three-teacher schools); and (b) the availability of specialty subject teachers (Ministerial Decree 83939/D1/2017).

Evidence showed that the enriched curriculum, with access to new subjects in all-day schools, was particularly welcomed by low-income parents, as more affluent families would typically have access to these additional subjects (ICT and foreign language learning) through private language academies and private tutors (OECD, 2018b). Yet, certain gaps between policy and practice have been identified. A recent OECD report (2018b, p.122) has highlighted the following challenges with respect to the operation of all-day primary schools in Greece:

> Reliance on European Structural Funds and the use of substitute teachers to deliver the programme has led to an unstable teacher workforce. Some schools reported having only managed to recruit specialist teachers for the afternoon sessions three months after the beginning of the school year**…**Specialised subjects are often delivered by teachers trained as secondary school teachers (and therefore not always having the adequate pedagogical training to teach primary school-age children).
>
> (OECD, 2018b, p. 122)

These findings are consistent with reports from head teachers in remote and isolated parts of the country whom I contacted during the scoping part of this study. These head teachers indeed confirmed that, in practice, the enhanced curriculum remained inaccessible to pupils in small rural schools, primarily due to teacher recruitment difficulties.

1.3 The Case for Blended Distance Education and Deep Language Learning

This research addresses calls in the recent literature to examine the potential of information and communication technologies (ICT) and other forms of ICT-supported learning for expanding educational access and broadening curricula through distance education, thereby alleviating the difficulties faced by remote rural schools in Greece (OECD, 2018b). More

specifically, the term ‘blended learning’ (BL) (also ‘hybrid learning’; HL) has broadly been used to refer to a mix of face-to-face and online learning (Garrison & Vaughan, 2008; Blissit, 2016). Others have defined it as ‘the integrated combination of traditional learning with web-based on-line approaches’ (Oliver & Trigwell, 2005, p.17)—the former referring to face-to-face instruction and the latter to that part of the course delivered via the Internet, usually through a virtual learning environment (VLE). The term has also been used to describe an instructional model that combines a fully online, distance-based curriculum with required on-site attendance (Watson, 2008), thus suggesting that in contexts where the use of digital technology is widespread, distance learning is understood to be synonymous with online learning. Other yet speak of a mix of synchronous (live or real-time) and asynchronous (e.g., discussion boards where students respond to questions from the instructor or other students) learning environments (Holden & Westfall, 2007).

In this study, the terms ‘blended learning’ and ‘hybrid learning’ are used interchangeably to describe the amalgamation of synchronous and asynchronous learning modalities in distance education settings, where students are physically co-present in the former but not in the latter. Further, the term ‘blended remote learning’ (or ‘hybrid remote learning’) is used to highlight the role of the remote teacher in facilitating classroom-based collaborative project work during live sessions. As will be discussed in the chapters that follow, peer learning takes increased prominence in this type of learning environment where the physical absence of a teacher allows scope for mutual scaffolding patterns to emerge whereby children are continually encouraged to work as a team and to tap into each other’s differential abilities to reach their common objective. In this sense, the study draws a distinction between learning in blended/hybrid modalities and what is referred to as ‘technology-enhanced learning’ (TEL) or ‘computer-assisted learning’ (CAL). This differentiation rests on the fact that in the former technology is thought to be central to both the design and delivery of the curriculum rather than merely a tool to enhance teaching and learning.

Indeed the ongoing global pandemic only really attached a sense of urgency to an already burgeoning field of research into the effectiveness of blended learning approaches in terms of academic achievement. Yet most of the research on blended learning has been carried out in the context of higher education (e.g., Boelens, Voet & De Wever, 2018; Medina, 2018; Castro, 2019) and, while there are some studies which have investigated blended

approaches in relation to K-12 learning, these have mostly concentrated on secondary education (Barbour, 2014; Waters, Barbour & Menchaca, 2014). As such, much less is known about the practical feasibility and the parameters that might facilitate or impede academic success in a blended learning environment involving primary school children. Furthermore, there has been little systematic attention to the effectiveness of such educational interventions in low-income and resource-scarce settings, not least in the context of Greece (Miminou & Spanaka, 2013; Anastasiou, Androutsou & Georgalas, 2015).

There is also a growing body of research into blended language learning which lends support to the argument that hybrid approaches may indeed, under certain circumstances, support second language attainment (e.g., Shih, 2010; Barani, 2011; Adas & Bakir, 2013; Liu, 2015; Ghazizadeh & Fatemipour, 2017). Again, however, the majority of these studies focus on university students or have been carried out in private language institutes where the majority of learners are adults. It thus becomes apparent that, though the demand for BL increases, our understanding of effective BL implementation, and by extension, the ways in which to eliminate rather than exacerbate existing inequities, is at present rather fragmented—especially in relation to K-12 settings.

Yet more recent conceptualisations of blended learning go beyond this notion of accessibility. In addition to flexibility in terms of time and place, BL also affords opportunities to cater to students' individual needs and, thus, achieve a degree of personalisation in teaching (Boelens, Voet & De Wever, 2018). Speaking to the same idea, Fishman and Dede (2016) draw an important distinction between using technology to *do conventional things better* versus using technology to do *better things* (Roschelle *et al.*, cited in Fishman and Dede, 2016, p. 1269; emphasis in the original). The authors argue that we need to move beyond treating technology as a means by which to simply automate conventional models of teaching; the real value in technology lies instead in its ability to act as a catalyst for a shift towards an 'alternative, next-generation educational model' (Fishman & Dede, 2016, p. 1271). For Fishman and Dede, this transformation entails swinging the pendulum in the direction of personalised, participatory, collaborative, guided learning, and deep content, amongst others.

The present thesis is therefore an attempt to contribute to an emerging body of research into blended educational formats that go beyond conventional models of online or hybrid teaching (even if it is only to make some initial connections), and, in doing so, it addresses concerns that failure to account for the development of non-cognitive capabilities such as emotional understanding, social competence, and identity development, there is the danger of teaching practices and school curricula leading to the rise of an increasingly impoverished inner identity with huge personal and social consequences (Tochon, 2019). The present intervention is thus rooted in a sociocultural understanding of development and the idea that subject matter and academic learning cannot in fact be separated from activities such as social identification and co-construction of understanding. Further, guided by this idea of using technology to do *better things*, I draw on Tochon's (2019) framework of deep language learning in reconceptualising teacher guidance as a resource for mediating increasingly greater self-regulation and holistic development in students. Therefore, from a pedagogical perspective, the present intervention is fundamentally centred around three key concepts: collaborative enquiry, authenticity, and self-paced mastery.

1.4 Why pragmatism as the epistemological framework?

This research is rooted within the philosophical tradition of pragmatism, reflected in the use of a mixed methods design. Given that it sets out to deal with a problem in a specific context, to meet specific goals and express specific values, the present study aims to generate knowledge which will create practical utility for the intended beneficiaries. In this regard, it is not concerned with the extent to which such newfound understanding converges with existing theory so much as with the degree to which it will allow us to generate a model for human problem solving within a specified reality. While pragmatism attaches great importance to the experimental approach, it also recognises that fact and value are inextricably connected, and hence questions about 'how' must be accompanied by questions about 'why' and 'what for' (Biesta & Burbules, 2003, p. 22). A pragmatist perspective then dismisses certain assumptions about the incompatibility of traditionally opposing methodologies such as quantitative and qualitative approaches and calls for the use of multiple tools of enquiry to gain a more complex, complete, and richer understanding of the problem at hand.

1.5 Why mixed methods?

The present thesis aligns with the view that socially embedded phenomena such as those that become manifest in the contexts of classrooms and schools are so ‘elusive and ‘intangible’ (Cohen, Manion & Morrison, 2018, p.10), and their behaviour so irregular, that any attempt to understand them through linear cause-and-effect claims is likely to fall short of the task. Instead, this study takes the view that schools must be viewed as ‘complex adaptive systems’ (Keshavarz *et al.*, 2010, p. 1468) which are composed of multiple interacting components, and whose complexity warrants multi-perspectival, holistic methodologies which enable multidirectional causes and effects (Morrison, 2012). In this regard, my aim in this scholarship has been to go beyond merely looking for patterns in the subjects' behaviour, and rather attempt to integrate these into a more general system comprising the goals, aspirations, and beliefs of the participants, thereby gaining a more accurate interpretation of their experience. In acknowledging the shortcomings of taking a singular approach to educational research, the study employs a mixed methods intervention design: on the one hand, the quasi-experimental strand will enable me, to the extent possible, to say something authoritative that can be generalised to similar populations beyond the specific ones of the research, and thus be of use in social policy formulation; and, on the other hand, the interpretative strand is expected to afford me a better understanding of the key factors that mediated/potentiated and/or inhibited the impact of the intervention on participants’ learning outcomes, thereby bringing together a more comprehensive account of the topic of enquiry at hand.

Further, it was reasoned that if the study were to provide any actionable insights for policymakers, it would be necessary to acknowledge that an educational programme may indeed be effective in increasing test scores, yet its scaleup might be financially implausible for a certain context once it is compared to its alternative. For this reason, it was deemed important to estimate the cost of the blended programme in relation to the face-to-face option, supposing the latter were made available to small rural schools. In doing so, it will be possible to determine whether a blended distance learning approach is likely to be effective at raising EFL attainment amongst primary learners at a comparable cost level to that of face-to-face programmes.

1.6 Aims and Research Questions

Therefore, the research questions are as follows:

1. What is the impact of the blended remote model on student EFL attainment, with reference to a) vocabulary knowledge, b) grammar knowledge, c) aural comprehension skills, d) writing skills, and e) oral fluency?

2. What are the specific mechanisms which mediate and/or inhibit said impact on learning outcomes?

a) What are children's perceptions of factors that facilitate and/or impede learning in a blended remote model?
b) What do head teachers and parents think about the impact of the blended remote model?
c) What are head teachers' and parents' perceptions of factors that facilitate and/or impede learning in a blended remote model?

3. What is the relative cost of the blended learning intervention compared to the education-as-usual programme?

1.7 Overview of the Thesis

This thesis is organised into eight chapters. In Chapter One the current political and educational context of the research was considered, detailing some of the major challenges facing children living in small rural and peri-urban areas in being able to access EFL teaching. It also included the aims, scope, and justification for the current study.

Chapter Two contains a critical review of selected relevant literature that considers conceptual frameworks and empirical evidence for examining 'deep' second language (L2) learning in blended modalities which are delivered at a distance.

In the third chapter, I restate the research questions and discuss potential approaches to this investigation; I then put forth the research design as well as the assessment tools used for

the study, while providing a detailed justification for each. The school settings are also described and ethical considerations are outlined.

Chapter Four is the first of three chapters to present the results of the study. It begins to examine the relationship between the blended intervention and student EFL attainment by presenting those results from the quasi-experimental study that address Research Question 1. Following on from Chapter Four, the next chapter reports on results from the structural equation modelling analyses, together with findings from the qualitative strand of the research design. In so doing, it attempts to answer Research Question 2 and its associated sub-questions through a mix of methodological approaches. The final results chapter – Chapter Six –is concerned with Research Question 3, and therefore provides the cost analysis of the blended intervention in detail.

In Chapter Seven, the thesis proceeds to the interpretation of the results and discussion of the key findings of this research, in relation to previous research and theory. The final chapter then revisits the main research findings in terms of implications for policy and practice. The study's contribution to knowledge and limitations are also discussed, and avenues for future research are also proposed.

Chapter Two: Literature Review

2.1 Introduction

Through a critique of selected relevant literature, this chapter considers conceptual frameworks and empirical evidence for examining children's learning in blended learning modalities which are delivered at a distance. The first section reviews the development of Second Language Acquisition (SLA) theory in recent years and the shift away from linguistic accuracy towards communicative competence (Section 2.2). It then proceeds to situate learning and development within a sociocultural theoretical framework, focussing on principles of learning within Vygotsky's (1978) Zone of Proximal Development (ZPD) and peer collaboration (Section 2.3). From there, it problematises conventional ontological and epistemological approaches to learning, and draws upon theoretical and practical work undertaken in understanding how a shift of focus towards 'deep language learning' can help accelerate not only cognitive but also noncognitive development amongst children (Section 2.4.). This is followed by a discussion on how these learning goals might be realised within a blended learning programme for second language acquisition (SLA), with particular reference to learning English as a Foreign Language (EFL; Section 2.5). Finally, the review concludes with an exploration of the potential for supporting opportunities for language learning through educational technologies in remote and resource-scarce settings, based on evidence from international initiatives (Section 2.6) as well as practical work conducted in the Greek context (Section 2.7). Section 2.8 goes on to discuss the aims and contribution of the current study.

2.2. Second Language Acquisition (SLA)

2.2.1 Goals of Language Learning

While early understanding of the goals of second language learning focused primarily on the mastery of grammatical competence, which was to be acquired through controlled activities such as memorisation and drilling, in recent years there has been a shift to viewing language as not what it is but what it *does* (Hall, 2016). Mastery of the rules of sentence formation is still of course considered an important dimension of language learning, however, there is now a broad consensus that without the knowledge and skills necessary to use grammar and other aspects of language appropriately for different communicative

purposes such as expressing an opinion, giving advice, and making suggestions, grammatical competence in and of itself is in fact insufficient (Richards, 2005). Thus, communicative competence is now largely recognised as the primary goal of general language teaching and learning, and is understood to encompass the following types of language knowledge:

- knowing how to use language for a range of different purposes and functions;
- knowing how to vary our use of language according to the setting and the participants (e.g. formal versus informal speech);
- knowing how to produce and understand different types of texts;
- knowing how to maintain communication despite having limitations in one's language knowledge (e.g. through using different kinds of communication strategies).

(Richards, 2005, p. 4)

2.2.2 Communicative Language Teaching (CLT)

Communicative Language Teaching was developed in the 1970s and 1980s in response to a need for a pedagogical method that would recognise the centrality of meaningful communication in language learning, and, thus, provide contextualised opportunities for learners to experiment and try out what they know, develop fluency, and use language authentically by integrating the different language skills such as reading, writing, speaking, and listening. Importantly, however, CLT does not exclude a focus on metalinguistic awareness or knowledge of rules of grammar, but rather endorses an inductive approach to the formation of these (Richards & Rodgers, 2014).

Yet its focus on naturalistic language acquisition and implicit learning processes, together with the fact that it emphasises the social functions of language over form (e.g., succeeding in communicating a request versus achieving linguistic accuracy in doing so) has attracted heavy criticism from those who maintain that explicit input and a clear focus on formal structure are vital to language automatisation. Dörnyei (2009b), for example, explains that mere exposure to plenty of authentic L2 input accompanied by communicative practice is not sufficient, and, therefore, we need explicit learning procedures – such as teaching formulaic language and controlled practice activities – to promote learners' conscious and

deliberate attempt to master the material. Rather than calling for a back-to-grammar shift, however, the author underlines the need for complementarity and proposes a CLT variant wherein a concern with the structural system of language is embedded within a primarily communication-oriented instruction.

2.2.2.1 Activity types and materials

There is an unlimited range of activity types that are compatible with CLT, provided that such classroom techniques enable learners to negotiate meaning and interact meaningfully. Adherents of CLT believe that in order to make it possible for learners to make connections between the classroom processes and the actual world of language use, it is desirable that they are exposed to either real or realistic situations and authentic content; in other words, content which was created 'to fulfil some social purpose in the language community in which it was produced' (Little, Devitt & Singleton, 2002, p. 45)[9].With low-level students who might be unable to grapple with truly authentic textual resources, realia are used frequently, especially when teaching a class of young learners. Language games are also commonplace in the CLT classroom, and, provided they are properly designed, they can give leaners ample opportunities to use the language and develop fluency (Larsen-Freeman, 2000).

Richards and Rodgers (2014, p.97) provide the following list of common pair and group activity types in the CLT classroom:

- Jig-saw activities (students take part in meaningful communication practice as they try to fit together the pieces of information that each holds);
- Task-completion activities (e.g., puzzles, map-reading);
- Surveys, interviews, and searches;
- Opinion-sharing activities;
- Information-transfer activities (e.g., presenting information in the form of a graph, a map, and vice versa).;
- Reasoning gap activities (e.g., working out a teacher's timetable from a set of class timetables);

[9] Arguably, however, in a technology-rich globalised era, the target language community can hardly be confined to those who speak the language as their L1.

- Role plays.

It becomes clear that CLT places greater emphasis on the social nature of learning rather than students as separate individuals operating on the basis of externalisation alone. Central to all the techniques mentioned above is the concept of student-student interaction and peer collaboration, the theoretical underpinnings and practical implications of which are discussed in the following section.

2.3. Collaborative Learning in the Primary Years

2.3.1 Sociocultural Theory and Second Language Acquisition Heterogeneity and the need for personalisation and differentiation

The sociocultural theory approach (SCT) to SLA argues that the most important form of human cognitive development takes place via higher mental processes which are socially and materially mediated. Within this framework, children become empowered to organise and regulate such mental processes as voluntary attention, logical problem-solving, planning and evaluation, voluntary memory, and intentional learning through the use of artefacts in the instructional environment which afford cognition/activity, such as the use of an online translation tool to look up unknown words while reading or writing, or the use of PowerPoint when making an oral presentation (Lantolf, Thorne & Poehner, 2015). Alternatively, these could be symbols, such as language or alphabet, and beliefs or concepts. In addition, Vygotsky reasoned that children's capacity for self-regulated cognitive functioning carries traces of social forms of mediation, whereby, through collaborative and communicative interactions with adults and/or more capable peers, children gradually attain the ability to carry out specific culturally defined tasks, including those involving language, independently of the guidance of others:

> Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, *between* people (*interpsychological*) and then *inside* the child (*intrapsychological*). This applies equally to voluntary attention, to logical memory and to the formation of concepts. All the higher functions originate as actual relationships between individuals.
>
> (Vygotsky, 1978, p. 57; emphasis in the original)

In Vygotskian terms, the site where these social forms of mediation develop is the learner's Zone of Proximal Development (ZPD), which he defined as:

> …the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers.
>
> (*ibid*., p. 86)

The ZPD has had a considerable impact on education and applied linguistics for a number of reasons. One is that it affords us a conceptual tool with which to take account of learning not only retrospectively (what has already been attained) but also prospectively (what is currently in the course of maturing and will likely be attained in the immediate future). In this sense, mediation (e.g., instruction) starts at the learner's current knowledge and skills–what Hartland (2003, p.265) describes as the learner's 'zone of current development' (ZCD)–and moves towards the upper boundaries of her ZPD, which eventually becomes her next ZCD, and so forth.

Effective instruction then, from a Vygotskian perspective, does not simply entail assessment of what learners can accomplish independently, but also information on how learners respond to and appropriate this kind of intermediary assistance. When used proactively, the ZPD has scope for 'creating conditions that may give rise to specific forms of future development' (Lantolf, Thorne & Poehner, 2015, p. 212). Underlying this principle is Vygotsky's assumption that two children who, at any one time, are in an equivalent ZCD are likely to respond differently to feedback, prompts, models, and leading questions, due to varying psychological abilities, thereby underscoring the importance of adapting the mediation process accordingly for each learner (Lantolf, 2011).

2.3.2 Peer Scaffolding and Krashen's i+1 in Classroom L2 Acquisition

The other important implication of the construct of the ZPD for development and L2 acquisition arises in the dialogic interaction amongst individuals (other-regulated development). Given the emphasis of Vygotsky's ZPD on the role of 'experts', development is typically understood to occur during teacher-student interactions, however, effective dialogic interaction is also evident in peer learning contexts (Ohta, 2001).

One common approach is for the more capable peer to act as the knowledgeable other and provide peer scaffolding through a range of techniques such as giving hints and clues, or rephrasing questions (Bodrova & Leong, 2007). Other scaffolding strategies whose effective use has been observed amongst young L2 learners include providing direct translations, explicitly correcting mistakes, asking leading questions, and co-constructing L2 utterances (Galeano, 2011). Although differential expertise can often result in unidirectional peer scaffolding, Ohta[10] (2001) reiterates Donato's (1994) notion of a collective expert and observes that true peers engage in a process of mutual assistance which is enabled by learners' differential abilities:

> …no learner is universally more or less capable than a peer…each learner presents an array of strengths and weaknesses that may be complementary. When learners work together… these strengths and weaknesses may be pooled, creating a greater expertise for the group than of any of the individuals involved.
>
> (Ohta, 2001, p. 76)

For example, in examining Year 6 ESL learners' mutual scaffolding in performing oral communication tasks, Gagné and Parks (2013) found that the children employed mutual scaffolding strategies mainly when in need of assistance and other-correction. To be sure, this notion deviates from Vygotsky's concept of ZPD, which, as noted earlier, specifies that mediation comes from someone, e.g., an older peer, who is at a more advanced stage in their development and can therefore serve as a model for imitation. Yet, the idea of mutual scaffolding highlights the bidirectional (or multidirectional) nature of socialisation that can lead to the internalisation and reproduction of L2 communicative practices. From a neo-Vygotskian sociocultural perspective, interactions amongst mixed-ability peers offer a developmental opportunity for the more proficient peers as they are socialised by the novices into their expert roles; they learn from the communicative or other learning needs

[10] Although Ohta's work centres around adult L2 learning, she suggests that children acquire interactional routines similar to the way adults do and, therefore, it is possible to deduce patterns of participation in classroom interactions and internalisation processes amongst children by observing the latter, and vice versa (see Ohta, 2001, p. 6).

of the latter and they also 'learn from these learners' own perspectives and prior experiences' (Duff & Talmy, 2011, p. 98).

There is an important distinction to be made at this point between the concept of scaffolding, as this was originally proposed by Wood, Bruner, & Ross (1976), and the ZPD. Whilst both can be potentially useful tools for the teaching of specific L2 skills, scaffolding refers to the amount of assistance provided by the more proficient other to the less proficient geared towards completion of a particular task, whilst the ZPD is thought of in terms of both the amount *and* the quality of mediation necessary to assist the latter along her path towards greater self-regulation in using those skills. In this sense, the concept of scaffolding lacks a developmental perspective (Chaiklin, 2003, p. 59). For this reason, throughout this thesis the scaffolding metaphor is employed with this important distinction in mind and is only applied in instances where it is appropriate to do so.

Similarly, despite a strong inclination to link Krashen's construct of *i*+1 to the ZPD in the context of SLA research and practice, not all sociocultural theory researchers agree that this is an appropriate association. This tendency towards relatability, and even integration, stems indeed from a number of—at least superficial—overlaps that exist between the two constructs. Krashen's *i*+1 is rooted in the idea that for L2 development to occur, it is necessary to first identify the leaners' *i* (that is, their 'current competence, the last rule acquired along the natural order'; Krashen, 1985, p. 101) and, following that, provide them with communicative input that is slightly beyond that, what he terms *i*+1 (that is, 'the next rule the acquirer is "due to" acquire or is eligible to acquire along the natural order'; *ibid.*). The learners' internal language processing mechanism (LAD) will then subconsciously assimilate the new information in a manner similar to children's L1 acquisition process.

Although it might initially be tempting to equate Krashen's *i* with the actual development of the child in Vygotsky's SCT, and *i*+1 with ZPD, Dunn and Lantolf (1998, p. 417) reduce this apparent relatability to an 'illusion' and reject any comparability or complementarity between the two constructs on grounds of theoretical incommensurability. In particular, they argue that Krashen's concept rests on the assumption that language acquisition is a linear process which is invariable across learners (see also Thorne, 2000). In addition, they point out that whilst the ZPD provides a conceptual tool that makes it possible to predict *a priori* the development of any given learner based on her responsiveness to mediation, this

is not equally possible with the *i*+1, as language development in Krashen's hypothesis does not occur until *after* the input has been received. Thus, it contradicts a fundamental theoretical underpinning of Vygotsky's ZPD, according to which 'instruction and learning do not ride on the tail of development but instead blaze the trail for development to follow' (Dunn and Lantolf, 1998, p. 419). In short, while with the ZPD, Vygotsky put into concise form his conviction that to be a proficient user of a language—L1 or otherwise—entails a degree of self-regulation, in Krashen's model, development is merely determined by shifts in linguistic performance (Lantolf, Thorne & Poehner, 2015).

2.3.3 Conceptual and Practical Issues Arising from Vygotsky's SCT

2.3.3.1 Epistemological and cognitive relativism

Traditional Vygotskian sociocultural theory has been widely criticised. One critical comment concerns Vygotsky's assertion that the individual is not separate from the collective. Implied in this assumption, according to Fox (2001), is an epistemological social relativism, whereby all concepts and hypotheses are constructed rather than given; in other words, 'knowing is relative to the situation in which knowers find themselves' (Cobb, 1996, p. 339) and therefore it becomes impossible to know objectively, hence intersubjectively, what is really the case. When it comes to explaining and building a theory of L2 acquisition, Jordan (2004, p.81) challenges the usefulness of relativism, arguing that reliable knowledge requires a rationalist basis – it involves 'scrutinizing [theory] so as to discover flaws in terminology or reasoning', and it can only be embraced if it survives the test of falsifiability. Bunge (2001) offers a potential compromise, postulating that the denial of the possibility to arrive at the objective truth does not preclude the idea that there is one anyway.

Such contrasting views have nonetheless sparked a debate around the pedagogical implications of the theory: if truth is in the eye of the beholder, then the teacher's role is 'not to teach but to promote the confrontation of rival views' (Bunge, 2001, p. 13010), to act as a guide-on-the-side rather than a sage-on the-stage and, in so doing, transform classrooms from learning centres into 'debating clubs' (*ibid*., p. 13011). In turn, this shift has been laden with its own problems. First, the 'guide-on-the-side' metaphor is at risk of reducing the role of the teacher to mere 'passive childminding and worksheet distribution'

(McWilliam, 2009, p.287). Embracing, or being forced to embrace, such a *laissez-faire* pedagogy, may paradoxically result in the undermining of teachers' status as the 'more knowledgeable other', depriving them of the right to reject factual errors and failures of reasoning, make decisions regarding what content is worthy of engagement, or evaluate students' learning. This concern indeed resonates with Sowey's (2013) criticism of unguided (or minimally guided) internet-based peer-supported enquiry approaches where, in an attempt to steer children away from dogmatism, facts are treated as relative to one's beliefs, thereby leaving erroneous assumptions to go uncorrected. Instead, Sowey concludes that what we need is 'the incisiveness and probing of critical and creative thinking to get deep into the viscera of the facts and anti-facts…and the…probing of good teachers to go deep into children's thought-space' (para. 23).

Situated between relativism (the guide-on-the-side) and dogmatism (the sage-on-the-stage) is McWilliam's (2009) model for the 21st century teacher as a 'meddler-in-the-middle', which is rooted in an 'interventionist pedagogy in which teachers are mutually involved with students in assembling and/or dis-assembling knowledge and cultural products' (*ibid*., p. 288). In an attempt to reconcile epistemological rigour in formal learning with greater liberty and active engagement, McWilliam conceptualises the 'meddler's' mission as nurturing learners' capacity to 'select, reshuffle, combine or synthesize already existing facts, ideas…and skills in original ways to serve new…purposes' (p.283). Indeed, such a conceptualisation of the role of the teacher might be more appropriate for internet-based peer-supported enquiry approaches, and is the one to which this study subscribes.

2.3.3.2 Effective peer collaboration

Another point of contention concerns the concept of the ZPD and the precise process of a child's development when working with a more capable peer. Lantolf (2011) notes that for successful collaborative mediation to occur, it is important that the mediator is aware of those abilities that are in the ZPD of the less knowledgeable partner. Similarly, Nassaji and Swain (2000) found that randomly provided corrective feedback was less effective for adult L2 acquisition than collaborative help within the learner's ZPD (e.g., the teacher/expert points out an error to the novice without explaining what is wrong with it; if the latter is able to identify and correct the error, then it is considered that she is nearing self-regulation and that soon she will be able to overcome the error without any form of support; this is

because the help she received was within her ZPD). The authors attributed this to a mismatch between the amount and type of assistance provided and the level of feedback the learner needed. In addition, given Aljaafreh and Lantolf' s (1994) findings that changes in learner control over specific L2 grammatical features presuppose shifts in the type of mediation (e.g., more explicit or implicit) depending on: (a) the learner; (b) the linguistic feature and the learner's control over it; and (c) the learner's responsiveness to each type of mediation, the question arises of how we might expect a more advanced yet untrained child to intuitively attune to their partner's potential for development at any given time so as to tailor the assistance accordingly. In other words, is it realistic to assume a child will possess the capacity needed to assess her less advanced partner's ZPD in such a way that will allow her to provide competent assistance towards autonomous L2 mastery development? Chaiklin (2003, p.54) argues that Vygotsky's use of the term 'collaboration' is not to be interpreted as 'a joint, coordinated effort to move forward, in which the more expert partner is always providing support at the moments when maturing functions are inadequate', but rather as any type of situation that involves an interaction geared towards a problem solving task, thereby providing an opportunity for imitation. Nonetheless, he admits that Vygotsky does not offer any systematic guiding principles or techniques for the way collaboration in the ZPD should be conducted, or how responsiveness to different types of mediation should be interpreted, other than the following:

> We assist each child through demonstration, leading questions, and by introducing the initial elements of the task's solution.
>
> (Vygotsky, 1987, p. 209)

> We show the child how such a problem must be solved and watch to see if he can do the problem by imitating the demonstration. Or we begin to solve the problem and ask the child to finish it. Or…we explain…the principle of solving the problem…analyze the problem for him, etc.
>
> (Vygotsky, 1998, p. 202)

Importantly, Vygotsky does not differentiate between the notion of teacher-student collaboration and that which occurs between children. As such, Chaiklin (2003) suggests that much of the work conducted on interactions in joint problem solving between an adult and a child might need to be revisited, and re-examined through a Vygotskian lens, to shed

new light on how they might vary compared to those taking place between school-age children.

Fawcett and Garton (2005), for instance, report that interaction with a more capable peer during a problem-solving activity involving Year 2 learners did not result in individual cognitive change for all children. The authors suggest that this finding might be explained by observational findings which revealed that the higher ability children did not always assist their partners effectively; that is, they did not routinely monitor their partner's activity or adapt their level of interaction to their partner's needs. The authors call for further investigation into the specific language and behavioural traits linked with effective peer scaffolding, and whether these skills can be successfully taught. Moreover, Fawcett and Garton propose that power and knowledge asymmetries between collaborators are likely to have impeded the lower ability children's active engagement and appropriation process, leading to passive acceptance of their partners' input. Children's perception of their relative competence then has emerged as another factor that likely influences the nature of the interaction and the resultant cognitive development. By contrast, Psaltis and Duveen (2006, 2007) discovered that nearly all low-ability children who engaged in 'explicit recognition' (verbal indication that they have reached an 'aha' moment) exhibited improved cognitive development post-test, whereas half of low-ability participants who engaged in what the authors refer to as 'resistance' (an initial defence of their position before accepting the view of the high-ability child) improved post-test (Psaltis & Duveen, 2007, p. 82). This seems to suggest that interaction with more advanced peers is more beneficial when the low ability peers' concerns are acknowledged and responded to, which reiterates the importance of specific language and behavioural traits in effective collaboration. Morcom's (2016) study provides further insights on this topic, contributing evidence that explicit teaching of personal values and attributes such as resilience, empathy and respect for others, supported by targeted social and reflective practices, can facilitate whole-class scaffolding by the teacher and more able peers to develop peer collaboration amongst primary pupils who exhibited antisocial behaviour. Overall, it becomes evident that simply placing children into groups and assigning language or other learning tasks is not sufficient for ZPDs to form, as peer interactions vary in how collaborative and mutually supportive they are.

2.3.3.3 Self-scaffolding and the Internet

Given that Vygotsky's ideas about child development emerged from a different era, a question may also be raised regarding to what extent they remain relevant in the context of contemporary learning settings. The Internet has proved to serve as a permeating source of scaffolding and learning and, thus, it could be argued that Vygotsky's original conceptualisation of the ZPD does not provide the means for understanding the impact of the assistance that is received via such sources, and their concomitant potential for stimulating children's internal developmental processes. While the term 'mediatory artefacts' has often been employed in reference to tangible tools that can mediate a relationship between children and the world, such as technology, whiteboards, and worksheets (see Singh & Richards, 2006), Anh and Marginson (2013) posit that created digital content—and the web as a networked system—has the capacity to create new understandings of what is possible, thereby extending the zone of proximal development. In the context of L2 acquisition, and in recognition of the fact that assistance involves not only the teacher, but also textual and interactional resources, Ohta (2005) proposed that it may be more useful to consider how the mechanisms of the ZPD may be internalised such that students can learn to make optimal use of these resources as scaffolds as they move towards autonomy. This could entail the ability to manage the ZPD for themselves as they interact both with people and with other L2 sources, thereby engaging in a process of 'self-scaffolding' (Bickhard, 2005)—a notion which might be particularly pertinent to learning settings where an expert hand is not always available to guide children upwards.

To summarise, Vygotsky's sociocultural theory, whilst not offering systematic methods for realisation of his theoretical logic in the classroom setting, nonetheless provides a useful tool for conceptualising classroom learning and cognitive development as a social enterprise, which is not conditioned on the presence of a more knowledgeable adult exclusively, but, under certain conditions, may also be mediated by textual or other symbolic artefacts, or a same-age peer. Moreover, there seems to be an agreement that it is quality, rather than quantity, of peer interaction that matters for individual success. Vygotsky's theory and its emphasis on autonomous thinking and self-regulation also has important implications for the ways in which L2 understanding might become 'deep' (Tochon, 2019)—a conceptualisation of learning which is discussed in the sections that follow.

2.4 Deeper Learning: Unpacking the Term

Drawing on seminal work conducted with university students, Entwistle (1997, 1998) draws a distinction between 'deep' and 'surface' learning, suggesting that learners who develop a deep approach to understanding are driven by a desire for personal transformation; they are actively involved in the process as a result of their genuine interest in the content, and, as such, they use their capabilities to engage in more complex mental processes, such as relating ideas to previous knowledge and experience, looking for patterns and underlying principles, and examining logic and argument cautiously and critically.

By contrast, the surface approach involves routine memorisation for the sole purpose of reproducing aspects of the subject matter and thus fulfilling course requirements. Learners who adopt a surface approach to understanding, study without reflecting on either purpose or strategy and treat the material as unrelated bits of knowledge, thus finding it difficult to making meaning of new ideas presented.

2.4.1 Deeper Learning in Terms of Transferable Skills

More recently, the nature of economic and technological change, including the ubiquity of the internet, an undue focus on standardised testing, and predetermined trajectories to 'a mile wide and an inch deep' educational goals have led to a resurgence of the demand for deeper learning[11] competencies like analytic reasoning and interpersonal skills (Pellegrino & Hilton , 2012, p. 128); when applied not only in the context in which they were taught but also in a different yet related situation, such competencies are assumed to help students thrive in their career, civic participation and everyday life. But what precisely constitutes a transferable skill, and how are they acquired?

Searching through the relevant literature, one is bound to encounter these skills under several names, including '21st-century skills, 'soft skills', 'social and emotional competencies', 'cognitive and noncognitive skills', 'college and career readiness', and 'higher-order thinking skills.' Despite the oft-confusing nomenclature, there is a general

[11] Although the term 'deeper learning' is relatively new and mostly associated with a growing movement in US education towards transferable competencies and holistic education, conceptually it is not different from the longer-standing term 'deep learning'. Hence, throughout this thesis the two are used interchangeably.

consensus in the existing literature regarding what competencies can be thought of as 'transferable'. Nevertheless, some variability may exist amongst discipline-specific publications, depending on what skills are most valued in the field. Martinez and McGrath (2014) propose that the ability to think critically and solve complex problems, work collaboratively, communicate effectively, have an academic mindset, and be independent, self-directed thinkers constitutes the foundation for nurturing students' capacity to learn how to learn, regardless of what discipline they are operating within. The US-based National Association of Colleges and Employers identify skills such as the ability to communicate effectively, problem-solve, work in a team, take initiative, lead others, as well as analytical/quantitative skills and a strong work ethic as the most sought-after job candidate attributes. Mehta and Fine (2015, p.11), writing from the K-12 perspective, focus on capabilities that emerge at the intersection of what they refer to as the 'deeper learning triangle': mastery, identity and creativity. The mastery node aims at developing students' deep content knowledge and skills within the traditional subject matter domains; the creativity node emphasises the development of 'original work through engagement in interdisciplinary, collaborative, real-world-aligned projects' (*ibid.*); finally, the identity node involves goals relating to students' identity development as learners, citizens and future professionals.

Mehta and Fine's conceptualisation underscores another key element of deep learning: rather than being dismissed as an outdated and irrelevant ability, factual knowledge is in fact viewed as the foundation upon which competencies in analysing evidence, developing interpretations, arguments, and conclusions are developed. In this way, their definition effectively rejects the 'skills versus facts' dichotomy as a false divide and recognises the two aspects as complementary to one another in the deeper understanding framework.

Having established then a relatively clear picture of what skills are associated with individuals who possess deep understandings of a domain, it is now necessary to examine how best these can be nurtured in students. Fullan, Quinn and McEachen (2017) report that in primary and secondary classrooms in Finland, Canada and Uruguay, transferable competencies were often being pursued by employing a problem-based or enquiry learning model. For example, the authors explain how primary school students in Espoo, Finland, were being challenged to use complex thinking and tap into their creativity by engaging in a deep challenge around climate change. Their enquiry process involved gathering

information about the problem by contacting experts and interacting with peers and families in entirely novel ways. The students also used a collaborative platform where they were able to record and reflect on their progress at any stage of the learning process. The authors report that this instructional method encouraged the students to begin forming their identities as global citizens, critical consumers of information, communicators, and collaborators, thereby fostering deeper understandings of the self, the world, and the interconnectedness between the two. This chimes with Warburton (2003), who argues that education for sustainability can be supported by a combination of mastery and discovery learning, wherein student self-direction and active involvement are encouraged and opportunities are provided to tap into their curiosity and enhance their inner sense of purpose.

Transferable skills are not bound by any subject domain; Fullan, Gardner and Drummy (2019) describe for example how one high school student who had enrolled in an academic Introductory Kinesiology course was able to engage deeply with the topic and demonstrate 'the depth of his learning' by participating in enquiry tasks which involved choosing an elite sports team and exploring their nutrition needs to create and later promote an appropriate organic nutrition supplement to industry experts (p. 67). Huberman *et al.* (2014) examined the deeper learning strategies implemented schoolwide across 19 US high schools participating in the William and Flora Hewlett Foundation's Deeper Learning Community of Practice. What they found was that project-based learning and internship opportunities were employed by the majority of schools to develop mastery of core academic content knowledge and critical thinking skills, and provide connections to the real world. In the interpersonal domain, collaboration and communication skills development were addressed through collaborative group work and alternative assessments such as portfolios and exhibitions. Intrapersonal competencies (learning how to learn and academic mindsets) reportedly constituted an integral part of the curriculum in almost half of the school sample, and were fostered through various strategies, including study groups and student participation in decision making. Importantly, efforts to promote deeper learning were consistent throughout the curriculum in each school, thus implying relevancy across different subject domains. Contrary to the previous studies however, the Hewlett Foundation report seems to have abandoned important intrapersonal competencies highlighted elsewhere such as the development of an 'inner sense of meaning' or identity formation as citizens of the world, favouring instead skills relating to academic resilience.

Novak and Krajcik (2019) explored a semester long project into water quality of a stream completed by 60 seventh-grade learners. The students engaged in scientific practices such as generating driving questions, collecting and analysing real data in real time, constructing explanations based on identified cause-effect relationships of multiple variables, and evaluating and communicating discoveries. Several disciplinary core ideas were integrated into these, for example concepts related to ecosystems as well as Earth and human activity, as were crosscutting themes such as stability and change. Students were given a significant amount of space to exercise initiative and strengthen their teamwork skills. The authors were able to find gains in students' reasoning ability, and, to a lesser but significant degree, their cognitive flexibility, as demonstrated by their capacity to adjust their assumptions in light of new evidence. Additionally, the service learning aspect of the project-based curriculum encouraged students to see themselves as global eco-citizens with a capacity to take transformative action for the betterment of society and the natural environment.

2.4.4.1 Causal links between transferable skills and academic achievement

While such skills as the ones described above constitute key developmental outcomes in their own right, there is a growing literature documenting that improving children's intrapersonal and interpersonal competencies, such as self-regulation, problem solving, and relationship skills, leads to improvements in their academic performance – an interconnection which is perhaps best encapsulated in Mehta and Fine's (2015) 'learning triangle' metaphor. In their review of 82 social-emotional learning (SEL) interventions involving a total of 97,406 K-12 students, Taylor *et al.* (2017) indicated that there was a long-term mean effect of medium magnitude (ES = 0.33) on academic performance, even when controlling for socioeconomic status and geographical context. The impact of transferable skills in the authors' analysis is consistent with earlier findings from a meta-analysis of 89 school-based SEL programmes delivered to students aged 4–18 years which revealed effect sizes on academic achievement ranging from 0.18 to 0.40 (M = 0.28; Wigelsworth *et al.*, 2016). Further support for the impact can be found in Wentzel (2009) and Gresham (2016) who theorise that enhanced academic attainment eventuates from the development of social skills such as listening carefully, responding considerately to others, sharing and cooperating, and effectively regulating one's own emotions and behaviour. Importantly, such intrapersonal and interpersonal factors take increased prominence in the

final years of primary education (ages 9-11)—a period permeated by a continued drive to achieve competence, independence, and relatedness, within a context of wider and more complex peer relationships (Panayiotou, Humphrey & Wigelsworth, 2019) .

How then do these skills constitute learning in the context of L2 acquisition, and how best might they be fostered? Tochon's (2019) trilevel taxonomy for deep language learning (Figure 2), although insufficiently explored in the SLA literature at the time of writing this, is certainly conducive to transferable skills development. It fuses many of the theoretical underpinnings as well as practical elements identified in the above studies in its conceptualisation of deeper language learning, and it was therefore deemed apt to discuss separately. Since the project method is also the core instructional approach advocated by Tochon, this will also be examined in greater detail in the sections that follow.

2.4.2 Deep Language Learning

Tochon (2019) proposes the term 'apprenticeship' as a term for reconceptualising language learning through a 'deep' lens (p. 23). His reframing entails viewing language learning in two novel ways: first, as an 'expression of dynamic planning prototypes that can be activated through self-directed projects'; and second, as the integration of structure and agency intended for meeting 'deeper, humane aims' (p. 24). He argues that language learning tasks become meaningful once they are embedded within bigger and broader transdisciplinary projects that meet higher values and aims such as deep ecology, deep culture, deep politics and deep humane economics (*ibid.*).

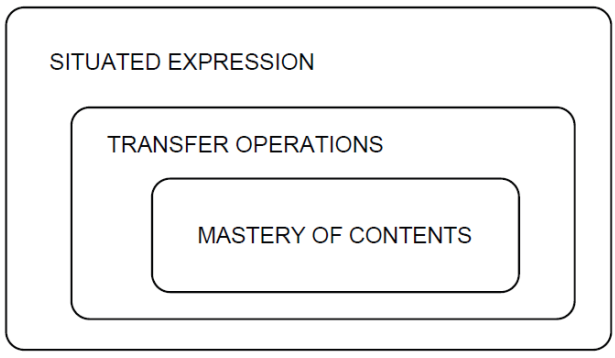
Tochon's (2019) proposed approach to language learning and teaching then is consistent with the aim of systems-level thinking: students are provided with conceptual tools for the pursuit of holistic insight by learning to move across fields to recognise patterns and causal relationships between intrapersonal, social, scientific, and environmental issues.

2.4.2.1 How can deep learning be enacted in the language classroom?

Tochon's (2019) framework is eclectic and post-methodological largely because it challenges the traditional view that language classes should be planned exclusively by the teacher and follow strict curricular guidelines. Instead, he maintains that unless the student is part of the planning process, no degree of syllabus adaptation will ever succeed in

stimulating engagement and thus use the full resources of the learner (*ibid.*, p. 40). This is because, in reality, it is not possible for teachers to find where the zone of proximal development for each student is. Rather, it is only students who have access to the full range of factors that shape their next level of interest and challenge; factors such as prior experience and knowledge, inclinations and dispositions, ways of knowing, topic preferences, etc. determine progression and flow learning (Csikszentmihalyi & Selega-Csikszentmihalyi, 1992). Instead, the teacher's role is to 'play with' learner's genuine intentions (used by Tochon in the place of 'learning goals' or 'outcomes'[12]) through tasks, domains, and levels of achievement whose focus will be to open the world of the child to the boundless possibilities for personalised exploration that the Internet age has made possible. The concept of deep schooling then stands in opposition to homogenised types of content and levels of achievement for all. From a pedagogical perspective, 'depth' can be achieved by virtue of organising open projects which integrate numerous tasks at the following three levels of interaction: (a) the mastery of declarative knowledge; (b) the transfer of procedural strategies and skills; and (c) the expression of situated understanding (p. 87; see Figure 2 below). Teaching by whole projects then allows these three dimensions to enter into dialogue, creating, in turn, a holistic and relatively autonomous learning experience. But before I discuss each of these dimensions in more detail, let us first examine the conception of 'project' and its relevance for education.

Figure 2 The three interconnected dimensions of a deep approach to project work (taken from Tochon, 2019, p. 109)



[12] This is because Tochon is generally critical of standard-based curriculum planning on the premise that it entails a Cartesian approach, wherein the educative material is split into fragmented operational outcomes which often favour the cognitive aspect of learning at the expense of higher order, reflective, and socio-emotional educational goals.

2.4.2.2 Project-based Learning (PjBL) and Project-based Language Learning (PBLL)

Since PBLL emerged from the application of project-based learning (PjBL) as a mainstream practice in general education, it seems pertinent to begin this section by offering a brief overview of the theoretical underpinnings, together with a functional definition of the PjBL method.

Project-based learning is often credited to John Dewey and his 1916 book 'Democracy and Education: An Introduction to the Philosophy of Education' where he warns that formal instruction, that is direct tuition, can easily become 'remote and dead—abstract and bookish' and therefore is at risk of cutting loose from its original practical bearing on the 'subject matter of life experience' (pp. 9-10). Dewey also expresses his concern that schools are becoming further and further removed from the notion of 'apprenticeship', or else 'learning from experience' and proposes that an educational reorganisation is required that will put both people's minds and hearts to work (*ibid.,* p. 364). Project methodology itself, however, was formally defined by Kilpatrick (1918), who wrote of the 'Project Method':

> …wholehearted purposeful activity in a social situation as the typical unit of school procedure is the best guarantee of the utilization of the child's native capacities now too frequently wasted. Under proper guidance purpose means efficiency, not only in reaching the projected end of the activity immediately at hand, but even more in securing from the activity the learning which it potentially contains.
>
> (Kilpatrick, 1918, p. 18)

The choice of word 'purposeful' (rather than 'planned') is key here. Contrary to Dewey, Kilpatrick placed the learner at the heart of the project-based model and advocated spontaneity, dynamism and a learning process that was primarily learner-driven. His original conception of the project method entailed freedom of action and initiative, both of which were fuelled by the learners' motivation. In Kilpatrick's view, only when the children have been given latitude to exercise these two mental functions are they able to acquire the capacity to reason and self-regulate (Knoll, 1997). In contrast, Dewey maintained that children by themselves were incapable of planning projects from which

sustained learning and growth could ensue. Thus, pupils engaging in the project method were to be guided by the teacher through the '"complete act of thinking" – from encountering a difficulty, via drafting a plan, to solving the problem' (*ibid.*). This formulation for what constitutes a project then, whilst still experiential, is largely based on scientific thought and empirical methods, with problem-solving being a core element of its design so as to challenge and develop the constructive skills of the pupils (*ibid.*).

The lack of agreement on the subject continues to this day, with researchers holding varying views on the role of the teacher and the degree of student autonomy during project work. For instance, Bender (2012) defines project-based learning as 'using authentic, real-world projects, based on a highly motivating and engaging question, task, or problem, to teach students academic content in the context of working cooperatively to solve the problem' (p. 8). Bender's definition suggests that the students are *given* a question, or a problem to solve as the foundation of their project work rather than identify these themselves. Thomas's (2000) review, on the other hand, revealed that in order for a project to be considered an instance of project-based learning, projects are not, in the main, teacher-led or scripted but rather involve more student autonomy, choice, and unsupervised time than traditional instruction. This 'openness' is unique in that it renders project outcomes or paths impossible to predetermine. Thomas further identified a set of five criteria which he found to be indispensable to project work:

> (1) *Projects are central, not peripheral to the curriculum...*
> (2) *Projects are focused on questions or problems that "drive" students to encounter (and struggle with) the central concepts and principles of a discipline…*
> (3) *Projects involve students in a constructive investigation…*
> (4) *Projects are student-driven to some significant degree…*
> (5) *Projects are realistic, not school-like…*
>
> (Thomas, 2000, pp. 3-4, numbering added; italics in the original)

According to Thomas, the first criterion is indeed what establishes project-based learning as a novel learning approach, thus setting it apart from previous strategies that have utilised

projects as an application of material learnt by students: in this new instance of project-based learning 'projects are the curriculum' (*ibid.*, p. 3; emphasis in the original).

As regards the driving question criterion, Thomas explains that projects may be built around thematic units or transcend disciplinary boundaries but the questions that serve as the starting point must serve an important intellectual purpose. This implies an agreement with Dewey's (1916) conception of the method as something more than just a hearty, purposeful undertaking but rather as responsible and systematic work which required the teacher to give thought to what questions were to be asked and what subject matter was to be pursued.

The implications of the notion of 'constructive investigation' are also intriguing. The term suggests that whether or not an activity counts as a project will be decided by the extent to which it involves the transformation and construction of knowledge, that is new understandings or skills, on the part of the learners. If it merely entails an application of previously acquired knowledge, then, he argues, it is simply an exercise.

The final criterion underscores the importance of authenticity in the choice of topic, tasks, the roles that students play, and so forth. There is the suggestion that project-based learning does not limit its applications to the classroom; on the contrary, it incorporates real-life challenges where the focus is on problems or questions whose solutions have the potential to be implemented out in 'the real world'. This is in agreement with the perspective of other scholars as well. Hasni *et al.*' s (2016) systematic review of the features of PjBL in science and technology pedagogy at K-12 levels revealed that out of 33 articles that provided a definition of the approach, 27 reported that project-based learning must be anchored in students' real world (authentic, out-of-school, real-world problem or question) and be of interest to them. Additionally, Hasni *et al.* report that in 21 articles the authors stated that the project must result in students developing a final product (or artefact) which can potentially be shared with others at school or outside of school. Collaboration, on the other hand, featured in 20 of these articles. Although both these elements of project-based learning are absent from Thomas's criteria, the notion of 'working cooperatively' does appear in Bender's (2012) definition above, suggesting a degree of consistency across different perspectives.

Based on the sources above, four conclusions can be drawn. First, project work requires active student involvement in the investigations or activities such that students can learn by doing, or experientially (Baran, Maskan, & Yasar, 2018). Second, teacher input, it seems, fluctuates in a U-shaped fashion: it is crucial in the planning process to ensure that the driving question or problem is developmentally appropriate; then students are left to explore their own pathways towards a plausible solution, with teacher intervention occurring at critical points and only if necessary; and lastly, teacher guidance once again ascends to a more prominent position towards the end of the process to help students through the evaluation/reflection process. Importantly, the curve pattern in the U shape is not expected to be regular across different learners or groups of learners. This is a salient point to which I keep coming back throughout the remainder of the chapter. Third, project-based learning can balance the needs for both declarative and procedural knowledge by supporting the development of important executive function skills such as self-regulation and cognitive flexibility. Finally, there is evidently a great amount of flexibility in how the project may be structured.

Having established the core tenets and aims of PjBL, it is now possible to fully appreciate project work in language learning. Just as there is some disagreement on what features must be present in order to constitute project-based learning, there is no universally agreed definition for what constitutes project work in the foreign language context. Rather unsurprisingly, however, there is significant overlap with the parent approach. For example, Moritoshi (2017) offers a working definition based on the following set of characteristics:

- a student-centred approach adhering to the tenets of the Communicative Approach;
- a series of thematically linked tasks,
- within a clearly understood situational context,
- completed individually and/or collaboratively in small groups,
- with support from the teacher as needed,
- with students using the TL (to the extent possible),
- over an extended period of time,
- to produce a tangible piece of work in the TL,
- through authentic, meaningful, purposeful, contextualised and self-directed TL use,

- with the intention of developing TL knowledge and skills.

(Moritoshi, 2017, p. 50)

The emphasis then appears to be on the development of students' target language (TL) communicative competence, with greater attention paid to meaning rather than form and grammatical accuracy. The role of the teacher once again is seen as creating opportunities for autonomous, meaningful, and contextualised communicative acts, advising students during communicative practice, and, finally, giving feedback on how well students have completed the task.

Nonetheless, one noticeable discrepancy between Moritoshi's definition and the broader project-based learning definitions provided above concerns a qualitative difference in teacher support: while in the latter, guidance is perceived to be on hand *throughout* the process, and aimed primarily at alerting students on the soundness of their chosen methods, in traditional PBLL, support seems to ultimately take the form of feedback on TL use with little regard for learners' procedural or metacognitive competencies. The distinction is an important one as it resonates with that that was made earlier between 'scaffolding' and the concept of the ZPD (see Section 2.3.2); while the former refers to the amount of assistance provided by the teacher to the student for the completion of a particular task, the ZPD is thought of in terms of both the amount *and* the quality of mediation necessary to assist the learner along her path towards greater self-regulation in using those skills.

Tochon's (2019) framework is helpful in bridging this gap. He proposes that a deeper approach to project-based language learning requires teachers to act in the capacity of advisors and facilitators, providing extensive interactive feedback on students' chosen actions. Moreover, teachers are available to provide coaching not only on the linguistic development of the students, but also their social and intercultural competences (*ibid.*, pp. 198-199). In this respect, teacher guidance is being reconceptualised as a resource for mediating increasingly greater self-regulation and holistic development in students.

2.4.2.3 Deep project-based language learning in practice

Project-based teaching has often been accused of being of little educative value on the basis that it lacks methodological rigour, insufficient emphasis on systematic mastery of content, alignment with curriculum standards, and time use (Marx *et al*¸1994; Marx *et al*¸1997; Thomas, 2000).

In response to such criticisms, and drawing on their work with Japanese high school ESL learners, Heilman and Stout (2005, pp. 589-591) offered a working model for an educative project structure, which they encapsulate in the following six stages:

Stage 1: *Students and teacher generate ideas and outline the project.* This stage involves initial brainstorming activities, grouping, role distribution, completion and evaluation criteria setting, and negotiation around time scales.
Stage 2: *Students develop a visualisation of the project.* This stage considers how the project can be developed into a communicative task. Possible scenarios can be drawn using mind maps, story boards, etc.
Stage 3: *Research and written aspect.* Skills that will need to be developed: Conducting efficient internet searches, strategic reading skills, summarising, interviewing skills such as turn-taking, and polite interruption.
Stage 4: *Preparation/rehearsal day(s).* Students refine their projects for presentation. Relevant presentation skills will need to be addressed.
Stage 5: *Project presentations or performances.* This stage may include teacher, peer, and self-evaluation, although peer evaluations will have to follow a systematic approach and utilise agreed-upon criteria in order to be deemed acceptable.
Stage 6: *Reflection on the project*. This could be done orally or in writing. Guidelines on the reflective process might include addressing the amount of TL use, new knowledge and skills acquired, lessons learnt from mistakes, alternative methods that could have been utilised, and feedback to the teacher.

To elucidate further how the trilevel learning taxonomy depicted in Figure 2 could be woven into the above model, it is worth considering an application of the principles of the deep approach through an example of an educative project undertaken by 13-14 year-old students of French as a foreign language, as described by Tochon (2019).

A number of students in the group had stated that they were fascinated by Chinese or traditional astrology and that they would like to know more about it. This theme therefore served as the foundation for the creation of a 'new' zodiac consisting of 12 signs, each of which corresponded to a vegetable. The students and the teacher agreed to have the final product presented in the form of a booklet, entitled 'Vegetable Horoscopes'.

Although its dynamic nature means that it may transcend its initial intentions, a project will function optimally when it is based on the guidelines corresponding to the content being mastered, the strategies being transferred, and the context within which the communicative act is embedded (e.g., given in the form of a rubric). For this reason, the next step was for the teacher to construct a unifying plan which brought together the sequence of tasks necessary for the realisation of the project while interweaving the three levels of knowledge shown in Figure 2:

Mastery of declarative knowledge: The project required students to grapple with a number of content elements, including comprehending and analysing material on sample astrological profiles (identified by the students); locating character sketches in texts, videos and known literary works; using vocabulary relevant to personality and character creation; descriptive verbs; language for expressing contrasts; 3rd person singular in the present tense; relative clauses; verb transposition from active to passive voice and vice versa, and from direct to indirect speech.

Transfer of procedural strategies and skills: Strategies that needed to be acquired involved researching and writing a report on a vegetable of their choice (e.g. its origins, behaviour and defining characteristics); transforming characters by means of antonymy; comparing physical and psychological characteristics and writing personality profiles (e.g., the astrological profile of the Vegetable-Woman and the Vegetable-Man); joining two vegetable-signs as a couple and describing their relationship in a humorous way (e.g., the relationship between 'Leek-Woman' and 'Tomato-Man'); and drawing up a common list of rules for assigning Chinese or traditional horoscope signs to these profiles.

Expression of situated understanding: By the end of the project, the students had gained a deepened appreciation of the concepts of behaviour and character traits; an increased

understanding of problems of economic and social nature such as relationships, harmony and conflict, marriage and divorce, and home and work[13].

An evaluation of the students' final product and the thematic projects' success based on previously negotiated criteria concluded the cycle, which had been anticipated to last for 3-12 weeks depending on the pace of the children. Some groups might need to spend longer on specific projects than others and this is to be expected; indeed, Tochon (2019) argues that this is an inherent characteristic of personalised, multi-level teaching. Nonetheless, the teaching strategy must be negotiated and clear expectations be put in place from the outset such that any emerging problems will be remediated according to the agreement (e.g., how to proceed should a number of students become bored with the theme or other aspects of the enterprise).

In sum, within a deep project pedagogical framework, students are led to notice, experiment with and compare the content elements that are vital to the realisation of their project aims, while constantly engaging in a process of knowledge transfer from one domain or activity to another, thus generating a continuous cycle of decontextualization and then recontextualization of strategies and skills. Ultimately, such bigger and broader transdisciplinary projects that meet higher values and aims such as deep culture, deep intra- and interpersonal competencies, and so forth, are precisely what lends meaning to language learning tasks.

2.4.2.4 From the interdisciplinary to the transdisciplinary to personal and social transformation

The notion of transdisciplinarity is a fundamental element of deep learning. It is rooted in a sociocultural understanding of development and the idea that subject matter and academic learning cannot in fact be separated from activities such as social identification, power relations and interpersonal struggles (Wortham, 2006). Packer and Goicoechea (2000, p. 25) describe how academic learning is an ontological (rather than epistemological) human process through which 'individuals create and transform themselves as they interact with

[13] Consistent with the need in holistic learning experiences to allow room for what Tochon (2019) refers to as 'the unforeseen…a functioning disorder…creativity' (p. 188), these expressions were not determined by the teacher in advance. Rather, they constitute post hoc insights based on learner observations.

others, sign systems and the world'. In this sense, we are constantly undergoing ontological change—no matter how small that may be—as we learn new things. Therefore, academic learning and social identification are understood as two distinct yet inextricably linked processes which become subsumed into a larger process involving personal (and, by extension, social) transformation.

According to Tochon (2019), transdiscplinarity goes beyond interdisciplinarity. To the extent that the latter is concerned with systematic connections across delimited bodies of knowledge (e.g., content-based SLA approaches or integrated curricula), it can be useful in contextualising knowledge and equipping students with a broader repertoire of linguistic and higher-order cognitive competencies such as complex and creative problem solving. Nonetheless, unless such skills are brought together with non-cognitive capabilities such as emotional understanding, social competence, and conscience development, there is the danger of teaching practices and school curricula leading to the rise of an increasingly impoverished inner identity with huge personal and social consequences. This echoes Mehta and Fine's (2015, p.5) assertion that 'cool' cognitive dimensions cannot be separated from 'warmer' qualities such as passion, interest and 'flow'– qualities that promote highly engaged learning in formal education settings. The transdisciplinary project aims at the unity of knowledge anchored in transformative action and is therefore understood as an indispensable component of the deep pedagogy.

Tochon's conceptualisation of a 'deep approach' to second language development, then, represents a paradigm shift which provides viable options that show that authentic language learning is profoundly connected to shaping thinking and social actions. Indeed, it goes beyond the traditional view that language education must be confined to merely a show of linguistic performances, but rather provides a theoretical foundation for a language pedagogy that includes but goes beyond the acquisition of linguistic knowledge and skills: it establishes a framework of action to situate language learning in transdisciplinary sociocultural contexts. In deep learning, learners break free from such a narrow focus on language to develop skills and competencies that allow the articulation of agency and a more well-rounded type of development.

From a practical perspective, this is achieved by embracing pluralism; deep language learning constitutes a bricolage of existing instructional approaches and techniques all

blended together on a solid theoretical foundation, while allowing room for diversity and flexibility, non-native speaker comfort, code-switching, and unique perspectives. Tochon's (2019) deep language learning framework was therefore selected as the conceptual framework for this project for two key reasons. Firstly, the great degree of heterogeneity encountered in multigrade classrooms and the increased associated need for personalisation called for a pedagogical approach that was flexible enough to accommodate the diverse needs and dispositions of these groups of learners. And secondly, because the blended model implemented in this study is rooted in a sociocultural understanding of development and the idea that subject matter and academic learning cannot in fact be separated from activities such as social identification and co-construction of understanding. Tochon's holistic approach to second language development thus provides an apt theoretical basis for the present study.

2.5 The Role of Educational Technologies in Learning

2.5.1 The rise of blended/hybrid learning

As discussed earlier, since the advent of digital technologies and their integration in education there has been increasing interest in instructional formats that combine a fully online, distance-based curriculum with required on-site attendance. But what are the reasons why schools may opt to move from a traditional classroom-based pedagogy to a blended model? First, there are economic reasons for introducing an online component in the delivery of a course (Hobbs, 2004). Although this model has not yet been widely adopted in K-12 education, a rising number of secondary schools around the world are turning to a 'flipped model' whereby at least part of the course may involve teaching assistants supervising students' engagement with online activities in the classroom. Similarly, increasing financial constraints have led to a large number of higher education institutions around the world replacing expensive face-to-face teaching with online alternatives (Betts, Hartman & Oxholm, 2009).

Second, there is a combination of other motives, including preparing digitally competent young people for lifelong learning, and equitable access to resources and educational opportunities where this would otherwise have not been possible, as will be shown in the sections that follow. Let us first consider the evidence around the effectiveness of BL in K-12 learning.

2.5.2 What impact does BL have on K-12 student achievement?

The effectiveness of hybrid approaches to K-12 learning in developed contexts has relatively recently begun to be documented in the literature—albeit concentrated in secondary education (Barbour, 2014; Waters, Barbour & Menchaca, 2014). An ongoing question is whether students in blended learning environments achieve academically as well as their traditional school counterparts. The findings have been mixed in this regard. Drawing on aggregated data from school performance ratings and report cards, Gulosino and Miron (2017) found that students in full-time blended schools across the US were learning significantly less on average in maths and reading achievement than the national average for all public schools. While highly motivated students may thrive in such environments, the authors argue that the online pivot alone is not enough to reverse the trajectories of those who struggle academically. Nevertheless, they acknowledge other ways in which students may benefit from a BL environment such as more flexible instructional time and greater personalisation[14]. Picciano *et al.* (2012) raise similar concerns, stating that many K-12 students may not have the characteristics to be successful in online learning environments, such as maturity and self-discipline. In a similar line of enquiry, Fainholc (2019) declares that successful distance learning entails perseverance, systematic dedication, capacity for self-direction, and an ability for interdependence and communication in groups, amongst others. This echoes Pulham and Graham's (2018) view that, to a certain degree, success will likely be grounded in the pedagogical practices enabled by several BL teaching competencies such as flexibility and personalisation, mastery-based learning, establishing expectations, and community development through facilitation of effective communication and collaboration; student-centred learning was also established as a key teacher competency in fostering students' self-regulation.

Gulosino and Miron's findings reported above conflict with evidence derived from Spanjers *et al.*'s (2015) meta-analyses that BL instructional conditions are slightly more effective than more traditional learning. Although K-12 students were underrepresented in the articles included, a follow-up moderator analysis revealed that the inclusion of quizzes,

[14] The Clayton Christensen Institute has indeed emphasised the 'element of student control over time, place, path and/or pace' in BL (Horn & Staker, 2014, p. 34).

tests or self-assessments was a contributing factor to effectiveness. The authors speculate that the feedback accompanying assessment helps give an image of students' mastery of the content, thus providing them with continuity and a sense of direction. As such, they agree with Gulosino and Miron that not all BL programmes are created equal and reiterate the importance of systematic, careful BL design. Comparing BL to automobiles at the turn of the 20th century, they also emphasise the irrelevancy in comparing the innovation to the learning equivalent of the horse and call for more forward-looking research efforts[15]. Comparative research into the relationship between subject area and blended/online learning effectiveness is one such direction, given that 'the field has no information regarding which subject areas may be more or less effectively taught online' (Xu & Jaggars, 2013, p.5).

2.5.3 What Impact does BL have on L2 Learning?

Despite a growing body of research into blended language learning (albeit, at the time of writing this, still mostly comprised of exploratory, non-comparison studies; see Hockly, 2018), the research findings remain mixed. In a review of the relevant literature, Mendieta Aguilar (2012) notes that while some researchers contend that exposure to the BL model can enhance L2 learning, others indicate that there is no significant improvement in comparison with more conventional (face-to-face) means of instruction (see e.g., Tosun, 2015). For instance, Xu *et al.* (2020) found that blended learning was associated with higher probability of passing an EFL course in a Mexican university by more than 3 percentage points, as well as better course grades by an average of 0.409 points on a 10-point scale; the impact on course grade corresponded to a moderate effect of 0.306 standard deviations. While the study did not provide any insights into attainment by language skill, improved outcomes have previously been recorded in terms of ESL/EFL reading comprehension (Liu, 2015; Ghazizadeh & Fatemipour, 2017), listening skills (Bañados, 2006; Barani, 2011), written performance (Adas & Bakir, 2013), oral skills (Bañados, 2006; Shih, 2010) and pronunciation (Bañados, 2006; Chang, Gregory, & Shak, 2020), based on experimental and quasi-experimental evidence from classroom studies that compared BL to traditional L2 instruction. Nevertheless, it is worth noting that the above studies have focussed either on university students, or have been carried out in language academies where the majority of learners are adults; as such, very little is known about K-12 students' performance in

[15] The authors make use of David Cook's analogy here (2009 cited in Spanjers *et al.* 2015, p. 101).

blended language learning environments. Vahdat and Eidipour (2016) were amongst the few to look at the impact of BL on L2 acquisition in a primary/secondary education setting. In analysing the listening performance of a group of Year 8 students in a high school in Iran, they found that the students who had participated in the computer-assisted L2 listening programme outperformed their peers who had received traditional instruction. Yet one notable difference between the design of this research and that of the above-mentioned studies (as well as the present investigation) is that the participants were not required to work on the technology-based component of the blended course in their own time, as this was done during regular contact time. This had important implications for the amount of technical and linguistic support that was available to them, and the extent to which the learning setup required them to exhibit a capacity to self-regulate. As such, the findings of the study may not be representative of students' level of readiness to work in BL formats which require them to engage with self-study.

Indeed, this is a crucial difference because an important challenge for blended EFL instruction remains the fact that successful learning in this environment requires students to become at least somewhat autonomous, which may be difficult for some, especially if they're coming from K-12 contexts that are mostly characterised by learner passivity and minimal engagement (Kuh, 2009). While a web-based learning platform can afford students flexible opportunities to engage with linguistic input and guided practice at their own pace, Whyte (2011, p.218) remarks that successful language learning requires more than that; encouraging effective and sustained use of online content requires 'imagination and effort' so that it becomes an integral part of the course. In an effort to expand upon the extant literature on the topic, Ferreira, Salinas and Morales (2014) reported findings from a blended EFL intervention involving university students in Chile. The module was designed to give participants ample opportunities to use the L2 for communicative purposes and to promote the development of the different language skills through engagement with collaborative tasks such as role plays and oral reports, whereas the online component contained a range of drill-type exercises with corrective feedback. In addition, students in the experimental group received regular and explicit training in language learning strategies (e.g., memorisation, metacognitive, and social strategies) to heighten their ability to self-direct while working online. The findings indicated a statistically significant improvement amongst participants who had received explicit training, suggesting that students are more

likely to make an efficient use of a blended format if they receive targeted and practical guidance on how to develop into more self-regulated learners in an online environment.

Thus the question has gradually begun to shift towards *how* to design an optimal blended language learning course across different proficiency levels and for diverse populations. Drawing on SLA research, Thornbury (2016) proposes a set of principles that can be applied to the selection of the technology-based component of a blended course. Specifically, he argues that the chosen learning tool should provide opportunities for interaction, personalisation, and flow, amongst others. While Thornbury's framework is only concerned with the asynchronous part of a BL environment, it serves as a useful reminder that, to the extent that technologies can enhance the learning process, they can do so not by purely replicating and replacing traditional didactic teaching approaches; rather, a design is necessary that acknowledges that students bring their own personal history, knowledge, personalities and experiences into a learning encounter, enables them to project themselves socially and emotionally, and allows the teacher to engineer and facilitate cognitive and social processes 'for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes' (Anderson *et al.*, 2001, p. 5).

2.5.4 Technology and Deeper Learning

Arguably, digital technologies that focus on drill and practice still have a place in language learning, such as for the acquisition of lexis or grammar or in cases where young learners at a beginning level may find knowledge construction too big a cognitive challenge (see Li, 2017). At the same time, however, and in recognition of the limits of such uses, in recent years researchers and industry experts have begun to focus their attention on ways in which we can leverage educational technology for the design of learning environments that promote deeper learning across subjects and grade levels. Some have even gone so far as to argue that it is impossible to provide *all* students with opportunities for deeper learning without the kind of personalisation that only technology-enabled tools and strategies allow (Vander Ark & Schneider, 2012).

Dede (2014), on the other hand, frames the role of technology in slightly different terms; he argues that teachers don't have to use digital means as it is indeed possible to teach for deeper learning without technology. Doing so, however, would be analogous to visiting a

friend twenty miles away on foot when much easier and faster options were available, such as using a bicycle or a car. He cites two reasons for this. First, affordability and scale: due to increasingly declining budgets, there is a general tendency across various sectors (e.g., healthcare) to adopt innovative models that use technology to become more cost-effective at scale; second, a need for alignment to students' emerging learning strengths and preferences: new media are reshaping people's ways of accessing, interacting with, producing, and distributing authentic content such that traditional school-based models are becoming less and less relevant to the lives and needs of people in the 21st century.

Fishman and Dede (2016) nonetheless draw an important distinction between using technology to *do conventional things better* versus using technology to do *better things* (Roschelle *et al.*, cited in Fishman and Dede, 2016, p. 1269; emphasis in the original). They argue that if we are to unlock the powerful learning opportunities of the technological tools present in the 21st-century world to engage students in deeper learning, we need to move beyond treating these as means by which to simply automate conventional models of teaching. While in some cases it may indeed be more efficient and effective to deliver for example online drill-and-kill instruction, the real value in technology lies in its ability to act as a catalyst for a shift towards an 'alternative, next-generation educational model' (Fishman & Dede, 2016, p. 1271). For Fishman and Dede, this transformation entails swinging the pendulum in the direction of personalised, participatory, collaborative, guided learning, and deep content, amongst others.

Dede (2014) lists a number of instructional approaches where educational technology has the most potential for transformative impact. These include collaborative investigations, extended enquiries, interdisciplinary projects, dynamic assessments that are embedded into learning, and other opportunities for students to discuss and debate complex ideas, to connect academic subjects to their personal interests, and to enhance their capacities to self-regulate (see Appendix 1 for a full list).

2.5.4.1 Computer-supported collaborative learning (CSCL)

In response to the need to better align digital technologies with contemporary pedagogical challenges and demands, in recent years the educational community has begun to engage with computer-supported collaborative learning (CSCL), a research field that focuses on

technology-mediated learning within collaborative methods of instruction (Stahl, Koschmann & Suthers, 2006). Underpinned by sociocultural perspectives, CSCL is a pedagogical model wherein students are encouraged to work together to negotiate meanings and construct knowledge and, in so doing, develop a deeper understanding of the subject matter, rather than merely recite input.

The birth of social technologies, such as blogs, wikis, social networking platforms, and content creation and sharing tools has undoubtedly facilitated this transition to more participatory and dynamic modes of learning. Within the SLA domain, the use of wikis for collaborative writing tasks is a good example of the ways in which the affordances of Web 2.0 technologies are being harnessed in order to expand the boundaries of collaborative learner-to-learner writing. Indeed, studies have suggested that the collaborative nature of wikis might encourage more frequent revisions and a stronger focus on macro-aspects of the writing process such as meaning, structure and organisation, rather than grammatical or lexical accuracy (Arnold, Ducate & Kost, 2009; Kessler, 2009; Oskoz & Elola, 2011), thereby helping them attend to ideational content (Kessler, Bikowski & Boggs, 2012). *Google Docs*, as another example of a synchronous collaborative writing technology, expands upon the advantages of a wiki by offering extensive multi-version support and the option to restore any previous version of a document, which can reveal areas of difficulty with vocabulary, grammar, pragmatics, or the group writing process, albeit without the option to analyse individual contributions and patterns of collaboration (Abrams, 2019). Moreover, the time-stamp function can help teachers understand how much time groups need to complete certain tasks, or progress from one step to another, thereby helping towards personalisation, as certain L2 learners are likely to need more time to complete tasks than teachers assume (Kormos, 2012).

In a somewhat different line of enquiry, Su *et al.* (2018) looked at the dynamics of EFL learners' self and social regulation and their relationship to learning outcomes during wiki-supported collaborative reading activities. Group comparisons identified patterns of regulation that differentiated high-performing groups from low-performing groups: high achievers demonstrated more regulatory behaviours across all learning tasks (e.g., elaborating, reviewing and improving group members' task response), employed reflection and evaluation more frequently, and were more socially and emotionally engaged in their collaboration; on the other hand, the low-performing groups only repeated self-regulation,

failing to exhibit co-regulatory or socially shared regulatory behaviours. Although the authors did not employ experimental methods in their study, the findings seem to indicate that successful group performance in CSCL settings is contingent upon members' ability to employ not only self but also social forms of regulation, and that students vary in their capacity and/or willingness to do so in such learning modalities.

While collaborative uses of technology in L2 learning contexts have so far primarily been restricted to the aforementioned formats, others have pointed to the interactivity afforded by a simulation or a shared interactive representation being a key driver of deep-level engagement with core content (Stahl, Koschmann & Suthers, 2006). In this case, the learning takes place largely through peer interaction, which focuses on the construction and exploration of an artefact, i.e. the simulation or representation. For example, Wu, Chen and Huang (2014) examined the use of a digital simulation which aimed to achieve context-relevant immersion for a group of EFL learners in a high school in Taiwan. The simulation provided opportunities for peer communication in a series of real-life scenarios, such as expressing an intention to purchase an item and requesting a refund. Compared to the control group that had received instruction as usual, they found significant improvements in the experimental group's oral skills. Importantly, however, this was a small-scale study which consisted of only one 50-minute learning session, and, thus, it is impossible to rule out that novelty may have impacted on students' performance.

2.5.4.2 Computer-supported collaborative enquiry

Although underexplored in the field of L2 learning, computer-supported collaborative enquiry methods have received widespread attention in the international literature over the last two decades. For instance, Järvelä and Salovaara (2004) argue that prolonged engagement in enquiry-based, computer-supported collaborative learning environments can foster deeper learning strategic activity amongst secondary students. They attribute these gains to extensive student exposure to processes of advanced and constructive knowledge, such as generating their own research problems and intuitive theories, as well as searching for explanatory information, all of which is inherent to an enquiry learning approach.

Other forms of enquiry might entail groups of learners using computers to search for information on the Internet and to 'discuss, debate, gather, and present what they found collaboratively' (Stahl, Koschmann & Suthers, 2014, p.481). This aspect of the instructional approach has the potential to enhance students' sense of autonomy, provided they are given the space and freedom to decide on what artefacts to concentrate on, ways to collect information and negotiate understandings, and the format of sharing their new insights with others inside and outside the classroom (Blumenfeld, Kempler & Krajcik, 2006). Each of these features is thus likely to foster increased cognitive engagement, including higher-level learning strategies and self-regulation.

Indeed, the use of the Internet as a research tool in the classroom is a relatively recent pedagogical development, which is rooted in an increasing demand for the growth and development of new, transferable skills amongst children as well as the promotion of active engagement with the learning process. As a 'spontaneously emerging global brain', the transformational potential of the Internet has been argued to be enormous (Mitra, Kulkarni & Stanfield, 2016, p. 232). Self-Organised Learning Environments (SOLEs) is an alternative learning approach which has emerged from this realisation.

2.5.6 Self-Organised Learning Environments (SOLEs)

A SOLE is a learning environment either inside a school or any indoor environment where groups of four to five children work together to investigate a big and challenging question which has been provided by an adult facilitator, or mediator. For a question to be considered appropriate for a SOLE, it is desirable that it is pitched right at the edge of the children's zone of proximal development. That is, they would, ideally, be unable to answer it without mediation from a more knowledgeable other and, in this case, without access to the Internet (Mitra, Kulkarni & Stanfield, 2016). Some examples of big questions might include open-ended queries such as *Why do people create music?, Why does the rainbow only have seven colours?, What makes a good school?*, or *Why is space dark?* (School in the Cloud, 2020). After a specified amount of time has lapsed, each group is invited to share their findings with the rest of the class and engage in a discussion around the new knowledge acquired as well as the strategies employed in the process.

2.5.6.1 The role of the teacher in a SOLE

Consistent with Dewey's (1916) views regarding a need to set clear parameters for the learning process in the project model, in a SOLE, teachers are typically responsible for providing learners with an appropriately challenging question to instigate the enquiry. Yet, once this step has been completed, teacher interference during the investigation stage is not only seen as unnecessary, but in fact it is considered undesirable. Instead, teachers are typically encouraged to take on the role of a non-knowledgeable, non-threatening other who willingly relinquishes control to allow children the freedom to take initiative, make decisions, and self-organise in order to reach their common objective. In doing so, students are perceived to be afforded the space to negotiate their own way into the learning environment, thus spontaneously engineering new sets of individual growth-oriented behaviours and social practices that are student driven and student owned (Weisblat & McClellan, 2017). In SOLEs, teachers are often likened to an affectionate grandmother, who listens attentively, probes, acts surprised by a child's discoveries, and offers praise in reward of the latter's engagement in and perseverance through a developmental and knowledge-sharing enterprise. In this sense, it could be argued that SOLE is underpinned by the educational principles of the Socratic method, whereby the aim of the leader (or the teacher) is not to intimidate the interlocutor (or the student), but rather, to push the conversation forward through targeted and genuine questioning. In the same way as Socratic enquiry is not concerned with merely producing a recitation of facts, the role of the teacher at the latter stage of a SOLE is to ask probing questions in an effort to bring to the surface the beliefs and assumptions that support the students' statements and practical choices, and invite them to embrace complexity and ambiguity, where appropriate.

2.5.6.2 Impact of SOLE on second language learning

In terms of the impact of the SOLE pedagogy on second language acquisition, Mitra *et al.* (2003) reported results from a quasi-experiment conducted with adolescents attending a low-cost private school operating in a slum area of Hyderabad. The participants demonstrated gains in their English pronunciation after intentional yet unsupervised and collaborative use of an English-language learning software, some English films, and a speech-to-text software engine for three hours a week over a five-month period. Despite methodological limitations acknowledged by the authors (e.g., lack of a control group), the findings from this study were able to be built upon in later investigations. More recently,

data from SOLE sessions involving one primary school in Uruguay serving children from middle class backgrounds indicated that Year 5 children who could not read English at all, were able to score 7.5% on the English reading assessment when allowed to read in groups and use the Internet (Mitra & Quiroga, 2012). Although, again, design limitations precluded the authors from establishing causation, behavioural observations pointed towards certain key mechanisms which may have mediated this improvement: first, the mutual scaffolding opportunities available in a collaborative environment where there is no competition, but rather where children are continually encouraged to work as a team to reach their common objective, enable group members to tap into each other's differential abilities, thus resulting in the emergence of what Donato (1994) refers to as a 'collective expert' (see Section 2.3.2); second, in the absence of human mediation during the enquiry process, students had to exercise cognitive flexibility in identifying ways to complete the task independently and with whatever resources were available to them in that environment. Using English to Spanish dictionaries appeared to be one such compensatory strategy, thus exemplifying children's willingness to self-regulate.

The extent to which SOLE can be seen as a transformational pedagogy that can promote deeper learning has been the topic of more recent international scholarship. Research conducted by The Sole Center at Cleveland State University, which involved various populations (i.e. varying age and outcome goals), showed that participation in self-organised collaborative enquiry tasks led to a significant change in students' academic identity; specifically, participants began to perceive themselves as 'architects of their own education' who saw their peers as true partners in the investigation process and their teachers as guides who helped them navigate complexity and uncertainty (Stiles 2016 cited in Weisblat & McClellan, p.311). Moreover, it was found that SOLEs were experienced as a shared social enterprise which enhanced positive affect and promoted student growth. Another finding related to participants' social and collaborative skills: similar to the observations made during the Uruguay study described above, students demonstrated a significant increase in their capacity to identify and leverage their partners' strengths, such that they were able to pool their individual talents and skills collectively to create a better artefact to share with others. Finally, opportunities to access and synthesise a plethora of diverse realms of information entailed an increase in content connectivity, thereby making it possible for students to think and make systematic connections across delimited bodies of knowledge (*ibid.)*.

Overall, it appears that the SOLE pedagogy has the potential to foster capabilities that emerge at the intersection of Mehta and Fine's (2015) deeper learning triangle: mastery within the traditional subject matter domains; students' identity development as learners, citizens and future professionals; and creativity, which is nurtured through the collaborative development of original, interdisciplinary, and real-world-aligned work (see Section 2.4.1).

2.5.6.3 Challenges associated with SOLE

For all its potential, the SOLE approach is not without its problems. To begin with, many of its benefits are derived from the freedom that is conferred on students to take ownership of their own learning and grow 'at the edge of chaos' (Mitra, 2014, p. 556). For instance, students are allowed to move freely between groups throughout the investigation, while explicitly defined methodological templates or on-demand assistance are not typically available to them during that stage. In other words, the SOLE environment seeks to create the conditions necessary for learning to emerge in the form of a self-organising system much in the same way as flocking behaviour, the formation of ant colonies, language, or society itself develop, whereby each set of interconnected parts, each unpredictable, produces spontaneous order in a seemingly chaotic situation (*ibid.*).

SOLE, then, is largely informed by self-organising principles that underpin the physics of complex systems consisting of many parts. Recent advances in complexity science confirm that complex systems can arise as the result of a process of self-organisation whereby a system evolves into an organised form in the absence of external pressures explicitly guiding the local behaviour of the individual components or sub-systems (Prokopenko, 2019). Speaking from a social sciences perspective, Nederhand, Bekkers and Voorberg (2016) posit that self-organisation is also centred around communication, choice, and behavioural adjustment, the combination of which facilitates the development of a shared goal. In effective self-organising networks, these local interactions result in entirely novel structural patterns and processes (Torres & Weidemeyer, 2019).

Notably, however, some features are considered essential for the self-organisation of social systems. Van Meerkerk, Boonstra and Edelenbos (2013) propose that effective self-

organisation presupposes the presence of actor relations that are characterised by trustworthiness, and a strong social capital across the network. In the absence of these, actors may be incapable of developing joint fact finding and mutual understanding of problem situations, thus resulting in an incoherent system response to the challenge (*ibid.*).

If we were then to apply current scientific understanding from social systems theory to the way learning is currently presumed to occur in a SOLE, it would become evident that a discrepancy arises between what young learners are expected to be able to do for self-organisation to be successful, and what they can actually do without targeted support. There is continuing evidence, for instance, on the impact of social and affective factors, such as children's dynamic struggles, negotiations and compromises, and distribution of control, on collaboration. Positive social relationships between children, trust, mutual support, symmetric co-regulated communication, and joint problem-solving have been identified as features of the classroom which make it conducive to group working (Kutnick & Berdondini, 2009). Kershner *et al.* (2014) focus on the language of the primary classroom (age 8-10) and one of the points they highlight is the importance of establishing a shared understanding of the classroom ethos and the 'participation structures'—the latter understood as '… the rights and obligations of participants with respect to who can say what, when and to whom' (Cazden 1986 cited in Kershner *et al.*, 2014, p. 203). The authors report in their study of primary science classrooms in England that there is a tension to be managed between espoused principles at classroom level and children's practice in group activity without the teacher present. They attribute this discrepancy to children's apparent difficulty in tackling the interconnected social, cognitive, and technical demands of computer-supported collaborative group work, and conclude that for technology to successfully mediate children's communication and knowledge building, it is necessary that: (a) the teacher should take an active role in guiding the activity; and (b) certain classroom conditions be in place, such as agreed-on, and ideally co-constructed, classroom rules regarding collaboration and talking together.

In reviewing features of co-present computer-supported collaborative learning settings that are important for motivation, Schmitt and Weinberger (2018) argue for the importance of interaction patterns that are characterised by equality and mutuality. They note that desktop computer settings are particularly prone to behavioural phenomena wherein one learner dominates the other(s) by controlling the mouse and not sharing access to the input

device. Jones and Issroff (2005) emphasise the salience of this issue for successful collaboration, considering that most collaborative work in formal education settings takes place with technologies that were not designed to support it. They point out that in situations where not all students can work on the task at the same time, some may end up losing ownership of the task, hence losing motivation. On the other hand, unequal participation and access to opportunities may also trigger the so-called sucker-effect whereby one member covers the majority of the task. This, argue Schmitt and Weinberger (2018), can have equally detrimental affective consequences for the learner in question and, by extension, the outcomes of the task.

2.6 Technology and Distance Learning

Arguably, the ongoing global COVID-19 pandemic has been the latest push to a massive forced shift to online (distance) education in a global effort to ensure continuity in learning whilst slowing down the spread of the virus. Despite the emergency online pivot being seen as temporary, some researchers and analysts have suggested the policies and practices that have been developed during the school closures constitute an opportunity to move beyond 'the grammar of schooling' and redesign the school system to make personalisation much more possible (Hargreaves, 2020; Harris, 2020; Sullivan, 2020; Young, 2020). Young's account of his 10-year-old son's homeschooling experience during the school closures indeed resonates strongly with Mitra's (2019) vision for the future of learning with the help of the Internet and technology:

> He's learning math…He's getting it through Khan Academy, through some online work and through meeting with a tutor once a week. He's getting reading…He and his grandma have a standing FaceTime date to talk about writing, and he's sending her some writing that he's doing.
>
> (Young, 2020, para.7)

2.6.1 Implementation of Blended Distance Learning Programmes in Low-Resource Settings

As mentioned earlier, interest in the development of BL spurred partly in response to a combination of socioeconomic and pedagogical issues present both in developing and developed countries. These include the perceived poor quality of teaching and chronic

shortages of 'excellent' teachers—particularly in remote areas—together with the resultant issues of equity and access to high quality teaching (Mitra, Dangwal & Thadani, 2008; Ratcliffe, 2014; Dwinal, 2015), and concerns about the increasing heterogeneity and lack of differentiation in the traditional classroom, which makes it impossible to sufficiently challenge the most able students while leaving low-performing ones behind (Ofsted, 2013).

The potential of hybrid learning programmes for increasing marginalised K-12 students' access to high-quality learning in resource-scarce contexts rests on the proposition that such approaches can substantially reduce the cost of education, while retaining face-to-face learning components to appease the need for feedback, social skills development, and engagement (Picciano *et al.*, 2012; Marrinan *et al.*, 2015). Traditional face-to-face education models also rely heavily on human resources which are often unavailable in large or resource-constrained settings. As such, hybrid and online approaches are often seen as viable alternatives to face-to-face learning, particularly in rural and remote communities constrained by financial burden as well as physical barriers (Kim & Frick, 2011).

While research into the impact of BL programmes implemented in the context of remote/distance education is still thin on the ground (Stanley, 2019), there is evidence to suggest that distance learning approaches can be just as effective in terms of student performance as traditional classroom instruction. In what follows, I summarise two technology-enabled BL innovations which were designed to serve poor and hard-to-reach communities in Latin America with no prior access to formal educational inputs. Both of these have been assessed as success stories.

2.6.1.1 The case of Ceibal en Ingles, Uruguay

Perhaps one of the best-known large-scale initiatives to promote inclusion and equal opportunities in the K-12 context with the help of digital technologies has been the *Plan Ceibal* project. Launched in 2007 by the Uruguayan government, *Plan Ceibal* is a nation-wide interinstitutional undertaking whose goal is to implement the One-Laptop-Per-Child model. Since its inception, it has distributed low-cost, low-power XO laptops and Internet connectivity amongst primary school learners and teachers across Uruguay, and developed a wide range of technology-supported educational programmes (Kaiser, 2017).

Given that EFL was included in the national primary curriculum as a mandatory subject only in 2008 (Marconi & Brovetto, 2019), there is an acute shortage of qualified teachers, especially in remote and rural parts of the country (Banegas, 2013). For this reason, the *Ceibal* administration decided in 2012 to introduce *Ceibal en Ingles* (CEI), a project embedded within the wider initiative which blended remote teaching via videoconferencing, a VLE, and teacher training, with the aim of reaching the most marginalised children. The programme sought to investigate the effectiveness of an educational model whereby lessons were delivered by remote teachers through videoconferencing, with support from classroom practitioners with little or no command of English whose role was to act as facilitators. The role of the latter entailed assisting in classroom management, assigning learners to groups, and making on-the-spot suggestions depending on the classroom dynamic. This was deemed a crucial aspect of the programme, as remote teachers were experts in the subject matter, but their colleagues on the ground were the ones who knew the context and the learners. Their role also involved catering to the affective needs of their students by engaging, inspiring, and empowering them (*ibid.*), much in the same way as the role of the mediator is conceptualised in SOLEs.

Each week, learners received three hours of instruction, one of which centred around language input and was delivered remotely by a qualified teacher (based in or outside Uruguay), and the other two being led by the classroom teacher. Complete syllabi and detailed lessons plans were designed for each week with instructions in both English and Spanish so they could be understood by all teachers. Additionally, a customised online platform was developed with educational resources for practitioners, and a space for course developers and teachers to exchange views and collaborate. Classroom teachers also received in-service training and ongoing support from specialised mentors, together with English language lessons to help them progress alongside their students and eventually qualify to run remote sessions themselves.

Students used their laptops primarily for language practice, such as completing information gap activities, playing online games, and creating their own resources, including flashcards, slides, and digital stories (*ibid.*).

Current estimates indicate that 71 per cent of Uruguayan students in Years 4, 5 and 6 learn English remotely (Plan Ceibal, 2017), while the programme has now been extended to

secondary schools. Overall, CEI has been evaluated as a success story in the context of technology-supported remote education, with primary school children involved in the project showing comparable progress to that achieved by their peers in the face-to-face-programme (see Marconi & Brovetto, 2019). The success of the initiative is largely due to adopting a nimble approach to scale-up and remaining responsive to feedback, with adjustments continually made to hardware and learning materials, as well as initial teacher training and ongoing mentoring schemes (Hockly, 2017). Indeed, in line with the programme's strong commitment to promoting equality, diversity, and inclusion, much of the teacher training centred around practical strategies for differentiating instruction to cater to mixed-ability classrooms (Kaplan & Brovetto, 2019). These included the use of dyslexia-friendly fonts such as *Dyslexie* or *OpenDyslexic*, visual cues to help students with behavioural difficulties to refocus their attention and prepare for the upcoming task, or providing learners with choice in their classroom response format (Rovegno, 2019).

Nevertheless, it is worth noting that an exhaustive programme evaluation of CEI which includes all language skills is yet to be undertaken, and therefore firm conclusions about the initiative's impact at a more holistic level cannot be drawn at this point (Banegas & Brovetto, 2020). Another issue has been that programme participation in secondary schools has seen a slow decline since its launch in 2014, which is in no small part due to high demands on class teachers' time (*ibid.*). In investigating learner motivation factors in CEI learning environments, Ramirez (2019) discovered that, while group work, games, videos, music, and inter-cultural activities were all driving forces for learner engagement, oral presentations were a source of anxiety, frustration, and demotivation. Similarly, a lack of social and emotional competency in teachers, externalised by behaviours such as not allowing children sufficient time to think through their answers or work through emerging problems, appeared to be contributing factors to negative affect amongst learners.

2.6.1.2 The case of the Amazonas Media Center, Brazil

Remote instruction approaches need not always rely on high-tech solutions. The Amazonas Government's Media Center project in Brazil is another large-scale initiative with an overt social justice agenda based on equity, learning, and low-tech resources. The distance-education programme, which began in 2007, aims to address the disparity in education access between Amazonas' urban and rural areas (Plata, 2020). Facing a chronic shortage

of secondary school teachers for the Amazon's 6,100 riverside communities, together with its concomitant dropout rates (*ibid.*), the government of Amazonas uses multipoint videoconferencing technology to broadcast lessons in real time via satellite television from a Media Center studio in the state's capital city to up to 1,000 classrooms at a time, with 5 to 25 students each, located throughout rural communities along the Amazon River (Cruz *et al.*, 2016). Each class is mediated by a professional onsite tutor with no specialist expertise in the subject area, who manages the classroom, helps with difficult parts of the classwork, and provides appropriate technical support to ensure that the experience is as interactive as possible (Trucano, 2014). With an emphasis on interactivity, students not only view lectures from the teacher in the studio, but are also able to interact with remote teachers through the digital platform and have their questions answered in this way. Just as *Ceibal en Ingles* secondary students are served by a custom-made digital platform with supplementary educational material, so Media Center students are supported by additional educational resources (in both print and digital formats). Lessons follow the state curriculum and are planned by the studio teacher, in consultation with national curriculum and technology experts—the latter being responsible for the digitisation process. This process makes it possible to create localised content that matches the needs of a specific group of learners (Cruz *et al.*, 2016). Studio teachers receive rigorous pre-service and ongoing training in both technical and pedagogical skills. The former cover aspects of effective behaviours in front of the camera, such as posture, speech, and screenplay. It is worth noting that the educational TV offerings utilise the space offered by municipal schools which serve as primary schools in the morning, and, as such, remote teaching takes place in the afternoons and evenings (Trucano, 2014; Cruz *et al.*, 2016).

Between 2007 and 2016, the distance learning programme had reached 300,000 students in remote, riverside communities across the Amazonas state. It was subsequently expanded to include youth and adult education, while scale-up efforts led to replication of the model in seven other states with poor and/or difficult-to-reach populations (Cruz *et al.*, 2016). Despite initial Internet connectivity and infrastructure challenges, preliminary results have shown promise— the programme led to a 16 per cent increase in high school progression rates between 2007 and 2011, dropouts in Amazonas state decreased by almost half between 2008 and 2011 (*ibid.)*, and children's learning has steadily improved, as reflected on the Brazilian Education Quality Index (Robinson & Winthrop, 2016).

2.6.1.3 Barriers to successful BL implementation

These two case studies of possible futures in the development of the use of technology to support learning and expand access to high quality education in resource-constrained settings illustrate that the empirical work in the field of blended remote learning in K-12 education is still at a nascent stage. While flexible access to curriculum and instruction serve to provide access to segments of the population that have been underserved in the past, there are also noticeable gaps that could limit the ability of the education innovations to help fuel and sustain educational progress amongst these children. For instance, few efforts prioritise pedagogical uses of technology that increase the breadth and depth of learning (Istance & Paniagua, 2019). Indeed, a marked example of the technologically deterministic assumption that simply by putting computers into the hands of children, high quality learning will ensue is the One Laptop per Child (OLPC) initiative. Launched in 2005, the project aimed to address issues of social inequality in developing countries by outfitting millions of schoolchildren with low-cost laptops. OLPC was theoretically underpinned by notions of constructivism whereby children's learning was expected to be mediated by the devices and their content. In other words, children were assumed to be sufficiently motivated and able to learn by themselves, provided they were equipped with appropriate resources. Nevertheless, study evaluations have shown mixed results and OLPC country programmes have often been criticised for showing little or no regard for teacher pedagogical support, thus causing the machines to quickly fall into disuse (Warschauer & Ames, 2010). In the impoverished city of Birmingham, Alabama, of those students who kept using them, fewer than half said the laptops helped them to learn (Leech, 2010). This starkly contrasts Uruguay's well-rounded educational intervention discussed above.

Other neglected factors include the ways learners' attributes, together with their level of cognitive, social and emotional development, interact with academic achievement in a BL environment. Expanded access to schooling in recent decades has increased the variability in learners' readiness for classroom instruction (Ganimian, Vegas & Hess, 2020). For this reason, it is important to obtain insights into what aspects of a BL model work favourably,

and for whom, in a given context. For example, in line with evidence discussed in Section 2.5.2, interview and observational data from an IDB study of a pilot project in Haiti indicated problems with student collaboration and patterns of dominant laptop use by the more capable group member (Näslund-Hadley *et al.*, 2009). Similarly, OLPC evaluations in Haiti, Uruguay, the United States and Paraguay revealed that many children, especially the most marginalised students, were not able to exploit the potential of the laptop on their own, whether using it at school or at home (Warschauer & Ames, 2010). The authors found that that more socioeconomically privileged children tended to make use of the laptops in more creative and cognitively challenging ways. Thus, they conclude that independent, unscaffolded laptop use by children might in fact exacerbate existing inequities, and highlight that failure to recognise variability in students' existing social and human capital as a moderator of academic success 'represents a flaw in the one-sided belief in self-directed constructionism' (Warschauer & Ames, 2010, p.44).

2.7 Technology and Distance Learning in Greece

While even before the COVID-19 pandemic, K-12 online and blended learning was already being used in meaningful ways to address specific student needs all around the globe, it was not yet as prevalent or expansive outside of the United States[16] (Barbour, 2014). Moreover, in most countries K-12 distance education occurring below secondary level only encompassed a small percentage of the activity (Barbour, 2014; Waters, Barbour & Menchaca, 2014). A few notable examples of systematic provision of interactive distance education opportunities to younger students include the Schools of the Air in Australia, which have been operating since the 1950s (Stacey & Visser, 2005), Turkey's Open Elementary School (Gedik & Goktas, 2011), and the Cyber Home Learning System in South Korea (Kwon & Jang, 2016).

Blended learning—and even full-time online distance learning—is generally regarded as the next evolution of effective technology integration, yet Greece is yet to systematically integrate distance learning models into its existing educational structure at the primary and secondary levels (Miminou & Spanaka, 2013; Anastasiou, Androutsou & Georgalas, 2015). Despite the absence of virtual or blended schools, there have been a number of initiatives involving telecollaboration between schools through the use of teleconferencing

[16] See Section 2.5.2 for a review of meta-analyses relevant to the US context.

tools. For example, 'Odysseus' was a comprehensive distance education programme developed by the Computer Science Department of the University of Cyprus and the Department of Primary Education of the University of Crete. It ran from 2000 until 2015 and focussed on the use of teleconferencing and Web 2.0 tools for collaborative enquiry and learning, as well as the development of core social skills amongst primary school children in Greece and Cyprus (Anastasiades, 2017). Towards this end, the researchers implemented a total of 70 teleconferences involving over 2,000 pupils from 46 primary schools in both countries; children engaged in collaborative enquiry projects wherein they gathered information on topics such as 'My town', 'My school' and 'My class', which they later shared with their peers and teachers in the form of a presentation, video, photo collage, song, and so forth (*ibid.*, p.98). As is also typical in SOLE, the final stage here too involved a discussion around the topic. Yet one notable difference between this initiative and the SOLE approach is that students were not making use of the Internet for their enquiries; instead, they were provided with worksheets and engaged in activities designed by the teachers. While this may have been advantageous in terms of achieving time efficiency, it nonetheless meant that children did not have an opportunity to engage with authentic resources, nor create new understandings of what is possible—beyond those mediated by their classroom environment (see Section 2.3.3iii). Early findings collected from three primary schools pointed to a statistically significant decrease in children's competitive attitudes and an increase in group cohesion, compared to a control group, which the researcher partly attributed to the collaborative aspect of the learning environment and its appeal to children's need for social recognition, sense of belonging, and the development and maintenance of social bonds (Habiouris, 2005). Comparative content analysis of group artefacts also indicated a qualitative improvement in children's linguistic abilities in their L1. More recently, Filippousis and Anastasiades (2019) report findings from a longitudinal study which examined the factors which contributed to children's enhanced social presence within a blended learning environment that involved frequent teleconferences between two primary classrooms (aged 10-12 years) situated in different regions of Greece. Relying on qualitative observations and content analyses, the authors found that, over the course of the programme, the children demonstrated an increased preparedness to express emotions and interact positively with their peers, such as through a stronger willingness to engage in a conversation and sustain communication. They suggest that in order for students to develop the skills and competencies necessary for success in the world beyond the classroom, they need to be exposed to student-centred blended learning environments which are centred on

collaboration, communication and positive peer interaction. While the aforementioned studies did not examine differential effects of the intervention by socioemotional and/or cognitive profile, Siakkas (2011) found that collaborative project work conducted via a blended model that involved teleconferences between partner-schools and face-to-face workshops with the teachers, and which aimed at the development of a creative artefact (e.g., a video animation), can indeed encourage the participation of students who are typically disengaged or underperform in the context of traditional instruction. Besides the novelty of the technology and the pedagogical approach, the author suggests that one of the factors that likely encouraged creativity in children was their use of prosopopoeia; that is, the act of communicating their ideas and reflections on a topic (e.g., 'The environment') through dialogues between inanimate objects, such as trees and clouds.

2.7.1 Online Distance Learning in Small Rural Schools

As has already been shown from initiatives that have occurred at the international level, online distance education has the potential to be transformative for small rural schools that often struggle to attract highly qualified teachers. Nevertheless, Greece is yet to implement a systematic distance education programme that caters to students attending small rural schools across the country. As such, very little is known about the parameters that might facilitate or impede the success of such an educational model at the local level. Perhaps the most prominent research project that has been conducted in this area is the University of the Aegean's 'Schedia' programme, which was launched in 2000 in 45 primary schools in 32 remote islands with a view to introduce the teaching of ICTs to small schools operating on the remote islands of the Aegean Sea (Tsolakidis & Fokiali, 2001). As part of the initiative, participating schools were provided with Internet connectivity and were subsequently invited to collaborate in the development of a web network, thus affording an opportunity to both teachers and students to enhance their digital literacy competence (Anastasiades, 2014).

Based on the sources above, two conclusions can be drawn. First, research in online/blended distance education in the Greek context mostly relies on descriptive accounts of past initiatives and ethnographic studies which employ qualitative methods in analysing results. As a result, it is practically impossible to establish the extent to which any observed improvements in children's learning and development constitute a significant change, from a statistical perspective. Related to this is the fact than none of the studies

reviewed have accounted for potential confounding factors in a systematic way. For instance, it is not known how the academic profile of Greek children (or those attending Greek schools) influences their engagement with and performance during an online/blended distance education programme. In other words, it is not known what works in that context, why, and for whom. Second, there has been no systematic assessment of children's academic improvement in different subject areas of the national curriculum. While findings from the Odysseus initiative, for example, indicated a qualitative improvement in children's linguistic abilities in their L1, these were based on content analysis of group artefacts, and, hence, failed to provide insights at the individual level. Finally, very little is known about the feasibility and sustainability of a blended distance education programme with social constructivist underpinnings in the small rural schools of the country, with cost being one key aspect that previous research has failed to consider; given the inequities identified in Chapter One, the present study was designed with the aim of addressing these gaps in the extant literature.

2.8 The Aims and Contribution of the Current Study

2.8.1 Raising EFL attainment in the primary years

In light of the theory and literature considered in this review, the principal aim of the current study was to expand upon the rather small number of existing empirical studies that have examined the effectiveness of blended remote learning in low-resource K-12 settings. One of the main advances of the current study is that it brings together several strands of practice, derived from both the learning/developmental sciences and SLA theory, which, to my knowledge, have not previously been explored in conjunction. It thereby incorporates principles of deep language learning (Tochon, 2019) and examines the extent to which these can be observed to be at work in a hybrid learning environment which fundamentally centres around three key concepts: collaborative enquiry, authenticity, and self-paced mastery. A further unique contribution of this research was to obtain the unique effects of the two distinct components of the intervention (i.e. the synchronous and the asynchronous) in terms of their prediction of learning outcomes, and test interrelationships between these in influencing child learning.

The study also aimed to address the methodological limitations of previous research, identified in the literature review, by undertaking a more holistic programme evaluation

which included nearly all language skills[17]. In addition, contrary to previous research conducted in Greece, it considered the cost involved in the implementation of a blended remote programme in rural and remote settings, and, in doing so, it placed renewed focus on sustainability, which was recently recognised as one of the nine Principles for Digital Development.

2.8.2 Factors affecting intervention outcomes

Another aim of the research was to shed light on the mechanisms underpinning the effectiveness of the hybrid intervention with primary children from a wide range of perspectives. Through mixing quantitative insights with findings from qualitative observations of children's use of the intervention, focus groups and semi-structured interviews with (head) teachers and parents, the present research aimed to elucidate how children's attributes, software features, and aspects of implementation (e.g. contextual factors at the classroom level or learning materials) may impact upon learning. Greater understanding in this area may hold implications for the development of technology that facilitates effective implementation of innovative pedagogies in K-12 education. A further strength of this study that minimises bias, is the inclusion of relevant covariates, such as cognitive ability, SES, home learning environment, and motivational disposition towards the L2, that adjust for factors other than the intervention that might influence child outcomes.

2.9 Summary

In summary, empirical evidence to date has shown that blended approaches hold promise for successful learning at the K-12 level, including in low-income educational settings. Indeed, blended programmes combining synchronous and asynchronous components and which are delivered remotely have been found to promote inclusion and equal opportunities in the K-12 context, although, evidence from more systematic investigations is urgently needed to assess second language development in such learning environments. Further work is also currently necessary in order to identify how the academic profile of children influences their engagement with and performance during an online/blended distance

[17] As will be explained in the next chapter, children's reading skills were the only language domain which was not assessed.

education programme, as well as the ways in which environmental factors interact with children's academic success.

The review presented Tochon's (2019) framework of deep language learning as the theoretical framework underpinning this study, and provided a discussion on the contribution of educational technology to more student-centred pedagogical techniques, such as collaborative enquiry- and project-based language learning. The discussion focused on three core constructs associated with deep language learning in hybrid environments namely, collaborative enquiry, authenticity, and self-paced mastery.

Lastly, this review considered the current literature relating to hybrid and distance learning in Greece, and identified gaps in the extant knowledge with respect to effective implementations of such novel models with primary school populations in rural and remote parts of the country. The research design and methodology of the study will be presented in Chapter Three.

Chapter Three - Methodology

3.1 Introduction

This chapter presents the methodology of the current study. It starts with the research questions, followed by a discussion of some of the most prevalent epistemological stances upon which empirical educational enquiry tends to be constructed. Then, guided by the principle of 'fitness for purpose' (Cohen, Manion & Morrison, 2018, p.1), the justification for the type of design used is presented. Following this is a detailed examination of the research procedure, including participant selection, data collection and analysis methods. An explicit discussion of potential threats to the validity and reliability of the research design follows, and the chapter closes with the ethical considerations of the present study.

3.2 Research Questions

This study examined if and by what mechanisms a blended learning intervention which was delivered via a distance education modality could enhance children's EFL achievement, with specific reference to five core language domains: vocabulary, grammar, aural comprehension, writing skills, and oral fluency. A further aim concerned the relative cost of the intervention compared to its face-to-face alternative. Therefore, the research questions are as follows:

1. What is the impact of the blended remote model on student EFL attainment, with reference to a) vocabulary knowledge, b) grammar knowledge, c) aural comprehension skills, d) writing skills, and e) oral fluency?

2. What are the specific mechanisms which mediate and/or inhibit said impact on learning outcomes?

a) What are children's perceptions of factors that facilitate and/or impede learning in a blended remote model?

b) What do head teachers and parents think about the impact of the blended remote model?

c) What are head teachers' and parents' perceptions of factors that facilitate and/or impede learning in a blended remote model?

3. What is the relative cost of the blended learning intervention compared to the education-as-usual programme?

3.3 Philosophical Foundation

3.3.1 Research Paradigms within Applied Educational Research

Multiple research paradigms exist within the social sciences and educational research, each with its own assumptions about the nature of the social phenomena being investigated (ontological), means of acquisition of knowledge around social behaviour (epistemological), the relationship between human beings and their environment (human) and technical approaches to arrive at such knowledge (methodological) (Burrell and Morgan, 1979). Positivism and interpretivism are two major doctrines which have traditionally been viewed as fundamentally contrasting perspectives of social reality (Feilzer, 2010). Amongst the interrelated assumptions that form the positivist paradigm are a commitment to an impartial science independent of people's values and goals, the belief that the social world is made up of distinct variables which are interdependent with causal relationships, and to theory formulation via the quantification of variables and the perception of knowledge as a logical derivative (Cohen, Manion & Morrison, 2018). Positivist approaches to pedagogical research often involve examining variables relevant to the classroom and the student and looking for correlations between them. Experimental or quasi-experimental methods which involve a systematic and controlled manipulation of variables to see if experiments will produce expected results reflect the operationalisation of a desire to reveal regularities by way of formulating statistical laws in order to describe, explain, and predict social phenomena, thus moving from correlation to causality (Lukenchuk, 2013).

Despite the advantages that have traditionally been attached to the positivist tradition, namely, reliability and validity of research findings as a result of rigorous experimentation, the ability to formulate and test hypotheses, as well as replicate and generalise to the parent population, and despite its dominance in many areas of scientific enquiry, positivism has suffered harsh criticism regarding its applicability to the study of human behaviour. Even

though advanced statistical techniques make it possible to unearth and subsequently control for some extraneous sources of influence when trying to explain an occurrence (a criticism once voiced by Kilpatrick [1992])—the question an educational researcher should perhaps be asking is whether it is at all possible to try to discover facts about a field of educational activity, represented in terms of 'units of observational evidence' (Radford, 2008, p. 145). This is because, arguably, the very complexity of socially embedded phenomena and the many facets that compose them are those features that make them what they are; if we were to break them down into sets of discrete factors, then one might rightfully wonder whether we would witness a social reality which would be different from the one initially observed. Cohen, Manion and Morrison (2018, p.10) speak of an 'elusive and intangible quality of social phenomena' apparent in the contexts of classrooms and schools where issues of 'teaching, learning and human interaction' pose a challenge so big that the positivist researcher might be unable to rise to it. Unlike the regularity with which we can expect the natural world to behave, schools can instead be viewed as 'complex adaptive systems' (Keshavarz *et al.*, 2010, p. 1468) which are composed of multiple interacting components, and whose behaviour as a whole is therefore greater than the sum of the parts (Byrne & Callaghan, 2014). In schools this notion of connectedness can be seen in the networked fashion in which children are linked to their peers, parents are linked to teachers and/or other parents in forming associations, local administrations to regional bodies and other educational institutions, or to centralised administrations. As Kauffman (1995) remarks, those complex and ongoing interactions give rise to the system's capacity for a kind of self-organised order which renders any *a priori* design or external control largely impracticable. Deterministic, command-and-control attempts to trigger linear cause-and-effect chains may thus not be particularly fruitful in educational research; instead, complexity theory warrants multi-perspectival, holistic methodologies which enable multiple causality, multidirectional causes and effects (Morrison, 2012) and feedback loops which occur not only at different levels but also *across* levels. Such forms of research, then, suggest Lewin and Regine (2000), call for interactionist, qualitative and interpretive accounts. Such a view echoes Schoenfeld's (2002) powerful critique of positivistic social science as lacking any guarantee that any interpretation that we may undertake of our findings will accurately reflect aspects of the real world, regardless of how sophisticated or accurate our manipulations within the formal system of statistics may have been. Scientific explanation, adds Eisenhart (1988), is not an adequate means of making sense of the social world, not least of educational settings, as it often ignores the intersubjective meanings that are formed

during classroom interactions; these meanings are not directly observable nor measurable by such means. And yet these meanings are equally capable of interpreting how phenomena emerge and evolve. This brings us to the second research paradigm discussed earlier in this chapter: interpretivism.

A central tenet underpinning interpretive approaches to social science is the idea that one needs to move beyond normative explanation and focus instead on interpretation (see for example Weber, 1949; Geertz, 1973; Deleuze, 1994). Shifting the focus away from seeking to explain actions premised on cause-effect relationships, adherents to this school of thought place great store on trying to integrate these into a more general system comprising the goals, aspirations and beliefs of the individuals who are part of the ongoing action being investigated, and into a framework describing the social norms and practices of the group in question, which will then allow a better understanding of these. Instead, then, of merely looking for patterns in the subjects' behaviour, there is a consequent emphasis on capturing the subjective *meaning* of their action (Geertz, 1973). In this regard, the researcher's task is to attempt to conceive the complexity and multifaceted nature of the phenomenon under scrutiny by way of gaining a better understanding of the participants' thinking and actions, and thus a more accurate interpretation of their experiences. In so doing, interpretive researchers will often gain access to accounts which offer a reconstruction of the facts from the standpoint of the individuals involved rather than that of a detached, objective observer. Understanding and interpreting then, or 'hermeneutics', as Dilthey (1976) put it, is the key methodological difference between the natural and the social sciences. In this sense, social reality is defined by the participants themselves (Beck, 1979), and, as a result, there can be multiple interpretations of, and perspectives on, single events and situations within the social setting occasioning them. This notion of active cognition and people's agentic construction of their own views and worlds is particularly pronounced in the constructionist tradition, requiring practitioners to pay attention to holism in understanding the actions of social actors by focussing on interactions, contexts, environments and biographies. Cohen, Manion and Morrison (2018) note that this is the very feature that makes more recent qualitative perspectives such as constructionism so pertinent to educational research.

Even if we adhere to the view that social research is ideographic rather than nomothetic in character, however, and thus argue that total generalisations are beyond the scope of the interpretative paradigm, and indeed the study of complex systems, it must be conceded that

interpretivist enquiry 'must be able to say something authoritative about instances beyond the specific ones of the research' in order to be of use in social policy formulation or programme evaluation (Williams, 2002, p. 126). Yet interpretivism is prone to a relativity of perspective which can lead to so much variability in its accounts as to render them 'of little value' in the understanding of the phenomenon under study (*ibid*., p. 137). In acknowledging the shortcomings of taking a singular approach to educational research, this thesis follows an ontological pathway that suits the particular aims of the present study and therefore embraces 'methodological, paradigmatic and theoretical pluralism, indeed mixed methods' (Cohen, Manion & Morrison, 2018, p.29). This is further discussed below.

3.3.2 Epistemological Assumptions Underpinning the Current Study

This research has its roots within the philosophical tradition of pragmatism, reflected in the use of a mixed methods design. Pragmatist thinkers like Peirce, Dewey, James and Mead offer fertile ground for social research that aims to be closely linked to social action. Pragmatism opposes deductive reasoning based on *a priori* theories and instead insists on inductive investigation and continuous empirical confirmation of hypotheses. The main feature of the philosophy of pragmatism then is its empirical nature: it postulates that theory is ultimately validated through the practical outcomes it generates (Baskerville & Myers, 2004). In this sense, pragmatists consider the truth of acquired knowledge to be a function of its consequences; if this knowledge has some practical benefits, it is useful and true. If, however, knowledge does not create practical utility, then further research is warranted (Dewey, 1938). This means that anything we may know is viewed as exploratory, uncertain, and possibly falsifiable, as it has been generated in specific contexts, to meet specific goals and express specific values. Stated in these terms, the acquisition of knowledge is basically a process of trial and error mediated by a series of constructions and reconstructions. As a philosophy of action, pragmatism offers an epistemological framework which is especially relevant for research such as this, which seeks to approach the 'problems of men' (Dewey, 1917, p. 46) primarily from a practical angle and 'gain the kind of understanding which is necessary to deal with the problems as they arise' (Dewey, 1929, p. 14), irrespective of whether such newfound understanding converges with existing theory. Methodically, (Dewey's) pragmatism attaches great importance to the experimental approach 'as a model for human problem solving and the acquisition of knowledge' (Biesta & Burbules, 2003, p. 5). Far from advocating a mechanistic worldview, however, it

recognises that fact and value are inextricably connected, and hence questions about 'how' must be accompanied by questions about 'why' and 'what for' (*ibid*., p.22). This perspective calls for the use of multiple tools of enquiry to gain a more complex, complete and richer understanding of the problem at hand; indeed, from a pragmatist point of view, rejecting certain false dichotomies, and dismissing certain assumptions about the incompatibility of traditionally opposing methodologies such as quantitative and qualitative approaches can open up new possibilities for thought, laying thus the epistemological foundation for mixed methods research (Tashakkori and Teddlie, 2003).

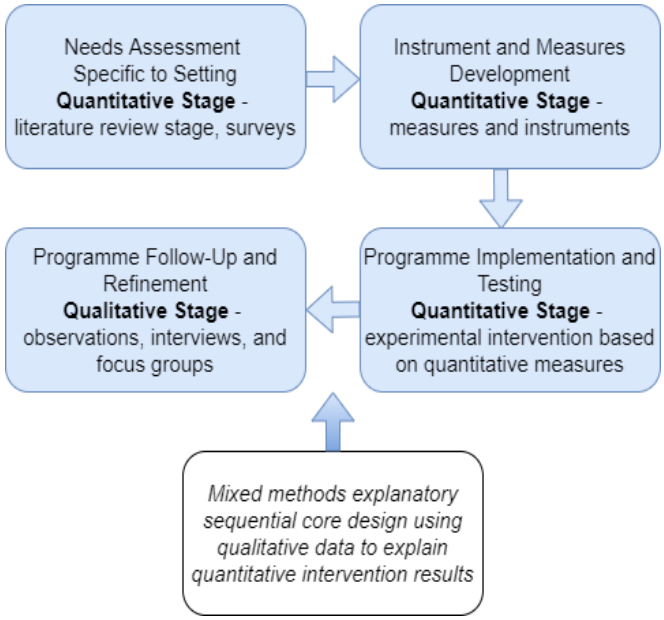
3.3.3 Mixed Methods

As discussed in the previous section, this research sets out to draw together methodological approaches and tools which are traditionally thought to carry different epistemological commitments (Hughes, 1990; Hesse-Biber, 2010; Creswell, 2014). There is a growing school of thought that combining quantitative and qualitative research strategies when conducting social enquiry allows for complementarity, offering the potential for the various strengths to be maximised and the weaknesses offset somewhat (Plano Clark & Creswell, 2008). Indeed, Fetters and Freshwater (2015) have gone so far as to argue that the exponential benefit a mixed methods approach brings to the research process is equivalent to the equation 1 + 1 = 3. Further, Bryman (2006) reports the notion that a mixed design where both quantitative and qualitative research are employed enables the researcher to bring together a more comprehensive account of the topic of enquiry at hand. More importantly, such combined approaches lend themselves to the investigation of complex systems problems (Mitleton-Kelly, Paraskevas & Day, 2018), making thus mixed methods designs particularly well suited to educational research (Teddlie & Tashakkori, 2009).

Since the main aim of the present research was to assess the practical use of the proposed innovation in producing change in the educational settings of interest, it was decided that an intervention should constitute the core design of the study (a detailed description of the intervention is provided in Section 3.5). When this is the case, the addition of qualitative data can contribute personal, contextual, qualitative insights drawn from the setting of the participants into the quantitative outcomes (Creswell & Plano Clark, 2017). As such, an explanatory sequential (after) mixed methods intervention design appeared particularly relevant to the research questions and was employed by the study. According to Creswell

and Plano Clark (2017), an explanatory sequential design consists of two distinct interactive phases, with the collection and analysis of quantitative data having the priority for addressing the study's questions. The second, qualitative phase of the study comprises the collection and analysis of qualitative data and is designed so that it follows from and helps to explain the initial quantitative results. This choice was driven by two important reasons: (1) because the research problem at hand warranted the ability to generalise to the population and was thus more quantitatively oriented, and (2) because, in addressing RQ2, I needed to gain a better understanding of the key factors that mediated/potentiated and/or inhibited the impact of the intervention on participants' learning outcomes. Although the administration of self-completion questionnaires pertained, amongst others, to the need for systematic information about social backgrounds, prior learning experience and measurement of the motivation construct along a common scale, the post-intervention focus groups, for instance, would provide valuable additional information on the *attitudes* of the participants towards their recent learning experience. This would allow me to interrogate the results obtained through the quantitative learning assessments in ways that would not otherwise be possible. This approach also seeks to avoid the pitfall of failing to 'consider and weigh all of the options for following up on the quantitative results' (e.g., by focussing attention only on personal demographics), which could severely compromise the validity of the overall findings (Creswell & Creswell, 2017, p. 305). Figure 3 provides an overview of the procedural steps followed to implement a two-phase explanatory design in this research.

Figure 3 Flowchart of the Basic Procedures in Implementing an Explanatory Sequential Mixed Methods Design in this Research (Adapted from Creswell & Plano Clark, 2011)



3.4 Research Design

3.4.1 Quasi-experimental Research

Given the aims of this research, it was judged that the measure of the intervention should rest on whether or not it succeeds in improving the pupils' EFL attainment across the five areas assessed. For this reason, the primary outcome measure in this research is the pupils' attainment in English language learning, with baseline measures at the start of the fieldwork, and a final measure upon completion of the 12-week treatment period. The study thus adopts a between-subjects pretest-treatment-posttest multi-factorial design with nine distinct groups of young learners to answer Research Questions 1 and 2 from a quantitative perspective.

It could be argued that an experimental design of this kind should have randomised allocation to treatment and control groups, which would minimise the threat of confounding variables and would enable us to reach causal conclusions (Johnson & Christensen, 2016). However, several arguments for not attempting to do so were put forward, and so a quasi-experimental design was deemed more appropriate in this instance. The first is that of feasibility of identifying and recruiting similar micro-schools operating in rural areas where English *was* being taught as a subject, and where the children and class teachers would consent to giving up approximately nine class periods for the administration of the battery of pre-tests and post-tests without being offered the opportunity to experience the innovation, and reap its potential benefits. Even in the unlikely event of securing the necessary interest, the procedure would give rise to a number of ethical implications. Second, the possibility was assessed of me delivering face-to-face instruction using the traditional approach to an additional set of schools where an English teacher was not available and which would therefore act as controls. This, however, was deemed beyond the scope of this study for a single researcher due to costs in time and resources, especially given the logistical constraints imposed by the concurrent delivery of the intervention to more than nine separate groups. Finally, a counterbalanced design whereby a set of schools that had initially received the innovation would then become a control group during the second half of the intervention period would have truncated the actual length of the intervention by half, thus compromising the chance of any meaningful changes in learning occurring.

Threats to the internal validity of the study arising from the lack of a control or comparison group, along with the steps taken to counteract these are addressed in Section 3.9.1.

3.4.2 Participant Selection

The intervention was delivered to primary pupils who were attending Year 3 (age 8-9) and above. This age range was chosen for two reasons. First, in Greece the national curriculum for EFL prior to Year 3 focuses primarily on the development of pupils' oral communication skills. Their exposure to the English alphabet merely aims to sensitise them to the letters and only constitutes a secondary learning objective, i.e. children up to Year 2 are not expected to go beyond the stage of letter recognition and reproduction, which only involves tracing. Systematic teaching of the alphabet does not begin until Year 3, when children are deemed mature enough to be introduced to the processes of comprehension and production of oral and written English (Dendrinos, 2013). Given that the scope of the present study involves the development of literacy and writing skills as one of the core objectives of the intervention, it was reasoned that only pupils who were at a level of English competence where these skills were being taught in a more focused and systematic fashion should participate.

Second, Year 3 is an appropriate time to begin a focused yet age-appropriate integrated-skills second language learning programme as by this time children will have generally already acquired the phonological system of the Greek language and, having learned and used it for sufficient time, it can be expected that they will have developed the mental and linguistic capacities and the conceptual maturity to start developing an awareness of the graphic and phonic systems of the English language (*ibid.*). Some educators and researchers, such as Conger (2009), may point to the 'Critical Period Hypothesis' (CPH) and suggest that the earlier the onset of second language acquisition the faster the rate at which young learners will become minimally proficient. However, the need to align the linguistic objectives of the intervention with those set out in the national curriculum for the sake of comparability called for a more pragmatic approach.

3.4.3 Criteria for School Selection

A preliminary *a priori* power analysis was performed using G*Power version 3.1.9.3 (Faul *et al.*, 2007), which indicated that in order to be able to reach meaningful conclusions about the significance of any differences in mean scores on the pre- and post-tests with adequate statistical power, a sample size of at least 34 participants would need to be tested (based on a statistical power of 80%, a two-tailed significance level of 5% and while looking to capture a medium effect [d = 0.5, r = 0.3], as per Cohen's [1988] levels). Following systematic research, a preliminary short list of schools that were deemed appropriate to support and implement the programme under study was subsequently made in February 2018. The considerations in the selection process were a non-availability of an English language teacher, school classification and location, the children's ages and access to technological equipment and the internet. With regard to this last criterion, a minimum requirement to participate in the study was that each school had at least one working computer.

To locate these schools, a list was obtained from the Ministry of Education containing details of all the small rural primary school units in the country operating multigrade classes. 1,174 schools were listed in total, of which 591 were immediately excluded because they were classified as operating with three teachers or more, thereby suggesting a very high probability of an English teacher also being available in the school (see Section 1.2.4)[18].

Next, eight geographical regions were randomly selected, and both continental Greece and the island of Crete were included. Feasibility of carrying out visits to all the participating schools mandated that smaller islands with only one potentially eligible school be eliminated. The regional units selected were Arta, Kozani, Trikala, Ioannina, Florina, Heraklion, Rethymno and Chania, comprising a total of 117 small rural schools. Of these, I was only able to establish contact with 51 head teachers, who were asked about the English language provision and teacher availability in their schools during the school year 2017-2018, and the presence of technological equipment in the school. Some were due to

[18] This was because, as explained in Section 1.2.4, 2017/18 was the first year of implementation of the all-day primary school scheme in rural areas and, contrary to the smaller schools, many of the three-teacher schools were able to offer English classes as part of their afternoon provision.

close their doors the following year due to the low number of pupils in the locality, whereas others which were located in the most remote villages only had one student on the roll and hence were not eligible to participate. It might be worth noting at this point that during this early stage in my communication with the head teachers it was interesting to note the degree of uncertainty under which all these schools seemed to be operating. Indeed, the vast majority of the head teachers were not able to confirm whether an English language teacher would be deployed to their village and suggested that I contact them again towards the end of September 2018, when they believed they might have a clearer idea about what subjects would be taught in their schools that year. Some went on to explain that they were very much dependent on teachers' preferences and whether they would opt to go and teach in their villages or not. Time constraints and the realities of research meant that these schools had to be eliminated as potential candidates for the study, leaving me with just 11 potentially eligible schools.

3.4.4 Gaining Access

The recruitment process began with sending each school an introductory letter (Appendix 2) and my Curriculum Vitae via e-mail. There followed phone calls and e-mail exchanges with head teachers in which we tried to establish the feasibility of conducting the study in their schools. This in turn led to arrangements for initial visits to each school for me to meet all the stakeholders in person (the school staff, pupils, parents and members of the community) and explain the scope of the research in more depth, as well as to provide them with the opportunity to ask any questions they might have and receive clarification, where needed. Visits were made to all 11 schools in June 2018, during which it was confirmed that the head teachers, parents, and students were all open to the study, therefore giving their consent.

As is the case with every centralised education system, to carry out research in any Greek state school, permission has to be first obtained from the Ministry of Education[19]. In compliance with this requirement, I applied to the Institute of Educational Policy (IEP)—the public body responsible for all matters relating to scientific research and issues related

[19] It is important to note that with the change of government in July 2019, this requirement was dropped; it is no longer necessary to obtain permission from the Ministry to carry out research in a school unit, so long as the proposed project has gained the approval of the associated faculty's Research Ethics Committee (IEP, 2020).

to primary and secondary education in Greece—seeking permission to conduct the study in the selected schools.

However, the IEP specifications at the time (which are still in place at the time of writing this) stipulated that no study would be approved which would be conducted within the school timetable and which would engage each class for more than two class periods per year (IEP, 2020). This restriction constituted a great barrier to the implementation of my research given that the intervention envisaged was designed to take place across a total of 12 class periods. To overcome this limitation, it was decided that the sessions would take place outside school hours at times and places agreed on by the children themselves in coordination with their parents and the head teachers. As a result, I was notified by the IEP that in this case permission was not required.

3.4.5 Difficulties Encountered

The research suffered some setbacks at the initial stages. A number of pupils who had initially signed up for the study during my visits to the schools in June 2018 subsequently went on to transfer to different schools in other localities and therefore were unable to participate. In a similar fashion, two of the teachers who had initially expressed great enthusiasm for the project, and had rallied not only parents but also members of the local community in garnering support for the provision of technological equipment, transferred to different schools for the academic year 2018/19. When contact was made with their successors in September 2018, it was found that—even though they had indeed been briefed by their predecessors—they lacked the technological skills to support the pupils throughout the fieldwork and therefore those schools were eventually excluded. At another school, the timetable for the school bus which transported the pupils back to their houses in the surrounding villages at the end of the school day had been modified by the start of the next academic year, now arriving to collect the pupils one hour earlier. In the past, children would have had to wait one hour inside the school for the bus to arrive and that window had been deemed an ideal time for our sessions. However, as of September 2018, that slot was no longer available and children did not have the option of taking a later bus as this was the only route going in that direction every day. As a result, this school was also excluded, eventually leaving me with eight sample schools.

3.4.6 Participating Schools

All the schools that received the intervention are mixed gender state primary schools in rural areas of Greece operating with a maximum of three teachers each (including the head teacher, whose professional duties in these schools normally also involve teaching responsibilities). As a result, they share multiple common characteristics, all of which are shown in Table 4 below. The schools have been pseudonymised, as have the names of the villages in which they are located. With only one school in each one of the localities that the study went to, this was a necessary step to avoid the schools participating being individually identifiable.

Table 4 Participating schools which received the intervention

School	**Distance from Regional Unit Capital** (in km, by car)	**Elevation** (in metres)	**Population** (2011 census)	**No. of Teachers in School** (incl. Head Teacher)	**No. of Pupils in Group**	**No. of Pupils in School**
Delphi	33	870	410	1	3	10
Arsinoe	58	1,160	396	2	3	12
Elaia	11	150	530	2	3	12
Marathonion	6	20	470	2+1[20]	10	18
Demos	12	50	350	1	4	7
Morphe	24	60	520	2+1[21]	8	19
Palaeopolis	19	100	650	2	4	(data not available)
Minos	65	110	430	2	12	14

Note that for the purpose of the intervention Marathonion was split into two experimental groups due to the relatively large number of pupils and a lack of physical space in the room where the school's only computer was located.

[20] Two full-time general education teachers and one part-time Physical Education (PE) teacher were available in this school during the school year 2018/19.

[21] The third teaching staff was a special education teacher who was responsible for offering parallel support to pupils with identified special educational needs (SEN). For more on this type of provision in Greece see Mavropalias and Anastasiou (2016).

Delphi Primary School (a pseudonym, as are all the names of the schools and the villages in which they are located)

This is a micro-school nested in the hills of Vermio in a small hamlet called Delphi just over 30 km away from its closest urban centre, and approximately 100 km from the Greece-North Macedonian border. Sitting at an altitude of 870 m, in 2011 this hamlet was home to 410 inhabitants (Hellenic Statistical Authority, 2013). The locals typically depend directly on agriculture for their livelihood. This is confirmed by data collected via the parents' questionnaires, which they completed at the start of the project. Two of the three stated that they earned their living from farming, including by selling their produce in farmers' markets. The third parent put 'truck driver' as his occupation. Two of the mothers also reported occasionally engaging in other unskilled work besides farming, such as house cleaning.

One of the participants was of Albanian origin, her parents having migrated to Greece in pursuit of better economic opportunities 24 years before. As a result, this pupil spoke both Greek and Albanian at home. Regarding the parents' educational level, all of them reported having received no formal education beyond Year 9 (age 14-15) and subsequently having opted to not proceed to high school (upper secondary) but instead to seek full-time employment.

There is only one (primary) school in Delphi, teaching Years 1 – 6. During the academic year in which the fieldwork took place − 2018/2019 – there were 10 children in the school, three of whom were eligible to participate in the study. They were all attending Year 6. The school has operated with just one teacher since 1979, and therefore specialist subjects such as Physical Education, Music, Art, IT/Computing and English which require specialist staff have never been taught to its pupils. The teacher had been at the school for 16 years and, not being a local, every day he had to travel 70 km to get to the school from his home and back. Although he did not interfere in the actual learning process at all during the intervention, from the start he was very enthusiastic about the opportunity he hoped this study would afford his pupils and remained very supportive throughout.

The school itself is a small building with only one floor and two classrooms. There is one computer in the big classroom, which the pupils used to do their online tasks during the

intervention. In September 2018 – only two months before the beginning of the fieldwork – the internet connection in the entire village was upgraded to almost 20MBps, which made our online lessons possible.

One major challenge facing the school's pupils and teacher are extreme weather conditions during the winter. Frequent snowfalls often meant that our lesson had to be cancelled, because either the teacher or the children, or sometimes both, were unable to access the school. Indeed, one of the things that struck me the most during my first visit to the school in June 2018 was the children's apparent feeling of physical and social isolation and disconnection from the rest of the world. This was best reflected in the question they asked me as soon as I introduced myself to them and explained where I had come from and what I was wanting to do as part of my research: 'How did you find us? No one knows our village!'

Arsinoe Primary School

This small primary school is in one of the most mountainous hamlets in the Epirus region (a region now divided between Greece and Albania) in north-western Greece. It is located at an altitude of 1,160 metres on the slopes of the northern part of the Pindus mountain range just to the south of Pindus National Park. The school has been officially recognised as remote and difficult-access (Hellenic Ministry of Education and Religious Affairs, 2018). Heavy winter snow often blankets the village, causing the community to become cut off and the school to close. Indeed, during the time when the pre-testing process was taking place—December 2018/January 2019—the intervention suffered disruption caused by heavy snow and recurring power cuts in the area.

Geographical isolation combined with limited employment opportunities and extreme weather conditions in winter are thought to have been amongst the driving forces behind a rapid decline in the population of the village, which fell from 616 in 2001 (Hellenic Statistical Authority, 2003) to 396 in 2011 (*ibid.*, 2013)—a 64 per cent decrease in a period of only 10 years. Mountain livestock farming is a key means of livelihood and a way of life in Arsinoe. Other common occupations of the local people include wood-processing, cheesemaking, winemaking, forestry, and textiles.

There is one primary and one nursery school in Arsinoe, both of which are housed in the same building. During the academic year in which the fieldwork took place—2018/2019—the primary hosted 12 pupils: four in Y1, Y3 and Y4 (Group 1), and eight in Y2, Y5 and Y6 (Group 2). As with all the schools, only pupils in Y3 and above were eligible to participate in the study. However, despite initial arrangements to have 12 pupils take part in the intervention, in the end only three of them were able to do so (Y6 = 2, Y5 = 1). This was mainly for two reasons. First, the increasingly cold weather and snowfalls made it exceedingly difficult for the children who lived further out to travel to the venue and back after sunset. The parents had initially agreed to divide the pupils into three groups of four (given that only one computer was available in each house), alternating weekly in terms of the houses where the lessons would be hosted. However, while the pre-testing process was still under way it became apparent that this setup would not prove very feasible. Additionally, I was soon to find out that the poor internet connection and outdated computer hardware in most houses rendered our communication almost impossible. As a result, only three pupils were able to complete the pre-testing process and thus receive the intervention. The group followed the original plan for the parents to alternate every week and so each family hosted the lessons in their home every three weeks.

Elaia Primary School

This rural primary school is situated in the heart of the Thessaly plain in northern Greece, just south of Macedonia and east of the Epirus region. Surrounded by a ring of mountains, Elaia was home to a mere 530 inhabitants in 2011 (Hellenic Statistical Authority, 2013), the majority of whom earn their livelihood from arable and livestock farming, although more and more are now turning towards the tourism and service industries. Data collected via questionnaires revealed a socioeconomic disparity between the two households which participated in the study, both in terms of parents' education level and occupational status. Whilst at first glance this may seem surprising given that subjects were sampled from the same locality and school, if we place this finding within the economic context of the country eight years into its sovereign debt crisis, we may be able to better understand the nuances underpinning the current reality, along with the paradoxes that have emerged from it. In this case, the disparity can be explained by a recent change in the financial circumstances of one of the parents from this group who, despite being a holder of a tenured academic post in one of the biggest and oldest state universities in Athens, had recently

seen a reduction in his annual salary by 20-30% due to cuts in education spending (European University Institute, 2018). As a result, and in an effort to adjust to the new status quo, this family had made the decision to homeschool their child and thus avoid the cost of tuition they would have had to incur by enrolling her in a private language academy. Shortly after my initial contact with the school's head teacher, then, I received a phone call from this parent, who, in a very forthcoming manner, informed me about the family's situation, as well as the shortcomings of the homeschooling approach given the parent's lack of expertise in the subject domain and work commitments in the capital, all of which served as a rationale for their interest in the project. Subsequently, two more pupils from this school who were eligible to join the study did so—both coming from the same household—and we agreed to hold our weekly meetings every Saturday morning at 10:30 local time. As a result of the fact that this particular regional educational authority had not permitted the use of the school premises after the end of the school timetable, it was decided that the lessons would take place at the home of one of the participants.

Marathanion Primary School

This small primary school is only approximately 6 km away from the regional unit's capital and therefore it is not officially classified by the state as 'remote.' However, having operated as a multigrade rural school since 1996, there is only state provision for a part of the national curriculum. As a result, the school has never had an English language teacher on its staff, which made it an eligible candidate for the study.

According to the 2011 census (Hellenic Statistical Authority, 2013), there were 470 people living in Marathonion. The school is the only one in the village and caters to a total of 18 pupils aged 6-12. Specifically, during the academic year 2018/2019 the school combined Y1 with Y2, and Y4 with Y5 and Y6 (there was no Y3 group). The numbers of pupils in each group were eight and ten, respectively. The latter group was selected to participate in the study in its entirety.

Almost half of the pupils were of Albanian heritage, speaking either only Albanian or both Albanian and Greek at home, while the rest were Greek. The proportion of pupils with parents educated beyond Year 9 (age 14-15) was 50 per cent (accounting for both parents' educational levels). The majority of the families were found to be of low socioeconomic

status, with almost all parents reporting that they earned their livelihood by doing unskilled work such as manual labour on agricultural land or in mines.

The head teacher had been at the school for 18 years. As a village native and an active member in the local community, he was not only respected by the parents but also had a very good rapport and more personal relationship with the pupils. This head teacher was supportive and remained on hand during the sessions in case the children needed assistance, for example with the technology.

Demos Primary School

This small primary school is also located in the Epirus region of north-western Greece and is approximately 12 km away from its closest urban centre. As with all the other schools which participated in the study, this too operates as a multigrade rural school, and therefore there is not—and never has been—any state provision for the teaching and learning of English. The school bears the name of the hamlet which hosts it, and which in 2011 was home to a mere 350 inhabitants (Hellenic Statistical Authority, 2013). Amongst the most common occupations of the local people are farming and running of small local businesses such as 'kafeneia' (cafes where pensioners tend to gather), tavernas or bakeries. Regarding the parents' educational level, all of them reported having received an education at least up to Year 12. There was only one exception of a parent who had had no formal education beyond Year 9 (age 14-15), having subsequently opted to not enrol to high school.

The school caters to a total of seven pupils aged 6-12. Specifically, during the academic year 2018/2019 the school combined Y1 with Y4, and Y5 with Y6 (there were no pupils in Y2 and Y3), thus effectively operating two groups only. Of the seven children in the school, four were selected to participate in the study. They were all attending Year 4 and above (Y4 = 1, Y5 = 1, Y6 = 2).

The head teacher was the only teacher in the school, and had taught there for seven years. He had been enthusiastic about the project since our very first communication and agreed to conduct the intervention right at the end of the school day on Fridays. This head teacher remained on hand during the sessions in case the children needed assistance, for example with the technology or stationery.

Morphe Primary School

This rural primary school is situated in a small village lying on the north coast of the island of Crete. Morphe is just under 25 km south of the capital of the prefecture and although its only primary school is not officially classified as difficult-access, the small size of its population means that is does not qualify for the level of provision enjoyed by schools in urban centres. As such, the school operates with only two general education teachers and has never offered English as part of its provision to the pupils.

During the academic year 2018/19 the primary hosted 19 pupils, 11 of whom were in Year 3 and above. The head teacher of the school had recently been deployed to this unit and was therefore relatively new to the locality. Despite the anticipated difficulties, he was very supportive of the project from the beginning and even volunteered to open the school in the evenings to allow our lessons to take place. He also offered to remain on hand for technical support and for supervision purposes. The choice of time and day for our weekly meetings was made after a series of negotiations between the head teacher and the children's parents, as well as the children themselves, with the intent to accommodate all needs and factor in other commitments. It was eventually agreed that we would have our lessons every Tuesday at 17:00 local time. Due to logistical constraints with regard to transport, three pupils who did not live within walking distance from the school were unable to take part, leaving us with eight participants in the group. Of these, five were attending Year 5 and three were attending Year 6.

Data collected via the initial questionnaires showed that over 60 per cent of the parents earned their livelihood by doing unskilled work such as manual labour on agricultural land or by working in the hospitality industry or in sales. The remainder were either education or business and administration professionals. Regarding the parents' educational level, all of them reported having received an education at least up to Year 12. The proportion of pupils with parents who had proceeded beyond that level and had at least some post-secondary education (either tertiary or non-tertiary) was 63 per cent (accounting for both parents' educational levels).

In terms of the technical equipment available to these pupils, besides one computer, an overhead projector had recently been purchased by the teacher after a donation was made to the school by some village residents.

Palaeopolis Primary School

This small primary school is located in a homonymous village in the north-western part of the island of Crete. The village is served by a provincial road which links it to the capital of the prefecture, situated just under 20 km to the north. Most of the 650 villagers in Palaeopolis depend on agriculture for their livelihood. However, due to the hamlet's relative proximity to the coast, many of those belonging to younger generations are now opting to become involved with tourism. Data collected via the parents' questionnaires revealed that in fact, only one parent was in agriculture, with the rest reporting being in industries such as hospitality, tourism or education. Indeed, the relatively higher socioeconomic status of these participating families may partly explain their keen interest in becoming involved with the project in the first place. As the head teacher of the school revealed to me, the four families were very interested in alternative ways of learning. The parents themselves later explained that this was partly due to the fact that two of the four children had recently been diagnosed with learning difficulties and suffered from a severe lack of confidence. As a result, they did not feel that the mainstream approaches were suitable for their children and, therefore, after reading the information sheet of the study, they welcomed the opportunity to become involved. These parents took an active interest in their children's learning and frequently enquired about their children's progress.

All four students who participated in the study were attending Year 3 and none of them had ever formally learnt English before. This meant that, being complete beginners, they were first exposed to the English alphabet and sounds during this intervention, learning to draw each letter by hand as well as identify the corresponding key on the keyboard. This group, then, was distinct from all the rest in the study in that it was composed in its entirety of absolute beginners with no prior foreign language learning experience.

The lessons took place every Tuesday at 13:45 local time at the home of one of the participants. This allowed the children ample time to return home from school, have lunch and then begin their English class.

Minos Primary School

This is the third school on the island of Crete which took part in the study. Located in the southern side of the island, the small hamlet from which the school takes its name is approximately 65 km away from its closest urban centre, and 10 minutes away by car from

the south coast of the island. Sitting at an altitude of 110 m, in 2011 Minos was home to 430 inhabitants (Hellenic Statistical Authority, 2013), the majority of whom were employed in agriculture. This is indeed supported by data collected via the parents' questionnaires. Other occupations reported by parents included working in construction, transport of goods, and the hospitality industry, either in food and beverage facilities or in tourist shops in the nearby coastal towns.

Three of the participants were of Albanian origin, their parents having migrated to Greece in pursuit of better economic opportunities. As a result, these pupils spoke both Greek and Albanian at home. Of these, one had been in Greece for less than three years. Regarding the parents' educational level, two-thirds of of them reported being educated to upper secondary level (age 17-18), with one parent holding a bachelor's degree, and one-third of them having received no formal education beyond Year 9 (age 14-15).

The school itself is a small building with the church attached to it and is located right in the middle of the village square. With only one floor and two classrooms, during the academic year 2018/2019 this primary catered to a total of 14 children and it operated with just two teachers. The head teacher was a village native who had completed his studies in Athens and had been keen to return to Minos and work in the school that he himself had attended not many years before. This head teacher was particularly keen on exposing his pupils to new experiences and ways of learning and was even willing to open up one class period every week in order for us to implement the intervention during normal school hours. However, due to restrictions imposed by the Ministry of Education (see Section 3.4.4) we eventually agreed to have the lessons at the end of the school day every Tuesday, as this was a shorter day than the rest.

All pupils in Year 3 and above received the intervention. In this case, this meant a total of 12 children, four of whom were attending Year 6, seven were attending Year 5, and one was attending Year 4. As with Morphe Primary, these pupils too had an overhead projector at their disposal, purchased on the head teacher's own initiative. Arguably, this made the intervention remarkably easier to implement with a group of this size, as it removed the need for all of them to cluster around the computer and, instead, allowed them to work from afar.

3.5 The Intervention

The intervention was conducted between January – May 2019, and consisted of two main components: a synchronous and an asynchronous learning component, treated for research purposes as a single integrated intervention. This timeline includes a two-week Easter break, but sessions for administering pre-tests, post-tests and other measures are not counted in it. Pre-tests and post-tests were started six months apart: 15 November 2018 and 10 May 2019, respectively**.**

3.5.1 Synchronous Learning

The synchronous learning component comprised twelve online weekly sessions lasting approximately 45 minutes, and took place via the videoconferencing platform Google Hangouts. This choice was primarily driven by the relative ease of access the application offers in comparison to other software that has traditionally been used in similar contexts, such as Skype. Google Hangouts, for instance, does not require installation as it can be run directly from the browser; further, during the testing phase of the research, it was found to perform more reliably than Skype (e.g., it crashed less often). These advantages made it a more attractive candidate overall and led to my decision to change my initial plan and use the Google application instead. Finally, the session duration was mandated by the need to match the duration of a class period in the primary schools in question.

The intervention was delivered by me, for the sake of consistency, reliability and internal validity. Lessons were taught and conducted in small groups within the child's normal classroom, or, where this was not possible, at one of the participants' homes, facilitated, on some occasions, by the classroom/head teacher or a parent. With parental and school permission, lessons were video recorded for reference purposes.

The curriculum of the live lessons was compatible with the Greek National Curriculum for English (Years 3-7), and each lesson was designed as a follow-up to the online activities each participant would have been working on that week. More specifically, these lessons were conceptualised as a forum which provided the circumstances in which the target language could emerge naturally, and thus encouraged the contextualised use of a grammatical concept, reading sub-skill, and so on. In effect, the implementation of the

lessons was founded within the theoretical framework of Krashen's (1981) acquisition-learning distinction, whereby he proclaims the following:

> Language acquisition…requires meaningful interaction in the target language—natural communication—in which speakers are concerned not with the form of their utterances but with the messages they are conveying and understanding.
>
> (Krashen, 1981, p. 1)

In this sense, even though the primary pedagogical goal of the lessons was to encourage the occurrence of a recently learnt linguistic phenomenon, focus was placed on fluency and communication rather than accuracy or artificial linguistic choices. Importantly, I have opted for the terms 'occur' and 'emerge' over alternatives such as 'use' or 'employ' in acknowledgement that in freer contexts of second language production the role of conscious choice becomes less prominent. Moreover, in the interest of creating an environment which encourages a low affective filter (Dulay & Burt, 1977) and thus fosters attitudes conducive to acquisition—such as openness to input—great care was taken in selecting topics which were more likely to pique the participants' curiosity and/or interest, but which also fell within the scope of the curriculum.

Finally, the synchronous component employed tiered product assignments that aimed to draw on the cognitive strengths of each student in a collaborative group (Cohen, 1994). This was deemed particularly important given that the intervention was attending to a mix of different learning profiles in each group, from varying levels of prior knowledge and readiness, to disparate predispositions for learning, to heterogeneous cultural and linguistic backgrounds and gender-based learning preferences (see for example Wehrwein, Lujan, & DiCarlo, 2007; Garber, Hyatt & Boya, 2017). In an effort to reconcile the above, the lessons were based upon practical mini projects which permitted differentiation of pupil output in three key ways:

1. **Multiple entry points for learning:** Tasks allowed some pupils to start at a different entry point (e.g., reviewing for some and extending learning for others, or a single assignment addressing multiple curricular components in response to

pupils' varied levels of readiness). Open-ended tasks with more than one right answer lend themselves particularly well to personal response.

2. **Choice:** Tasks supported the pupils' use of varied modes of expression, resources, and technologies (e.g., product formats that allowed learners to express themselves in ways other than written language alone). They also could choose whether to work alone, with a partner or in a small group.
3. **Extra support:** For groups with pupils who were in the initial stages of their learning, a strong support system for translating was put into place. In addition, they were allowed initially to express ideas in Greek and then to translate them into English (with appropriate assistance either from their peers, online translation tools, or me).

(adapted from Tomlinson, 2001)

The goal of differentiating product assignments, then, was to achieve inclusion, and was predicated on the notion that calibrating challenge to the particular needs of a learner is more likely to lead to growth and pupil engagement (Tomlinson, 2005). This is of particular relevance to small schools operating multigrade classrooms, where the circumstances mandate that multiple curriculum areas be addressed in a simultaneous mode. As a final note, a great deal of thought was put into how meaningfulness could be preserved during the intervention; therefore, the tasks and topics were selected such as to encourage the learners to draw linkages between the ideas and skills they study in school and the ways in which these are used by real people 'out there in the real world'.

Appendix 3 provides a detailed description of each lesson, including the topic area of the curriculum that it relates to, different pedagogical foci per level, and the procedures that were followed. A separate account is offered for the Palaeopolis group, which consisted of four learners at absolute beginner level; being at a very initial stage of their L2 developmental process and also relatively inexperienced with regard to social learning practices in a classroom setting, these learners required increased structure in both their collaborative and individual learning activities. Moreover, their limited linguistic repertoire in the target language mandated a more explicit focus on form, together with an appropriation of the notion of 'meaningful interaction' (Krashen, 1981, p.1) to the group's abilities and resources available to them (e.g., their linguistic capital in the L1).

3.5.2 Asynchronous Learning: EdApp

As a way of providing input to the learners, along with opportunities for guided and controlled practice of the target language, an asynchronous online learning component was designed to complement the live sessions. This made it possible to obtain comparable results in terms of the participants' learning outcomes, whilst compensating for a lack of textbooks in the participating schools. The study adopted a microlearning app, *EdApp*, as the e-learning platform. Even though *EdApp* has been designed and marketed as a corporate training tool, it was judged that it could also lend itself particularly well to language learning within the context of mainstream education due to a number of reasons. First, it combined a plethora of compelling features, such as mobile and web-based learning, mastery-based instructional design options, a wide array of interactive tasks that enabled participative design and templates for introducing new content in an engaging way, a user-friendly interface, as well as an intuitive cloud-based course authoring tool. Moreover, it allowed content delivery in a microlearning format, which enabled the breaking down of information into topical, bite-sized chunks. Additional affordances which acted as key contributing factors to the selection were the following:

1. **Gamified formative assessment:** This included the incorporation of point scores and star bars as a learner worked her way through the material in the course, allowing her to unlock the next lesson and progress through the level. "Gamification" is a relatively new term used by researchers to refer to 'the use of video game elements (rather than full-fledged games) to improve user experience and user engagement' in non-game contexts (Deterding *et al.*, 2011, p. 2426). Previous research has argued that taking game mechanics and gameplay features such as avatars, badges, points, leaderboards, levels, and progress bars and incorporating them into the learning process can trigger positive engagement amongst primary and secondary learners (Mystakidis, *et al.*, 2014). Moreover, Halloluwa *et al.* (2018) report findings that participation in a gamified learning experience encouraged Sri Lankan pupils as young as eight years old to take ownership of their own learning, thus suggesting a shift towards a more learner-driven collaborative environment.
2. **Learning analytics:** Digital data from the learners' online activity were captured, and user, group, and level metrics on performance and engagement were reported.

Insights included time spent on task, number of attempts, and progress achieved as a percentage of the goal of the lesson or course.

3. **Offline mode:** Learners were able to complete lessons when Internet connection was poor or non-existent by pre-downloading materials. Even when working offline, learning activity automatically synced to the app and stars continued to be populated.
4. **Pricing:** The app was free to use with a small number of learners (see Section 6.2.3 for updated costs).

Consequently, it was decided that, overall, *EdApp* met the needs of the present study.

Next, a self-paced course was designed, and was organised in levels according to the Common European Framework of Reference for languages (CEFR). Five levels were built in total (Pre-A1 - A2.2/Years 3-7), each of which contained an average of 20 lessons. To enable comparability, the course was mapped to the National Curriculum for English, and the lessons in each course were designed such as to match those in the textbooks used by primary schools across the country. Specifically, each course corresponded to the first three modules of the book (with the exception of Year 3/Level Pre-A1, whose content was limited to the alphabet and some colours), and each lesson contained input and activities which practised reading, writing, and listening skills as well as vocabulary and grammar. Activity types included filling in blanks, multiple choice, matching, reordering, drag and drop, spot the error, and free writing (on which I then provided feedback), as well as games such as word search, Memory, Letter Jumble, Image/Word Match, and Jeopardy (see Figures 4 and 5 below). New content was presented in the form of text, audio and/or video.

Each pupil was assigned a level at the end of the pre-testing process. Information obtained from the parents' questionnaires regarding their children's prior exposure to English, together with pre-test scores, were used to determine the course each pupil would be placed into. On the contrary, no consideration was given to the year group which the pupils were attending in school. Participants were introduced to *EdApp* in a separate session prior to the initiation of the intervention so that lack of familiarity with the interface would not hinder the children's use of the app. For the duration of twelve weeks, pupils logged into their online course, and worked independently through lessons using the application. Navigation through the lessons was linear, however, pupils were provided with options and

could choose to reattempt a lesson (e.g., to try again for more stars), open the next lesson, or go back and review their answers. For every question answered correctly, a set number of stars was awarded, depending on the level of challenge it posed to the leaner. I was able to monitor the pupils' online activity to ensure that no one was being left behind, and if so, address potential issues with the pupil in question and/or her head teacher or parent. At the start of each live lesson, a table was displayed to the class which contained everyone's progress since the previous lesson in terms of stars earned. Contrary to leaderboards, the progress of single participants was tracked over the course of one week to display the number of stars that had been earned out of the total available in the lesson that each of them had completed. These scores were not comparable as the total number of stars varied from lesson to lesson, and therefore this approach to measuring and recognising progress was chosen as an alternative to normative measurement, which would have focused instead on differential progress achieved.

Underpinning the course design were the core principles of mastery-based learning and the notion that, given sufficient time to achieve mastery of the material and a systematic approach to instruction, all learners can attain a high level of learning capability (Bloom, 1976). Consistent with the above, each course featured the following: clear learning objectives which were sequenced as units in increasing difficulty, a set minimum passing standard for each learning unit, formative testing to gauge mastery of the material, progression to the next learning unit given measured achievement at or above the mastery standard, and continued practice on a learning unit until the mastery standard was reached (adapted from McGaghie, 2015). Figure 6 shows a screenshot of the web-based version of the *EdApp* homepage for course level A1.1.

Figure 4 Screenshot showing a Memory game from the Pre-A1 course

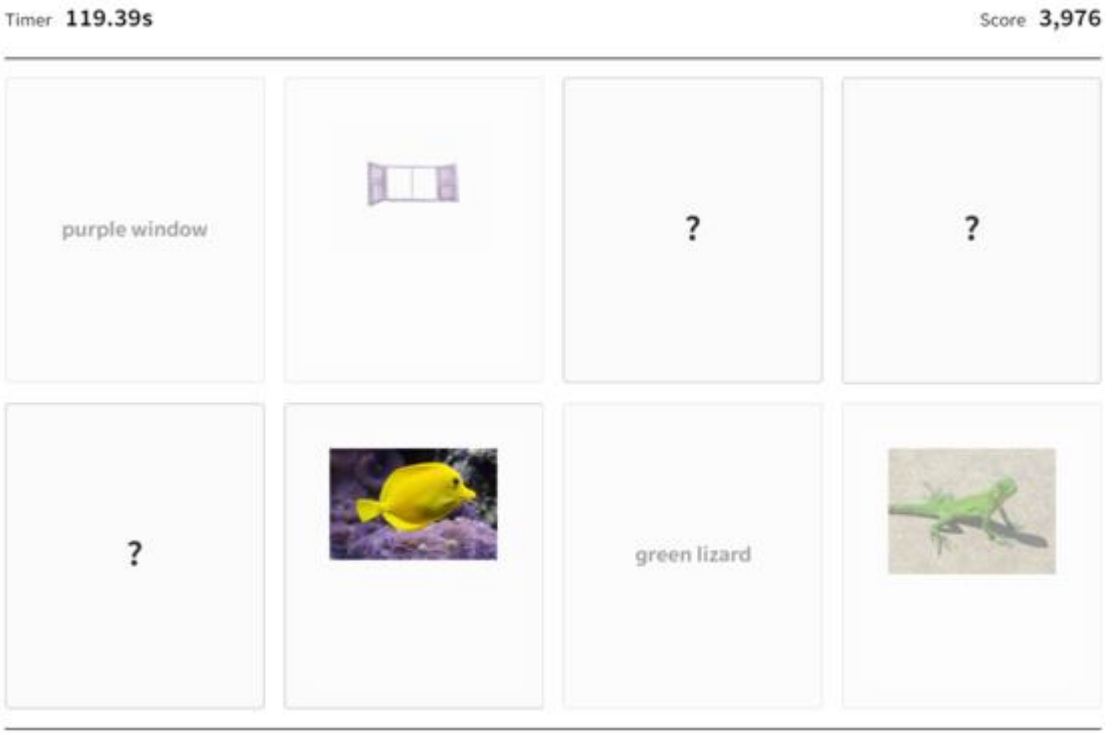


Figure 5 Screenshot showing a Letter Jumble game from the A2.1 course

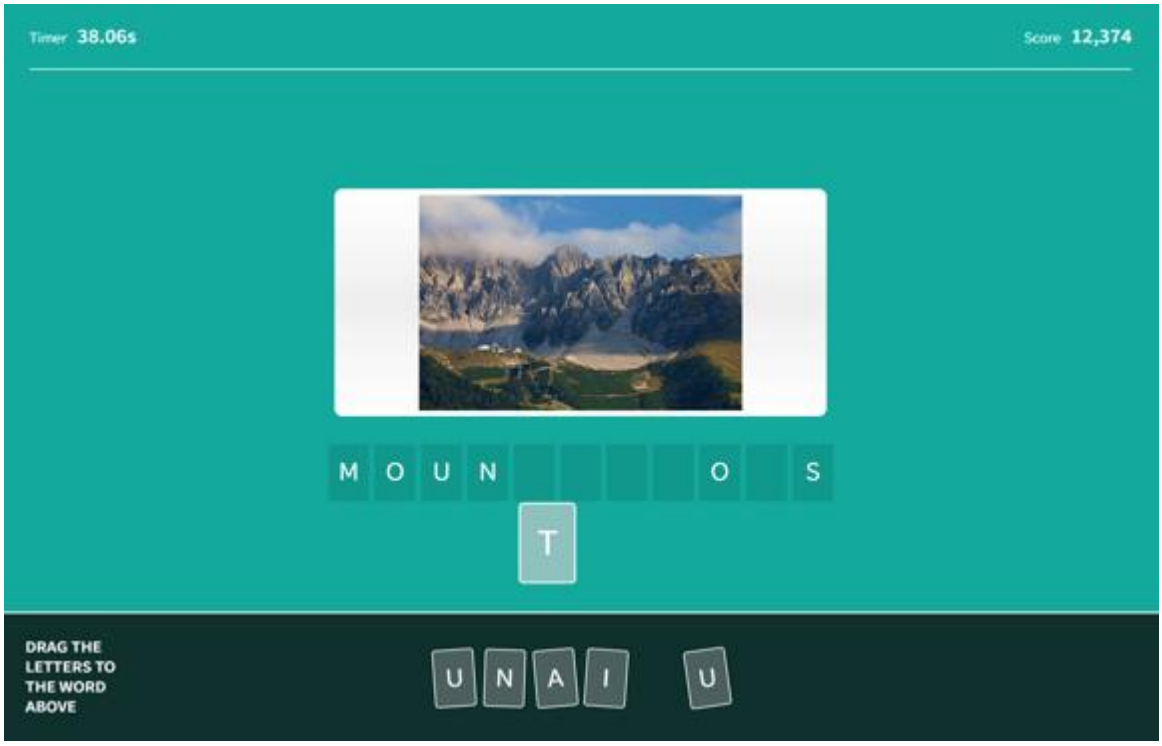
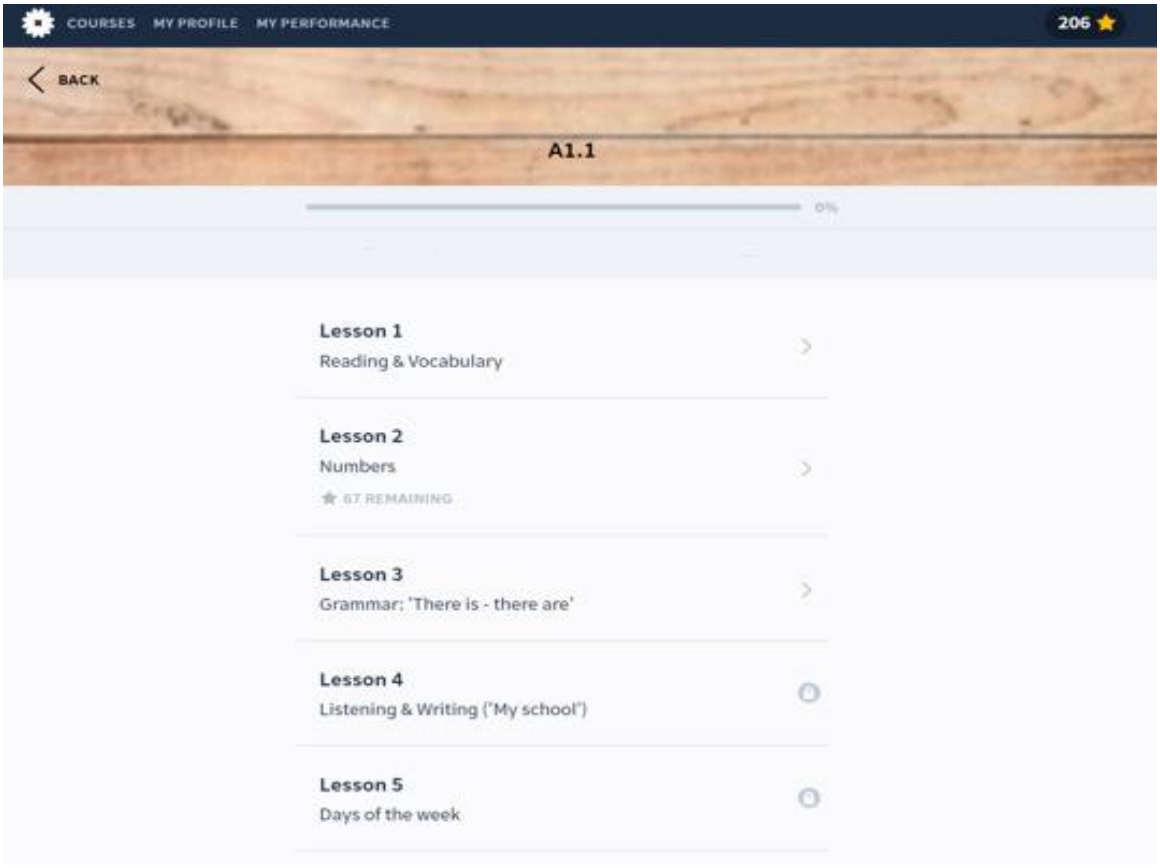


Figure 6 *EdApp* homepage for course level A1.1



3.6 Quantitative Research Methods

This section presents details about measures used in the present study. Five proficiency tests are described alongside questionnaire and psychometric testing methods. Additionally, further detail is put forth about the administration of each measure.

3.6.1 Parent and Student Questionnaires

A parent questionnaire (see Appendix 4) was developed and distributed at the beginning of the study with the remit of increasing understanding around the home environment and socio-economic circumstances that might influence the participants' English language learning. Owing to the construct's multidimensionality, the present study used a composite of parental education and parental occupation status as an indicator of socio-economic status (SES). Parental education was separately measured for the participants' fathers and mothers, and one variable was created to represent the parents' combined highest education level. Indeed, van Ewijk and Sleegers (2010) recommend either the use of a composite or the use of one single indicator as continuous variables. Therefore, the scale

was adapted from the International Standard Classification of Education 1997 (ISCED, UNESCO, 2006), an international standard classification for education-related data maintained by the UNESCO Institute for Statistics. Even though a revised version exists (ISCED 2011) the earlier version was chosen for the purposes of this study because not all the levels on the ISCED 2011 scale would have been relevant to the Greek context (e.g., 'Short-cycle tertiary education'), not least at the time when most of the parents in this study would have completed their education. This discrepancy was seen as holding potential for confusion amongst the participants and therefore the simpler version was adopted. One adaptation that was made to the ISCED 1997 scale, however, was that it did not differentiate between master's and doctorate degree holders.

Furthermore, parent responses on theirs and their spouses' (or co-parents') occupations were coded according to the four-digit International Standard Classification of Occupations (ISCO) codes developed by the International Labour Organization (ILO, 2007). These were subsequently mapped into the International Socio-economic Index of Occupational Status (ISEI, Ganzeboom & Treiman, 2010). In the converted ISEI-08 scores, higher scores indicated higher occupational status. As before, a single variable was created to represent the higher level of occupation status of either parent.

Sections 2 and 3 of the questionnaire sought to extract factual information about the students' English language learning environment and background, including their extra-curricular contact with the L2 and its speakers (e.g. listening to English songs or watching English-language programmes on TV or the Internet, as well as travel to English-speaking countries), the parents' English language proficiency, and the extent of the parents' support (English language learning milieu). The scales were adapted from Dörnyei *et al.* (2006) Language Disposition Questionnaire and aimed to serve as a method of cross-validation of parental and student responses (see Section 3.9.5).

A student questionnaire was also developed and administered in the week before the initiation of the pre-testing process (see Appendix 5). Overall, the design was driven by the following question:

- What specific socioeconomic, personal and educational factors are likely to be an important influence on student attainment in English, outside of the intervention?

As before, the questionnaire drew on Dörnyei *et al*'s (2006) Language Disposition Questionnaire in attempting to elicit information relating to the following variables:

- linguistic background (e.g., multilingual family backgrounds, English and other language learning experience);
- attitudes towards English and the L2 community (that is, the extent to which students felt positively towards particular English-speaking countries and their citizens);
- extra-curricular contact with the L2 and its speakers (e.g., listening to English songs or watching English-language programmes on TV or the Internet, as well as travel to English-speaking countries and meeting tourists);
- attitudes towards foreign language learning in general (e.g., fear of assimilation);
- self-confidence in foreign language learning;
- intended effort (that is, amount of effort the student was willing to expend on learning English), and
- language learning milieu (that is, extent of parental or other familial support available, and attitudes towards foreign language learning in the children's environment, such as family and peers).

To test whether the questionnaire was appropriate, and that the questions were clearly understood by children of the target age group, the questionnaire was piloted using a convenience sample ($N = 6$) with similar characteristics to the participants. All comments were taken into consideration and amendments were made as required in terms of language comprehension and clarity.

3.6.2 Raven's Coloured Progressive Matrices Test

Individual differences in cognitive abilities have been shown to influence academic achievement in both instructed and uninstructed second language acquisition settings which provide for incidental L2 exposure, such as by way of complex naturalistic input (Robinson, 2005). Given this, a decision was made to administer a standardised test which would enable assessment of the variation in terms of the participants' reasoning abilities, and its consequent influence on attainment. To this end, the Raven's Coloured Progressive

Matrices Test (CPM; Styles, Raven & Raven, 1998) was employed as an estimate of the non-verbal component of Spearman's *g* in this study. Thanks to its language-, culture- and gender-neutral content, the CPM is generally regarded as a culturally and ethnically fair instrument for the assessment of general cognitive functioning in children, including non-English speakers, and is therefore commonly used in educational settings (Valencia, 1984; Kaplan & Saccuzzo, 2018). The test has been found to have fairly reasonable reliability, with estimates from available studies ranging from the high .70's to low .90's (see Raven, Raven & Court, 1998).

The CPM comprises three sets (set A, Ab and B) which are ordered in terms of increasing difficulty. There are 12 items within each set, each containing a pattern problem with one part removed and students are required to select one of six pattern pieces that best solves the overall array or matrix by engaging in a process of abstract reasoning. Items within each set also get progressively more difficult with increasingly more complex patterns to evaluate.

Although Greek norms have recently become available thanks to Sideridis *et al.* (2015), what was of interest here was the capacity to draw meaningful conclusions regarding the students' general intellectual functioning relative to one another, and, as such, it was decided that the use of a standard sample against which to compare test performance was beyond the scope of this study.

3.6.3 Vocabulary Knowledge Test

Vocabulary knowledge is not a uni-dimensional construct, but includes facets of size (that is, how many words someone knows), and depth (that is, how well they know these words) (Nation, 2001). These are then assessed in terms of receptive versus productive knowledge (ability to understand versus ability to produce these words automatically on demand).

Many standardised tests exist to measure the many different aspects of second language learners' English vocabulary knowledge, however, whilst examining fitness for purpose of some of the most widely used instruments, a number of micro-level conflicts were identified. For instance, the 'industry-standard' measure of vocabulary size, Nation's Vocabulary Levels Test (Nation, 1990), assesses the test-takers' understanding of the

meanings of the target words by having them match up the definitions to three of the target words in each item. The vocabulary items being tested in each of its five Levels comprise words with a high frequency of occurrence, however, they were not found to be suitable for second language learners possessing only small vocabularies nor were they congruent with the national curriculum for EFL in Greece. Similarly, Meara's Yes/No tests (Meara & Milton, 2003) measure vocabulary size by requiring testees to indicate whether they know the meaning of single words, some of which are genuine and some pseudo-words. Even though both have been widely adopted in educational research, one limitation that can be attached to both these basic vocabulary size tests relates to the fact that they are only assessing passive recognition knowledge of vocabulary, thus disregarding important aspects such as vocabulary depth (e.g., see Read, 1997). Read's own suggestion for overcoming this impasse is the Word Associates Test format (WAT; Read, 1998) which tests knowledge of high-frequency content words by asking learners to identify associational links between individual words. Whilst this test would indeed provide some insight into how well test-takers know a word, this is another attempt to measure vocabulary knowledge taking a word-based approach, which does not allow us to make statements about the learners' vocabulary as a whole. Of course, this would not be a problem for beginner or elementary level participants, however, it becomes less useful as we go up the proficiency scale.

For these reasons, and given that there is no standardised assessment for primary English learners in Greece, a decision was made to devise a testing tool which would encompass assessment of all three aspects of knowledge about a word—form, meaning and use—and which would also correspond to the national curriculum. The final version (see Appendix 6) was adapted from the first two Cambridge English Qualifications for Young Learners—Pre-A1 Starters and A1 Movers—whilst for items corresponding to Level A2 it drew on Laufer & Nation's Productive Levels Test (Laufer & Nation, 1999). This test is being widely used in studies of productive vocabulary knowledge (Meara, 2013). In sampling vocabulary items for inclusion in the testing instrument, sets of five randomly selected words were created for each of the five levels (i.e. Pre-A1, A1.1., A1.2, A2.1, and A2.2), and an aggregate of these sets subsequently formed the pool from which the final set—comprising 25 items—was randomly generated. A reliability analysis was carried out on both pre- and post-tests which showed the instrument to reach high internal consistency (Cronbach's alpha = .89 and .92, respectively).

Table 5 below illustrates the type(s) of vocabulary knowledge each test item was designed to measure, together with the CEFR level it corresponded to.

Table 5 Types of vocabulary knowledge assessed

Type of Knowledge / **Level / Item No**	**Pre - A1**				**A.1**					**A.2**			
	Item 1	Item 2	Item 3	Item 4	Item 5	Items 6 - 8	Items 9-10	Items 11-13	Items 14-15	Items 16-18	Items 19-20	Items 21-23	Items 24-25
Form (recognition)	✔			✔	✔	✔		✔					
Form (production)		✔	✔				✔		✔	✔	✔	✔	✔
Meaning	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Use				✔	✔	✔		✔		✔	✔	✔	✔

3.6.4 Grammar Knowledge Test

Given the prominence of grammatical development in second language acquisition research, it was deemed necessary to discover if the students who received the intervention had made progress in their knowledge and understanding of contextualised use of grammar as a result of their participation in the study. Towards this end, a grammar test was devised aiming to elicit the participants' knowledge of some of the more fundamental aspects of language learning, as well as their ability to draw possible associations between form and meaning. Following the same item sampling method as before, a 25-question test was devised (see Appendix 7) which was mapped to the CEFR, and was designed to assess all five levels on a single, continuous scale which increased in difficulty. Replicating the format employed by Zhang (2012) for the purpose of assessing explicit knowledge of grammar, the testing tool consisted of a grammatical error correction task which contained 25 sentences and required learners to identify the part of the sentence that made the sentence ungrammatical, and correct the identified part to make the sentence grammatically sound. Visual support for the sentences was provided in the form of still pictures. The task was untimed, but most groups completed it in approximately 30-35 minutes. The internal consistency of this measure was good for both pre- and post-tests (Cronbach's alpha = .85 and .91, respectively). Finally, as this aspect of learning did not pertain to the Pre-A1 curriculum, the Grammar Knowledge test was not administered to those students.

3.6.5 Aural Comprehension Skills Test

With the advent of the communicative language teaching (CLT) era, listening skills came to be recognised as a crucial aspect of interlanguage communication, providing a valuable source of input for second language acquisition (Krashen, 1985; Swain, 1985). In light of the importance of helping students develop their aural abilities as part of the intervention, a listening test was developed to make it possible to determine any gains in listening proficiency. In operationalising the linguistic competencies that needed to be assessed, this study drew on Buck's (2001, p. 114) default listening construct, which he defines as the ability:

- *'to process extended samples of realistic spoken language, automatically and in real time,*
- *to understand the linguistic information that is unequivocally included in the text, and*

- *to make whatever inferences are unambiguously implicated by the content of the passage.'*

To elicit these core linguistic skills, a task was created (see Appendix 8) which was typical of a common communicative situation, i.e. listening to a narrative. As a way of adding to the authenticity of the task, and in order to render our communication in the L2 as meaningful as possible, the test comprised a listening-to-writing (or, better, drawing) exercise, whereby in nine utterances of varying length and complexity I described the view from my window. The students then had to recreate this view on their piece of paper by drawing a window and placing each object in the right position, according to my description. They were told that the end goal of the task was to try and make a fair guess as to where I was, however, in reality, this did not form part of the assessed component of the test. Even though on this occasion the description was of an imaginary world, the task itself was particularly relevant to our context. This was because, being aware of the fact that I was often on the road over the course of the intervention and therefore connecting to them from various parts of the world, our meetings often started with the students asking to know my whereabouts, along with details around my visit to each location. As a result, I often replied to these questions by prompting them to have a guess. Of course, they could not know, but they always enjoyed suggesting names of faraway places, or trying to remember my previous locations.

Going back to Buck's (2001) auditory competencies, in order to assess the students' ability to recognise and parse linguistic input into meaningful chunks, it had to be ensured that any new linguistic information would activate existing knowledge or schemata. For this reason, content words and syntactic clues were used which formed part of the syllabus of the intervention, and were therefore expected to constitute familiar ground. In so doing, it was hoped that the students would be able to construct the gist of each idea by making inferences based on prior knowledge, and in this way, build up a summary of the whole text (*ibid*.).

Finally, in order to exclude inferences that were dependent on abilities other than linguistic knowledge (e.g., drawing), students were advised to use text and their L1 in order to explain parts of their drawings that might look ambiguous, or which they did not feel confident enough to draw. Similarly, students were given the option to either use colour marker pens

to indicate the colour of certain objects, or simply write the colour next to the object in their L1. The task was untimed, but most groups completed it in approximately 20-25 minutes.

The internal consistency of the measure was calculated using both pre- and post-tests and was found to reach acceptable values at $\alpha = .81$ and $\alpha = .84$, respectively.

3.6.6 Writing Skills Test

The writing skills measure was adapted from Writing Part 7 of the Cambridge English A2 KEY qualification assessment (Cambridge Assessment English, 2018). In consonance with the listening skills test described in the previous section, the writing task used an image to prompt cross-thematic language use across a range of levels. First, students were shown a picture of a school playground (see Appendix 9) and were subsequently given ten minutes to describe in writing what they observed, trying to record as many details as possible. The image was projected on the screen and was left up for the duration of the task. To help scaffold the activity, a short brainstorming session was held in the students' L1 prior to the initiation of the test encouraging students to come up with and share leveled questions about the photo. This stage was deemed crucial in ensuring that a lack of understanding of task expectations did not inhibit performance. Beginner level students were invited to simply write down words, as opposed to full phrases or sentences, in describing the picture. All students were instructed to write numbers in word form, if possible. Examples of participant responses are available in Appendix 10.

Test performance was assessed using holistic assessment criteria. A multiple-trait rating scale was developed (see Appendix 11) based on the mark scheme for Writing Part 7 of the Cambridge English A2 KEY test (*ibid*., p. 22). The scoring criteria focussed on the quality of the linguistic content of the text, i.e. task fulfilment (evidenced by the level of descriptive detail), language control (including clarity and organisational structure), as well as fluency. These criteria, in effect, constitute the operational definition of the construct of second language writing as adopted by the study, and are largely informed by three core dimensions commonly relied upon in SLA research to describe L2 written performance: complexity, accuracy, and fluency (CAF) (Armstrong, 2010; Johnson, Mercado & Acevedo, 2012; Biber & Gray, 2013). Drawing on findings pointing to a significant and positive correlation between length of text and overall score (e.g., Cumming *et al.*, 2006;

Gebril & Plakans, 2013), fluency was operationalised as length and therefore measured through overall word count.

Following the protocol outlined below, I began the rating process by coding each writing sample for the total number of words:

- Contractions were counted as 2 words;
- repetitions were not included in the word count (e.g. *the the boy*= 2 words);
- made-up/nonsensical words were not included in the word count;
- where misspellings existed, words were included in the word count provided that their meaning remained intelligible;
- numbers (e.g. 5, 4) were not included in the word count unless they were written in word form (e.g. *five*, *four*);
- sentences had to be true, i.e. accurately describe the picture;
- two-digit numbers were counted as one word (e.g. twenty-four), even if not hyphenated.

A native English-speaking teacher with over ten years' experience teaching EFL/ESL was trained in the coding procedures and subsequently blind double-marked 40% of the writing samples. The first marker scores were stratified into three different bands (low, middle, high). From each band 12 responses were chosen, at random, for second marking. Guidelines for applying the holistic assessment criteria were produced and made available to the second rater in writing (see Appendix 12). Where a discrepancy occurred, this was discussed between the two of us and a final score agreed on. Interrater reliability for the written responses was calculated using Cohen's kappa (1960). There was an initial interrater reliability coefficient of 0.75, rising to 0.82 ($p < 0.001$) following further discussion as part of the moderation process, thus indicating high agreement (Landis & Koch, 1977; Altman, 1991).

3.6.7 Oral Fluency Test

Central to the aims of this research was that, to the greatest extent possible, all teaching, learning and testing procedures were grounded in communicative authenticity. As intuitive as this may seem to CLT adherents, it does, however, imply that, in the context of L2

performance, a balance amongst fluency and other aspects of performance such as complexity and accuracy may be difficult to achieve. This alludes to Skehan's (2009) 'trade-off hypothesis' which posits that due to capacity limitations the three core components in L2 performance compete for attentional resources and that this is likely to result in learners prioritising meaning (fluency) over form (accuracy and complexity). With the above in mind, a decision was made to look at the participants' performance from the perspective of fluency. In addition, L2 fluency has been found to correlate significantly with productive vocabulary knowledge (see Uchihara & Saito, 2019), and, therefore, it was reasoned that, even if we ended up missing observations about grammatical elements and syntactic complexity, this measure would still likely be an accurate reflection of the participants' L2 lexical repertoire and their ability to retrieve this in oral communication.

In designing the task, the following factors were considered. First, it was vital to select a task that offered the students more freedom of lexical and grammatical choice than, say, a picture story task does (Derwing *et al.*, 2009). Second, the immediacy of information factor was considered. Indeed, L2 fluency has been found to correlate quite strongly with L1 at low levels of L2 proficiency (Derwing *et al.*, 2009), and, hence, it was deemed necessary that the participants be assessed on a topic in which they were most likely to be fluent in their L1. With the above in mind, and following Derwing *et al.* (2009) as well as Kormos and Dénes (2004), the task was designed such as to elicit speech by means of monologue. In fact, the overwhelming majority of fluency research deals with monologue (Ejzenberg, 2000; Witton-Davies, 2013), and there is good reason for this: it is far easier to analyse compared to dialogue or multilogue. Assessing fluency in the context of conversations between myself and the participants, or between the participants, would have presented a number of measurement issues due to turn-taking, floor-holding, overlapping, and interrupting, all of which present difficulties at the analysis stage which pose a threat to reliability. The task comprised a personal information monologue requiring interviewees to keep on talking about themselves for as long as they could. It was presented to them as a game, however, they were not informed that a timer would be running whilst they spoke, as it was feared that this might put undue stress on them. The test was administered to each participant separately, with the same instructions read out to everyone prior to the task for the purpose of standardisation (see Appendix 13).

The output from the participants was audio recorded and transcribed, following conventions described in Lennon (1990). Where performances exceeded one minute in length, only the first 60 seconds were used for analysis beginning when the participants actually started speaking. Microsoft Word for Office 365 was used to measure a temporal aspect of fluency, namely, pruned speech rate (PSR). PSR has been used extensively in L2 fluency research (see Lennon, 1990; Mehnert, 1998; Yuan & Ellis, 2003; Derwing *et al.* 2004, 2009, although the latter two did not use the term 'pruned speech'). It refers to rate of speech after repetitions, false starts, reformulations, and asides—including comments on the task itself and words addressed to the interviewer—have been eliminated from the calculation (Lennon, 1991). It can be calculated by dividing total word counts (after pruning) by speaking time in minutes (including silent pause time), and is expressed in words per minute (WPM);

$$\text{Pruned Speech Rate (PSR)} = \frac{\text{'Pruned' words}}{\text{Minutes of speaking time}}$$

In this research, speaking time was obtained by timing the recordings with a stopwatch, and subsequently converting it from seconds to minutes using the Google unit converter. Finally, as this component of L2 proficiency did not pertain to the Pre-A1 curriculum, the oral fluency measure was not administered to the four students attending the Pre-A1 group. It was, however, administered to the other two beginner level students, who were attending two separate mixed-level groups, and, therefore, participated in the product assignment activities as part of this intervention. This was to account for any change that might have occurred as a result of this exposure. The reliability estimate that was obtained on the assessment was relatively low ($\alpha = 0.59$). Possible explanations and the implications of this are discussed in Chapter Seven.

3.6.8 Scheduling and Administration of Measures

As mentioned in Section 3.5, pre-tests and post-tests were started six months apart: 15 November 2018 and 10 May 2019, respectively**.** For each group, testing took place over the course of four weekly sessions, following the schedule shown in Table 6 below:

Table 6 Quantitative measure schedule

Session 1	**Session 2**	**Session 3**	**Session 4**
Student Questionnaire	Grammar Knowledge Test	Aural Comprehension Skills Test	Oral Fluency Test
Raven's CPM	Vocabulary Knowledge Test	Writing Skills Test	

Parent questionnaires had originally been intended to be administered online, however, it was soon discovered that degrees of digital literacy varied significantly amongst parents, and, therefore, a paper-and-pencil version was used instead. The amount of sensitive information the questionnaire aimed to elicit rendered self-administration as the most appropriate mode of data collection in this setting. Indeed, Tourangeau and Smith (1996) warn that self-administration respondents are likely to be more willing to disclose sensitive or socially undesirable information, a view which is aligned with Oppenheim's (1992, p.126) assertion that self-administered surveys have a lower effect on social reliability bias compared to the interview method. Questionnaires used coded ID's and were returned to the head teachers in sealed pre-paid envelopes, who, in turn, posted these to my address.

All student measures were administered in group settings within the participants' normal classrooms, or, at one of the participants' homes, depending on the arrangements that had been put in place regarding the administration of the intervention. Measures were administered by me via Google Hangouts, with some support from the classroom teacher or a parent, depending on the setting. In this regard, then, the test setting replicated that of the learning environment. Additionally, care was taken to ensure that participants were tested in a non-threatening and supportive environment. All tests were approached one question at a time by projecting the relevant item on the screen and allowing children enough time to record their responses on their answer sheets, all of which had been coded with the corresponding student ID. This setup was chosen for two reasons. First, logistical constraints regarding access to printing facilities in some schools, together with difficulties arising from posting test packages to schools, and then expecting these to be redirected to the homes where testing was due to take place without any potential threats to contamination, meant that self-administration had to be eliminated as a viable option. Second, this kind of setup afforded these young learners a degree of support, or, put in McKay's (2006, p. 81) terms, a 'degree of reciprocity' between me as the test administrator and the children, which was more likely to make them feel at ease in a test situation such

as this. With regard to the CPM, Kaplan and Saccuzzo (2018, p.302) assert that group administration is indeed employed in schools at every level, with scoring for group tests being 'more objective and hence typically more reliable than the subjective scoring of many individual tests'.

To support reliability, all tests were administered in a fixed order and according to standardised instructions. Moreover, to reduce any memory or test exposure effects, a six-month gap was allowed between the pre- and post-tests, while students were not informed that they would take the same test a second time, and answers were not released after the pre-test. Lastly, two practice items were included in each of the CPM, Vocabulary Knowledge, Grammar Knowledge, and Aural Comprehension Skills Tests.

3.7 Qualitative Research Methods

This section presents the additional explanatory data gathered in the present study to further illuminate the quasi-experimental outcomes and the mechanisms which might be underpinning these. Qualitative aspects relating to the children's learning were investigated through a series of focus groups and semi-structured interviews. The rationale for conducting these is outlined below.

3.7.1 Focus Groups

In order to qualitatively answer Research Question 2 (together with its associated sub-questions), data were collected about students' perceptions of the intervention and the factors which they felt may have affected their academic performance. Whilst questionnaires or individual interviews were considered, focus groups were selected as the most appropriate method to access the views and experiences of the participating students on their recent learning experience. This decision was primarily guided by the epistemological status that is commonly afforded to the method, i.e. that focus groups can be used within a social constructionist research framework (Wilkinson, 2004). Indeed, such an approach assumes that sense-making is a collaborative enterprise constructed through group discussions and interactions rather than individuals having fixed pre-existing ideas, views and understandings (*ibid*.). In this regard, interaction between participants becomes a social context in its own right where naturally occurring data can be obtained, and, as such, it could be considered as the most distinctive feature of the method. For example,

such interactions may 'allow respondents to react to and build upon the responses of other group members', creating thus a 'synergistic effect' which can yield important dimensions or ideas which individual interviews might not have elicited (Stewart, Shamdasani, & Rook, 2009, p. 594). Focus group participants may agree, disagree, challenge or express astonishment at a group member's view, all of which could serve the purpose of provoking the emergence and elaboration of rich accounts, thereby leading to new insights. Furthermore, the presumed shift in control away from the interviewer due to the number of participants simultaneously involved when compared to individual interview approaches affords the focus group methodology an 'egalitarian' status (Wilkinson, 2004, p. 181) which enables researchers to overcome issues relating to power dynamics which may arise in individual interviews (see Matthews, Limb & Taylor, 1998; Oakley, 2013). Focus groups provide children with a 'safe space' in which to voice their opinions since they have an opportunity to find support in their peers as they naturally do in their day-to-day social interactions. In fact, Bloor *et al.* (2001) posit that utilising pre-existing peer groups for focus group research can prove beneficial as participation is less daunting for individuals, and I would argue that this point becomes even more salient when research involves children. In the context of the present research, it was hypothesised that children might find it difficult to express potentially negative feelings towards their participation in the study—or aspects of it—on a one-to-one basis with the researcher, but that a focus group setting might instead create a familiar environment in which children would feel comfortable in disclosing their candid views. Nevertheless, it is acknowledged that the relative degrees of freedom afforded by the focus group technique embed risks in themselves, including a tendency for self-directed conversations, or interactions which are dominated by a very opinionated member (Stewart, Shamdasani, & Rook, 2009). I therefore remained aware that as moderator I would have to make decisions about what to attend to and what to gently steer them away from in maintaining the group's focus.

I conducted the focus groups via Google Hangouts as both children and head teachers were already familiar with the software by that point. Discussions took place in a quiet room at each school or at the home of one of the participants, following the schedule in Appendix 16. All focus group sessions lasted between 10-20 minutes and were video recorded. A short debriefing session followed each interview. Focus group interviews took place in a separate session following completion of the post-testing process and, given that many of the participants' English proficiency was still low, they were all conducted in Greek.

Typically, a focus group may involve between eight and twelve individuals (*ibid.*), however, in this case and for reasons of continuity, groups were formed according to pre-existing learning group structures, and thus varied in size from three to eight participants. A total of 35 children participated in the qualitative phase of the study; timetabling conflicts prevented students from Minos ($N = 12$) from taking part in interviews, and therefore data from this school were recording as missing. The interview schedule was comprised of a total of 10 questions, most of which were accompanied by a series of follow-up questions to encourage development and elaboration of responses. Throughout the interview, children were encouraged to provide as much detail about their experiences and feelings as they could, and expand on answers wherever possible. The data analysis procedure that followed is described in Section 3.8.2 below.

3.7.2 Semi-structured Interviews

Consistent with the argument put forth in Section 3.3.1, it was reasoned that in order to produce the kind of knowledge necessary for an in-depth understanding of the mechanisms underpinning the learning process within an institutional structure, a multi-perspectival approach would have to be adopted which would serve to shed light on the relationships, dependencies, tensions, or other types of interactions between multiple interacting components forming the ecosystem under investigation. To that end, data on the parents' and head teachers' perceptions of the intervention were also generated through semi-structured interviews following the end of the post-testing process. Indeed, in social science research today, interviews are frequently used in combination with other methods, while in post-experimental interviews specifically, the interview method is typically used to question subjects on their understanding of the experimental design (Kvale, 2007). The semi-structured interview format was chosen to provide sufficient flexibility with respect to interpreting the meaning of the described views and experiences from the participants' own perspectives and in their own words, thereby aiming to achieve a balance amongst the strengths and limitations of approaches sitting at opposite ends of the continuum between strictly structured questionnaires and open everyday conversations. This allowed room for a number of on-the-spot decisions—for example, whether to follow up new leads or choose not to deviate from the interview guide. Some of the ways in which I actively followed up answers included asking for specifics and elaborations of meanings and feelings, or by seeking to test the strength of the participants' expressed beliefs through counter questions

and ‘meaning-oriented replies’ (*ibid*., p.11). This study is grounded in a postmodern epistemological understanding of the interview as a process of social construction of knowledge, whereby knowledge is seen as constituted in the interaction between two people and thus interrelational and context-sensitive (see Rapley, 2007). Aligned with this stance, I remained cognisant of my own subjective perspective and the ways in which this could influence my personal interaction with the participant, as well as the knowledge produced. Having acknowledged that the topic of the conversation was not one that I could approach with detached objectivity, I remained aware that finding that balance and eliminating the potential for bias required vigilance and ‘commitment to disclosure’ (Mears, 2009, p. 4). Such a recognised and deliberate use of my personal perspective, I hoped, would contribute to the co-construction of a multi-perspectival reality which, rather than invalidate, would open up alternative ways of making sense of the experiences and phenomena under discussion. Lastly, the interview was not designed to be a one-way dialogue; rather, it was my goal to design the interview guides (see Appendices 14 & 15) such as to instigate equality in both questioning and interpreting and thus create a stage which would be conducive to reciprocal sharing.

Thematically, the interviews sought to do the following: on the one hand, they aimed at eliciting comprehensive accounts of different aspects of the children’s life worlds that delineated the qualitative diversity of their academic experiences; these questions centred upon the themes of educational provision and availability of resources at the school and the family levels. On the other hand, the interviews sought to obtain an extended understanding of the children’s perceptions of the intervention, from the perspective of the parents and head teachers who had been actively involved in the learning process. It was hypothesised that such nuanced accounts would facilitate the identification of situational factors which may have contributed to or impeded the students’ academic achievement during the intervention. Each interview was introduced by a briefing in which I briefly talked about the purpose and design of the interview, the use of an audio recorder, and asked if the participant had any questions before starting. The initial briefing was followed up by a debriefing before ending the interview, where I asked if the participant had anything more to say, and also after the interview, where I rounded off with some key insights I had gained from the conversation.

Time constraints made it impossible to include all head teachers and parents. Instead, a decision was made to conduct interviews in six out of eight participating schools, and include either one parent or a head teacher from each of these. As a result, four head teachers and two parents took part in the interview process (N = 6). The former were selected at random, whereas, for the parents, the selection was made on the basis of their involvement in the intervention—that is, parents who had been hosting lessons in their own homes were invited to participate on the grounds that they would be better placed to comment on the efficacy of the intervention and offer more in-depth accounts of theirs, their children's, and their host children's experiences. Interviews were conducted via Google Hangouts, and, in the case of head teachers, took place in a quiet room at the school, otherwise at the parent's home, following completion of the post-testing process. All interviews were conducted in Greek, lasted between 1-1.5 hours and were audio recorded. The data analysis procedure that followed is described in Section 3.8.2.

3.8 Data Analysis

3.8.1 Quantitative Data

All data (questionnaire and test responses) were entered into SPSS for cleaning and analysis. Various statistical tests including paired sample t-tests, hierarchical linear regressions, and structural equation modelling (SEM) were used to understand trends and data patterns. Following quasi-experimental conventions, data were collected before and after the intervention period for all participants.

All descriptive, bivariate, multiple regression and exploratory factor analyses (Sections 4.2 – 4.4) were conducted using the Statistical Package for the Social Sciences Version 24 (SPSS, Chicago, IL, USA). Interaction effects were examined via PROCESS (Preacher & Hayes, 2004), downloaded into SPSS. Structural equation model (SEM) analyses, including confirmatory factor analyses (Section 5.2), were carried out in Stata Version 16 (StataCorp, 2019), with all SEM models provided in this thesis built using Stata's graphical user interface.

Null hypothesis significance testing (NHST) is a widely used approach to testing hypotheses with statistical models in applied educational research. NHST provides criteria for separating signal from noise, thereby enabling us to derive the probability that any

observed differences have occurred simply by chance. We can then use this as a reference to make a decision to reject or not to reject the null hypothesis. Although, in principle, the critical value used for rejecting or accepting a hypothesis is the researcher's choice, in educational research, the basis of any statistically significant differences between two population parameters is typically set at $p < 0.05$ and infers that 1 in 20 is attributed to chance or some other unaccounted factor, thus resulting in the rejection of the null hypothesis and the acceptance of an alternative one (Peers, 1996). Despite the fact that recourse to the $p < 0.05$ significance level has prevailed in practice, one of the most prominent criticisms of contemporary practices is that researchers must evaluate the *practical* significance of the outcomes of tests of statistical inference, rather than statistical significance alone (McLean & Ernest, 1998; Richardson, 2011). This view is echoed by Field (2017, p.125), who asserts that, rather than speaking in dichotomous terms of accepting versus rejecting a hypothesis, we should talk about 'the chances of obtaining the result we have (or one more extreme), assuming that the null hypothesis is true'. Further, McLean and Ernest (1998) note that as sample sizes increase, the role of statistical significance becomes less important. To address concerns regarding the interpretation of the outcomes of NHST, this study has taken extra care to implement the following procedures when reporting statistical significance:

1. consider and report (significant) effects sizes (Carver, 1993). These are used to describe the magnitude and direction of the observed differences of means when comparing gain scores amongst the participants who received the intervention. Cohen's *d* statistic (Cohen, 1960, 1988) is used as a guide to interpreting the magnitude of effects. The values used in the interpretation of results obtained in this study range from 0.2 (small), 0.5 (medium) and 0.8 (large). In addition, linear regression and SEM results are reported in standardised beta (β) coefficients (with a mean of 0 and a standard deviation of 1), thereby allowing for interpretability and comparability across different units of measurement;

2. where results are given in meaningful units, confidence intervals are also reported and interpreted alongside *p*-values and effect sizes (Cohen, 1990, 1994; Kirk, 1996);

3. any evidence obtained from the measurements is evaluated only in the context of other research that has investigated similar problems employing similar methods (MacDonald, 2002).

To account for the influence of sample size on estimates of statistical significance, a preliminary *a priori* power analysis was performed whilst still at the research design stage wherein predetermined levels of alpha risk, effect size, and power were used in calculating an adequate sample size for the intervention.

Missing Value Analysis (MVA) was carried out in order to examine individual study variables for amount of missing data and to identify any pattern in the absence of the data. Using Schafer's (1999) 5% threshold, it was found that only four variables had missing values that exceeded this: parental occupation status (8.5%), aural comprehension post-test (10.6%), and oral fluency pre- and post-tests (34% and 12.8%, respectively). However, Little's MCAR chi-square test indicated that almost all data were missing completely at random (MCAR). As such, either a pair-wise or a list-wise deletion of missing value cases was chosen for all analyses. An exception to this was the parental occupation status variable, for which the test showed that data were not MCAR, but either missing at random (MAR), or missing not at random (MNAR; the test does not distinguish between these). A detailed description of missing value replacement procedures that were followed is provided in Section 4.2.2.

Finally, SEM model fit is evaluated using the fit indices and recommended cut-off points illustrated in Table 7.

Table 7 Fit indices and thresholds for evaluating model fit in SEM

Fit index	**Values indicating a good fit**	**Values indicating an acceptable fit**
Chi-square	non-significant *p*-values	
Root mean square of approximation (RMSEA)	< 0.05 (Browne & Cudeck, 1993; McDonald & Ho, 2002)	0.05-0.10 (*ibid*.)
Comparative fit index (CFI)	≥ 0.90 (Schumacker & Lomax, 2016)	

Tucker-Lewis index (TLI)	≥ 0.90 (*ibid*.)	
Standardised root mean square residual (SRMR)	< 0.08 (Hu & Bentler, 1999; Acock, 2013)	

3.8.2 Qualitative Data

Qualitative data from focus group and interview responses were analysed using an interpretive approach to establish students', head teachers' and parents' views on the impact of the intervention on students and their environment, as well as the specific mechanisms by which this impact was perceived to have operated.

Thematic analysis, using constant comparison techniques from grounded theory was chosen as the most appropriate method to analyse the data (Glaser & Strauss, 1967). However, although a grounded theory approach to data analysis relies on using categories generated by participants, approaching the analysis 'as an entirely "empty vessel" with no preconceptions' about what I was likely to find (Barbour, 2007, p.120) was not deemed feasible in this case. As a result, and consistent with Blumer's (1969) depiction of sensitizing concepts, a pragmatic version of grounded theory was employed (see Bryant, 2017), whereby a statement of focus stemming from the research questions, as well as my personal observations throughout the intervention, gave me ideas to pursue; these, nonetheless, provided no more than a starting point. Indeed, my intimate familiarity with the research settings and (at least partial) familiarity with the participant experience, together with my numerous interactions with the latter precluded me from assuming a neutral position; rather, they enabled me to co-construct these qualitative data together with the research participants by interpreting their implicit meanings, whilst taking care to maintain a balance between my own disciplinary assumptions and the participants' concerns. As such, the constructivist variant of grounded theory was considered apt for the purposes of this analysis (see Charmaz, 2006)[22]. Finally, in seeking to explain differences between individuals and intra-/inter-group discrepancies, quantitative data were often incorporated into the analysis.

[22] At the risk of giving rise to an epistemological paradox, the metaphor of emergence is employed in abundance throughout this analysis; yet this is done on an understanding of 'emergence' as a phenomenological rendering rather than an appeal to objectivism.

The analytical procedure comprised an initial phase which was predominantly descriptive and involved segment-by-segment coding (*ibid.*), followed by focused or 'axial' coding (Glaser & Strauss, 1967) which entailed making decisions about the most significant and/or frequent earlier codes and trying to establish an overall pattern by grouping the categories under 'higher order headings' (Burnard, 1991, p. 462).

The interviews were all personally transcribed to ensure accuracy of the transcripts. All transcription was done in Greek, with a dynamic equivalence approach being used for the translation of excerpts selected for inclusion in the thesis (with the exception of a few words, which are cited in the original language in order to preserve and highlight finer shades of sociocultural meaning). Analysis was conducted using NVivo Version 12 (QSR International Pty Ltd, 2018).

3.9 Validity and Reliability

In order to ascertain the trustworthiness of the research design, this section considers potential threats to the validity and reliability, together with the steps taken to address these. Limitations to the design are also discussed.

3.9.1 Internal Validity

Campbell and Stanley (1963) identified eight possible threats to internal validity, four of which were considered relevant to this study and are explored below[23].

The first one relates to history threats; one-group designs which lack a no-treatment control or comparison group are prone to threats to internal validity, thus making it difficult to demonstrate cause as factors beyond the researcher's control could have also influenced the results (Johnson & Christensen, 2019). Indeed, to suggest in this case that any gains in the participants' attainment may have partly been due to the treatment is a bold claim, and certainly one that should not be made lightly. For instance, the fact that for the duration of the intervention the majority of the participants were also attending English classes outside

[23] The other four are: statistical regression (operating where groups have been selected on the basis of their extreme scores), biases resulting in differential selection of respondents for the comparison groups, differential loss of respondents from the comparison groups, and selection-maturation interaction (differential rates of normal growth between pre-test and post-test for the groups). Given the absence of score-based selection and between-group comparisons, none of these were considered relevant to this study.

the school—either in private academies or at home with a tutor—means that any subsequent improvements might have been due to learning that occurred outside the intervention. For this reason, steps were taken to collect data on outside learning for each participant (measured in hours per week), and account for the effect of said variable through statistical analysis. Similarly, in order to bolster any claims this study makes regarding the extent to which the relationship between exposure to intervention and student attainment can be considered causal, information on multiple potential confounders was collected via questionnaires. The above-mentioned procedures are discussed more extensively in Chapter Four.

Maturation was deemed another possible threat; this related to the likelihood of changes in the performance of participants in the post-test relative to the pre-test being due to mental or physical changes occurring within them across time, independent of the treatment they received. Whilst this threat cannot be entirely eliminated—especially given that children go through a great amount of normal development processes—this seems more relevant to cases where a drop in attainment is observed; children's performance would have been more likely to decrease with the passage of time due to factors such as experimental fatigue, loss of interest or enthusiasm over the novelty, as well as the fact that the post-testing process took place towards the end of the school year, when inattention levels tend to increase amongst primary learners (who do not typically need to sit any exams). Additionally, learning is identified and analysed which can be directly associated with the content of the intervention. Nevertheless, maturation effects can result from longer term changes that can take place in children even within short timeframes. These may impact a range of physical, social, behavioural, and psychological factors, and thus the possibility of any discrepancy between pre- and post-tests being partly due to these maturity processes cannot be ruled out.

Another threat, testing, was identified by Campbell and Stanley (1963), which relates to the possibility of changes in performance occurring as a result of repeated testing; this was minimised by allowing a gap of six months between repeated uses of experimental measures. In addition, correct answers were not revealed after the administration of the pre-tests; when children wanted to know the answer to a question on any of the measures administered, I replied that I was unable to reveal the correct answers, but reminded them

instead that what was important was that I was able to see what they *did* rather than what they did *not* know.

Next, instrumentation threats were considered; these refer to possible changes seen between observation points in the instruments used to measure the dependent variable being mistaken for a treatment effect. This was avoided by strict adherence to standardised instructions in the administration of the measures. Further, for each linguistic dimension assessed, both pre- and post-tests were marked as a single batch and in a random order after the end of the intervention to ensure that any improved understanding that stemmed from increased practice in interpreting and applying the writing scale descriptors in particular would not have a systematic impact on either the pre- or post-test scores.

Lastly, to establish content validity, each linguistic construct was operationalised based on existing theory, and steps were taken to ensure that the items on each measure were fairly representative of the entire linguistic domain. For example, the vocabulary measure covered different types of vocabulary knowledge, from understanding of form to contextualised use of lexical items for production of meaning (see Section 3.6).

3.9.2 External Validity

One of the main goals of quasi-experimental research is to generalise the findings to the population of interest. Campbell and Stanley (1963) used the term 'external validity' to refer to the degree to which an empirical investigation would produce the same results under different conditions, e.g., if we used different subjects, manipulated the independent variable in a different way, if the setting were different, and so forth. Of Campbell and Stanley's four identified external threats, two were deemed pertinent to this research and are considered below[24].

First, selection bias; it was important that the sample chosen was representative of the target population, i.e. multigrade schools operating in rural or peri-urban parts of the Greek mainland and islands. As such, it needs to be noted that generalisability to heterogeneous

[24] The other two are: multiple treatment interference and interaction of pre-testing and treatment. No other programmes were being implemented in the settings alongside the present intervention and, therefore, the former was not considered pertinent. Similarly, exposure to the pre-testing process was not expected to have affected the success of the intervention in any way.

educational settings was not amongst the aims that informed the research design, however indications that the findings may indeed be generalisable beyond the specific contexts and thus have potential for informing policy and practice across the county were considered. Although careful consideration was paid to using a geographically stratified sampling technique so that there was an increased likelihood that the underlying causal process were the same for both the sample and the target population, the sampling of settings was done on a voluntary basis and therefore selection bias was deemed a possible threat to the validity of the causal inferences that can be drawn from this study. According to Rosnow and Rosenthal (1970), individuals who volunteer to join a research investigation may differ from nonvolunteers in a number of characteristics, including education, social class, approval motivation, and attitudes towards the intervention, thereby affecting the generalisability of research results to the general population. To minimise the likelihood of volunteer bias, all eligible students from each school—based on the year group they were attending—were invited to participate, with adjustments being made to facilitate this, where necessary, thereby ensuring that 'pseudovolunteering rates' were kept to the minimum (Aditya & Rosnow, 2004, p. 1187). Such adjustments involved providing access to electronic equipment by permitting use of the school facilities by certain students during after-school hours (where supervision arrangements could be made), and allowing flexibility in timetabling, amongst others. This contributed to both refusal and mortality rates remaining very low throughout the study . Moreover, it should be borne in mind that the most common reason cited by schools which were eligible to participate yet refused to do so was a lack of availability of supervision outside of normal school hours. However, given that the aim of this study was to assess the effectiveness of the intervention with a view to drawing conclusions on the feasibility of its implementation as part of the school timetable, one needs to ask: had the programme been delivered as a timetabled initiative with no extra demands on parents' or head teachers' time, would buy-in have been significantly higher? Clearly, the choice to participate was contingent on situational as well as personal factors that may not have necessarily related to motivation or attitudes towards the intervention, and, as a result, differences between volunteers and nonvolunteers with regard to these characteristics cannot be assumed simply on the basis of participation versus nonparticipation.

Second, effects of experimental arrangements; several steps were taken to prevent artificial findings from being generated by the process of experimentation and the fact that subjects

knew that they were participating in a research investigation—a phenomenon known as the Hawthorne effect (Roethlisberger & Dickson, 1939). The intervention took place in the natural environment of interest, and, for the most part, the participants received the treatment within their regular classrooms and/or their regular groups, thereby instilling a sense of 'normalcy' in the experimental process. Further, although it was ethically important to introduce the broad purpose of the research, as well as to obtain written consent for the video (screen) recordings of the lessons, no explicit reference was made to the video recording process during these sessions (beyond the first one). This decision was guided by a desire to make the subjects feel relaxed in the presence of a participant observer, rather than perceive me as a threat, which findings reveal can help overcome any adverse reactions from the Hawthorne effect (Oswald, Sherratt & Smith, 2014). Finally, the intervention was designed to last for a sufficient amount of time to allow the children to become accustomed to the e-learning tool, and thus allow any perceived novelty effect which might contribute to an increased engagement to wane with the passage of time (Keller & Suzuki, 2004).

3.9.3 Length of Intervention

It is important that the amount of intervention time is sufficient to ensure that a student can make adequate progress and thus any treatment effect can be observed (Mertens, 2015). Although this amount can vary across setting and learner characteristics, evidence from the research domain of computer-assisted language learning (CALL) suggests that groups can show positive improvements over the course of the instructional treatment irrespective of length, with medium effect size values found for treatments lasting for less than 2, 2 to 4.9, and more than 17 hours (Grgurović, Chapelle & Shelley, 2013). Implementing weekly intervention sessions over a period of 12 weeks should therefore have been sufficient to establish whether the intervention had a significant effect.

3.9.4 Measurement Reliability

According to Cronbach (1990), reliability in quantitative research refers to consistency in a series of measurements. Two different types of measurement reliability were assessed for the tests administered in this study: (1) internal consistency was measured through Cronbach's alpha (see Sections 3.6.3 - 3.6.5 & 3.6.7); and (2) interrater reliability was measured through the Kappa statistic test (see Section 3.6.6). Reliability for four out of five outcome measures was in the range of 0.82-0.92, thereby indicating a strong probability

that any increase was due to an increase in the participants' true scores, rather than due to unsystematic variation (Gliner, Morgan & Leech, 2017). This was deemed especially important given that all outcome measures were generated by the researcher and therefore previously reported reliability coefficients were unavailable. An exception to this was the oral fluency measure, which produced change scores that had relatively low reliability (α = 0.59). This measure was excluded from further inferential analyses, while possible explanations and recommendations for future measurement are discussed in Sections 7.2 and 8.4.1, respectively.

In addition, in order to account for as much of the variance in children's learning outcomes as possible, information on multiple potential confounders was collected and relevant data were included in the structural equation models. Results for the equation-level goodness-of-fit are reported for all language constructs that were subjected to SEM analyses. These revealed that the models were able to explain 76.0% to 90% of the total variance across the different language areas, thereby suggesting that only a relatively small amount of unsystematic variance in children's post-test achievement was left unaccounted for.

Further, reliability as participant error was established by administering measures under standardised conditions and by gathering data about students present on the day, along with any alternative arrangements made for them to be tested at a different time, whilst ensuring that the order of tests would remain unaffected. This factor was thought likely to affect the settings in significant ways, and was therefore taken into consideration in the analysis and interpretation of findings. Additionally, assessments were reorganised if the teacher had concerns about the children's tiredness or affect on the day.

Finally, at least four children in the sample had special educational needs (e.g. special behavioural or learning needs) and therefore learning outcomes were thought likely to be influenced by this factor; yet, it was considered necessary, in terms of reliability, to represent the multiple and complex reality that is an intrinsic part of most primary school settings. For this reason, and in order to optimise representativeness of the sample used in the study, learners of varying needs were represented, and each context was described in detail (Mills, 2007).

3.9.5 Qualitative Validity

Creswell and Miller (2000) define qualitative validity as the degree to which *trustworthiness, authenticity,* and *credibility* can be established. To ensure the accuracy of the findings of this study and subsequent interpretations, I drew on Creswell and Miller in incorporating the following validity strategies into the research design:

- *Triangulation.* Themes in the study were established based on evidence collected through multiple methods and from several sources (i.e. tests scores, parent and student questionnaires, parent and head teacher interviews, student focus groups, informal observational data).
- *Thick, rich, description*. Every attempt has been made to provide rich and detailed accounts on the setting, the participants, and the themes of the study.
- *Disconfirming evidence.* As evidence for the validity of the narrative account, after I had established the preliminary themes, I started searching through the data for evidence that ran counter to the themes. Contradictory perspectives are presented (e.g., children's differential views about various aspects of the intervention) as a way of offering an account that is more representative of a 'multiple and complex' reality (*ibid*., p. 127).
- *Researcher reflexivity*. This was discussed in Section 3.7.2; I have remained cognisant of ways in which my interpretation of the findings is likely to have been shaped by my background, assumptions, and personal beliefs. Rather than entirely suspend those biases, however, I have chosen to incorporate this reflexivity into the narrative account.

3.9.6 Qualitative Reliability

Qualitative reliability refers to the consistency or stability of qualitative research (Creswell, 2014). In line with Gibbs (2007), the following qualitative reliability procedures were incorporated into the data analysis of the study:

- *Transcription checking.* I transcribed all interviews manually, and subsequently checked transcripts to make sure that they did not include any obvious mistakes made during transcription.

- *Constant comparison on coding.* A ‘definitional drift’ in codes was avoided by constantly comparing data with the codes, including reviewing codes established earlier to ensure consistency, and by writing memos about the codes and the thinking that went behind their development (*ibid.*, p.98).

3.10 Ethical Considerations

All research was conducted according to the British Educational Research Association Ethical Guidelines for Educational Research (BERA, 2018) as well as the Newcastle University Code of Good Practice in Research (Newcastle University, 2020), and gained the approval of the Faculty of Humanities and Social Sciences Research Ethics Committee at Newcastle University. Measures were taken to ensure that participants knew exactly what the research involved before consenting. Information sheets were translated into Greek and were provided and discussed with all the head teachers, parents and children, ensuring they had the opportunity to ask questions, that they knew they could withdraw at any time and that their anonymity would be protected. Given the young age of the children who participated in this study (8-12 years), written consent was sought and obtained from each child’s guardian (i.e., either the father or mother). In addition, all children were informed about what the study involved and their oral assent was obtained prior to the start of the fieldwork. I also remained sensitive to signs of ongoing consent from the children themselves throughout the data collection process, including the live sessions and the focus group interviews.

All children received lessons of an equal amount and duration. As a result, there were no concerns around equal distribution of learning time. Any difference related exclusively to the innovation under investigation and to content allocation, which was kept to the minimum by purposely aligning the content of the asynchronous component of the intervention to that of the National Curriculum and the textbooks provided by the Ministry of Education. The children who received the intervention would not otherwise have been attending any English classes in their schools, and therefore the intervention did not introduce learning risks that might have arisen in the case of deviation from normal school practice.

One ethical issue which exists within this research concerns video recording. Consent for video recordings of the live lessons and focus group interviews (which was done with the help of purchased specialist screencast software) was granted by parents or carers, with the specific purposes and uses these were being requested for clearly outlined in the permission form. The possibility to grant varying degrees of permission was also made available to the parents. All audiovisual data collected during the live sessions were permanently deleted from the software. English and Greek versions of the information sheet, participant consent form for parents, and interview consent form are provided in Appendices 17-22.

3.11 Summary

This chapter has put forth the main aims and research questions of the present study. It has also presented an explicit description of the design of the study, including the sampling and research procedures implemented, and the measures used. In an effort to contribute to the validity of the project, a comprehensive account of the research sites has also been provided, with details regarding the content of the intervention being given both in the body of this chapter as well as in Appendix 3.

In summary, the fieldwork in this research included weekly synchronous English lessons with a remote teacher for twelve weeks in each of the eight participating schools with 47 children aged eight to twelve years (Years 3-6). Lessons emphasised collaborative enquiry, open ended product assignments tackled as mini projects, with choice and differentiation being two core elements of the programme design. Children were also given access to a personalised web-based learning platform, populated with content which was mapped to the National Curriculum for English (Years 3-7), and were encouraged to work through the materials in their own time and at their own pace. Pre-tests and post-tests in English language ability measures of vocabulary, grammar, aural and writing skills, as well as oral fluency were administered.

At the end of the intervention, qualitative data from focus group and interview responses were gathered to establish students', head teachers' and parents' views on the impact of the intervention on students and their environment, as well as the specific mechanisms by which this impact was perceived to have operated. In the following chapter, quantitative

analyses of (i) parent and student questionnaires, and (ii) student scores in the measures administered will be described in detail.

Chapter Four – The Relationship between the Blended Intervention and Student EFL Attainment

4.1 Introduction

This chapter presents the results of the statistical analyses used in relation to Research Question 1:

What is the impact of the blended remote model on student EFL attainment, with reference to a) vocabulary knowledge, b) grammar knowledge, c) aural comprehension skills, d) writing skills, and e) oral fluency?

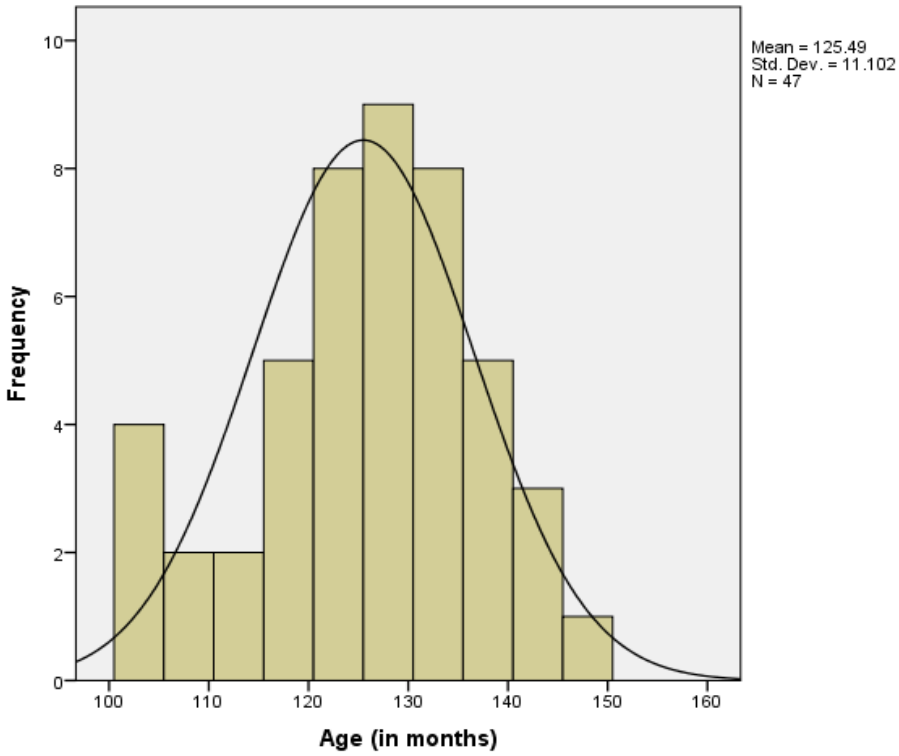
Outcomes on each of the five linguistic areas in question are presented in turn, beginning with a presentation of descriptive statistics, before turning to the results obtained from t-tests and multiple regression analyses.

4.2 Descriptive statistics

4.2.1 Participant Characteristics and Educational Experiences

The student group consisted of 27 males and 20 females. All students were registered as being full time students at one of the eight participating schools. Additionally, all students reported living in the same locality as their school. The participants were in Years 6 (N = 18), 5 (N = 20), 4 (N = 5) and 3 (N = 4) during the fieldwork timeframe (academic year 2018-2019). The mean age of the participants was 10 years 5 months (SD = 0.93) at the start of the fieldwork testing in November 2018 (N = 47, M = 125.49 months, SD = 11.10, min. = 103 months, max. = 147 months). Figure 7 illustrates the age frequency of the participating students.

Figure 7 Distribution of student participants' age (in months)



With regard to nonverbal cognitive ability, the results from Figure 8 suggest that the mean percentage of correct answers on the Raven's test for the entire student group was relatively high (M = 79.30, N = 46, SD = 16.89)[25]. In addition, Table 8 shows the mean percentage of correct answers for each one-year cohort of children. Overall, it is evident that test results vary by year group. For example, the students in Year 4 had 60% of the Raven's test scores correct. In contrast, the youngest age-group of children—those in Year 3—had on average 79% of the test answers correct. This is probably explained by the fact that the two extreme values appearing at the negative end of the distribution in Figure 8 both represent test results from Year 4 students who scored significantly lower than their peer group, thereby causing a negative skew in the data obtained from the subset. Indeed, if we exclude these two observations, the Year 4 average immediately jumps to 83%, indicating an equal percentage of correct answers to that achieved by the Year 5 students.

[25] Raw values.

Figure 8 Distribution of Raven's scores (% correct answers)

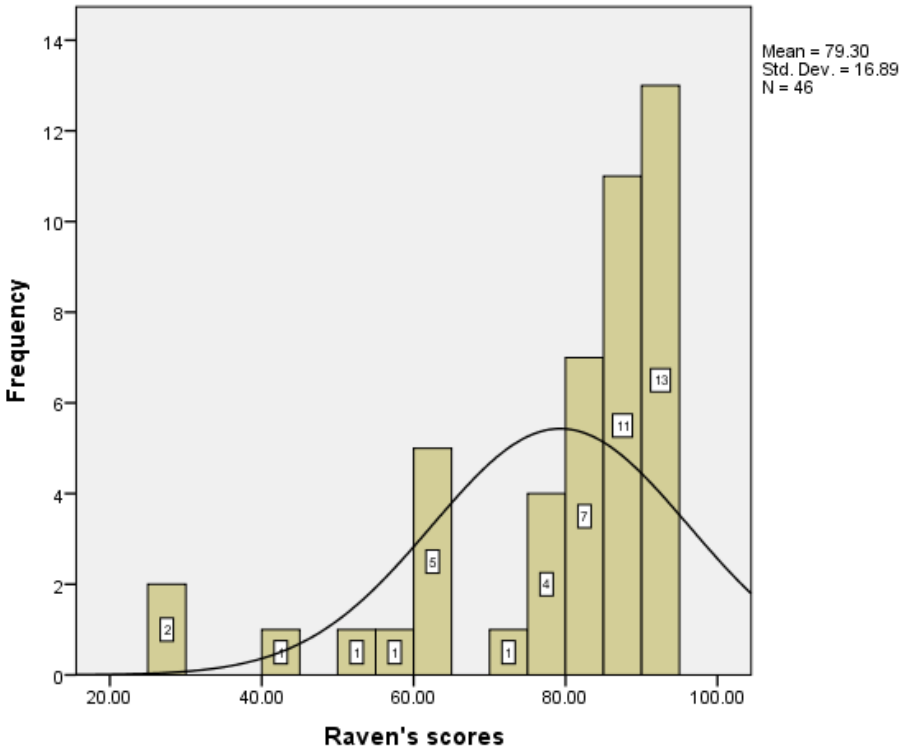


Table 8 Percentage of correct Raven's test answers for children in Years 3-6

Year	Number	Mean	Standard error	Standard deviation
Year 3	4	78.75	5.27	10.53
Year 4	5	59.60	14.39	32.17
Year 5	20	82.70	2.62	11.73
Year 6	17	81.24	3.60	14.83

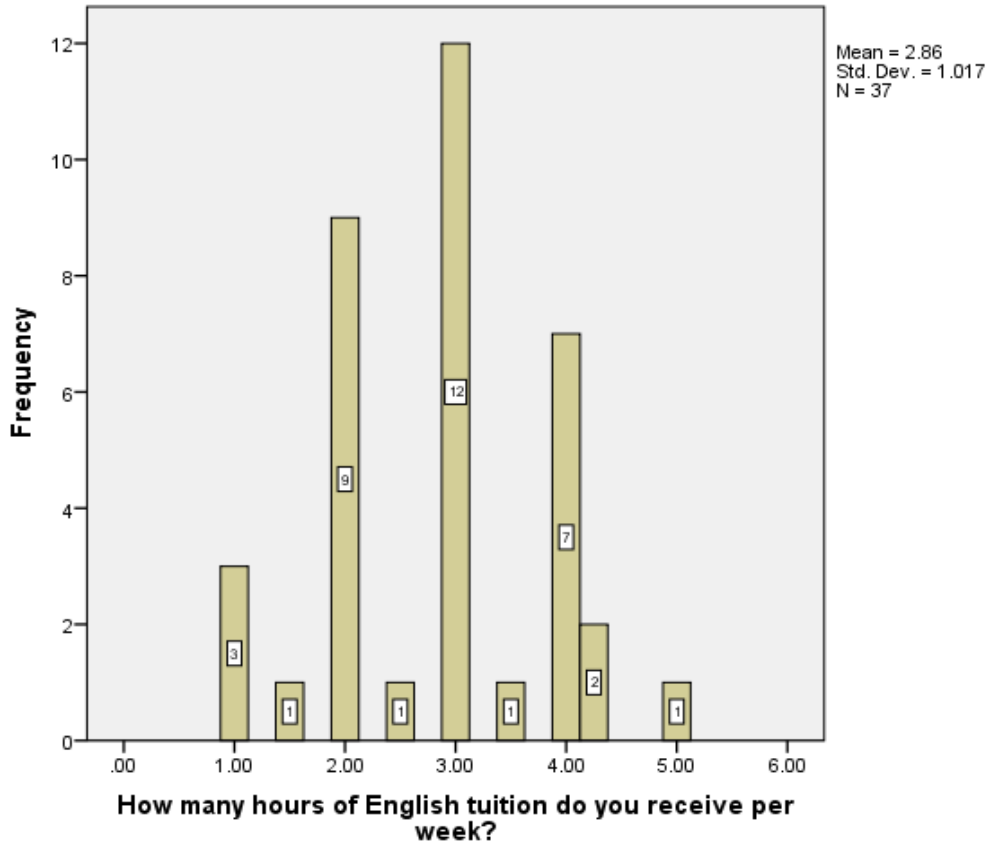
As noted in Chapter One, it is common practice for many Greek students to receive fee-paying English language tuition outside their school. These are usually locally accessed at private academies running classes in the afternoon or evening, or, as is the case in most small localities where such academies are not available, by means of a tutor who travels from nearby locations to deliver language sessions at the student's home. 79% of the students reported that they were engaged in some form of after school English tuition, either in a private academy or at home with a tutor (see Table 9 below). One student reported that she was learning at home with the support of a parent.

Table 9 Percentage of participants receiving fee-paying English language tuition

	Number	Per cent	Cumulative Per cent
Tuition	37	78.7	78.7
No tuition	10	21.3	100.0
Total	47	100.0	

The average amount of time spent at after school English tuition was 2.86 hours per week. As shown in Figure 9, out of a total of 37 participants who belonged in this subset, 13 were only spending up to 2 hours at English tuition, whereas 10 were spending between 4 and 5 hours.

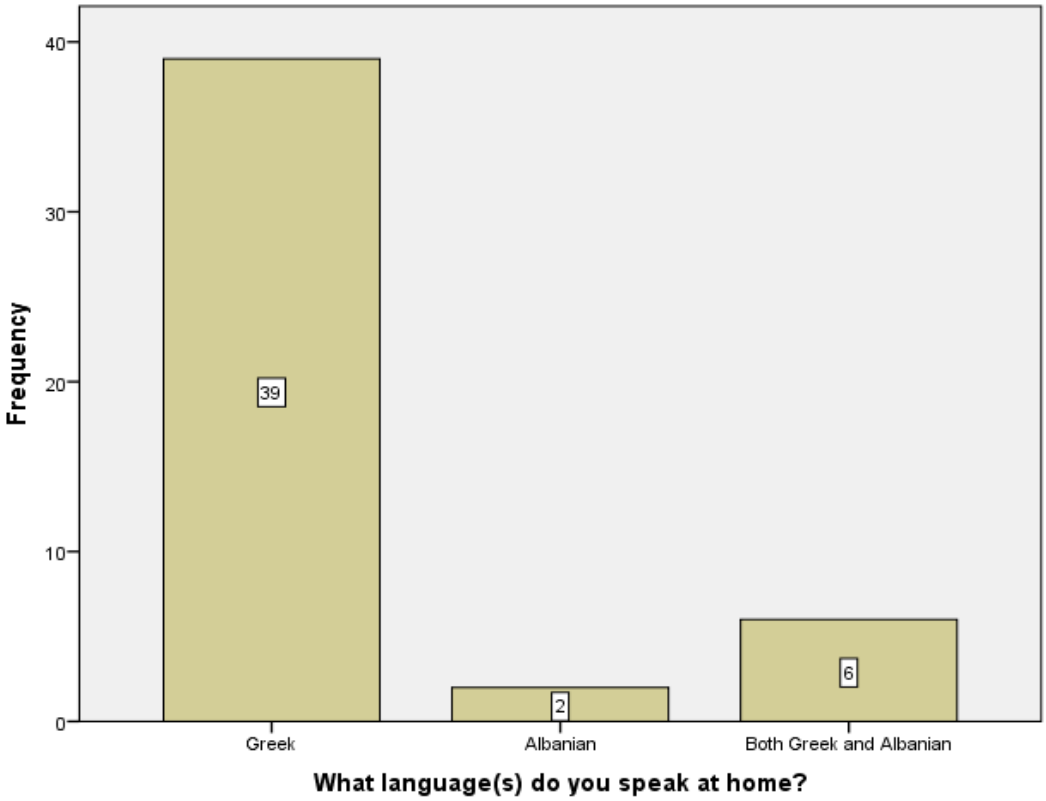
Figure 9 Amount of English tuition (hours/week)



Only three participants (6.4%) reported learning a second foreign language. Languages being studied included French, German, and Albanian. It is worth noting that the latter respondent was indeed of Albanian descent and also reported speaking both Greek and Albanian at home (see below), so it may be more appropriate to consider this as a *second* rather than a foreign language.

Responses on the question of languages used at home revealed that 39 students (83%) used only Greek to communicate with members of their household, 2 (4%) did so exclusively in Albanian, while a further 6 (13%) used both (Figure 10).

Figure 10 Language(s) spoken at home



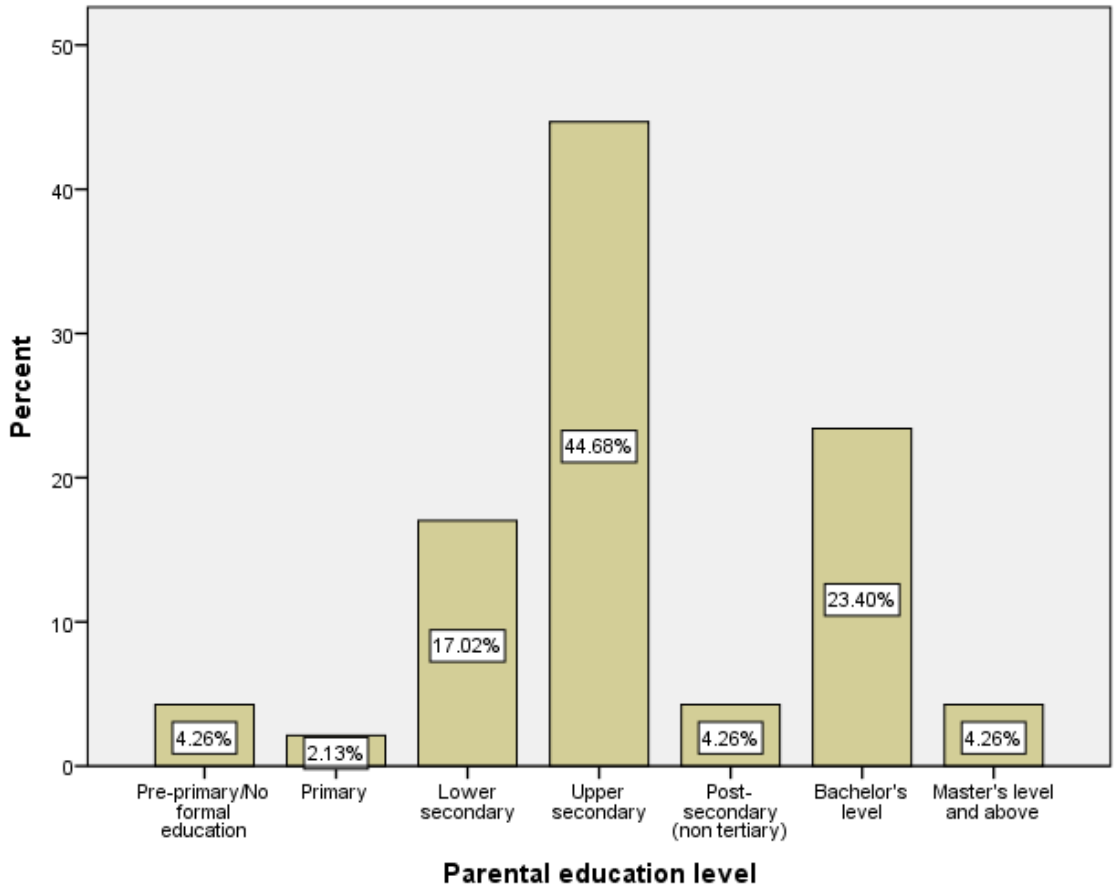
4.2.2 Participant Socio-Economic and Family Background

As described in Section 3.6.1, parental occupations were coded according to the four-digit International Standard Classification of Occupations (ISCO) codes developed by the International Labour Organization (ILO, 2007), and then mapped to the International Socio-economic Index of Occupational Status (ISEI, Ganzeboom & Treiman, 2010). The converted ISEI-08 scores ranged from 10 (subsistence farmers, fishers, hunters and

gatherers) to 70 (science and engineering professionals), with higher scores indicating higher occupational status. Scores were created on the basis of the higher level of occupation status of either parent. The median score was 33 (N = 43, min. = 19, max. = 66, IQR = 27– 45). What was identified from the questionnaire responses was that more than half of the student sample primary caregivers either engaged in low-skilled manual labour jobs, typically involving agricultural work, construction or mining, or were in the service industry, typically involving work in tavernas/restaurants or as sales workers (including shopkeepers).

In terms of parental education, this was separately measured for the participants' fathers and mothers, and one variable was created to represent the parents' combined highest education level (see Section 3.6.1). The scale used in the questionnaire was adapted from the International Standard Classification of Education 1997 (ISCED, UNESCO, 2006) and reflected *completed* stages of formal education. The results from Figure 11 suggest that 68% (N = 21) of the student sample's parents/guardians did not continue their studies after the age of 18—that is, following completion of upper secondary education. A further 17% (N = 8) completed up to Year 9 (lower secondary) and 6% (N = 3) either had no formal education at all or achieved up to Year 6 (primary). Only two parents reported having postgraduate degrees, making up a mere 4% of the total sample. This, however, is consistent with national rates for tertiary attainment, which reveal that only 4% of Greek adults have attained a master's degree as their highest qualification (OECD, 2019a). Further to this, the percentage of parents with either no formal education or attainment below primary level was found to be substantially higher than national rates, according to which, at the time of data collection, only 0.8% of the population (aged 25 – 64) was not completing primary education (OECD, 2018a).

Figure 11 Parental education level



To generate a composite socio-economic status (SES) variable from the two indicators 'parental occupational status' (POS) and 'parental education level' (PEL) for each student, the following steps were implemented. After establishing monotonicity between the two variables through visual inspection of a scatterplot (see Figure 12), a correlation analysis was run which showed a significant positive association between POS and PEL, $r_s = 0.52$, 95% BCa CI [0.24, 0.73][26], $p < 0.001$. For this reason, and as a way of dealing with missing values in one of the two variables (POS, $N = 43$)[27], each missing data point was replaced with the mean POS value observed for its corresponding PEL score (Wilks, 1932). For example, if a parent's reported education level was equivalent to upper secondary, their occupational status score was derived from the mean observed values for that level, in this case $M = 33$. Mean POS scores associated with education level are provided in Table 10.

[26] Given the lack of normality in both these variables, bootstrapped confidence intervals were calculated.
[27] Little's MCAR test: χ^2 (1) = 3.771, p = .052.

Three out of a total of four missing values were obtained by way of the above-described procedure, the fourth case belonging to a unique education level group (primary), thus making it impossible to compute a mean occupational status score. It is habitual practice amongst education researchers to calculate parametric statistics such as a mean score for ordinal variables, thus resulting in scales with continuous or approximately continuous data (Sullivan & Artino, 2013). Thus, as a next step, an approximately continuous composite SES variable (unweighted) was generated by calculating a mean value across the POS and PEL indicators. Lastly, a factor analysis was conducted using a Promax rotation to evaluate the acceptability of the combination of the two variables to represent the SES construct (*ibid*.). Only one factor recorded an eigenvalue above 1, thereby suggesting that both items fit onto a single theoretical construct. In addition, inspection of the Component Matrix table showed that both items loaded equally strongly on the underlying component ($\lambda_1 = 0.901$, $\lambda_2 = 0.901$).

Figure 13 illustrates the distribution of the SES composite scores across the sample. Scores varied greatly ranging from 9.5 to 35.5 with a mean value of 20, *SEM* = 1.14, 95% BCa CI [18.01, 22.23]. SES does not appear to be normally distributed, with a *z*-score of moderately positive skew equal to 0.83 (*SE* = 0.35). Nevertheless, this is a deviation of less than ±1 from zero, and given that our sample is larger than 30 (*N* = 46), we can rely upon the Central Limit Theorem in assuming that the mean of our sample of data on SES is highly likely to approximate the mean of the overall population in question (Gravetter & Wallnau, 2014; Field, 2017).

Figure 12 Scatterplot illustrating the relationship between parental occupation and parental education

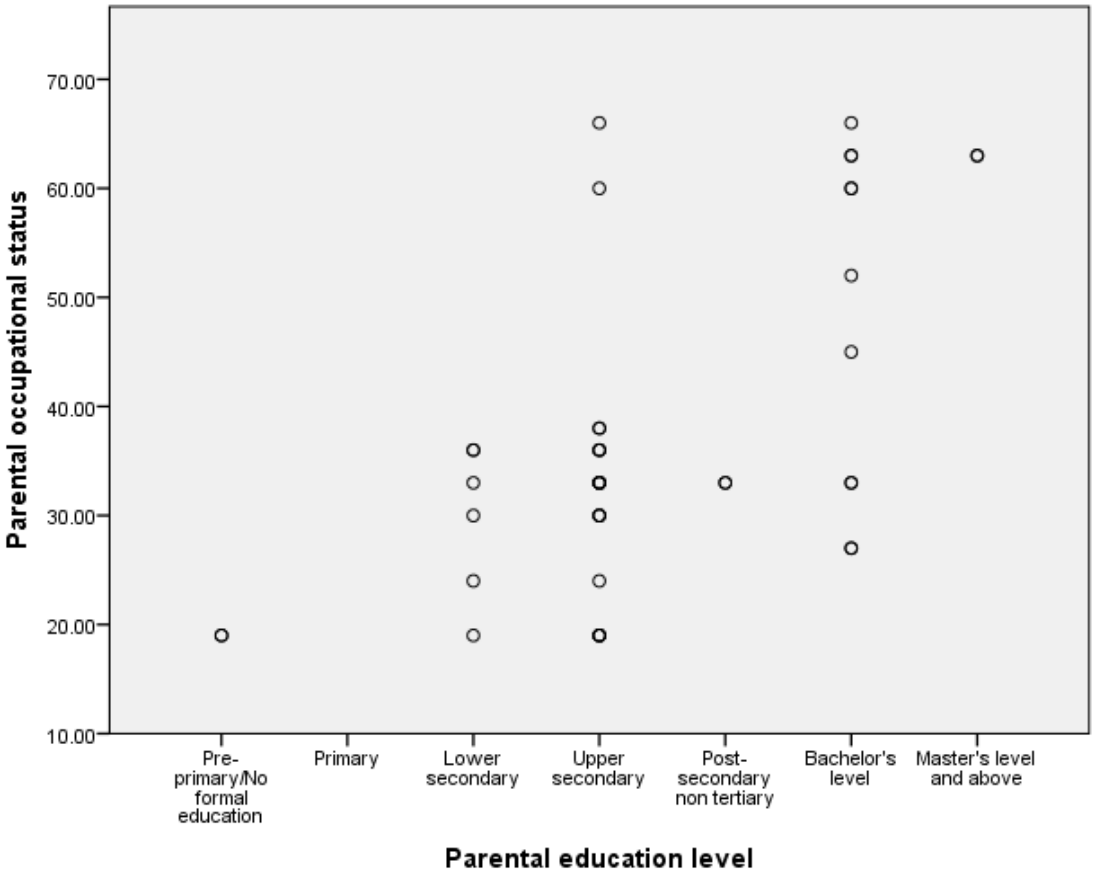


Figure 13 Distribution of SES composite scores

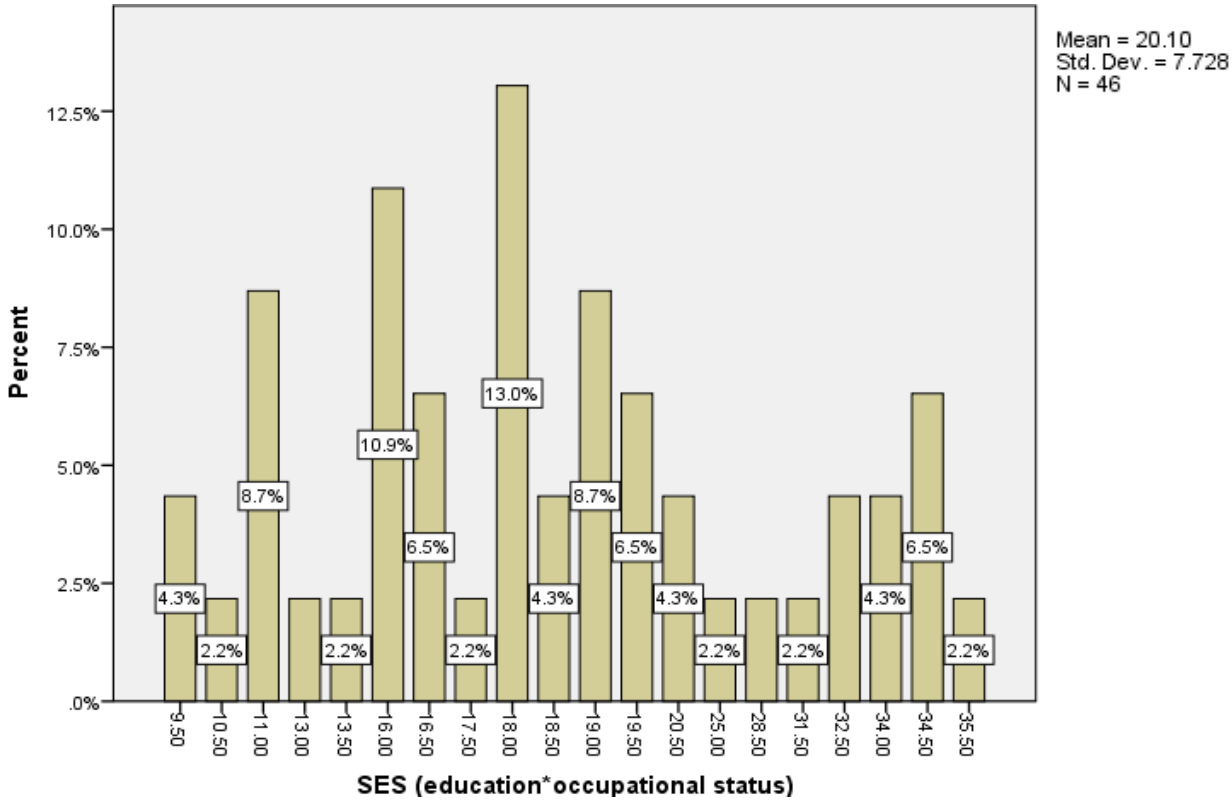


Table 10 Mean parental occupational status (POS) per education level

Education Level	*N*	Mean POS	*SD*
Pre-primary/No formal education	2	19.00	0.00
Lower secondary	6	29.67	6.89
Upper secondary	20	33.25	12.11
Post-secondary non tertiary	2	33.00	0.00
Bachelor's level	11	48.09	15.55
Master's level and above	2	63.00	0.00

Finally, with research pointing to an association between marital dissolution and children's academic achievement (see, for example, Potter, 2010; Sun & Li, 2011), it was deemed important to gather information on the marital status of the participants' parents in order to account for the effect of said variable on the students' attainment during the intervention. As such, data were collected via the parent questionnaires, and marital status was reported for each respondent as either "Single, divorced or separated," "Married", or "Widowed". Only two family structure types emerged from the findings (N = 47), with the majority of students (87.2%) coming from nondisrupted two-parent households, while a smaller percentage (12.8%) were being raised in single-parent or divorced families.

4.2.3 Participant Motivational Disposition towards English

As discussed in Section 3.6.1, the participants' motivational disposition towards the L2 was assessed prior to the start of the intervention via the use of student and parent questionnaires. Six five-point scales were adapted from Dörnyei *et al.* (2006) Language Disposition Questionnaire and formed the motivational disposition construct. Table 11 below provides a description of each scale, along with its corresponding items.

In addition, students were asked the following open-ended and multiple-choice questions:

- Do your parents or other members of your family ever help you with your English homework?

- If you could choose, which foreign languages would you choose to learn next year at school?
- What are your top three favourite subjects at school?

Student responses about the extent of parental or other familial support with English homework were triangulated with data collected from parents on the same variable. The resulting coefficient showed a non-significant association between the two scales (r = 0.18, p = 0.26, N = 43), which may have resulted from differential perceptions of the quantity and/or quality of support available at home. As it was necessary to also account for *perceived* support, and despite a low reliability estimate (α = 0.30, N = 43), it was thought that the self-report measure would still provide some indication of this, and therefore it was used in all subsequent analyses, albeit interpreted with caution.

Extra-curricular contact with the L2 and its speakers: Triangulating self- and parent-report data

Data on extra-curricular contact with the L2 and its speakers (i.e., listening to English songs, watching English-language programmes on TV or the Internet, watching YouTube videos in English, reading English online, learning English online, and travel to English-speaking countries) were gathered from both students and parents. The responses revealed that no participant had ever travelled to an English-speaking country, so this variable was eliminated from the analysis. In assessing the degree of consistency between the two types of responses, an exploratory design was used, and a factor analysis was run on each set of five Likert-type questions representing the construct in question. This section focusses on reporting on the results of the analysis, however, details on the procedure are available in Appendix 23.

Exploratory factor analysis (EFA) revealed there to be a single latent factor for the self-report data, and two factors for the parent-reported data: (1) “contact for educational purposes” and (2) “contact for fun”. A correlation analysis on the two types of responses reported a non-significant coefficient (r = -0.2, p = 0.19), however, a modest yet statistically significant association was found between “parent-reported contact for fun” and “self-reported contact” (r = 0.34, p = 0.02). Taking method variance into account,

Table 11 Description of scales and items forming the Language Disposition Questionnaire

Scale	Items
A. Attitudes towards English and the L2 community	1. I like English. 2. I think knowing English would help me to become a more knowledgeable person. 3. English is important in the world these days. 4. Learning English is important in order to learn more about the culture and art of its speakers. 5. Knowing English would help me a lot when travelling abroad in the future. 6. Knowing English would help my future career. 7. I would like to sound like the people who speak English, e.g. people from England, the USA or Australia. 8. I would like to travel to the UK. 9. I would like to travel to the USA. 10. I would like to travel to Australia. 11. I like meeting foreigners (e.g. tourists) from English-speaking countries. 12. I like American films. 13. I like American TV shows.
B. Extra-curricular contact with the L2 and its speakers	How many hours do you spend doing each of the following in the average day?

	1. Watching English or American films on TV or the Internet 2. Watching videos in English on the Internet (this could be anything other than video clips) 3. Listening to songs in English 4. Reading in English on the Internet 5. Completing exercises on the Internet in order to learn English
C. Attitudes towards foreign language learning in general	1. I don't think that foreign languages are important school subjects. *(reverse-coded)* 2. I often watch foreign programmes. 3. Learning foreign languages makes me fear that I will feel less Greek because of it. *(reverse-coded)*
D. Self-confidence in foreign language learning	1. I am sure I will be able to learn a foreign language well. 2. I think I am the type who would feel anxious and ill at ease if I had to speak to someone in a foreign language. *(reverse-coded)* 3. Learning a foreign language is difficult. (*reverse-coded)*
E. Intended effort	1. I am prepared to expend a lot of effort in learning English (even if it is hard).
F. Language learning milieu	1. People around me tend to think that it is a good thing to know foreign languages. 2. My parents do not consider foreign languages important school subjects. (*reverse-coded)* 3. What is your level of English language proficiency overall? 4. What is the level of English language proficiency overall of the child's other parent?[28]

[28] Items 3 and 4 were included in the Parent Questionnaire. For the purposes of all subsequent analyses, one variable was created to represent the parents' combined highest proficiency level.

such ‘monotrait-heteromethod correlations’ begin to provide good convergent evidence for the self-report measure of extra-curricular contact with the L2 (Furr, 2017, p. 266). Due to the overall similarity of findings, child-reported data were used for further analyses within this study.

Dimension Reduction

Given the relatively large number of variable groups contained in the questionnaire, the next step was to examine the structure and relationship between these, and attempt to establish a potentially smaller number of underlying dimensions between the measured variables and latent constructs. Once again, and given the absence of *priori* restrictions regarding said relationship, exploratory factor analysis was used to simplify the existing factor structure (Humble, 2020). The analysis revealed three themes, which were interpreted as “attitudes towards English and the L2 community” (Factor 1), “English as a means to better future prospects” (Factor 2), and “attitudes towards foreign language learning in general” (Factor 3). A detailed description of the procedure, together with the reliability and correlation analyses for the final, three-factor Motivational Disposition towards English construct, are provided in Appendix 23.

Calculating a mean value for each factor in the Motivational Disposition construct

Finally, composite scores were computed for each of the three new variables by adding the values of all corresponding items together and then averaging these to obtain a mean value for each respondent. Considering that scores report extent of agreement with responses recorded on a five-point scale (1 = strongly disagree, 5 = strongly agree)[29], the “attitudes towards foreign language learning” mean was found to be higher (M = 4.61, SD = 0.6) than the other two factors. Higher composite scores indicate more positive attitudes within each construct. In addition, by calculating the percentage of children who responded with either ‘agree’ or ‘strongly agree’—that is, an average score of anywhere between 4 and 5, after rounding—on the scales contained within each construct, it can be reported that 92% of the participants were favourably disposed towards English and the English-speaking

[29] A slight deviation from this pattern was “parents' level of English proficiency”; although this item too was coded on a five-point scale, values here ranged from 1= not at all to 5 = very good. However, conceptually, this was aligned with the overall structure within each theme.

community (*M* = 4.09, *SD* = 0.5), a further 89% considered English to be important for their future (*M* = 3.99, *SD* = 0.7), whereas 96% of them were favourably disposed towards foreign language learning in general.

Summary

In summary, the PAF analysis on motivational disposition towards English revealed three underlying dimensions related to attitudes towards English and the L2 community, conceptions towards the importance of English for their future, and attitudes towards foreign language learning more broadly. These factors were later subjected to further analysis to determine the magnitude of their effect on participant attainment, as measured by scores on pre- and post-tests in five different language learning domains (see Section 5.2).

4.3 Comparative Analyses of Pre / Post-Test Scores

In order to fully examine the effects of the intervention, this section will report scores from tests administered once before the start of the intervention (pre-tests) and once again after it finished (post-tests). The DVs were related to children's English language attainment in five different learning areas: vocabulary, grammar, listening, writing, and oral fluency. This section reports the descriptive statistics of each test, thereby addressing Research Question 1:

What is the impact of the blended remote model on student EFL attainment, with reference to a) vocabulary knowledge, b) grammar knowledge, c) aural comprehension skills, d) writing skills, and e) oral fluency?

As argued in Section 4.2.2, given that our sample is greater than 30 (*N* = 46) and there were no deviations from skewness or excess kurtosis of more than ±2 from zero (maximum skewness and kurtosis values across all measures = 1.16 and 1.62, respectively), we can rely upon the Central Limit Theorem in assuming that there is a high probability that the mean of our sample of data will approximate the mean of the overall population in question (Gravetter & Wallnau, 2014; Field, 2017). Therefore, a decision was made to proceed with

conducting inferential analyses. A detailed analysis of bias, normality, and homogeneity of variance is reported in Appendix 24.

Means comparisons for each measure of attainment are presented separately below, starting with vocabulary pre- and post-test scores.

4.3.1 Global descriptive statistics for performance scores at pre- and post-test, by school and level

Descriptive statistics for pre-and post-test results across all five domains are displayed in Tables 12 and 13, with scores provided separately by school and level, respectively[30].

[30] Although disaggregation inevitably means that results are now based on a lower sample of children, it was nonetheless deemed important information to provide, and acknowledge that a certain degree of caution will be required in their interpretation and generalisation.

Table 12 Descriptive statistics for performance scores (%) at pre- and post-test (by school)

School	**Mean Learning Gain *(SD)***												
	Vocabulary Knowledge	***N***		***Grammar Knowledge***	***N***	***Aural Comprehension***	***N***		***Writing Skills***	***N***		***Oral Fluency***	***N***	
		Pre	Post				Pre	Post		Pre	Post		Pre	Post
Delphi[31]	22.00 *(16.37)*	3		17.00 *(18.38)*	2	(data not available)	3	0	6.67 *(11.55)*	3		-6.00 *(17.00)*	3	
Arsinoe	13.33 *(2.31)**	3		12.00 *(10.58)*	3	15.67 *(17.79)*	3		26.67 *(30.55)*	3		2.00 *(2.65)*	3	
Elaia	12.00 *(16.37)*	3		26.00 *(10.39)**	3	27.67 *(6.35)**	3		13.33 *(11.55)*	3		*-30.00 (21.63)*	3	
Marathonion[32]	8.20 *(8.82)**	10		9.33 *(13.56)*	9	21.70 *(15.58)**	10		14.00 *(16.47)**	10		11.80 *(25.06)*	10	
Demos	22.50 *(4.43)**	4		18.50 *(13.80)*	*4*	*26.50 (12.01)**	4		20.00 *(16.33)*	4		-1.25 *(13.45)*	4	
Morphe	15.71 *(7.25)**	8	7	11.50 *(8.47)**	8	12.57 *(25.30)*	8	7	5.71 *(9.76)*	8	7	-11 *(28.79)*	8	6
Palaeopolis[33]	15.00 *(2.00)**	4		--		24.00 *(0.00)*	4	3	26.67 *(11.55)*	4	3	--		
Minos	11.33 *(8.06)**	12		20.33 *(15.95)**	12	45.10 *(27.77)**	10	12	18.00 *(17.51)**	10	12	(data not available)	0	12
Overall	**13.48 *(9.20)****	**46**		**15.66 *(13.49)***	**41**	**26.60 *(22.38)***	**40**		**15.35 *(16.23)***	**43**		**-1.90 *(24.43)***	**29**	

*p<0.05

[31] [32]One pupil at Pre-A1 level; Grammar test not administered. Oral Fluency tests *were* administered as pupils were already capable of producing some short utterances at T1.

[33] All students at Pre-A1 level; Grammar and Oral Fluency tests not administered.

Table 13 Descriptive statistics for performance scores (%) at pre- and post-test (by level)

Level	**Mean Learning Gain *(SD)***															
	Vocabulary Knowledge	***N***		***Grammar Knowledge***	***N***		***Aural Comprehension***	***N***		***Writing Skills***	***N***		***Oral Fluency***	***N***	
		Pre	Post		Pre	Post		Pre	Post		Pre	Post		Pre	Post
Pre-A1 (Beginner 1)	11.33 *(5.89)**	6		--			18.00 *(12.00)*	6	4	16.00 *(16.73)*	6	5	36.00 *(35.36)*	2	
A1.1 (Beginner 2)	11.14 *(10.12)**	8	7	6.00 *(7.01)**	8		12.00 *(22.13)*	7		10.00 *(10.95)*	7		-2.25 *(34.42)*	5	7
A1.2 (Beginner 3)	9.11 *(13.08)*	9		5.78 *(7.51)**	9		25.13 *(20.97)**	9	8	17.78 *(18.56)**	9		-7.13 *(12.86)*	8	9
A2.1 (Elementary 1)	16.44 *(7.08)**	18		21.67 *(12.35)**	18		34.00 *(22.95)**	18	17	21.11 *(12.78)**	18		1.00 *(19.78)*	12	18
A2.2 (Elementary 2)	16.00 *(8.58)**	6		*25.33 (14.51)**	6		28.20 *(25.57)*	5	6	-4.00 *(16.73)*	5	6	-24.33 *(29.50)*	4	5

*$p<0.05$

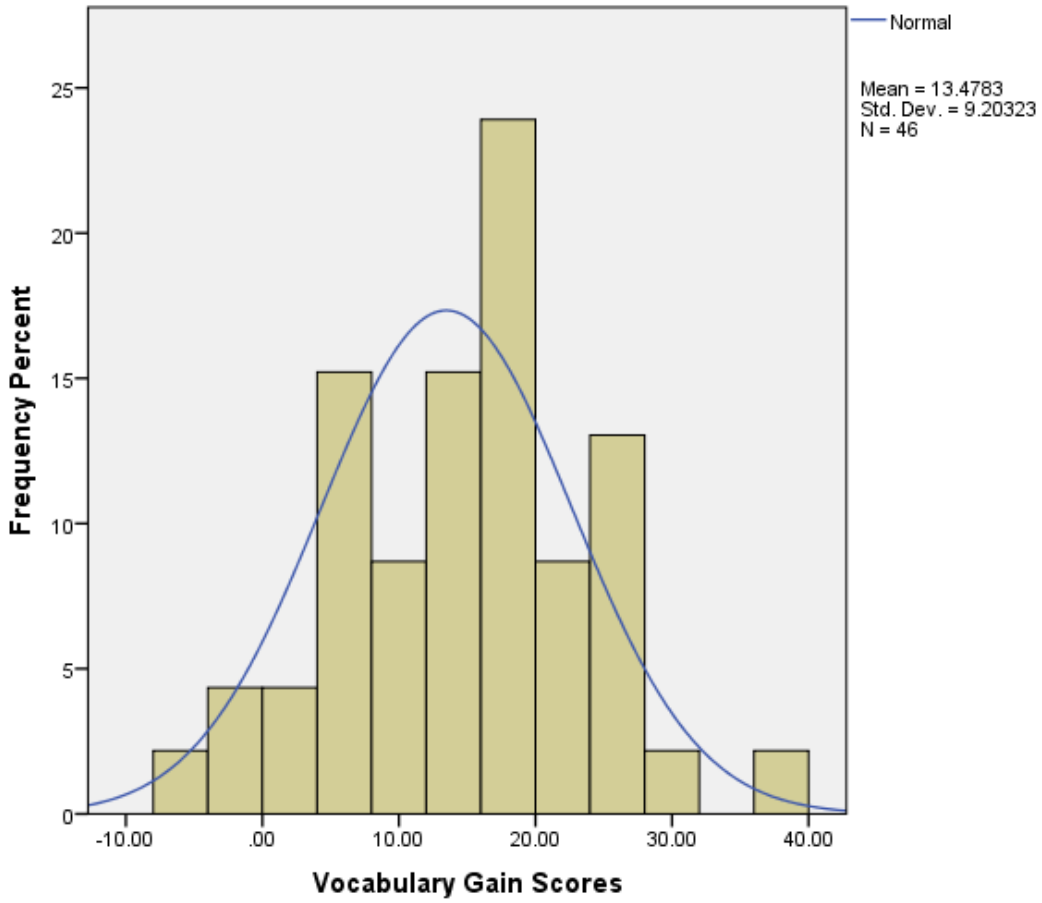
4.3.2 Vocabulary Knowledge

The results suggest that there was an overall improvement in vocabulary knowledge at post-test (*N* = 46, *M* = 13.48, *SD* = 9.20), with the two largest schools—Marathonion and Minos—showing the least improvement over the two time points (*M* = 8.20, *SD* = 8.82 and *M* = 11.33, *SD* = 8.06, respectively). In contrast, this increase was significantly larger for two of the smallest groups—Delphi and Demos (*M* = 22.00, *SD* = 16.37 and *M* = 22.50, *SD* = 4.43, respectively)—when compared to the overall mean learning gain. However, there was greater variability from the mean for Delphi, which is likely explained by the fact that this group included one learner at absolute beginner level, who scored significantly lower than his peers at both pre- and post-test (skewness = -1.21 and -1.73, respectively). Separate analysis by level, however, indicates a different pattern across settings. Mean gain scores were similar for Beginner levels 1 and 2 (*M* = 11.33, *SD* = 5.89 and *M* = 11.14, *SD* = 10.12, respectively); likewise, the two highest levels—Elementary 1 and 2—also reported similar gain scores (*M* = 16.44, *SD* = 7.08 and *M* = 16.00, *SD* = 8.58, respectively). This suggests that the higher the students' English proficiency at baseline, the greater the improvement they were able to make in their vocabulary attainment between T1 and T2.

Figure 14 shows the distribution of gain scores achieved across the sample. The distribution was approximately symmetric (skewness = -0.08) with some scores clustered at the lower end of the scale. Negative kurtosis values (-0.16) indicated a relatively flat distribution across the sample.

Further analysis revealed a positive and significant correlation between pre- and post-test values across the sample ($\tau = 0.760$, $p < 0.001$). A paired-samples t-test was subsequently conducted to evaluate the extent of improvement in students' vocabulary knowledge scores. There was an increase from pre-test (M = 33.26, SD = 20.84) to post-test (M = 46.74, SD = 24.24) which was statistically significant, M = 13.48, 95% CI [10.745, 16.211], $t(45) = 9.933$, $p < 0.001$ which represented an effect of d = 1.47.

Figure 14 Distribution of vocabulary knowledge gain scores from T1 to T2



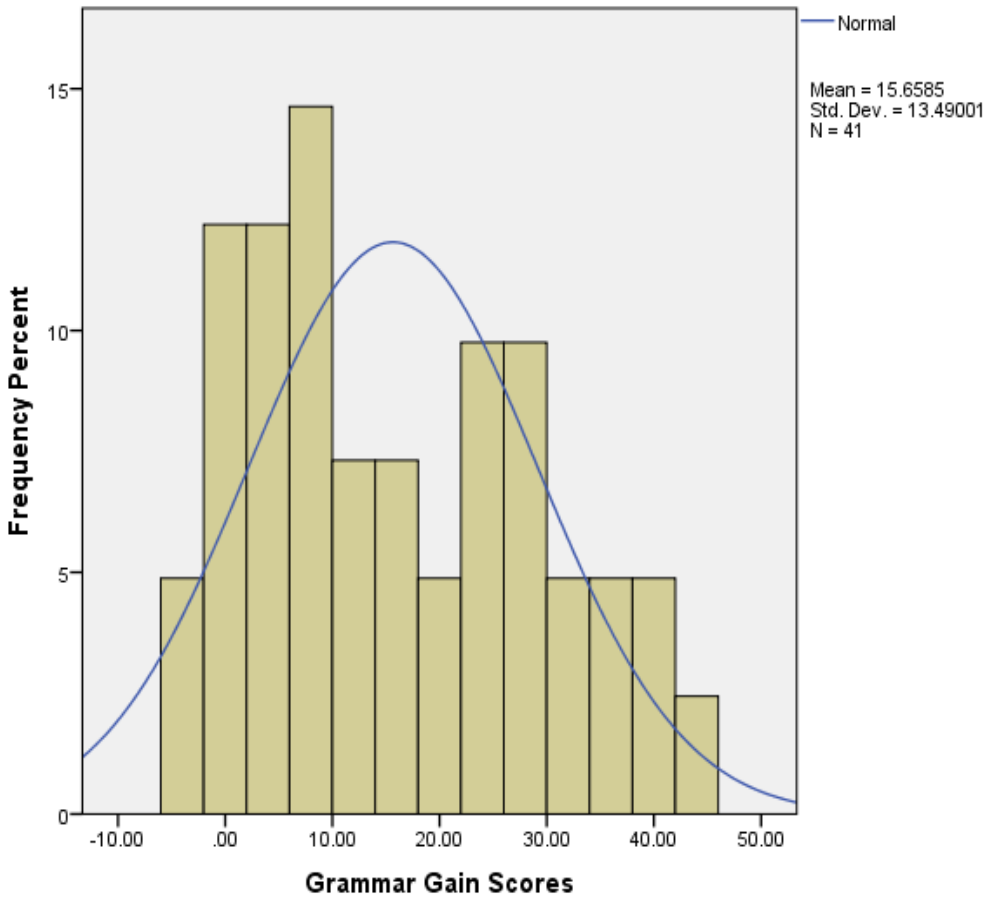
4.3.3 Grammar Knowledge

There was an overall improvement in grammar knowledge at post-test (*N* = 41, *M* = 15.66, *SD* = 13.49), with Marathonion achieving the lowest mean gain score of all eight schools, for both grammar (*M* = 9.33, *SD* = 13.56) and vocabulary. By contrast, Minos, whose mean vocabulary improvement was relatively low compared to other groups, reported the second highest grammar gain score across the sample (*M* = 20.33, *SD* = 15.95). No results are reported for the six students at Pre-A1 level, who were not assessed in grammar.

Separate analysis by level indicates that mean gain scores were similar for Beginner levels 2 and 3 (*M* = 6.00, *SD* = 7.01 and *M* = 5.78, *SD* = 7.51, respectively); likewise, the two highest levels—Elementary 1 and 2—also reported similar gain scores (*M* = 21.67, *SD* = 12.35 and *M* = 25.33, *SD* = 14.51, respectively). As before, this suggests that the higher the students' English proficiency at baseline, the greater the improvement they were able to make in their grammar attainment over the two time points.

Figure 15 shows the distribution of gain scores achieved across the sample. There was some positive skewness at 0.36, with scores clustered at the lower end of the distribution. Negative kurtosis values (-0.97) indicated a relatively wide distribution across the sample. However, this seems normal if we consider that: (a) the participants were sampled from a rather broad spectrum of L2 proficiency, and (b) children who had high scores at T1 increased more (β = 0.849, p < 0.001; Dugard & Todman, 1995).

Figure 15 Distribution of grammar knowledge gain scores from T1 to T2



Further analysis revealed a positive and significant correlation between pre- and post-test values across the sample (τ = 0.677, p < 0.001), and a paired-samples t-test was subsequently conducted to evaluate the extent of improvement in students' grammar knowledge scores. The increase from pre-test (M = 22.00, SD = 16.47) to post-test (M = 37.66, SD = 24.30) was statistically significant, M = 15.66, 95% CI [11.401, 19.917], t(40) = 7.432, p < 0.001, and represented an effect of d = 1.16.

4.3.4 Aural Comprehension Skills

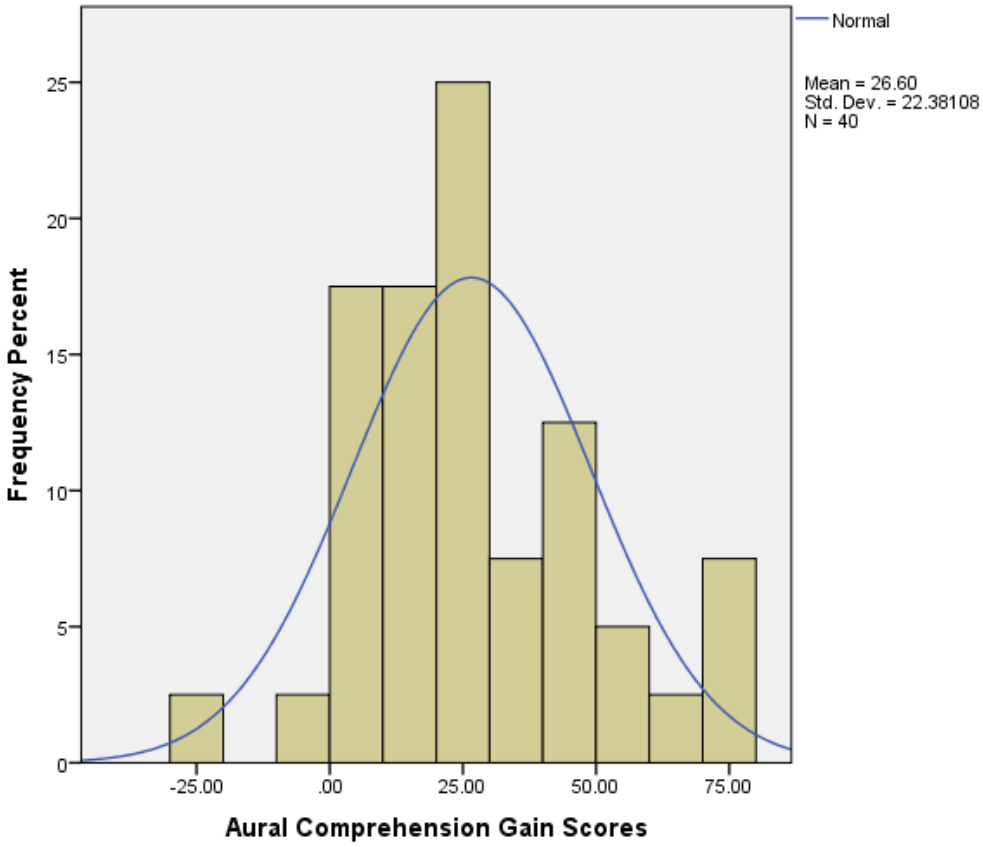
There was an overall improvement in aural comprehension skills at post-test (N = 40, M = 26.60, SD = 22.38), with students from Minos achieving a substantially higher mean gain score compared to the rest of the schools (M = 45.10, SD = 27.77). However, there was more variability away from the mean relative to other groups—a pattern which is also observed within Morphe, and could therefore be attributed to the fact that these were the only groups comprised of four different proficiency levels.

Separate analysis by level reveals no consistent pattern in terms of variability, with A1.1 learners achieving the lowest mean gain scores across the sample (N = 7, M = 12.00, SD = 22.13), and those at A2.1 the highest (M = 34.00, SD = 22.95). Interestingly, there was significantly less variability from the mean after the intervention at level A2.2.

Figure 16 shows the distribution of gain scores achieved across the sample. Some positive skewness is present, with a value of 0.34 and scores clustered at the lower end of the distribution. Negative kurtosis values close to zero (-0.04) indicated a relatively normal distribution across the sample (Hair *et al.*, 2017).

Further analysis revealed a positive and significant correlation between pre- and post-test values across the sample (τ = 0.471, p < 0.001), and a paired-samples t-test was subsequently conducted to evaluate the extent of improvement in students' scores on aural comprehension. The increase from pre-test (M = 36.93, SD = 24.66) to post-test (M = 63.53, SD = 28.10) was statistically significant, M = 26.60, 95% CI [19.442, 33.758], t(39) = 7.517, p < 0.001, and represented an effect of d = 1.19.

Figure 16 Distribution of aural comprehension gain scores from T1 to T2



4.3.5 Writing Skills

There was an overall improvement in writing skills at post-test (*N* = 43, *M* = 15.35, *SD* = 16.23), with learners from Arsinoe and Palaeopolis achieving an equal, yet substantially higher mean gain score compared to most of the schools (*M* = 26.67, *SD* = 30.55 and *M* = 26.67, *SD* = 11.55, respectively). However, the former revealed a lot more variability away from the mean relative to other groups, with one learner out of the three achieving an improvement of 60 percentage points, and another one showing zero increase in her writing score over the two time points.

Similar to the aural comprehension skills scores, separate analysis by level reveals no consistent pattern in terms of variability, with results for A2.2 learners this time reporting no gains in terms of L2 writing ability (*M* = -4.00, *SD* = 16.73), and learners at A2.1 again recording the highest improvement (*M* = 21.11, *SD* = 12.78).

Figure 17 shows the distribution of gain scores achieved across the sample. There was some positive skewness at 0.18, indicating that the distribution was approximately symmetric.

Positive kurtosis values (0.60), on the other hand, suggested a relatively narrow distribution across the sample.

Figure 17 Distribution of writing skills gain scores from T1 to T2

Further analysis revealed a positive and significant relationship between pre- and post-test values across the sample ($\tau = 0.764$, $p < 0.001$), and a paired-samples t-test was subsequently conducted to evaluate the extent of improvement in students' writing scores. There was an increase from pre-test ($M = 41.86$, $SD = 28.89$) to post-test ($M = 57.21$, $SD = 28.48$) which was statistically significant, $M = 15.35$, 95% CI [10.353, 20.345], $t(42) = 6.200$, $p < 0.001$, and represented an effect of $d = 0.95$.

4.3.6 Oral Fluency

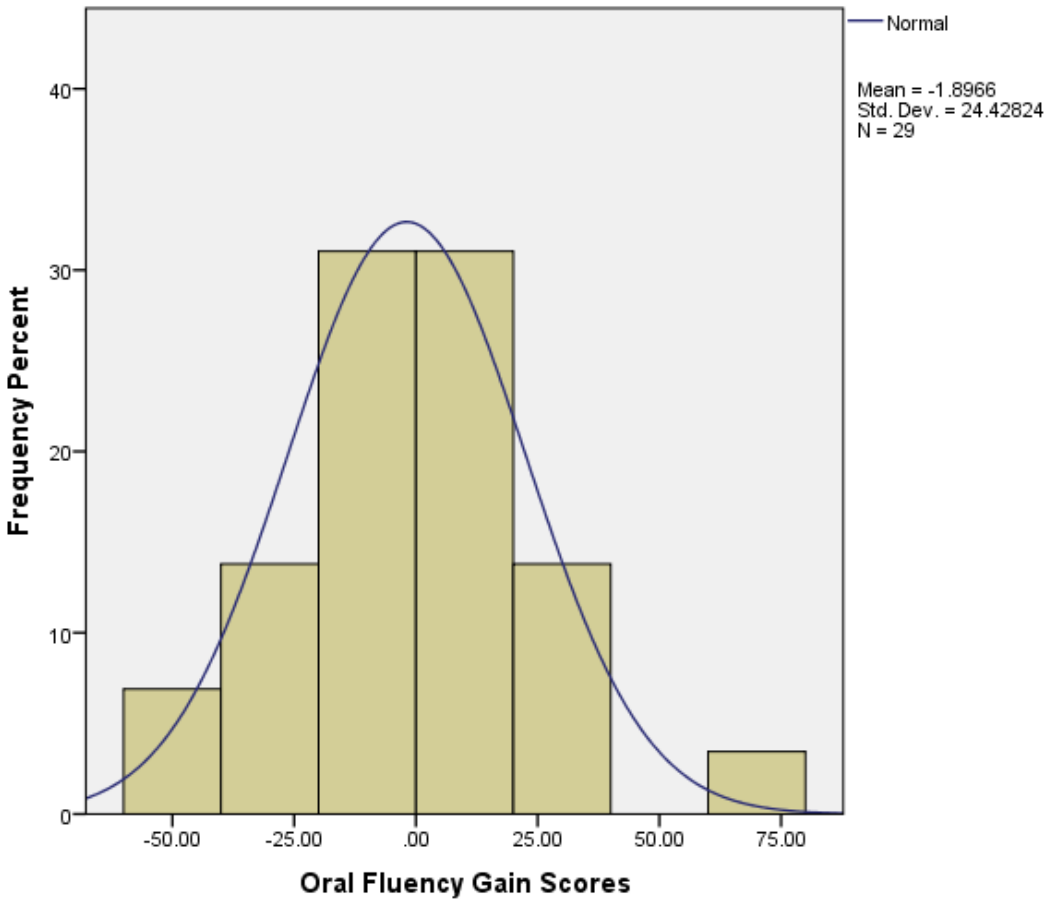
Oral fluency scores are provided in words per minute (WPM). Table 12 shows that there was no overall improvement in oral fluency at post-test ($N = 29$, $M = -1.90$, $SD = 24.43$), with only one school achieving a relatively substantive increase in mean learning gain over the two time points ($M = 11.80$, $SD = 25.06$). Nevertheless, due to technical difficulties which resulted in no recordings of the Minos group's oral fluency performance at pre-test, the sample was significantly smaller than in all other measures (a significant amount of background noise in the recording which was obtained rendered the data largely unusable).

While missing data were found to be missing completely at random (Little's MCAR test: χ^2 = 30.455, *df* = 25, *p* = 0.208), it does nonetheless mean that a full picture of the participants' performance on the measure was not obtained.

Separate analysis by level reveals a similar pattern across settings. Lower-level groups (i.e. Pre-A1 and A1.1) reported a mean gain score of 10.50 (*N* = 6, *SD* = 36.76), whereas upper-level students (i.e. A1.2 – A2.2) reported no learning gain (*N* = 23, *M* = -5.13, *SD* = 19.99) between T1 and T2.

Figure 18 shows the distribution of gain scores achieved across the sample. The curve was approximately symmetric (skewness = 0.14) with only a few outlying values clustered on the positive end of the scale. Positive kurtosis values (0.92), on the other hand, indicated a relatively narrow distribution across the sample.

Figure 18 Distribution of oral fluency gain scores from T1 to T2



Further analysis revealed a positive and significant relationship between pre- and post-test values across the sample ($\tau = 0.289$, $p = 0.03$), and a paired-samples t-test was subsequently conducted to evaluate the change in students' oral fluency scores. There was a decrease from pre-test (M = 48.31, SD = 25.44) to post-test (M = 46.41, SD = 19.44) which was statistically non-significant, M = -1.90, 95% CI [-11.189, 7.40], $t(28) = -0.418$, $p = 0.68$, and represented an effect of $d = -0.08$.

4.3.7 Summary

To summarise test performance which relates to learning that occurred between T1 and T2, all but one L2 measures demonstrated statistically significant increase between pre- and post-test scores. However, it is important to note that missing values in oral fluency—the only L2 construct which showed no increase between test times—resulted in a substantial loss of cases, which amounted to 38 per cent of the original sample ($N = 29$). It is therefore suggested that the t-test may not have had high enough power to detect an important difference between the two time points, thus increasing the probability of a Type II error. This is further discussed in Chapter Eight. In terms of the amount of variation in scores between pre- and post-tests, analyses demonstrated that effect sizes were positive and large for four out of five L2 constructs; by contrast, a negative effect of an almost negligible magnitude was revealed for oral fluency. Table 14 reports mean gain scores, *t*-statistics with their corresponding levels of significance, and effect sizes for all five language proficiency measures.

Overall, these findings confirm the original hypothesis that at T2 children would have significantly higher L2 vocabulary, grammar, listening, and writing skills than they did at T1. The null hypothesis is therefore rejected on the basis that there are indeed significant differences across said constructs.

The next section reports on analyses conducted to measure the amount of contribution of the learning intervention to recorded progress on the above-mentioned measures of general L2 proficiency.

Table 14 Summary of performance at pre- and post-test (by language skill)

L2 measure	Mean Learning Gain	*t*	*d*
Vocabulary	13.48	9.933**	1.47
Grammar	15.66	7.432**	1.16
Aural Comprehension	26.60	7.517**	1.19
Writing Skills	15.35	6.200**	0.95
Oral Fluency	-1.90	-0.418	-0.08

*p<0.05, **p<0.01

4.4 Predictive Relationships and Post-Test L2 Performance

In order to answer Research Question 1 (*What is the impact of the blended remote model on student EFL attainment, with reference to a) vocabulary knowledge, b) grammar knowledge, c) aural comprehension skills, d) writing skills, and e) oral fluency?*), ordinary least squares regressions were carried out to investigate the relative strength of each predictor after appropriate controls are included in the analyses. Specifically, multivariate regressions were used to examine the strength of association between the intervention and students' academic achievement at post-test whilst controlling for other educational inputs, relevant student characteristics and family factors available in the data set. To avoid problems of multicollinearity and to be able to fit the appropriate statistical models to answer the research question, a limited set of control variables was chosen based on theory, and was included in the model in the order these factors were hypothesised to influence learning outcomes (from proximal to distal). Visual inspection of generated scatterplots suggested a linear relationship between the expected value of the post test scores for each L2 construct and each independent variable, holding the others fixed. As such, the assumption of linearity was met.

4.4.1 Hierarchical Multiple Regression on Post-test Achievement

Hierarchical multiple regression was used to assess the ability of predictor variables to predict post-test scores an all measures which had previously indicated a significant change from pre- to post-test (dependent variable). The first model (Model 1) contained five independent variables relating to learning inputs, including prior attainment: time in minutes spent on the asynchronous component of the intervention (*timeonline*) and in sessions during the intervention, accounting for days of nonattendance as well as session duration (*livecontact*), English proficiency level (*level*), amount of English language learning taking place outside school (*englishoutside*; in hours/week), and pre-test scores (*pretest*). Table 15 provides an overview of the results of the analyses across the four language domains. More detailed results, along with model validity checks, are available for each measure separately in Appendix 25.

Table 15 shows that, overall, Model 1 was statistically significant across all measures at $p < 0.001$, explaining 66-85.5% of the total variance. Inclusion in Model 2 of the amount of support from family with English homework (*home*) yielded non-significant R^2 changes from Model 1. Similarly, entering one control at the student level—cognitive ability (*cognab*; as per Raven's CPM scores)—had no significant impact on the original model. As such, Model 1 was retained for all measures.

4.4.2 Vocabulary Knowledge

Overall, the regression model was statistically significant at $p < 0.001$ ($N = 41$), explaining 85.5% of the total variance. The strongest predictor, pre-test scores, was once again found to have a positive relationship with post-test scores (see also Section 4.3.2), $\beta = 0.713$, $p < 0.001$. The second predictor was time spent online, $\beta = 0.216$, $p = 0.009$. With the effects of the other four factors held constant, as time spent on the online learning platform increased by one standard deviation, post-test scores increased by 0.216 standard deviations. Stated differently, for every 175.36 more minutes (2 hours 55 minutes) spent on the platform, an extra 5 percentage points (0.216 x 23.186) were achieved on the post-test vocabulary assessment. Live contact was not found to have significant effects on vocabulary learning outcomes ($\beta = -0.074$, $p = 0.361$). Similarly, no interaction effect was found between live contact and time spent online ($b = 0.000$, $p = 0.973$; not included in Table 15).

Table 15 Hierarchical multiple regression on post-test achievement

Model	Variables	**Vocabulary Knowledge** *β*	**Grammar Knowledge** *β*	**Aural Comprehension** *β*	**Writing Skills** *β*
1	Constant				
	timeonline	**.216****	**.198***	**.294***	.025
	livecontact	-.074	-.103	-.022	.034
	level	.172	**.398*****	**.586*****	.140
	englishoutside	-.050	-.143	.020	-.066
	pretest	**.713*****	**.541*****	.242	**.771*****
	Adjusted R^2	**.855*****	**.833*****	**.690*****	**.660*****
2	Constant				
	timeonline	**.224****	**.196***	**.294***	.025
	livecontact	-.083	-.099	-.021	.032
	level	.170	**.394*****	**.585*****	.137
	englishoutside	-.053	-.145	.020	-.068
	pretest	**.729*****	**.540*****	.244	**.774*****
	home	.109	-.021	-.005	.023
3	Constant				
	timeonline	**.192***	**.203***	**.285***	.029
	livecontact	-.072	-.101	-.018	.032
	level	.125	**.398*****	**.576*****	.140
	englishoutside	-.043	-.148	.025	-.070
	pretest	**.757****	**.543*****	.243	**.775*****
	home	.105	-.019	-.007	.024
	cognab	.087	-.025	.027	-.012

*p<0.05, **p<0.01, ***p<0.001

After entry in Model 3 of *cognab*, the total variance explained by the model as a whole was 86.7%, suggesting a non-significant increase in the model fit, R^2 change = 0.006, $p = 0.190$. Yet, it is notable that inclusion of cognitive ability in the model resulted in a decrease in the net effect of the second strongest predictor —time spent online—by 0.032 standard deviations ($p = 0.020$), suggesting that part of the influence of the amount of time spent on the online asynchronous component could be attributed to differences in general cognitive functioning amongst the participants.

4.4.3 Grammar Knowledge

Overall, the regression model was statistically significant at $p < 0.001$, ($N = 40$), explaining 83.3% of the total variance. Three independent variables made a statistically significant contribution to the model: time spent online, proficiency level, and pre-test scores.

Unsurprisingly, prior attainment was found to be one of the two strongest predictors of grammar learning outcomes, $\beta = 0.541$, $p < 0.001$. The second strongest predictor was L2 proficiency level, $\beta = 0.398$, $p < 0.001$. As level increased by one standard deviation, grammar achievement at post-test went up by almost 0.4 standard deviations, all other factors being equal. Stated differently, assuming equal intervals, as level increased by one (e.g., from Pre-A1 to A1.1), an extra 9.7 percentage points (0.398 x 23.969; after rounding level *SD* from 0.987 to 1) were achieved on the post-test grammar assessment. The third strongest predictor was time spent online, $\beta = 0.198$, $p = 0.024$. With the effects of the other four factors held constant, for every almost 3 hours more spent on the platform, an extra 4.7 percentage points were achieved on the post-test grammar measure. In contrast, no significant net effects of live contact time could be established for progress in L2 grammar ($\beta = -0.103$, $p = 0.238$). Similarly, no interaction effect was found between live contact time and time spent online ($b = 0.000$, $p = 0.869$; not included in Table 15).

After entry in Model 2 of one control at the family level—amount of support from family with English homework (*home*)—the total variance explained by the model as a whole dropped to 82.8%, suggesting no improvement in the model fit, R^2 change = 0.000, $p = 0.763$. No other notable changes were observed in the model.

As a final step, the L2 grammar attainment model was built upon using the student factor of cognitive ability (*cognab*) in Model 3. This resulted in a yet further decrease in the explained variance of the outcome variable to 82.3%, thus yielding a non-significant R^2 change from Model 2 (R^2 change = 0.001, $p = 0.739$). Prior grammar attainment, overall English proficiency level at entry to the study, and time spent on the online component were still the only three predictors with a statistically significant contribution to the model, whereas the net effect of live contact remained non-significant.

4.4.4 Aural Comprehension Skills

The regression model was statistically significant at $p < 0.001$, ($N = 36$), explaining 69% of the total variance. Two factors made a statistically significant contribution to the model: time spent online and proficiency level, with the effects of prior attainment being established as marginally non-significant.

Overall L2 proficiency level was found to be the strongest predictor of aural comprehension improvement, $\beta = 0.586$, $p < 0.001$. The second strongest predictor was time spent online, $\beta = 0.294$, $p = 0.022$. All other factors being equal, and again assuming equal intervals, as level increased by one (e.g., from Pre-A1 to A1.1), aural comprehension achievement at post-test went up by an extra 15.4 percentage points (0.586 x 27.079; after rounding level *SD* from 1.028 to 1), whereas approximately three hours (i.e. 185 minutes) extra spent on the online component of the intervention led to an increase in aural comprehension achievement at exit by 8 percentage points. Prior attainment on this L2 construct was established as only marginally non-significant, $\beta = 0.242$, $p = 0.058$. By contrast, and reinforcing a previously observed pattern across other outcomes variables, no significant net effects of live contact time could be established for progress in L2 aural comprehension ($\beta = -0.022$, $p = 0.857$). Similarly, no interaction effect was found between live contact time and time spent online ($b = 0.000$, $p = 0.080$; not included in Table 15). However, after entry of the *timeonline* x *level* interaction term, the total variance explained by the model as a whole was 79.8% (compared to 73.4%, previously), representing a statistically significant R^2 change equal to 0.031, $p = 0.032$.

The second model for attainment in aural comprehension included amount of support at home with English homework (*home*) and did not constitute an improvement in the model fit, R^2 change = 0.000, $p = 0.961$. English proficiency level and time spent online remained the only two significant predictors of aural comprehension at exit.

After entry in Model 3 of cognitive ability (*cognab*) as a potential confounder, the total variance accounted for by the model as a whole dropped to 66.8%, suggesting a non-significant increase in the model fit, R^2 change = 0.001, $p = 0.812$.

4.4.5 Writing Skills

The regression model was statistically significant at $p < 0.001$, ($N = 39$), explaining 66% of the total variance. Only one factor made a statistically significant contribution to the model: prior attainment in L2 writing, $\beta = 0.771$, $p < 0.001$. All other factors being equal, for each percentage point increase in the writing assessment at entry to the study, achievement at post-test went up by an extra 1.02 percentage points. Conversely, no significant net effects of live contact time or time spent on the online component of the intervention could be established for progress in the writing skills construct ($\beta = 0.034$, $p = 0.788$ and $\beta = 0.025$, $p = 0.843$, respectively).

The second model for attainment in writing skills included amount of support at home with English homework (*home*) and did not constitute an improvement in the model fit, R^2 change = 0.001, $p = 0.814$. Prior attainment remained the only significant predictor of writing skills at exit.

Next, Model 3 shows that after entry of cognitive ability (*cognab*) as a potential confounder, the total variance accounted for by the model as a whole dropped to 63.9%, suggesting no improvement in the model fit, R^2 change = 0.000, $p = 0.911$.

4.4.6 Summary

Research Question 1 (*What is the impact of the blended remote model on student EFL attainment, with reference to a) vocabulary knowledge, b) grammar knowledge, c) aural comprehension skills, d) writing skills, and e) oral fluency?)* posed questions about the impact of the blended learning intervention on five key second language learning domains: vocabulary and grammar knowledge, aural comprehension, writing skills, and oral fluency. The analyses show that the amount of time spent on the online learning platform, *EdApp*, used as a proxy for the asynchronous component of the intervention, was a strong predictor of mean L2

achievement at post-test[34]. Separate analyses for each outcome measure uphold this finding, with the exception of writing skills, in which case time spent online could not be established as a significant predictor. Conversely, the amount of live contact was not found to have a significant effect on post-test performance in any of the four linguistic domains examined. Furthermore, children's English proficiency level was shown as another strong predictor of mean L2 achievement at post-test (although not so for vocabulary knowledge or writing skills). This shows clearly that the children's progress through the intervention was based on differential levels of readiness as well as curricular exposure: an extra 6.2 percentage points were achieved, on average, for each level the children went up along the proficiency scale (i.e from Pre-A1 to A1.1).

Of note is the finding that the greatest improvement across all eight schools and all five language skills appeared to have been made by students at Minos Primary, while no significant progress was recorded for the three students at Delphi in none of these areas. This finding was unexpected not only because of the substantial difference in the size of the two groups (twelve and three, respectively), but also because informal observations and interactions with both groups throughout the delivery of the intervention revealed that the latter group consistently exhibited much higher engagement levels, both in the classroom and online. This group also exhibited a higher degree of capacity and willingness to self-regulate, partly due to the fact that their teacher allowed them plenty of opportunities to do so during the regular programme. This insight raises important questions regarding the types of assessment chosen for the evaluation of programmes that aim at a deeper level of student engagement with the subject matter; such questions are addressed in more detail in Section 8.5. The quantitative findings and interpretations will be discussed in Chapter Seven.

The next chapter reports on supplemental analyses carried out in order to examine relational patterns involving the variables identified in this section, along with potential associations of the outcome variables with some of the latent constructs uncovered by the EFA, as described in Section 4.2.3. This is done with a view to answer Research Question 2 through a quantitative lens, before delving into the qualitative data and the associated sub-questions.

[34] Oral fluency was excluded from the analysis due to a lack of a statistically significant increase between pre- and post-test scores (see Section 4.3.6).

Chapter Five – Factors Influencing Learning Outcomes in the Blended Intervention

5.1 Introduction

Although the traditional additive regression model is sufficient for examining associations between observed variables, its use to understand complex phenomena is limited (Schumacker & Lomax, 2016). Structural equation modelling, in contrast, affords the opportunity to specify and assess a relational model that is as good a representation of the phenomenon in question as possible. The multiple regression approach also limits the potential to model and test indirect effects that variables may have on each other. Considering that no direct effects were established for live contact on student achievement, yet that the time students spent on the asynchronous (i.e. online) component was found to be a significant predictor of performance at post-test for three out of four measures, the next step was to assess the potential of live contact having had indirect effects on achievement which were mediated by time spent online, and thus attempt to unearth the specific mechanisms potentiating the effects on children's learning outcomes, as discussed in Section 4.4. In so doing, the first part of this chapter seeks to address Research Question 2 (*What are the specific mechanisms which mediate and/or inhibit said impact on learning outcomes?*) from a quantitative perspective, before going on to explore the qualitative data and shed further light on factors that are likely to have affected children EFL achievement during the blended learning intervention.

5.2 Relational Patterns in Structural Equation Models (SEM)

5.2.1 Confirmatory Factor Analysis (CFA) on Participant Motivational Disposition towards English

The measurement part of SEM was used to establish the ways in which participant motivation levels may have interacted with other factors in contributing towards the observed variance in their performance at post-test. To that end, it was first necessary to determine if items measured the motivational disposition construct well and were suitable for use in the structural equation models. In this respect, this section builds on the EFA procedure which was outlined in 4.2.3.

With regard to sample size requirements in SEM, one measure of sample adequacy is the ratio of available observations to number of parameters in the model to be estimated. Bentler and Chou (1987) suggest that a ratio as low as 5:1 is sufficient for normal distributions when the latent variables have multiple indicators. The current dataset with a sample size of N=47 would therefore be considered powerful enough to detect small effects only if a relatively limited number of parameters were to be estimated. As a result, a decision was made to retain a single measure of the motivational disposition construct which would consist of up to four reflective indicators[35].

Table 16 below provides a description of the items that were retained. Confirmatory factor analysis (CFA) was carried out next to inspect how well the items measured the identified factor, and their suitability for use in further structural equation models. The hypothesised measurement model specified the latent motivation variable, 'motiv', and the four indicator variables that were thought to load on this. The model was fitted using maximum likelihood estimation (ML) accompanied by the Satorra–Bentler scaled chi-squared statistic to obtain standard errors that were robust to nonnormality (Satorra & Bentler, 1994)[36].

Table 16 Variable names and items in CFA

Observed variables/Indicators	**Variable name**	**Response**
I like American films.	*films*	Scale (5-point Likert)
Learning English is important in order to learn more about the culture and art of its speakers.	*culture*	
Knowing English would help my future career.	*futurejob*	
People around me tend to think that it is a good thing to know foreign languages.	*attitenv*	

Figure 19 shows the fitted measurement model together with the model fit indices for this. Overall, and taking 0.40 as a cut-off point (Bowen & Guo, 2012), all standardised factor loadings of indicators on the latent variable were acceptable, ranging from a low of 0.54 for *films* to 0.71 for *attitenv*. All loadings were statistically significant at the $p < 0.05$ level. Values related to the proportion of variance in each indicator that was explained by the latent factor are also shown in Table 17. This shows moderate values ranging between 0.29-0.51, with an

[35] Details on the procedure are provided in Appendix 26.
[36] For a more detailed description of the CFA procedure, see Appendix 27.

overall $R^2 = 0.76$. Therefore, the theoretical construct predicted its manifest items reasonably well.

Figure 19 Result of CFA of the Motivation construct

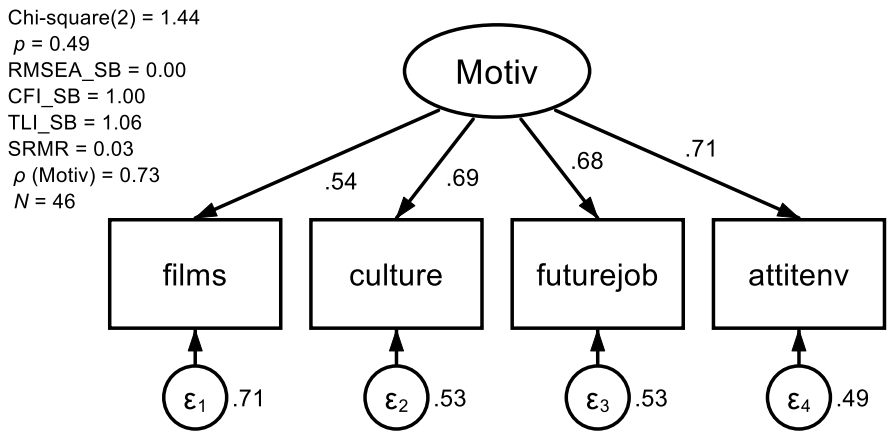


Table 17 Standardised and unstandardised coefficients and variance explained in CFA of motivational disposition towards the L2

Indicator	B	*β*	SE	R^2	Residual variance (e)
films	1.00	0.54	0.13	0.29	0.71
culture	1.14	0.69	0.12	0.47	0.53
futurejob	1.03	0.68	0.11	0.47	0.53
attitenv	0.75	0.71	0.11	0.51	0.49

Fit indices indicated that the model provided an excellent fit to the data (Satorra-Bentler scaled $\chi^2(2) = 1.44$, $p = 0.49$, RMSEA_SB = 0.00, CFI_SB = 1.00, TLI_SB = 1.06, and SRMR = 0.03; see Table 7 in Section 3.8.1 for recommended cut-off points for each). The scale reliability was found acceptable with a coefficient $\alpha = 0.73$. Due to modification indices not being available with the MLR estimator, these were not requested.

The measurement model was therefore suitable for use in further SEM analyses addressing the part of Research Question 2 of this study that investigates the specific mechanisms which mediated the effects of the intervention on children's learning outcomes. Results of these analyses are presented in the section that follows.

5.2.2 SEM Model Construction

Having obtained a reliable measure for the motivation latent construct, the sections that follow report on the procedure that was followed in developing three structural equation models that would accurately reproduce the complex multivariable relationships that helped explain the change in the participants' (i) vocabulary knowledge; (ii) grammar knowledge; and (iii) aural comprehension skills between T1 and T2.

Drawing on the results of the exploratory regression analyses reported in Section 4.4, three distinct models were hypothesised and specified which aimed to simultaneously assess the effects of (a) the intervention, (b) student characteristics, and (c) student's learning environment at home. Specifically, the models included the effect of each of the two components of the learning programme—amount of live contact and time spent independently on the learning platform—as a way of disentangling the impact each of these may have had on learning. Recall that live contact was not found to have had any direct effects on vocabulary knowledge attainment, however, it was hypothesised that indirect effects may have been mediated by the time spent online. This indirect path is shown in the structural model. Additionally, considering the amount of variability in size amongst the various groups (min. = 3, max = 12), it was deemed important to measure the effect this may have had on post-test performance. This was because group size has previously been found to significantly influence EFL achievement in computer-assisted cooperative learning environments, with members of groups of two, three, or four having limited opportunities for peer interaction (AbuSeileek, 2012). Members of groups of five and above were also found to be at a disadvantage in the same study, as not all members had equitable opportunities to share and express themselves within the group. Conversely, the study concludes that an ideal group size is five members.

With respect to student characteristics, it was hypothesised that children's attitudes and motivational disposition towards the L2 and the L2 community—as reflected by the four indicators discussed above—would have had an effect on their level of engagement with the learning process, and, by extension, their attainment at post-test (Dörnyei, 2009a). Prior attainment was found in the regression analyses to be a significant predictor of performance on the post-test assessment across all three measures and was therefore included in each model, together with cognitive ability. Although the latter did not appear previously to significantly influence attainment, it was nonetheless added to the models to facilitate the specification of

correlational terms between this and variables such as prior attainment and home learning environment. Similarly, the amount of home support with English was thought to influence attainment when allowed to correlate with other variables. This was based on evidence which suggests that parental involvement at home (e.g., providing help with homework) is significantly and positively related to primary school students' motivation to achieve EFL mastery and perform well in class (He, Gou & Chang, 2015).

Finally, one extra explanatory variable—English proficiency level (*level*)—was inserted into Models (ii) and (iii), as this had earlier been found to significantly predict grammar and aural comprehension achievement at post-test.

5.2.3 Fitting the SEM Models

As with CFA, the SEM models were fitted using maximum likelihood estimation (ML) with the Satorra–Bentler scaled chi-squared statistic to obtain standard errors that were robust to nonnormality.

With regard to SEM-Vocab, there were 11 observed variables in the full structural equation model and 8 (measurement model part) + 28 (structural part) unknowns, leading to a total of 36 parameters to estimate. With 66 possible equations, the degrees allowed to vary were 30, suggesting that the model was over-identified and thus able to be fitted.

Conversely, there were 12 observed variables in each of SEM-Gram and SEM-Aural, with 8 (measurement model component) + 35 (structural component) unknowns, leading to a total of 43 parameters to estimate in each. With 78 possible equations, the degrees allowed to vary in each were 35, suggesting that both models were over-identified and thus able to be fitted.

A description of all variables included in the hypothesised models is given in Table 18 below.

Table 18 Variable structure and names in SEM-Vocab

Variable (latent or observed)	**Variable name**	**Scale of measurement**
Exogenous		
Motivational disposition towards the L2 (latent)	*Motiv*	Scale (5-point Likert)
Prior L2 vocabulary attainment	*prevocab*	Continuous
Amount of exposure to intervention (synchronous; accounting for days of nonattendance and session duration)	*livecontact*	Continuous

Cognitive ability	*cognab*	Continuous
Group size	groupsize	Continuous
Home learning environment/support with English	*home*	Scale (4-point Likert)
Endogenous		
Vocabulary achievement at post-test	*postvocab*	Continuous
Amount of exposure to intervention (asynchronous)	*timeonline*	Continuous
I like American films.	*films*	Scale (5-point Likert)
Learning English is important in order to learn more about the culture and art of its speakers.	*culture*	
Knowing English would help my future career.	*futurejob*	
People around me tend to think that it is a good thing to know foreign languages.	*attitenv*	

5.2.4 SEM Model (i) – Explaining Vocabulary Knowledge Attainment

Bivariate correlations between the observed variables were calculated and are shown in Table 19.

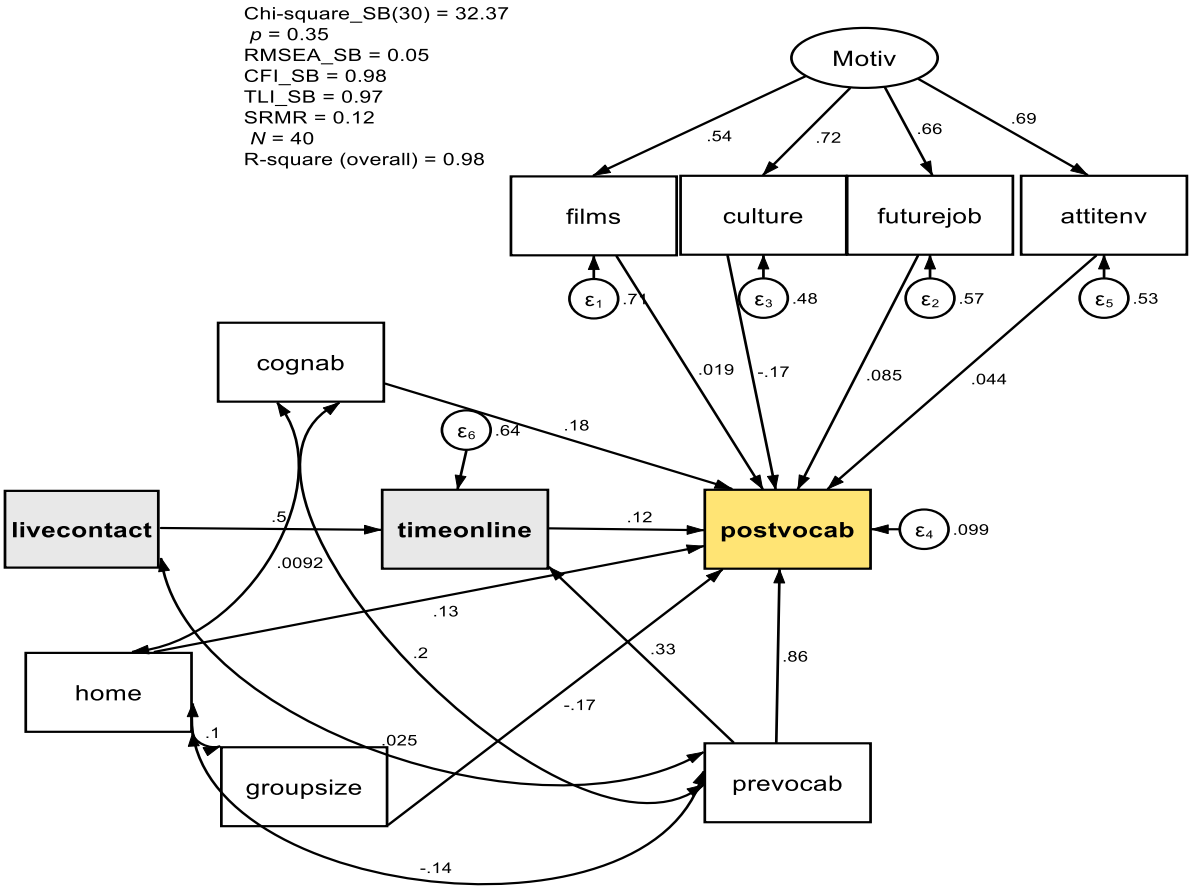
Figure 20 shows that the model predicts vocabulary achievement at exit (ε = 0.099), with a significant positive effect of the time spent on the online component of the intervention (β = 0.12, p = 0.002), prior vocabulary knowledge (β = 0.86, $p < 0.001$), amount of support at home (β = 0.13, p = 0.007), and cognitive ability (β = 0.18, p = 0.003). Perceived importance of English in terms of future prospects was also established as a significant predictor (β = 0.08, p = 0.017), whereas a negative influence on vocabulary learning outcomes was identified with respect to perceived importance of English in learning about the cultures of its speakers (β = -0.17, p = 0.006) and group size (β = -0.17, p = 0.003). The amount of children's independent engagement with the asynchronous component of the learning intervention was also partially predicted by the model (ε = 0.64), with prior vocabulary knowledge (β = 0.33, $p < 0.001$) and the amount of live contact (β = 0.50, $p < 0.001$) both having a significant influence on this. As will be discussed in a later section, qualitative observations throughout the intervention revealed that drawing explicit links between children's progress on the web-based platform and the live sessions created a sense of continuity between the two learning modes, thereby enhancing students' perceptions about the relevance of the online component, and, by extension, its utility. This may constitute one plausible explanation for the significant relationship identified here between the two variables.

Table 19 Bivariate correlations between variables in SEM-Vocab (τ)

	livecontact	***groupsize***	***timeonline***	***prevocab***	***postvocab***	***home***	***cognab***	***culture***	***futurejob***	***films***	***attitenv***
livecontact	1.000										
groupsize	-.076	1.000									
timeonline	.352**	-.062	1.000								
prevocab	.026	.070	.196	1.000							
postvocab	.036	.003	.293**	.760**	1.000						
home	.071	.070	-.077	-.084	-.049	1.000					
cognab	.035	.186	.148	.221*	.282**	-.046	1.000				
culture	-.082	-.118	-.229*	-.256*	-.360**	-.100	-.198	1.000			
futurejob	.019	.203	.060	.148	.141	-.046	.009	.356**	1.000		
films	-.135	-.114	-.111	.071	.044	.087	.023	.358	.373	1.000	
attitenv	-.075	.047	.054	.035	.001	-.131	-.239	.433	.630	.296	1.000

*p<0.05, **p<0.01

Figure 20 Results of SEM model for vocabulary attainment at post-test (with fit indices)



By examining Figure 20, we see that *livecontact* had a significant indirect effect on *postvocab* that was mediated by *timeonline* ($\beta = 0.018$, $p = 0.019$). Conversely, as stated earlier, there was no direct effect of *livecontact* on *postvocab.* These results were congruent with the original hypothesis regarding the unique influence of each of the two components on L2 vocabulary learning outcomes and are further discussed in Chapter Seven. Table 20 shows a summary of the results of the fitted SEM model, including both direct and indirect effects on the outcome measure.

The results for the equation-level goodness-of-fit showed that the model explained 90% of the variance in vocabulary achievement at post-test and 36.4% of the variance in time spent online. The goodness-of-fit measures suggested the model was an acceptable to good fit to the data

(Satorra-Bentler scaled $\chi^2(30) = 32.37$, $p = 0.35$, RMSEA_SB = 0.05, CFI_SB = 0.98, TLI_SB = 0.97, and SRMR = 0.12)[37].

Table 20 Significant predictors of L2 vocabulary achievement at post-test (direct and indirect effects)

Predictor variable	***β***	**SE**
prevocab	0.86**	0.04
cognab	0.18**	0.06
home	0.13**	0.05
timeonline	0.12**	0.04
futurejob	0.08*	0.04
culture	-0.17**	0.06
groupsize	-0.17**	0.06
livecontact[38]	0.02*	0.01

*p<0.05, **p<0.01

By contrast, significant effects on *postvocab* were not established for two indicators: *films* ($\beta = 0.02$, $p < 0.728$) and *attitenv* ($\beta = 0.04$, $p < 0.494$). However, dropping these two variables from the model (and, by extension, removing the measurement model component itself but keeping the two significant indicators *culture* and *futurejob* as observed variables) did not lead to a statistically significant chi-squared value for the difference between the two models (χ^2_sb(24) = 24.81, $p = 0.42$) nor to a considerable improvement in the remaining fit indices. Conversely, and despite its obvious advantages in terms of achieving parsimony, removing the two variables resulted in a noticeable loss of information, now explaining only 92.9% of the variance overall from 98.1%. As a result, it was thought appropriate to retain them in the model. A comparison in tabular form of the goodness-of-fit of the two models, along with their respective R^2 values is available in Appendix 28.

Finally, winsorization of the cognitive ability data by replacing the two extreme outliers below the 25th per centile with the next largest value did not produce a substantial difference compared to the original SEM-Vocab. Tables 21 and 22 show a summary of the results of the fitted SEM model after winsorization, and a comparison of the two models, respectively.

[37] The relatively high SRMR value, although reported, was not taken into consideration when evaluating the goodness of fit of this structural equation model due to the measure's sensitivity to small sample sizes. Asparouhov and Muthén (2018, p.4) argue that 'larger SRMR values can occur quite often when the sample size is 200 or less', and, therefore, if the exact fit holds, as is the case here, the model should be considered well fitting, even if SRMR> 0.08.

[38] Unstandardised *B* value is reported for indirect effects.

Table 21 Significant predictors of L2 vocabulary achievement at post-test (direct and indirect effects), after winsorization

Predictor variable	B	*β*	SE	*Sig.*	95% CI for *β*	
prevocab	0.99	0.85	0.05	< 0.001	0.761	0.938
cognab	0.23	0.16	0.06	0.007	0.045	0.279
home	2.51	0.13	0.05	0.007	0.035	0.220
timeonline	0.02	0.13	0.04	0.002	0.051	0.216
futurejob	2.34	0.09	0.04	0.021	0.013	0.159
culture	-4.44	-0.17	0.06	0.005	-0.296	-0.052
groupsize	-0.99	-0.16	0.06	0.004	-0.274	-0.054
livecontact[*]	0.02	0.07	0.01	0.017	0.004	0.036
R^2 = 0.90						

[*] Indirect effect; SE and CI reported for unstandardised coefficient B only

Table 22 SEM-Vocab model comparison before and after winsorization of *cognab* data

	Chi-squared_SB	df	*Sig.*	RMSEA_SB	CFI_SB	TLI_SB	R^2 (overall)
Model 1 (before)	32.37	30	0.35	0.05	0.98	0.97	98.1%
Model 2 (after)	32.19	30	0.36	0.04	0.98	0.98	97.9%

5.2.5 SEM Model (ii) – Explaining Grammar Knowledge Attainment

Further analysis was conducted to explore potential direct and indirect effects of the intervention on grammar attainment at post-test, as well as the relational structure of intervention-, student- and family-related influences on the children's learning outcomes. Bivariate correlations between the observed variables were calculated and are shown in Table 23.

Figure 21 shows that the model predicts grammar achievement at exit (ε = 0.11), with a significant positive effect of the time spent on the online component of the intervention (β = 0.14, p = 0.014), prior grammar knowledge (β = 0.40, p < 0.001), group size (β = 0.13, p = 0.014), and level (β = 0.54, p < 0.001). Attitudes towards American films was also established as a significant predictor (β = 0.17, p = 0.001), whereas a significant negative influence on grammar learning outcomes was identified with respect to perceived importance of English in terms of future prospects (β = -0.21, p < 0.001). The amount of children's independent engagement with the asynchronous component of the learning intervention was also partially predicted by the model (ε = 0.63), with the amount of live contact

Table 23 Bivariate correlations between variables in SEM-Gram (τ)

	livecontact	***groupsize***	***timeonline***	***pregram***	***postgram***	***home***	***cognab***	***level***	***culture***	***futurejob***	***films***	***attitenv***
livecontact	1.000											
groupsize	-.076	1.000										
timeonline	.352**	-.062	1.000									
pregram	-.074	-.072	.200	1.000								
postgram	-.003	-.031	.230*	.677**	1.000							
home	.071	.070	-.077	-.198	-.199	1.000						
cognab	.035	.186	.148	.245*	.296*	-.046	1.000					
level	.021	.065	.140	.697**	.711**	-.092	.386**	1.000				
culture	-.082	-.118	-.229*	-.037	-.158	-.100	-.198	-.157	1.000			
futurejob	.019	.203	.060	.090	.033	-.046	.009	.191	.356**	1.000		
films	-.135	-.114	-.111	.133	.101	.087	.023	.061	.358**	.373**	1.000	
attitenv	-.075	.047	.054	.034	-.043	-.131	-.239	-.008	.433**	.630**	.296*	1.000

*p<0.05, **p<0.01

(β = 0.55, p < 0.001) and prior grammar knowledge (β = 0.26, p = 0.047) both having a significant influence on this. This was in line with qualitative findings which, as will be shown later, suggested that children's attitudes towards the autonomous use of a web-based learning platform as a medium of study were fundamental factors in their quantity and quality of interactions with the online learning platform of the BL intervention. Although capacity for self-regulation was not measured quantitatively in this study and therefore not possible to include in the SEM model, it is nonetheless likely to have operated as a latent factor influencing children's preparedness to make use of the online asynchronous component: those with a higher level of grammar knowledge may have felt more confident in their ability to work in an autonomous fashion, and, thus, more willing to interact with the self-paced online component.

By examining Figure 21, we see that *livecontact* had a significant indirect effect on *postgram* that was mediated by *timeonline* (β = 0.025, p = 0.023). Table 24 shows a summary of the results of the fitted SEM model, including both direct and indirect effects on the outcome measure.

The results for the equation-level goodness-of-fit showed that the model explained 88.6% of the variance in grammar achievement at post-test and 37.1% of the variance in time spent online. The goodness-of-fit measures suggested the model was a good fit to the data (Satorra-Bentler scaled $\chi^2(35) = 32.22$, p = 0.60, RMSEA_SB = 0.00, CFI_SB = 1.00, TLI_SB = 1.04, and SRMR = 0.09)[39].

By contrast, significant effects on *postgram* were not established for the following indicators: *culture* (β = -0.07, p < 0.225), *attitenv* (β = 0.04, p < 0.534), *home* (β = -0.08, p < 0.160) and *cognab* (β = -0.10, p < 0.156). However, dropping these four variables from the model did not lead to a statistically significant chi-squared value for the difference between the two models (χ2_sb(30) = 31.35, p = 0.40) nor to a substantive improvement in the remaining fit indices (RMSEA_SB = 0.00, CFI_SB = 1.00). Conversely, removing the four variables resulted in a noticeable loss of information, now explaining only 84.0% of the variance in grammar achievement at exit from 88.6%, and 88.2% of the variance overall from 98.0%.

[39] Note again the relatively high SRMR value, which is nonetheless presumably attributable to the small number of cases in the model and therefore, given that the exact fit holds, can be disregarded (N = 39; Asparouhov & Muthén, 2018).

Figure 21 Results of SEM model for grammar attainment at post-test (with fit indices)

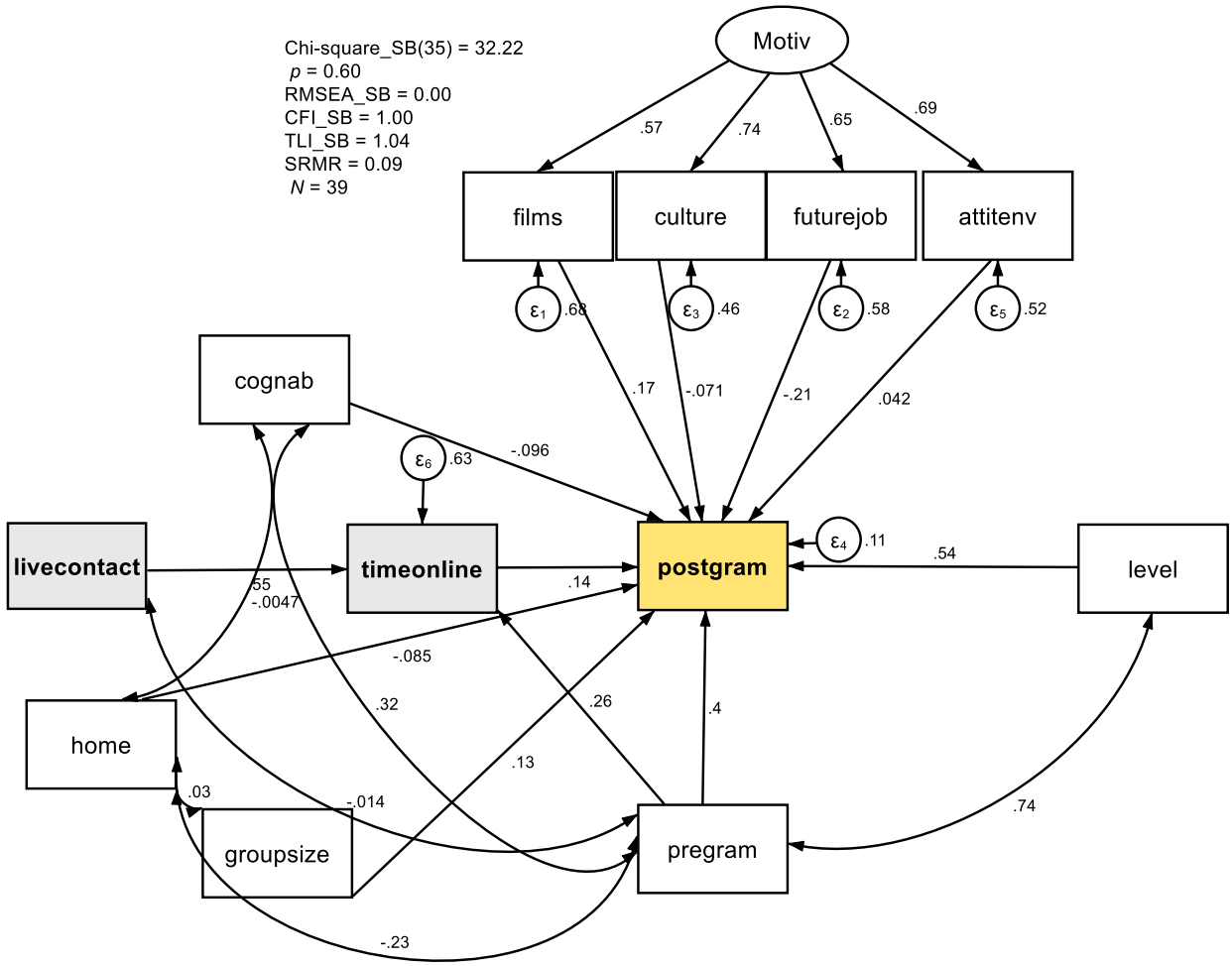


Table 24 Significant predictors of L2 grammar achievement at post-test (direct and indirect effects)

Predictor variable	**B**	***β***	**SE**	***Sig.***	**95% CI for *β***	
level	13.58	0.54	0.08	< 0.001	0.376	0.704
pregram	0.59	0.40	0.08	< 0.001	0.252	0.552
futurejob	-6.45	-0.21	0.05	< 0.001	-0.306	-0.121
films	4.43	0.17	0.05	0.001	0.068	0.277
timeonline	0.02	0.14	0.06	0.014	0.028	0.250
groupsize	0.88	0.13	0.05	0.014	0.026	0.231
livecontact[*]	0.02		0.01	0.023	0.003	0.046
R^2 = 0.886						

[*]Indirect effect; SE and CI are reported for unstandardized coefficient B only

As a result, it was thought appropriate to retain them in the model. Table 25 illustrates a comparison of the goodness-of-fit of the two models, along with their respective R^2 values.

Table 25 Model comparison between SEM-Gram with and SEM-Gram without *culture*, *attitenv*, *home* and *cognab*

	Chi-squared_SB	**df**	***Sig.***	**RMSEA_SB**	**CFI_SB**	**TLI_SB**	**R^2 (overall)**
Model 1 (with)	32.22	35	0.60	0.00	1.00	1.04	98.0%
Model 2 (without)	0.87	5	0.97	0.00	1.00	1.16	88.2%
Difference	31.35	30	0.40			0.12	9.8%

Finally, winsorization of the cognitive ability data by replacing the two extreme outliers below the 25th per centile with the next largest value did not produce a substantial difference in the results of the fitted SEM model compared to the original SEM-Gram. Table 26 shows a comparison of the two models before and after winsorization.

Table 26 SEM-Gram model comparison before and after winsorization of *cognab* data

	Chi-squared_SB	**df**	***Sig.***	**RMSEA_SB**	**CFI_SB**	**TLI_SB**	**R^2 (overall)**
Model 1 (before)	32.22	35	0.60	0.00	1.00	1.04	98.0%
Model 2 (after)	31.79	35	0.62	0.00	1.00	1.04	98.0%

5.2.6 SEM Model (iii) – Explaining Aural Comprehension Skills Attainment

The final analysis concerned L2 aural comprehension attainment at post-test. Bivariate correlations between the observed variables were calculated and are shown in Table 27.

Figure 22 shows that the model predicts aural comprehension skills achievement at exit (ε = 0.23), with a significant positive effect of the time spent on the online component of the intervention (β = 0.31, $p < 0.001$), prior L2 aural comprehension skills (β = 0.45, $p < 0.001$) and level (β = 0.46, $p < 0.001$). Attitudes towards foreign (American) films was also established as a significant predictor although, strangely, a negative relationship was identified between the two variables (β = -0.23, p = 0.038). None of the remaining variables were found to significantly impact L2 aural skills attainment at post-test. The amount of children's independent engagement with the asynchronous component of the learning intervention was

also partially predicted by the model ($\varepsilon = 0.63$), with the amount of live contact ($\beta = 0.61$, $p < 0.001$) having a significant influence on this.

Nevertheless, the goodness-of-fit measures suggested the model failed to fit the data to an acceptable degree (Satorra-Bentler scaled $\chi^2(35) = 49.59$, $p = 0.05$, RMSEA_SB = 0.11, CFI_SB = 0.87, TLI_SB = 0.80, and SRMR = 0.11). As such, and following an iterative approach, eventually, a more parsimonious model was specified and fitted anew (Figure 23).

Figure 23 elucidates that only five observed variables were included in the final model, three of which were shown to have a significant direct positive effect on L2 aural skills attainment at exit: *level* ($\beta = 0.59$, $p < 0.001$), *timeonline* ($\beta = 0.28$, $p < 0.001$), and *preaural* ($\beta = 0.27$, $p = 0.01$). *livecontact* had a small but significant indirect effect on *postaural* which was mediated by *timeonline* ($\beta = 0.06$, $p = 0.004$). Although not a significant predictor of *postaural*, *films* ($\beta = -0.12$, $p = 0.10$) was retained in the model as removing it led to a reduction in the goodness of fit of the model. Finally, *timeonline* was also partially explained by the model ($\varepsilon = 0.66$, $R^2 = 34.2\%$), with the amount of live contact ($\beta = 0.58$, $p < 0.001$) contributing significantly to the variance within it. A summary of the results of the final fitted SEM model, including both direct and indirect effects on the outcome measure is shown in Table 28.

The results for the equation-level goodness-of-fit showed that the model explained 76% of the variance in aural comprehension achievement at post-test. The goodness-of-fit measures suggested the model was an excellent fit to the data (Satorra-Bentler scaled $\chi^2(3) = 1.65$, $p = 0.65$, RMSEA_SB = 0.00, CFI_SB = 1.00, TLI_SB = 1.05, and SRMR = 0.03). For illustrative purposes, Table 29 offers a comparison of the goodness-of-fit of the final, more parsimonious model and the one that was fitted at the start of the iterative process. The two models are significantly different at the 0.05 level, with the final model performing better across all goodness-of-fit measures, the trade-off being a noticeable loss of information regarding the overall variance within it.

Table 27 Bivariate correlations between variables in SEM-Aural (τ)

	livecontact	***groupsize***	***timeonline***	***preaural***	***postaural***	***home***	***cognab***	***level***	***culture***	***futurejob***	***films***	***attitenv***
livecontact	1.000											
groupsize	-.076	1.000										
timeonline	.352**	-.062	1.000									
preaural	-.043	-.200	.004	1.000								
postaural	.037	.065	.288**	.471**	1.000							
home	.071	.070	-.077	.185	-.121	1.000						
cognab	.035	.186	.148	.176	.397**	-.046	1.000					
level	.021	.065	.140	.577**	.714**	-.092	.386**	1.000				
culture	-.082	-.118	-.229*	-.183	-.190	-.100	-.198	-.157	1.000			
futurejob	.019	.203	.060	.060	.064	-.046	.009	.191	.356**	1.000		
films	-.135	-.114	-.111	.206	-.006	.087	.023	.061	.358**	.373**	1.000	
attitenv	-.075	.047	.054	.009	-.109	-.131	-.239	-.008	.433**	.630**	.296*	1.000

*p<0.05, **p<0.01

Figure 22 Results of initial SEM model for aural comprehension skills attainment at post-test (with fit indices)

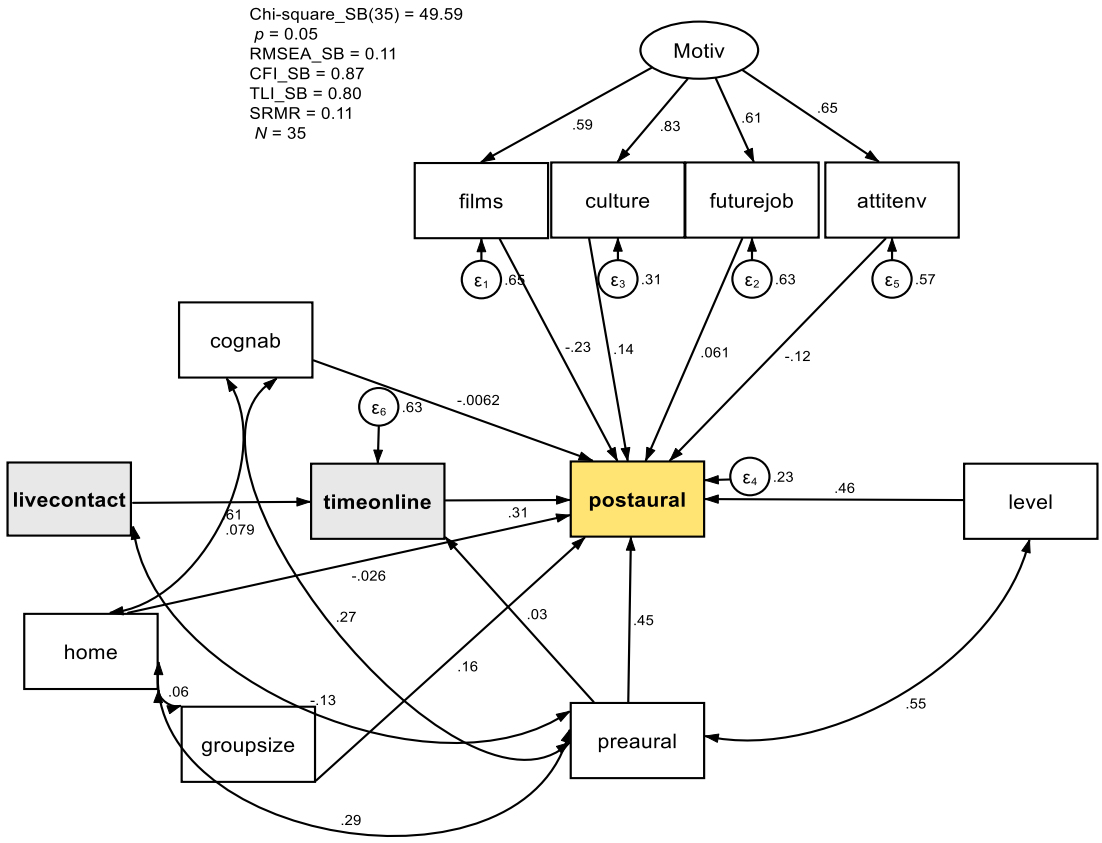


Table 28 Significant predictors of L2 aural comprehension achievement at post-test (direct and indirect effects)

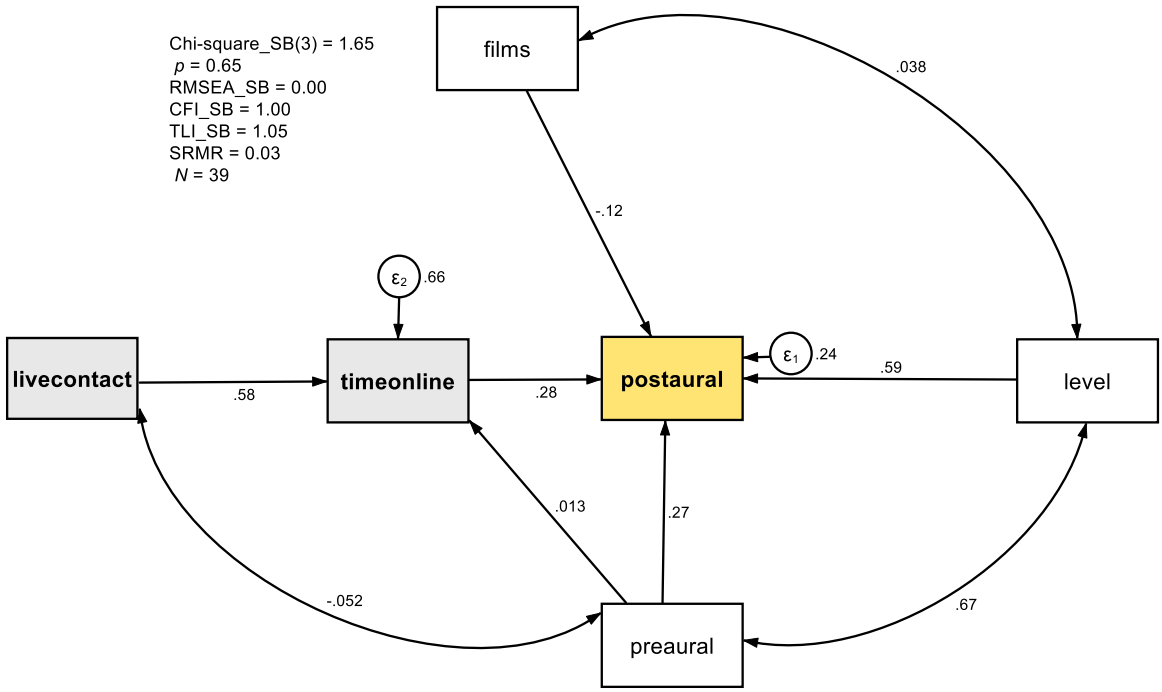
Predictor variable	B	*β*	SE	*Sig.*	95% CI for *β*	
level	13.74	0.59	0.11	< 0.001	0.384	0.806
timeonline	0.04	0.28	0.07	< 0.001	0.139	0.414
preaural	0.30	0.27	0.11	0.01	0.065	0.479
livecontact[*]	0.06		0.02	0.004	0.019	0.1
R^2 = 0.76						

[*]Indirect effect; SE and CI are reported for unstandardized coefficient B only

Table 29 Model comparison between the initial SEM-Aural and the final, more parsimonious model

	Chi-squared_SB	df	*Sig.*	RMSEA_SB	CFI_SB	TLI_SB	R^2 (overall)
Model 1 (initial)	49.59	35	0.05	0.11	0.87	0.80	96.6%
Model 2 (final)	1.65	3	0.65	0.00	1.00	1.05	81.9%
Difference	47.94	32	0.03			0.25	14.7%

Figure 23 Results of final SEM model for aural comprehension skills attainment at post-test (with fit indices)



5.3 Perceived Facilitating/Inhibitory Mechanisms for Student Learning in the Blended Intervention

5.3.1 Introduction

The qualitative data were captured in order to unpick and supplement the quantitative data in addressing Research Question 2:

What are the specific mechanisms which mediate and/or inhibit said impact on learning outcomes?

Qualitative data collection was therefore designed to enhance understandings of the elements of the intervention, the participants and the wider environment which supported the children in making learning improvements, or which otherwise impeded their progress.

Data were gathered from three sources: focus groups with the children, and interviews with a selection of (a) head teachers and (b) parents from the participating schools (see Appendices 14-16 for the themes/questions focussed upon during the interviews and focus groups). Thus, the discussion that follows is divided by the sub-questions which are associated with Research Question 2:

a) What are children's perceptions of factors that facilitate and/or impede learning in a blended remote model?

b) What do head teachers and parents think about the impact of the blended remote model?

c) What are head teachers' and parents' perceptions of factors that facilitate and/or impede learning in a blended remote model?

5.3.2 RQ2a: Children's Perceptions of Factors that Facilitated and Impeded their Learning – Focus Groups

The themes and codes to emerge from the student focus group data are summarised in Table 30.

Table 30 Student focus group interviews: codes and themes

Theme	Reference tally	Code	Reference tally
Meaningful social bonding	29	Enjoying group games in class	19
		Enjoying asking questions about others and talking about myself	1
		'Coming closer as a team' whilst working together towards a goal	6
		I'd rather be 'dumber than a box of rocks but be around other children'	1
		Perceived lack of peer acceptance stifling motivation to participate in learning	2
Engagement	26	'Learning new things' - the need to explore and discover	11
		'Then I had this idea about unicorns and a tree school' - leveraging imagination and creativity	4
		Enjoying homework on *EdApp*	11
Attitudes towards extrinsic reward	16	Game-oriented design of *EdApp* (i.e. stars) encouraged me to persevere on tasks and/or manage own progress	15
		Game-oriented design of *EdApp* (i.e. stars) may foster unhealthy competition	1
Perceived benefits of collaboration	16	'Two brains are better than one'	14
		Working with others understood as dependency	2

Perceived digital competence	14	Attitudes towards *EdApp* related to perceived typing/handwriting skills	11
		Attitudes towards *EdApp* related to perceived ability to troubleshoot	3
Autonomy/freedom to take control of own learning	12	Perceptions amongst higher-performing students of being held back by lower-performing collaborators	8
		The need to assess and showcase personal achievement	3
		It's 'what I'm used to'	1
Perceptions of what is learning and what is not	2	Learning for the sake of learning/learning for personal growth	2
Concerns regarding the use of technology	1	Negative effects of excessive screen time	1

Meaningful social bonding

The most common theme to emerge in this analysis was students addressing social aspects of the intervention, with the main code within this theme being students saying that they enjoyed participating in group games in class. Other codes included enjoying asking questions about their peers (making specific reference to the survey they had conducted in class where they had spent time collecting information from one another on things that made them happy and things that made them unhappy; see Appendix 3, Lessons 3 & 4, Levels Pre-A1 to A2.2) and talking about themselves to others, including sharing their opinion on various topics. The third code identified—'coming closer as a team' whilst working together towards a goal—is an *in-vivo* code that emerged in the context of providing explicit reasons for their enjoyment of working collaboratively. The reason for linking it to the theme of 'Meaningful social bonding' rather than 'Perceived benefits of collaboration' is because the references were interpreted as alluding to the social rather than the cognitive aspect of collaborative work. Moreover, a decision was made to seek out implicit meanings in student responses regarding the types of activities that they reportedly enjoyed engaging in during the live sessions, with a view to shedding light on the ways in which the students' needs were being fulfilled or thwarted, or both. The one dimension which underlay student responses around enjoyment pertained to a pronounced need for human bonding, acceptance within the peer group, and a sense of belonging in a circle that shares a common purpose. In the case of educational team games, this shared purpose took the form of contributing to one's own team success or advancement. The need for social bonding appears particularly strong in the following excerpt, where one high-performing 12-year-old student even went so far as to proclaim his own hierarchy of needs, placing the need for peer relationships before individual accomplishment and prestige:

> I would rather even not be the smartest one in class – I'd rather be dumber than a box of rocks but be around other children. Because you can't really do anything on your own. Okay, let's suppose I get straight A's…so what? **(Student A, Delphi)**

The salience of the theme is reinforced by the last code—'perceived lack of peer acceptance stifling motivation to participate in learning'—which attempts to encapsulate the

detrimental effects on motivation that seem to emanate from a rupture of these meaningful social bonds. Two references have been linked to this code, which come from two students attending the same school but participated in two separate focus groups. Towards the end of the interview, the first student vocalised his desire to participate in a possible future iteration of the learning programme, however, he also expressed a wish to be placed in a different group, without giving any explicit reasons for this. Unaware of that comment, the second student was able to offer insights into possible causes for the lack of social cohesion within that group through the following response:

> We generally need to be able to take our time, regardless of whether someone else has completed their task half an hour earlier. For example, it was usually either me or Evangelia who finished first and I would sometimes look at Konstantinos and see him get stressed, start writing really frantically, and somehow panic. And that was also because Evangelia often rushed him to get done faster. **(Student A, Arsinoe)**

Perceived benefits of collaboration

The extent to which students perceived collaboration as a beneficial work mode was also found to be a recurrent theme. Responses mostly centred around efficiency and possibility to generate more ideas during a task:

> I think working on your own is one thing, and working with someone else is another…because if two brains join forces, then they will be better than one. **(Student A, Delphi)**
>
> --
>
> What I liked most was when we worked in teams because we helped one another: if there was something I didn't know, or Stamatis or Vasilis didn't know, we would discuss it and solve it together. **(Student A, Arsinoe)**

Not all children viewed collaboration as beneficial and fruitful. There was also evidence in the focus group data of students having experienced collaboration as merely a peer-tutoring process which entailed telling lower-ability group members what to do and making sure that the latter followed through, as well as convincing the disengaged to engage, ultimately leading to a culture of dependency and thus compromising learning. These views were

vocalised by average-to-high-performing students belonging to the youngest age group (aged 8 years):

> I think it's better to work individually because each one does what they can. Because that's how you learn. You can't learn if you just copy from someone else. **(Student A, Palaeopolis)**
>
> --
>
> I enjoyed the test! It was perfect because we didn't have to say 'that's how you need to write this word' – I didn't have to say to anyone 'write this' or 'write that'. **(Student B, Palaeopolis)**

Autonomy/freedom to take control of own learning

The need for autonomy and freedom to take control of their own learning process emerged as another reason behind some students'—particularly those of above-average achievement—expressed preference to work individually rather than with one or more partners, at least sometimes. The following excerpts are from students who exhibited higher self-directional learning skills and levels of self-efficacy than the rest of their group throughout the course of the intervention:

> I prefer to work alone. For example, I really liked when we were doing the tests and we had to find the words that were missing from the texts…It helped me see what I had understood from the lessons. **(Student B, Arsinoe)**
>
> --
>
> Sometimes I preferred to work on my own and some others I preferred when we worked altogether…I preferred doing the writing tasks alone because it was easier. **(Student A, Elaia)**

One student from Marathonion (also fitting the profile described above) cited reasons related to the notion of habit, or because that's what he was 'used to', alluding to the teachable nature of learning behaviours practised both inside and outside the classroom, and the possible fossilization of those in case of a lack of systematic exposure to alternatives ways of learning.

Engagement

Rather unsurprisingly, 'engagement' emerged as another recurring theme in the focus group data. Yet, what was of interest in this analysis was to try and tease out the precise aspects of each of the two components of the learning programme that engaged the students in the learning process, even after the novelty effect had worn off. Foreign language learning requires repetition and practice, and although the affordances of *EdApp* (e.g., the ability to present new content in an easily-digestible format through bite-sized learning modules, coupled with a variety of highly interactive task types to choose from) allowed for a large amount of this to be presented to the students in the form of games, it was important to understand how to successfully drive sustained student engagement in computer-assisted learning that goes beyond the novelty effect. Asked about their favourite part of the programme, a number of students mentioned having enjoyed doing homework on the app, whereas others expressed a preference to complete their homework tasks on the app rather than in a book, primarily because it was 'less boring' and they enjoyed the multimodality afforded by the former:

> Working with a book is a little boring…It'll sound a little crazy but the reason why I prefer working on the app is because it's got nice colours and…I don't know how to say it… the tasks are more exciting. **(Student A, Elaia)**
>
> --
>
> **Student B:** It's much more convenient to work on the computer because if you make a mistake, you can easily go back and delete it –
> **Student C:** Yes, Miss, and it also feels like a game.
> **Student D:** Yes. If we'd simply had to write in the book, we would've got bored.
> **(Marathonion)**
>
> --
>
> I really loved the exercises on *EdApp* and I even did them twice because they were really cool. I liked the grammar tasks, in particular. **(Student B, Arsinoe)**
>
> --
>
> I prefer the way we did it rather than if we'd used books. Because it was the same as the book in that we didn't have any help, but whenever we made a mistake we weren't immediately given the correct answer…it just told you that it was wrong and you could either move on to the next

> question and come back or think about it and have another go. **(Student A, Arsinoe)**

Learners' interactions with the digital platform differed depending on their gender (girls recorded significantly greater amounts of progress on the app than boys, $t(45) = 2.92$, $p = 0.006$), and their attitudes towards foreign language learning (however, only marginal significance was established, $p = 0.057$; conversely, when regressed on the amount of progress achieved on the online course, neither level nor age was found to be a significant predictor, $p = 0.824$ and $p = 0.441$, respectively). Nonetheless, all who actually did use it succeeded in making progress in their vocabulary, grammar and aural comprehension skills, though not in writing or oral fluency ($r_{Vocab} = 0.502$, $p < 0.001$, $r_{Gram} = 0.349$, $p = 0.025$, $r_{Aural} = 0.343$, $p = 0.03$, $r_{Writ} = 0.076$, $p = 0.629$, $r_{Oral} = -0.261$, $p = 0.171$). While not all children took full advantage of its learning affordances, each made as much use of it as their personal profile allowed, and their English learning outcomes appeared to have improved accordingly.

When asked to share examples of lessons that they had found to be particularly useful, interesting or engaging, a number of students singled out the 'stars lesson' and the 'supermarket lesson'. Interestingly, several of these comments referred to students having 'learnt new things' in these sessions, with 'new things' being perceived as new knowledge about the world that was not necessarily linked with the EFL curriculum. Rather, this new knowledge was often cross-disciplinary and, on the surface, appeared to deviate from expected, 'schoolified' content:

> The lesson that I really enjoyed was the one with the prices. Besides the fact that we discovered some Greek products over there, we were also searching online as opposed to just writing things. **(Student B, Delphi)**
>
> --
>
> The few times I was engaged were, for example, when we were watching the video about the unusual schools, the other [lesson] with the survey, the stars, generally when we were doing something different. Not the same thing again and again. **(Student A, Morphe)**

The second excerpt above belongs to a student described by his teacher as 'gifted' (he was the highest-achieving participant on the Raven's test, scoring 94 out of 100, with an IQ evaluation previously conducted by a psychologist having placed his fluid intelligence at

113), although, interestingly, his mean progress score from T1 to T2 of the intervention placed him only at the bottom 25% of the overall sample distribution. Already a proficient user of English (A2.2 level) at the start of the programme, this contradiction might, at first glance, be attributed to an 'invisible learning ceiling'; however, even after taking level into account, his performance remained in the 25th per centile. During the focus group, this student was open about his discontent over the fact that a lot of the sessions were spent on testing (before and after the intervention), and he pitted those against the 'more engaging' lessons which involved enquiry and 'generally, …doing something different'.

Linked to that were comments about lessons, or specific tasks within lessons, that encouraged students to stretch their imagination and think beyond the bounds of reality as they know it; yet, as can be seen in the following excerpt, levels of engagement in such tasks were at least in part dependent upon children's perceived capacity for creative imagination as well as the degree to which they were able to relate to the topic:

> The only lesson which I found a bit boring was the one where we had to design our own dream school…that was a bit boring because we didn't know what to do, we didn't have any imagination…but then I had this idea about unicorns and a tree school – as we named it – and from that point on we gained momentum! **(Student A, Arsinoe)**

Attitudes towards extrinsic reward & Perceptions of what is learning and what is not

As mentioned in Section 3.5.2, previous research suggests that incorporating gameplay features such as badges, points, levels, and progress bars into the learning process not only can trigger positive engagement amongst primary and secondary learners (Mystakidis, *et al.*, 2014) but can also encourage pupils as young as eight years old to take ownership of their own learning (Halloluwa *et al.*, 2018). The way learning was gamified on the digital platform was through the incorporation of point scores and star bars which increased as learners worked their way through the material in the online course, allowing them to unlock the next lesson and progress through the level, or 'level up'. It was hypothesised that such tangible and timely rewards would make success visible to the pupils, thereby leading to improved extrinsic motivation levels, at least for some participants. Asked whether the fact that they were earning stars for each task they completed successfully had affected their motivation levels, the majority of students responded positively, adding that

the anticipated reward encouraged them to persevere on tasks, occasionally attempting tasks more than once in order to earn more points, while some explained that it enabled them to gauge their progress:

> I say it's better with the stars. Because the stars are like a reward. It's like I'm earning a prize. And so students become more motivated. **(Student B, Delphi)**
> --
> We should keep the stars as a feature of the app. Because otherwise we won't know how we've done. **(Student E, Marathonion)**
> --
> Earning stars helped us do more. Although we did the tasks and the stars sometimes would disappear… I have even thought that instead of stars we could be earning something like little stickers, just virtual, which we could have in the form of little pictures! **(Student A, Elaia)**

The above findings are supported by observations over the course of the intervention, throughout which students would occasionally complain that a certain number of their earned stars had 'disappeared' from their profile (on one occasion I even received a communication from the parent of the third student in the excerpt above, informing me that their daughter had become upset because the number of stars appearing in her profile was not accurate, and asking if I would please look into it). Importantly, the majority of those who stated that they had indeed felt motivated to work more in anticipation of such extrinsic rewards were high-performing students with increased self-efficacy levels; conversely, those who stated being rather indifferent to external reinforcement had typically exhibited lower levels of both self-efficacy and engagement throughout the learning programme and were generally low-to-average achievers. Perhaps more interesting, however, was the notion of 'unhealthy competition' which was brought up by a student who had previously admitted that such embedded rewards had helped him progress through the online material:

> **Student A_{Delphi}:** Sometimes I even wondered…did children in other schools fight over who had earned the most stars? For example, 'I've got more stars than you', or 'Yes, but you take longer, or 'I've got 7,000 stars'.
> **Researcher:** Do you think that would be a good thing or a bad thing?
> **Student A_{Delphi}:** A bad thing. Well, on the one hand, it's a good thing because the other kids will do better in their studies, just through sheer

> determination, but if they do it just for the sake of beating another classmate, then it's not a good thing.

Here, we see evidence of the way in which attitudes towards gamified rewards differed depending on the learners' pre-existing views on what constitutes learning and the extent to which each had internalised the value of learning for its own sake. The following is a brief interaction between two high-achieving 8-year-old female participants (and close friends) caught debating the importance of external rewards:

> **Student $C_{Palaeopolis}$:** I enjoy earning stars, too, though...
> **Student $B_{Palaeopolis}$:** But it's not the biggest thing. What matters is that we are learning.

Perceived digital competence & *Concerns regarding the use of technology*

Despite the fact that all but one had access to a computer at home[40], learners possessed varying levels of digital skills, resulting in differing attitudes towards the use of the app at home. Specifically, the most common code under this theme was one which pertained to participants' perceived typing skills, with those who had had more experience, and therefore felt more confident using a keyboard, expressing a preference to work on the app rather than with a book. Similarly, those with a perceived 'bad handwriting' shared the same positive views on using the app:

> **Student A:** I believe it's better to do our homework on the app. For one reason only. (*Turning to the other two)* You know why? Because I can't write very well by hand and my writing is a little sloppy -
> **Student B:** It can't be worse than ours!
> **Student A:** …and working on the keyboard is faster. Because if I were to do one task such as those we were doing that took us 30 minutes, it might have taken us one hour or one hour and a half. Because writing is harder than typing.
> **Student C:** I said it's easier on the internet, too, because you don't need to write.
> **(Delphi)**

[40] That student was able to access *EdApp* either through his mother's phone or tablet.

Conversely, all four members of the pre-A.1 group, who were also the youngest across the sample, noted books as their preferred medium of study, citing two reasons for this: (a) not being able to type very well (i.e. fast) on the computer, and (b) finding working with the book less cumbersome or prone to technical issues than working on the computer.

Questions about the research participants' attitudes towards the use of the app as a medium of study also elicited a single yet insightful response that shed light on an aspect that had not been previously addressed, that is children's concerns regarding the potentially harmful effects of excessive screen time:

> *(Continued from the above excerpt)*
>
> **Student B:** Personally, I don't agree with Myrto [Student C]. Because we may have a lot of tasks to complete and we may need to keep looking at the screen and damage our eyes. At least when you write, you exercise your hand. Whereas on the computer you may just be doing this for two hours *(mimics typing on a keyboard).*
> **Student A:** What do you mean, how might you damage your eyes?
> **Student B:** *(To the researcher)* Take Pericles for example! He's been playing video games since he was 5 or 6. *(Turning back to Student A/Pericles)* How do you like your glasses?!

This demonstrates the importance to learning of conscientious attention to learners' perceived and actual digital competence, and the need to problematise discourse surrounding the alleged natural affinity of so-called 'digital natives' to use technology in a sophisticated way (Prensky, 2001). Moreover, it underscores a need to challenge normative expectations regarding children's preparedness to uncritically adopt a digital technology for the purpose of learning. Such broad sweeping assumptions are especially problematic when applied to small rural Greek primary schools where, just like with English, children do not have access to ICT instruction.

5.3.3 RQ2b: Head teachers' and parents' views on the impact of the intervention on students and their environment

Following an inductive, bottom-up approach to thematic analysis, a diverse group of codes emerged from the head teacher and parent interview data; these were grouped together under four themes: the role of the state; the role of the teacher; aspects inherent to the design

of the learning programme; and views on the effectiveness and overall impact of the intervention (see Table 31).

In the interviews, it became apparent that by the end of the intervention, all head teachers and parents held the view that such a distance learning implementation of a hybrid educational programme was an ideal alternative for small schools whose unique circumstances (i.e. their geographic location and number of students on the roll) rendered face-to-face instruction of specialist subjects such as English an implausible option:

> **Delphi head teacher:** I can say without reservations that their participation in the programme was a positive learning experience for the children. Something like this is a perfect solution for schools where there are no teachers. Now, with reference to those who say that technology leads to the deterioration of this necessary connection and communication with the teacher in the classroom, yes, it's true. But here we are dealing with different circumstances. Take a settlement at the top of Everest as an example. Those people have for their own personal reasons chosen to live up there. As a direct consequence of that, they are missing out on some educational opportunities that they might have access to if they lived in a city or in a settlement a little bit further below. Hence, in this case, such a type of communication is the best solution given the circumstances and the alternatives that are available to them. No one has to and no one should have to move to the city to have access to quality education when a middle-ground solution can be found.
>
> **Researcher:** Do you believe that implementing such a learning model on a year-round basis would be a viable possibility for the learning and teaching of small rural schools operating multigrade classrooms?
>
> **Delphi head teacher:** Definitely. And it's definitely viable. However, it requires appropriate infrastructure. Last year we had very poor internet connectivity and we wouldn't have been able to do this. Thankfully, this year it became possible.
>
> --
>
> **Demos head teacher:** If the Ministry could implement this at scale, that would be a very good solution. A *very* good one. Especially for those children who don't have any [English teachers]. Because there are several schools that only have one or two students on the roll and which don't have access to nearby primary schools like we do here. Those schools are completely isolated. This would be a very good – I'd say even ideal solution.

Table 31 Head teacher and parent interviews: codes and themes

Theme	Reference tally	Code	Reference tally
The role of the state	39	'The education system is designed exclusively for Athens'	29
		Small rural schools having to 'rely on charity' for equipment and infrastructure	4
		Lack of relevant and actionable training and on-the-job support	5
		Making teachers feel valued through fair compensation	1
The role of the teacher	13	Teacher-student rapport and the importance of 'leaving a mark on them'	6
		Openness to experience and experimentation being a key teacher personality trait	2
		Physical proximity with the teacher being the main determinant of at-risk students' success	5
Aspects inherent to the design of the learning programme	27	Exposure to novel experiences and people promotes student growth and engagement	8
		Harnessing students' innate desire to branch out to new domains, understand, and providing opportunities for transfer	6
		Gamifying the learning process as a way of making learning visible and fun	6
		The benefits (and limitations) of collaboration	4
		The danger of 'regressing to the mean' in a multi-level classroom	2
		Homework and student burnout	1
Views on the effectiveness and overall impact of the intervention	13	The hybrid model could be a plausible and sustainable alternative for these schools	10
		The novelty of the learning intervention helped shift parents' negative attitudes towards small schools	1
		Distance learning modality helped develop both students' and teachers' digital competences	2

Another participant discussed the spillover effects of the implementation of a hybrid learning programme in those contexts. Specifically, he addressed benefits in terms of teachers' digital competencies, which would not only help expand their instructional methods repertoire, but would also grant them access to a plethora of further professional development opportunities which are currently only available to them via digital means:

> **Morphe head teacher:** Granted, our school is not as isolated as other schools up on Pindus where schools sit at a 30-minute distance by car from one another. Yes, this is an ideal solution, especially for Greece…because we have a lot of *akritika*[41] villages and schools and that would definitely help…It helps because we live in a society where technology is moving very rapidly. And we won't just do this for the children, we'll also do it for ourselves. As I said earlier, there are so many of us who attend such professional development seminars via distance learning. If the Ministry starts offering this as an option to small multigrade schools and invites a few of those in the first instance to pilot it in, see how it goes and then scale it up, it will be a nice thing to know that children in small multigrade schools are not isolated after all, that they are learning English, too. Even if it's via this mode. Just to give you an idea, every time we'd mention to people here in the village in Morphe that we were learning English at the school, they'd look at us as though we'd come from outer space! Just try to imagine how this whole thing seemed to them. They would say, 'This is not just any school, they do English there, too'; we'd hear various such things from the mothers. Because they prefer the big schools over the small ones.

The notion of shifting parental perceptions of the quality of small village schools is an important one. There were a number of instances in the interview data where head teachers made reference to parents treating small multigrade schools with scorn, preferring to send their children to bigger schools in nearby towns where possible, thereby contributing to the gradual demise of the former:

> **Demos head teacher:** The way it's going, this school will stop operating in a year. These ones will now go on to secondary school and there just aren't enough children... What they [the parents] do is they go and ask the local authorities to provide a bus service that takes the students to

[41] The word *akritika* (Greek: ακριτικά) is used in the Greek language to refer to the outermost parts of the national territory, especially frontier regions in northeastern Greece and small islands lying close to the country's sea border with Turkey. The term derives from the word *akres* (Greek: άκρες), which was the name by which the Byzantines referred to the frontiers of the Byzantine Empire; this, in turn, gave rise to the word *akrites*, a group of highly-esteemed border guards whose job was to protect the Empire from Arab invaders. Today, the word carries connotations of heroic bravery and patriotism on the one hand, and hardship and isolation on the other.

> bigger schools in Erithrea, another village nearby, because they have an all-day primary school there…and they think they will get a better education. So they prefer those schools.
>
> --
>
> **Morphe head teacher:** Parents here think that it's better for their children to go to a bigger school. Because there they'll learn English, they'll do PE...We, too, could be doing those things, and we could be doing them in a very nice way. We lose children because they go to bigger schools elsewhere. Of course, it's not the children, it's the parents. I had a parent once say to me, 'Humans can now travel to space and our children are still learning in small multigrade schools'!

Even though there was a general consensus amongst the head teachers around the ways in which students and local communities stood to benefit from the scaleup of such an education model, there was a feeling overall that it was a desirable solution insofar as there was no face-to-face alternative. In this respect, it was viewed as 'the next best thing', which, however, was not without its risks; namely, an uncritical uptake of technology, emanating from the lionisation of its potential for expanding access to learning, combined with a shrinking education budget:

> **Elaia parent:** As a mathematician, I have a natural tendency to think critically. When one is to develop a proposal, it is necessary to put a great deal of thought into it because oftentimes both the status quo and the proposed substitute for the status quo come with their own problems. So, I'm having difficulty proposing, for instance, online lessons or hybrid learning models at school. I believe in physical proximity between students and teachers. However, absent this possibility, an education modality like the programme we've just implemented is perhaps one of the best alternatives – perhaps it is the *best* alternative. As an alternative, I probably recommend it unequivocally and without reservation. As an alternative, though. As a primary method of learning, I am not so sure – I have a few reservations. The way these things usually go down resembles the fall of Troy: you anticipate problems, you warn those in charge, they ignore the warnings, and, in the end, things go badly…Cassandra tried to warn the Trojans not to bring the wooden horse into the city, but no one listened to her…A lack of direct contact between teachers and students will certainly not help resolve any emerging issues of whatever kind. Suppose that you as a parent, as a teacher, or as the state come to the realisation that the new system is not as effective as originally expected. This might be, for instance, because

> of the technology, or because of the teachers, who will be doing a different kind of work than before…there won't be an opportunity to fix this. When societies choose to go down a path, even if this proves to be the wrong one, they stay the course, trying instead to simply patch up any issues. I fear that if we move away from this direct and more personal teacher-student contact that we have been used to, if we lose the kind of immediacy that is afforded to us by having teachers and students sat next to the other in the same physical space, it will not be possible to go back to this…I believe that when there's something good – and this kind of direct contact between teacher and students is a good thing – we shouldn't disrupt it…The way public education took place in ancient Greece was a teacher would sit in the middle surrounded by the children…I think that having a computer opposite you and the teacher behind that is the best plan when you can't have a teacher. But the teacher will lose her circle and you will lose the centre of that circle...We mustn't lose neither the centre nor the circle.

Implicit in the above is the role of two key education actors in shaping learning: the teacher and the state, both of which emerged as key themes throughout the interview data and are therefore discussed in the next section.

5.3.4 RQ2c: Head Teachers' and Parents' Perceptions of Factors that Facilitated and Impeded Children's Learning

Aspects inherent to the design of the learning programme

When asked about their motivation for participating in the study and their thoughts on aspects of the learning programme that they had found to be particularly useful or effective, a number of respondents brought up the notion of exposing children to novel experiences being instrumental in promoting student growth and engagement. In contrast with my initial expectations, this was not limited to children living in relatively isolated conditions, but rather appeared to be a more global theme which was independent of geographic location or degree of remoteness:

> **Demos head teacher:** We don't have any other teachers here, I'm on my own – there's no Music teacher, no English teacher, no PE teacher, just me. And that's why what we did was something entirely novel to them – because they were interacting with someone other than me! For the past six to seven years they haven't been seeing anyone else besides me – they know me inside out! It's good for them to be able to interact with

someone else and talk about something different. I'm certain that they'll never forget this experience.

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Delphi head teacher: I don't think children at this age are capable of making conscious decisions regarding their knowledge, hence, learning English *per se* was not a major contributing factor towards their desire to participate. What they did want to do was have regular contact with someone who lived so far away – beyond the bounds of their own village but also of Greece – and do that through the use of technology, which they find fascinating. They wanted to have contact with someone other than their teacher who would talk to them about different things.

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Elaia parent: The reason why we chose to participate in the programme was because for us it was something new. We wanted her to have some contact with the English language…and we also wanted her to have some extra contact with computer technology. I also saw it as a method of socialisation for Artemis because as a family we are relatively closed. We don't go out a lot, we don't have many contacts due to our busy work schedules…so it was a form of socialisation, too.

Another feature of the intervention that was perceived as having had an impact on students' engagement levels was the project-based learning approach, which provided children with opportunities to explore topics that they were interested in as well as branch out to new domains. This links back to comments made by students during the focus groups regarding their enjoyment of engaging with cross-disciplinary themes which were not immediately relevant to the EFL curriculum. Nonetheless, as one head teacher noted, personalisation and choice are key as not all children become fascinated by the same things, 'Each child has their own interests, for example, Orestis loves watching videos on YouTube about science, someone else might enjoy astrophysics or painting, and in this way each can learn through their own area of interest.'

The importance of gamifying the learning process as a way of making learning visible and fun also emerged strongly in several of the interviews, as did, once again, the benefits and limitations of collaboration:

> **Delphi head teacher:** This gamified way of learning was something they found very appealing and made them look forward to their lessons because it was different to what they normally did at school.
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> **Morphe head teacher:** What they liked overall was that the lessons did not resemble the typical English lessons that many of them are used to in the private academies, where you'll open the book, do the exercises and then take a few words and start making sentences…The approach here was both playful but also encyclopeadic, for example, through the videos you were watching…
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> …Behaviourally, I definitely noticed some development in the relationship between them, however, there were still the usual stereotypes regarding who would work with whom, for example, 'I don't hang out with Dimitris so I'll only work with whoever I hang out with.' What they were also looking for when asked to work collaboratively was a higher-ability partner who would be able to help them…That's why they wanted to choose their own partners…It's a natural tendency for us humans to search for someone or something to make us feel secure when we don't feel we're up to the task…Vasilis did that a lot, he kept partnering up with Orestis because he felt safe – that he wouldn't have to say much because Orestis would. And if he felt confident about something, then he'd jump in so he could feel that he was contributing something, too.

What is interesting about the above excerpt is that it reveals the mechanisms of homogenisation in a mixed-level classroom, whereby internalised comparisons to more capable others seem to generate feelings of inadequacy and a reluctance to 'step up' amongst lower-level learners. Similar concerns were reflected in one parent's warning about the potentially dangerous consequences of failing to acknowledge extraordinary performance in high achievers in a mixed-level classroom:

> **Elaia parent:** Having raised three children, I must say that I have identified a tendency in Greek schools to homogenise everything – to make everything look the same. It's a good thing to try and push low-achievers up, towards the mean, but it's a bad thing to undercut the progress of those high up in the same way ancient tyrants used to cut tall wheat in order to maintain balance. This is a tyrannical way of treating excellence – be it with words, a simple 'bravo', or something else,

> excellence should be rewarded. We're no longer allowed to tell a student that she's got a lot of potential for fear of hurting the feelings of the rest…Insofar as every child is receiving all the help she can, I don't think anyone's feelings are being hurt. It's when they are being deprived of equal opportunities that they're being hurt – and that's discrimination.

Even though it emerged only once in the interview data, the link between homework and student burnout was deemed noteworthy. Homework was perceived by one head teacher as a significant stressor for the children, 'A child feels happier when she leaves the school for the day knowing she doesn't have any more work to do at home', whilst pointing to the lack of support available once they leave the classroom, 'There are two advantages to having them do these online tasks in class: first, you're able to monitor their progress live, and second, you can respond to their needs in a more timely and immediate manner'.

The role of the teacher

The second set of factors that were perceived as having influenced the success of the intervention were related to the role of the teacher in supporting the social-emotional development of the children, and the significance of the latter not only as a potential mediator of cognitive development, and, by extension, academic achievement, but also as an outcome in and of itself. Specifically, teacher-student rapport emerged as a supportive factor of academic and social engagement, achievement motivation, self-efficacy and, ultimately, learning achievement:

> **Delphi head teacher:** I'm not sure what they learnt in terms of English, but what I can say with certainty is that beyond what can be assessed with those language skills tests, there are additional skills and knowledge that might be harder to measure – and yet, *this* is what these children took away from this programme. Without a doubt, your personality played a part in this, and you definitely left your mark on them. This is their biggest takeaway – having had human contact with someone they wanted to be in regular contact with and whom they were fond of.
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> **Morphe head teacher:** What's also important is *who* is teaching them …if the teacher manages to earn the children's respect and trust, they will be very happy to come to class.
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> **Palaeopolis parent:** I was a little worried at first about how she would respond to all this, I mean, when she had her first lesson with you and then

> she had the online app to work on, too. At first, on a scale of 1 to 10, I'd say her level of response was probably a 6. And then, with your contribution and with the lessons…I noticed that in the end she was doing it joyfully. And she learnt the basics, the colours, some words, the names of the animals…

Besides agreeableness, respectability and trustworthiness, another key teacher personality trait that was noted by head teachers was openness to experience and to experimentation. This element in a teacher's character was understood to be associated with imagination, creativity, curiosity, inquisitiveness and zest, ultimately contributing to teacher as well as student growth:

> **Demos head teacher:** There is no [state-provided] professional development. Everything I learnt as a teacher I learnt it on my own initiative. Out my own personal interest…You need to put your soul into it, open a book and read and learn. Find out how you can do this and how you can do that. When I first started teaching, I used to read about Summerhill school. It's designed around an entirely different teaching philosophy – it was for those kids who weren't able to stay in one school so he'd take them in and he'd set them completely free – okay, fair, it's very difficult to implement this, but I remember for many years after I had started teaching I would spend hours and hours in the university library reading, borrowing books, going to professional development seminars. But all of it was on my own accord, not so I could receive certificates or recognition...I'm now almost 50…How can I possibly have the same amount of zest I had when I was 23, 25, or 30 to do different things?

Nonetheless, there was a general consensus amongst all head teachers and parents that the teacher-student dynamic afforded to us by the brick-and-mortar classroom was not possible to reproduce in a virtual learning setting. The idea of physical closeness was a recurrent code throughout the interview data and was understood as fundamental to the success of learners with special educational and/or emotional needs, in particular:

> **Demos head teacher:** It was truly difficult for Athena to respond to you and participate – she found it really hard to find the courage to open up and share her opinion in the way she shares it with me, for example. But even with me, she needs to have me physically beside her – because I've had her sitting next to my desk since she was in Year 1. One year I had her join desks with two children from Year 4 – because we have everyone's desks set up in small groups – and she went and moved the

> desks so that hers was right next to mine….because she wanted me to keep an eye on her work.
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> **Morphe head teacher:** ***(****Explaining the role of the special education teacher offering parallel support to pupils with identified SEN)* …It took time to make it look as though Sotiris [the SEN teacher] was there to support all of them rather than those two exclusively…So he wasn't sitting next to Orestis the whole time except when Orestis went into crisis mode…and there were a few episodes – there was usually something that would upset him and so I'd have to take him by the hand, have a conversation with him and all that.

The role of the state

A further theme identified from both data sets related to the role of the state in creating conditions that would be conducive to children's learning. Although these conversations did not reveal variables at the state level that may have contributed to or impeded the success of the intervention *per se*, they did, however, uncover factors that would determine whether or not implementation of the programme at scale would lead to successful outcomes. Almost all respondents made explicit reference to the lack of equity which permeates the country's education system. One way in which this becomes manifest, according to these head teachers and parents, is through policies which may constitute plausible solutions for the capital but which, nonetheless, do not translate to small rural schools and the distinct realities of rural communities across the country. A case in point was the then government's plan to implement later starting times in schools to allow students more sleep, thus shifting the school day from a 8:15 a.m. start to 9:00. For the students of small rural schools whose parents still had to leave the house early to go to the fields, and given the lack of nursery schools in many of those villages, this meant an extra 45 minutes sitting in a chair in the school lobby waiting for the school day to start. The very absence of provision for early childhood education in rural areas was also touched on by one participant:

> **Demos head teacher:** Generally speaking, the Greek education system is a terribly inequitable system – across all educational levels. There are villages without any nursery schools and those children start Year 1 without having received any preschool education…Can those children compete with their peers in cities and towns? Do they have equal opportunities?

Chronic underfunding of small rural schools compared to their urban counterparts was viewed as another manifestation of a deeply inequitable system, with children from small schools being put at a disadvantage due to a lack of access to core learning domains, and school leaders having to 'rely on charity' for the procurement of necessary equipment and infrastructure:

> **Delphi head teacher:** Remoteness *per se* is not an issue for these people**.** The fact that they are isolated really makes them what they are: a village population. The fact that they don't have any specialist subject area teachers is what excludes their children from certain cognitive skills which they might otherwise have the opportunity to cultivate…The problem is not that there aren't enough teachers willing to go and work in those areas – considering there are currently thousands of teachers looking for work – but rather, the fact that it's not possible to justify in the education budget the provision of specialist teachers in schools in small rural areas. If there was a school with only 10 pupils on the roll – like ours – but was situated in an urban centre instead, the Ministry would be obligated to equip it with specialist subject teachers, despite the low number of pupils. The fact, however, that it is situated in a rural part of the country allows the state to exclude it from relevant provision on the pretext of 'difficult access.'
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> **Morphe head teacher:** There's an American tourist who has bought a house just outside the village and occasionally donates to our school…Last year I was able to buy new curtains for the school and this projector using those funds.
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> **Demos head teacher:** …and this computer that I have right here was donated to us by [name of a big Greek bank] last year. This is how these schools operate…a little bit here…a little bit there…We rely on charity…I had been trying to convince the municipality to have the school painted for 6 years…They eventually did so last summer.

Another hidden mechanism of inequity in learning opportunities exists in the form of shadow education participation, according to one of these head teachers. The lack of access to foreign language learning in small rural schools was believed to further exacerbate existing equity issues

by ‘forcing’ families of higher socioeconomic status to seek out private alternatives whereas those who lack the financial capacity to do so are effectively left behind:

> **Marathonion head teacher:** I believe in free public education for all children. As far as I’m concerned, being forced to pay for private after-school tuition is a crime – and, of course, this does not just happen with foreign languages; nowadays, it’s a very broad phenomenon.

Finally, both head teachers and parents noted two further factors which they saw as having detrimental implications for children’s learning: (a) a lack of relevant and actionable teacher training and ongoing support, and (b) unfair teacher compensation, which results in the devaluation of their work:

> **Marathonion head teacher:** We’ve recently had a counsellor from the Ministry come in and train us on the new Maths book for Year 5 because the previous one was an incredibly badly-written book which confused children even more. And he expected the entire lesson to be covered in 45 minutes because there shouldn’t be any homework, either. This is not realistic no matter how much one tries…Not all children in a classroom are at the same level…And there are children with SEN, too…They show me how to teach something but they don’t demonstrate how to do this in the actual classroom. Why don’t you come show me how to implement all this in the classroom – I doubt they’ll be able to… Theory is one thing, practice is quite another. 90% of teacher trainers in Greece are all about the theory – not the practice, really.
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> **Demos head teacher:** You came all the way from England and I haven’t had a single counsellor visit me for two years now. Not even ask how things are going. We’re completely left to our own devices.

5.4 Summary

Research Question 2 posed questions about the specific mechanisms which are perceived by children, head teachers and parents to mediate and/or inhibit children’s learning in a blended remote educational model.

The SEM procedures uphold findings from the regression analyses outlined in Chapter Four, having shown that the amount of time spent on the online platform was a relatively weak yet

statistically significant predictor of achievement at post-test for three out of five outcome measures: vocabulary, grammar and aural comprehension, even after controlling for prior attainment and other student- and family-related influences[42]. No direct effects were found for the synchronous component on any of the skills tested, nevertheless, indirect effects were indeed established for vocabulary, grammar and aural comprehension, which were mediated by the amount of the children's engagement with the learning platform. This shows clearly that the children's progress through the online, self-paced element of the hybrid intervention operated at least in part through the live interactions during their weekly sessions, even if these, too, are taking place via a distance learning modality. Furthermore, student characteristics such as their motivational disposition towards the L2 and the L2 community as well as regarding the role of the language in advancing one's career prospects were found to create a complex network of interrelationships with variables at the classroom and home environment levels which significantly predicted student achievement.

Furthermore, the analysis of the focus group and interview data shows that the intervention had an impact not only on students' academic attainment—as revealed by the quantitative strand of the study—but also on aspects of their social-emotional development. Teacher personality, the degree of engagement afforded by features of the digital platform and the pedagogical approach employed during the live sessions all emerged as contributing factors to the success of the intervention. Online engagement, for instance, was found to be promoted by the affordances of the learning platform, that is the ability to present new content in an easily-digestible format through bite-sized learning modules, highly interactive task types, multimodality, and gamified content. On the other hand, engagement in the live sessions was very much driven by the extent to which tasks allowed students to learn new things that often deviated from the EFL curriculum, explore, be surprised, and discover. Interestingly, those children who explicitly stated being driven by such a desire tended to be students who were normally highly engaged during the live sessions, yet whose gain scores at the end of the intervention were not commensurate to the degree of involvement they had exhibited. This raises important questions regarding the reliability of assessment in educational programmes that target deeper levels of understanding.

[42] As Sammons and Anders (2015, p.1315) remind us, 'In educational studies effect sizes often tend to be rather small when applying Cohen's rules; however, these small effects often have high practical relevance'.

Finally, respondents articulated variables at the state level which would be key to the success of future scaleup efforts such as equitable funding, relevant teacher preparation and ongoing support, as well as fair teacher compensation. The findings and interpretations are discussed in Chapter Seven.

Chapter Six – Cost Analysis of the Blended Intervention

6.1 Introduction

Having examined the effects of the intervention on children's educational outcomes, the specific mechanisms that are likely to have mediated and/or inhibited its success and the participant's views on its educational value and feasibility, this chapter goes a step further and analyses the cost of the intervention, focussing on the programme goal of increasing English language attainment across five core domains: vocabulary, grammar, aural comprehension, writing, and oral fluency. The purpose of this strand of the analysis is to address Research Question 3:

What is the relative cost of the blended learning intervention compared to the education-as-usual programme?

Estimating the relative cost of the programme is important, as an educational programme may be effective in increasing test scores, but its scaleup might be financially implausible for a certain context once it is compared to its alternative. In this case, the blended model is analysed in relation to the face-to-face option currently available to small rural schools[43]. In doing so, it will be possible to determine whether a blended distance learning approach is likely to be effective at raising EFL attainment amongst primary learners at a comparable cost level to that of face-to-face programmes.

To identify and estimate the total resource cost for the intervention, this analysis uses the Cost–Procedure–Process–Outcome Analysis (CPPOA) Model (Yates, 1999, 2009) and the ingredients model (Levin & McEwan, 2001). The CPPOA model provides a useful framework for measuring:

(a) resources (what makes a programme possible),
(b) procedures (what a progamme does with participants),
(c) processes (what a programme changes in its participants)[44], and

[43] Even though, in practice, and for reasons that have been explained in Chapter One, schools have not been able to make use of this option as of yet.
[44] Not relevant to this analysis.

(d) outcomes for an intervention (what a programme achieves with and for participants),

and also for attempting to quantify potential causal relationships between these (Yates, 1999). The ingredients model is a systematic approach to cost estimation of an intervention (Levin, 1983), and entails three phases: '(a) identification of ingredients [i.e. programme resources]; (b) determination of the value or cost of the ingredients; and (c) an analysis of the costs in an appropriate decision-oriented framework, e.g., based on cost burden across various agencies; at different levels of scale; adapted for different geographical locations or modes of implementation' (Levin *et al*., 2012, p. 9). Finally, the focus of this analysis is on incremental costs of delivery, that is, costs above and beyond existing costs on regular school programming in each of the participating schools.

6.2 Cost Analysis of the Intervention

The primary goal of the cost analysis is to collect all the costs of the intervention and to assign them to specific activities or procedures. Towards this end, the first step was to organise all the resources used for the implementation of the programme into the following cost categories:

6.2.1 Personnel

Although for the purposes of this study, the intervention was delivered in its entirety by myself, an annual personnel cost was established based on teacher base salary data obtained from the Ministry of Economic Affairs. The estimated salary cost was inclusive of time needed for preparation, teaching, marking and administrative duties. No adaptation was made for the number of teaching hours per week, as the estimation was carried out on the premise that one English language teacher would teach in more than one school until she reached a full-time workweek (i.e. 24 hours/week).

6.2.2 Facilities

Even though facility use was identified as a resource, this category was not included in the cost estimation analysis. The reason for not doing so was that the school space used as part of the programme did not incur any incremental costs for the municipality; in other words, the programme used classrooms which were already being used daily for the purposes of regular school programming. For example, in many schools some students would sit on their own in one

classroom and work on assigned tasks, while the teacher would be teaching another group in the classroom next door.

6.2.3 Materials

This includes the yearly costs of access to *EdApp* for each student, which was obtained from the provider, based on a coverage of 522 schools[45] and catering to a total of approximately 6,500 students. Notably, by April 2020, a long-term global learning initiative had been launched by *EdApp* in partnership with the United Nations Institute for Training and Research (UNITAR) which was designed to increase access to free, high-quality education. Towards this end, the *EdApp* mobile learning platform was opened up for the public and now provides free access to its course authoring tool and hosting services. As a result of this development, a company representative informed me that there would be no fee charged for the use of the platform by schools. The implications of the 'Educate All' initiative are discussed further in Chapter Seven.

The materials resource does not include the cost of computers, as all the schools were already equipped with at least one desktop or laptop computer (whether in use or not), however, it does include the cost of an overhead projector and a screen for groups with a number of students larger than 5. Pricing is based on a mid-range projection kit of a similar standard to what was being used by schools throughout the intervention, with an assumed life cycle of four years, which probably constitutes a rather conservative estimation. It also includes e-learning content and training materials development costs, which would, nevertheless, be incurred during the first year of programme implementation only.

Following the creation of a list of basic resources, the next step was to identify relevant activities/procedures which were involved in the implementation of the learning programme. These included: (a) teacher training, and (b) delivery of the EFL curriculum.

Table 32 shows a breakdown of the costs of resources by activity, along with a total yearly cost for the implementation of the BL programme across 522 small rural/peri-urban schools, assuming a mean class size equal to that of the intervention. A total cost for a four-year implementation period was also estimated as it would provide a more representative picture of the spread of costs across a period of time matching long-term government budget planning. Teacher training was

[45] Accounting for small schools operating with either one or two generalist teachers only, similar to the study sample.

calculated on the basis of providing a two-week training at the beginning of the first year of implementation, with subsequent two-day training events repeated annually for the next three years for a total of 131 teachers (one teacher for every four schools; see Footnote 46 below).

Table 32 Comparative cost analysis of the Blended Learning Programme versus regular programming, in 2020 euros

	Blended Learning Programme		**Regular Programme**	
	Teacher training	Delivery of the EFL curriculum	Teacher training	Delivery of the EFL curriculum
Teachers	€71,253	€1,710,072	€0	€1,960,632[46]
***EdApp* access**	€0	€0	€0	€0
Overhead projector & screen	€0	€65,250	€0	€0
Content development	€0	€19,984	€0	€0
Teacher training materials	€19,984	€0	€0	€0
Total for Year 1	€1,886,543		€1,960,632	
Total for 4 years	**€7,045,260**		**€7,842,528**	

A total cost for the implementation of the blended learning programme for Year 1 was estimated at €1,886,543. Due to startup costs, Year 1 would be expected to be the costliest, with an average yearly cost across a four-year implementation period estimated at €1,761,316, compared to €1,960,632 in the regular programme.

Costs were then compared by school, with the yearly cost per student varying from €281.18 to €1124.72 (M = 790.43, SD = 308.80), depending on class size (M = 5.2, SD = 3.0). Additionally, the average yearly costs of programme resources were compared, with teachers being the costliest resource (€1,735,011, or 98.5% of the marginal resource cost). Finally, the average costs by activity/procedure were estimated, with delivery of the EFL curriculum found to be the costlier

[46] Inclusive of base salary (€13,104 p.a.), Difficult Access Area Allowance (€100/month), and mileage costs (local fuel rate valid as of September 2020), assuming one teacher would teach in four different schools located in neighbouring towns or villages to reach a full-time workweek. As there is no provision for English instruction in small schools, the amount of contact time in each was extrapolated from the stipulated number of contact hours in urban schools, adjusted for class size.

of the two (€1,731,381, or 98.3% of the activities; teacher training was calculated at an average yearly cost of 29,935).

6.3 Summary

Comparing the cost of the blended learning programme with that of the face-to-face alternative in small multigrade schools operating with one or two teachers, it is clear that the former constitutes a substantially more affordable method of providing small rural schools with access to the national curriculum for EFL. This remains the case even after we include the marginal cost of providing 131 teachers across 522 schools with training on digital literacy and digital pedagogy. Although such knowledge and skills are likely to have positive externalities across other domains (e.g., helping swing the pendulum in the direction of school-wide use of instructional methods that support deeper learning as well as more targeted integration of technology in the learning process), these have not been taken into account in this analysis. This is primarily because the absence of a comparison group in this intervention rendered such an analysis impossible to carry out. Nonetheless, the potential of such benefits, together with the implications of the cost analysis, are explored in more detail in Chapter Eight.

Chapter Seven – Discussion

7.1 Introduction

The primary aim of the current study was to investigate the effectiveness of a blended distance learning model in underserved geographical areas where school staffing difficulties mean that children are unable to access core areas of the national curriculum. To this end, I designed and implemented an educational intervention which aimed at raising English as a Foreign Language (EFL) attainment amongst pupils attending Years 3-6 (aged 8-12) in small rural schools across Greece. The BL model was comprised of live sessions with a remote teacher (myself), while the students were also served by an interactive online learning platform which gave them access to a five-level course that they could work through in their own time. Students were introduced to new thematic areas via the online course and were provided with opportunities for scaffolded practice. The synchronous component of the programme was underpinned by principles of project-based language learning (with varying degrees of structure, depending on the English language ability and age of the children), Tochon's (2019) deep language learning framework, and was fundamentally centred around three key concepts: collaborative enquiry, authenticity, and self-paced mastery.

This chapter summarises and synthesises the study's findings in relation to previous literature and theory, considering the impact of the intervention on children, as well as factors that may have affected outcomes. Key insights from this scholarship are discussed in relation to each of the three research questions, reflecting on how they fit in with existing knowledge and understandings about blended learning approaches in low-resource settings.

In what follows, I consider the three main research questions in light of findings from the various strands of data collection and analysis outlined in Chapters Four, Five and Six, using a deductive approach where each research question (RQ) is treated as a theme.

7.2 RQ1: What is the impact of the blended remote model on student EFL attainment, with reference to a) vocabulary knowledge, b) grammar knowledge, c) aural comprehension skills, d) writing skills, and e) oral fluency?

There were clear indications that, after 12 weeks, the blended learning intervention impacted positively on student EFL attainment within the settings—with both the quantitative (at least in some areas) and qualitative data supporting this view. There were statistically significant improvements between pre- and post-test across four out of five L2 constructs. First, the results on the vocabulary knowledge measure indicated that there was a large ES (d = +1.47) overall, with the highest two levels—A2.1 and A2.2—reporting the largest gains across the sample. Moreover, analysis of variance (ANOVA) showed that these differences were significant (p = 0.026), thereby suggesting that as far as vocabulary is concerned, children who were already at a higher proficiency level at baseline stood a better chance of benefitting from the programme. Importantly, it was possible to significantly predict vocabulary knowledge improvement from the amount of exposure to the intervention, even after controlling for factors such as: motivational disposition towards English, group size, proficiency level, amount of English language learning taking place outside school, support from home, and cognitive ability.

The second largest improvement was in children's aural comprehension skills (d = +1.19), and this too was able to be significantly predicted by the intervention, even after accounting for potential confounders. Interestingly, the two highest levels once again made the most progress, only this time between-group differences were only marginally significant (p = 0.056).

Children's grammatical knowledge also improved from T1 to T2, with the results indicating once again a large ES (d = +1.16), and weaker yet significant (and potentially educationally meaningful) intervention effects maintained once confounding factors had been entered into the explanatory model (β = 0.14, p = 0.014). As before, the two highest levels made the most progress, this time with statistically significant between-group differences (p < 0.001). The differential gains could at least partly be attributed to the fact that there were also significant between-level differences in the amount of grammar lessons completed on the online platform; in other words, proficiency level appears to be a factor that determined the efficiency with which children exploited the available resources in their own time, and, given a marginally significant correlation between online progress and grammar attainment (r = 0.302 p = 0.055), the latter appears to have been impacted accordingly.

Contrary to experimental hypotheses, however, a statistically significant intervention effect was not identified on the writing skills and oral fluency measures; while an overall improvement was indeed recorded in the former (d = +0.95, p < 0.001), the intervention did not appear to have made a statistically significant contribution to it. Finally, no significant overall gains were recorded on the oral fluency test (d = -0.08, p = 0.68). It is worth mentioning, however, that results on this measure are not representative of performance across the entire sample, as a substantial amount of information was lost due to technical issues with the recording equipment (see Section 4.3.6); consequently, results are based on a final sample of N = 29.

A number of possible factors might explain the mixed pattern of results obtained; first, it is possible that the null result on the writing skills measure was due to low statistical power (N = 43), given that a statistically significant difference between pre- and post-test was indicated by the descriptive statistics (M = 15.35, p < 0.001). Second, it is important to note that writing skills did not have as prominent a role in the live sessions as other language areas, such as listening, speaking, or vocabulary acquisition. While the students did engage in various writing tasks, such as taking down notes during surveys or videos, these did not typically require them to produce long stretches of written language. Further, most of these tasks were completed collaboratively; thus it may be that students had not yet reached a point where they had internalised the learning that had been achieved during group work. Finally, children did not have an opportunity to benefit from real-time feedback in this area on the online platform as they did with vocabulary, grammar and aural comprehension activities. Instead, for this aspect of children's learning, it was necessary to rely on manual evaluation and feedback, which, although perhaps more personalised, was typically relayed to them by the local teacher on hard copies, sometimes a week later[47]. The timing of feedback is important as it can affect learners' ability to extract relevant information from it. Indeed, Lightbown (2008) contends that, when it comes to L2 learning, feedback is likely to be most effective if it occurs in the same context as it is going to be used, rather than if it takes place in isolation. In delayed corrective feedback there is a temporal mismatch between the act of communicating and the receiving of correction so that the cognitive processes active during the learning are not the same as those that are active during retrieval; that is, feedback becomes decontextualised, and, thus, possibly less effective. On the other hand, when we are dealing with fluency building rather than task acquisition, immediate corrective feedback can actually 'detract

[47] This was due to software constraints of *EdApp*, which did not at the time have any provision for manually inserted comments on students' work.

from the learning of automaticity and the associated strategies of learning' (Hattie & Timperley, 2007, p.98). This is the reason why feedback on language use during children's presentations typically occurred towards the end of the live sessions.

With regard to the results obtained on the oral fluency test, possible measurement effects on the assessment of the skill should be acknowledged. First, low-level students may have been at an advantage on this assessment due to producing substantially fewer and shorter stretches of language, but with greater fluency. For example, a student who was only able to produce the utterance 'My name is Pericles and I am eight', may have achieved a higher score on the fluency measure than a higher-level peer who appeared more dysfluent due to incorporating a greater degree of lexical, grammatical and syntactic complexity into a longer response. Though speech rate is a widely used measure of oral fluency, to my knowledge, the literature does not provide a method for correcting for the identified bias. Second, despite an original hypothesis, based on Uchihara and Saito (2019), that this measure would likely be an accurate reflection of the children's L2 lexical repertoire and their ability to retrieve this in oral communication, no significant relationship was found between oral fluency and productive vocabulary knowledge at post-test[48]. This means that either the students were not able to retrieve the L2 knowledge necessary to express their ideas with fluency and without too many hesitations, or they were not motivated enough to do so, or both. Qualitative observations throughout the oral fluency assessment provided support for the latter; it was evident at post-test that the children no longer perceived the task of talking about themselves as meaningful and authentic a communicative act as it had been at the pre-testing stage when I knew very little about them. As such, it is possible that they did not see value in communicating information that they presumed I now already had about them, such as where they lived, what school they attended, what year, and who their friends were. The concomitant search for new information to share is likely to have imposed increased cognitive demands on the children, thereby taking a toll on their fluency. This then may help explain the low reliability coefficient that was obtained on the measure ($\alpha = 0.59$).

7.2.1 Comparing the impact of the synchronous and asynchronous components on learning outcomes

In attempting to identify which of the two strands of the intervention could better explain the increase in L2 attainment, it was discovered that only the asynchronous component (using the amount of time spent on the online platform as a proxy) had had a significant direct effect on

[48] See Section 3.6.3, Table 5 for test items measuring productive vocabulary knowledge.

child learning (β_{Aural} = 0.28, β_{Gram} = 0.14, β_{Vocab} = 0.12); while exposure to the live, remote sessions was not found to directly influence achievement, the fitted SEMs revealed there to be statistically significant indirect effects which were mediated by the amount of the children's engagement with the learning platform. This suggests that the children's progress through the online, self-paced element of the hybrid intervention operated in part through the live interactions occurring during their weekly sessions, even if these, too, were taking place at a distance. Previous research has indeed highlighted that despite a common misconception for many years that technology would single-handedly empower L2 learners by offering them access to unlimited resources and language input for self-study, reality has proven to be much more complex (Reinders & Hubbard, 2013). For example, it is now acknowledged that online learning requires learners to become somewhat autonomous. Students who cannot take control of their learning may lack the skills to sustain interest and engagement with this learning environment, thereby minimising their chances of success (Driscoll *et al*., 2012). It is, therefore, possible that interactions with peers and the teachers (both the remote and the class teachers) during the real-time sessions diminished the likelihood of online disengagement occurring and promoted motivation to participate amongst those who were less inclined to self-regulate. In this sense, the two strands of the blended programme are likely to have worked together in complementary ways, thereby compensating for the constraints of one another. Qualitative observations throughout the intervention also revealed that creating a sense of continuity between the two learning modes helped enhance students' perceptions about the relevance of the online component, and, by extension, its utility. This was mainly achieved in two ways: first, through my own efforts during the onsite sessions to draw links between classroom learning and the online content by making regular references to the latter, such as *'The reading text of Lesson 2 this week is actually talking about this'* or *'Do you remember that animated picture that was used on the platform to describe this word?'*; and second, through students' own references to their online accomplishments and/or struggles (e.g., *'I made the same mistake on the platform and I missed those stars.'*), as well as the conversations about their experiences working online which ensued from this.

It could be argued then that the impact of the online course seems to have operated primarily at a cognitive level, providing children with individualised learning opportunities through the possibility to access content on-demand, receive automated scaffolding, and progress at their own pace; on the other hand, the effects of the real-time sessions appear to have operated primarily at a socio-affective level, enhancing children's emotional engagement with the subject matter and

providing motivational benefits from the increased guidance and opportunities for social interaction. As Stein and Graham (2020) assert, a learner who is affectively engaged is motivated to learn and is willing to commit mental effort to the challenging cognitive tasks required in the learning process. It therefore may well be that each mode of learning is conducive to certain child outcomes more than others. Possible factors affecting children's cognitive, social, and affective engagement in a BL environment are discussed further under RQ2.

7.2.2 A note on individual differences in outcomes

It is important to recognise that there was a high level of variability in the learning gains made by the children on the L2 assessments overall (M_{Vocab} = 13.48, *SD* = 9.20; M_{Gram} = 15.66, *SD* = 13.49; M_{Aural} = 26.60, *SD* = 22.38; M_{Writ} = 15.35, *SD* = 16.23). L2 proficiency level has already been identified as a significant factor, at least in some areas of learning. Recognising that these individual differences may affect the interpretation of the group level evaluation outcomes discussed above, it is crucial that any attempt in explaining these gives due consideration to the unique settings within which outcomes were generated; individual differences in EFL attainment are therefore considered in light of informal observations throughout the fieldwork, and the stakeholders' perceptions of the intervention and its impact.

7.3 RQ2: What are the specific mechanisms which mediate and/or inhibit said impact on learning outcomes?

Additional aspects of data collection/analysis embedded within this study allow further illumination of the mechanisms underpinning the efficacy of the blended learning intervention with a primary student population, and features of the intervention as well as contextual factors which may affect the outcomes considered above. A number of data collection methods were employed to address these factors, including informal observations, focus group interviews with children, semi-structured interviews with head teachers and parents, t-tests and correlation analyses.

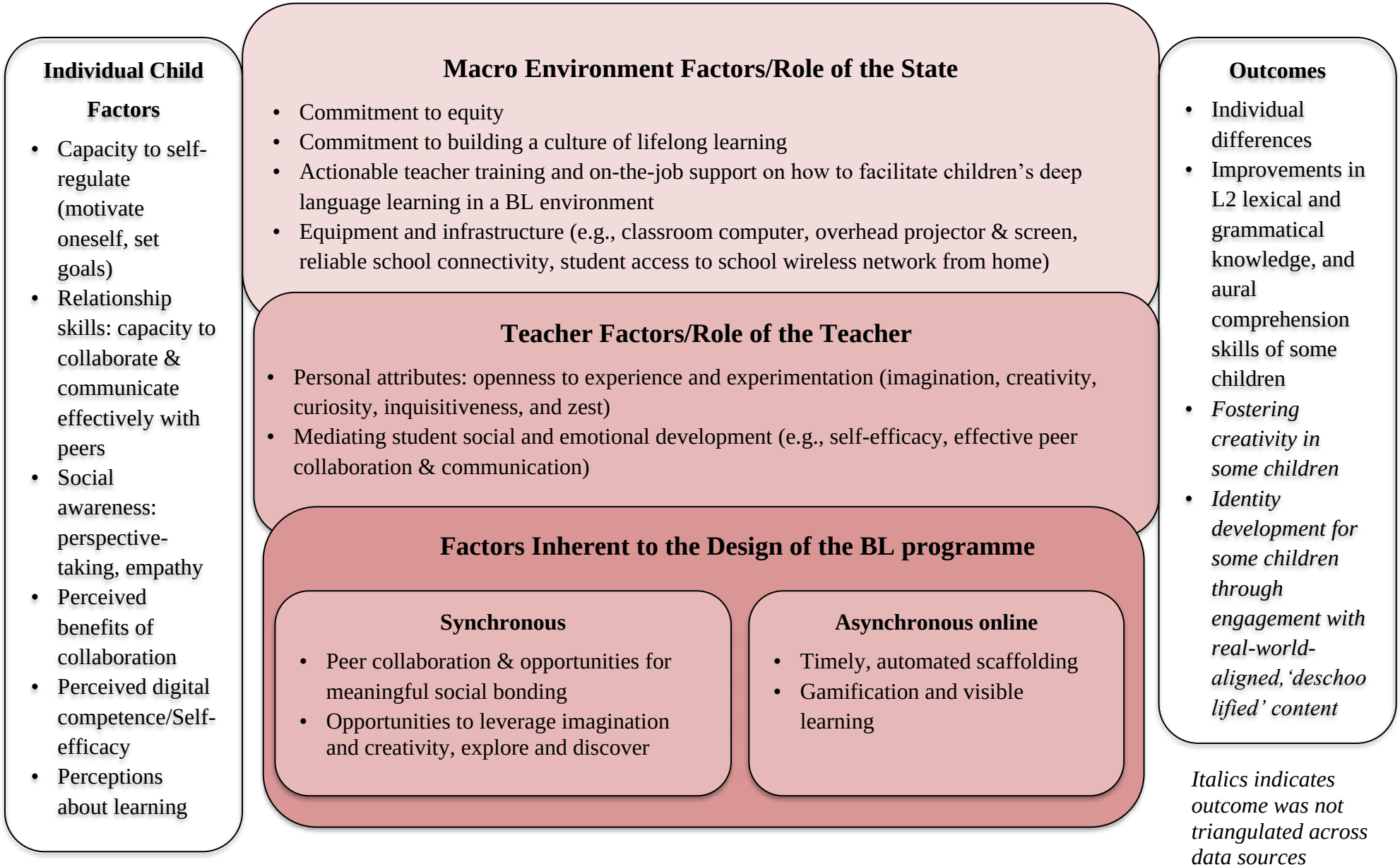
Based upon analyses of these data, a model of the underpinning mechanisms of the blended learning intervention in this study was developed (see Figure 24). On the left are key characteristics of children which may have affected their learning experience during the intervention. In the centre, starting from the macro- and moving towards the micro-level, are factors that may have affected children's individual learning experience, derived from the main

themes identified from the analysis of the qualitative data (see Section 5.3). These are identified in relation to three key areas:

- the role of the state,
- teacher factors/the role of the teacher, and
- factors inherent to the design of the BL programme, addressing elements pertaining to the synchronous and asynchronous components separately.

The final outcomes of the intervention are identified on the right of the figure. The model is discussed in detail below, in relation to key supporting data, theory from the learning and developmental sciences, and previous research.

Figure 24 A model of the mechanisms underpinning the efficacy of the blended learning intervention



7.3.1 Peer collaboration, opportunities for meaningful social bonding, and the teacher's role in mediating student social skills development

Peer collaboration was one of the three concepts around which the design of the BL programme was centred. Yet focus group interviews indicated that the extent to which children were able to engage in effective collaboration during the live sessions was affected by individual perceptions around the value of collaborative learning: those who viewed it as a beneficial and productive way of working in the classroom were able to benefit more from group work compared to those who described collaboration as merely a process which entailed telling lower-ability group members what to do (i.e., peer tutoring) and convincing the disengaged to engage. According to this latter subset of children, such practices were far from conducive to learning; instead, they were thought to lead to a culture of dependency, thereby compromising individual progress. These observations are supported by Kirschner, Paas and Kirschner (2009), who argue that whether collaboration will occur depends on the perceived or actual costs involved in the process: only if learners believe that the extra time and effort that need to be invested to work together will pay off in terms of effectiveness and efficiency of learning, will they feel motivated to communicate and coordinate with others. This may help explain why negative attitudes towards collaborative learning and a desire to exercise autonomy were vocalised almost exclusively by students with higher self-efficacy beliefs; it may be that, for them, the transactional costs exceeded the returns; in other words, mutual scaffolding may have failed to materialise in groups where mixed levels of academic self-efficacy were observed. Considering links between academic self-efficacy and self-regulation (Pintrich & Schunk, 2002; Duckworth *et al.*, 2009), it may be that students low on academic self-efficacy tended to be less proactive, show less initiative, and appear less capable of managing their participation in the collaborative environment; this, in turn, might have been perceived by their peers as free riding behaviour (Savicki, Kelley & Ammon, 2002; Lipponen *et al.*, 2003), thus leading them to adopt exclusionary practices wherein they chose to participate within groups of peers whose level of perceived academic competency was similar to their own (Vaquero & Cebrian, 2013). Children's mixed pattern of views and experiences of working in groups could also serve as an indication that the value of working collaboratively had not been discussed explicitly enough or in sufficient depth with them (Tunnard & Sharp, 2009). In particular, ways in which higher-ability students could stand to benefit from the partnerships might have served to minimise observed discrepancies—a point to which I return a little later in this section.

Despite children's differential views on the value of collaborative work with respect to cognitive performance, social aspects of the intervention were in fact the strongest theme to emerge from the focus group data. Asked what they had enjoyed most in the programme, the majority of children mentioned participating in group games in class, finding out things they might not know about their peers and, likewise, talking about themselves to others. Underlying student responses, overall, was a social dimension which pertained to a need for human bonding, establishing and maintaining friendships, acceptance within the peer group, and a sense of belonging in a circle that shares a common purpose, all of which were subsumed under the theme 'meaningful social bonding'. In this context, the term 'meaningful' is used to describe experiences students engaged in because they had intrinsic or internalised motivations for doing so (Nicholson, 2015); the notion is rooted in Mezirow's model of transformative learning, where an experience can allow transformation of existing beliefs and long-term change (Mezirow, 1991). Thus, it seems likely that in discussing aspects of themselves which did not normally form part of peer conversations, or by simply sharing a mutually enjoyable experience, some children's views about each other underwent shifts, possibly even breaking down previously-held stereotypes and prejudice, thereby enhancing group cohesion.

In summary, although similar positive effects surrounding collaborative work have been documented by Ramirez (2019), who found that group work and games were driving forces for learner engagement, and Stiles (2016 cited in Weisblat and McClellan, p.311), who observed that when the collaborative learning process was experienced as a shared social enterprise, it enhanced positive affect and promoted student growth (see also Filippousis and Anastasiades, 2019), the children in this study failed to attach any importance to the mix of abilities in a group, with comments indicating frustration over the absence of mutual cognitive scaffolding in partnerships involving mixed levels of academic self-efficacy. In the absence of targeted training, students did not demonstrate an increase in their capacity to identify and leverage their partners' strengths. This underlines the view of Morcom (2016) that explicit teaching of personal values and attributes such as resilience, empathy and respect for others, supported by targeted social and reflective practices, can support effective peer scaffolding practices and collaboration amongst primary pupils. Effective peer collaboration may also be enhanced if collaborative learning is no longer viewed by teachers purely as a means for achieving the cognitive aims of the course (Le, Janssen & Wubbels, 2018); rather, raising students' awareness of the value of positive social interaction skills in their own right, and using levels of teamwork, cooperation competency and initiative competency—that is, the collaborative *process*—as markers for group success

alongside cognitive outcomes may help shift higher-ability students' focus away from trying to meet their individual goals onto fulfilling the team's goals (Lee, Kim & Byun, 2017). In Tochon's (2019) terms, this would be consistent with a 'deep' teaching approach, which emphasises the linkage of new knowledge to prior experiences within an understanding of the value of societal improvement, thereby positing sociocultural themes that account for the developing identities of the students.

7.3.2 Opportunities to leverage imagination and creativity, explore and discover, and the role of teacher attributes

Consistent with the findings of Siakkas (2011), children's levels of engagement during the live sessions also appeared to be influenced by the quantity and quality of opportunities they were given to think 'out of the box', come up with original ideas and objects, as well as new solutions to problems, or ways of looking at problems. Robinson (2017) defines imagination as the ability to bring to mind things that are not present to our senses, and creativity as the process of putting this ability to work to create original ideas that have value. Indeed, focus group responses included references to lessons, or specific tasks within lessons, that encouraged children to step out of the here and now, take a different view of the present, and work to design alternative futures; for instance, one of the projects which came up during the interviews, was the Dream School project that levels A1.1. to A2.2. became involved with during the first two sessions of the intervention (see Appendix 3). Children designed and pitched for schools which were located on tree tops and where 'lessons sometimes take place outside with the animals'; schools where they studied subjects such as astronomy, and which started later in the morning because 'it's easier for [children] to remember things' when they are well rested and fully awake; children designed schools where 'every child creates her own programme' with the help of a teacher-mentor, and complained that 'we can send humans to the moon' and yet formal education still relies exclusively on 'books and pencils'. It becomes evident that, in this instance, being creative was about thinking laterally, exploring new horizons, and using imagination. As Read (2015) argues, however, creativity does not happen in a vacuum; indeed, the learning environment seemed to provide a fertile 'sandpit' for such mental processes in three key ways: first, the generation of children's original thinking was apparently stimulated and underpinned by authentic video-based descriptions of some of the most unusual schools in the world that students had watched prior to the design task and the conversation that had followed on from the viewing; this became manifest in some students' ability to combine elements from these schools into

entirely authentic designs, thus lending support to the notion that creative novelty is produced through a process of discovery of new possibilities (Martin & Wilson, 2017). In each of these learning settings, there was a discovery, whether that were of the possibilities in the physical properties of a school building or a classroom, alternative learning approaches and environments, or students' own emotions evoked by their exposure to different ways of 'doing' school. From a deep language learning perspective, this act of going beyond existing beliefs about 'what is' and 'what can be' is precisely what sets in motion a process of personal transformation amongst language learners, thereby allowing for social and self-actualising goals to be embedded within the second language curriculum (Tochon, 2019).

Second, children were given space to play with ideas freely and spontaneously, and express their personal feelings[49], while, at the same time, the design framework they were provided with imposed constraints which promoted disciplined thinking, attention to detail, and the development of specific strategies and linguistic skills (Read, 2015). While freedom and choice were pivotal in motivating and helping children push the boundaries of what they thought possible, working within formal (including linguistic) constraints did not seem to stifle creative work (Robinson, 2017). As Tochon (2019) argues, shifting away from a rather liberal conception of the learner as an entirely autonomous decision-maker can in fact help us define flexible educative projects that would reconcile curriculum outcomes with the needs and preferences of the students.

Finally, teacher attributes, such as openness to experience and experimentation, curiosity, inquisitiveness, and zest appeared to be important factors in triggering children's imagination and creativity during the intervention. This finding echoes Schoff's (2016) view that creative ESL education goes beyond simply 'covering' a topic, getting through a section in the textbook or curriculum, or just having fun; rather, it requires a capacity for critical and creative thinking so as to frame activities as challenges for students to address collaboratively, with space for playfulness within the language structures, and incorporation of their own and their students' interests. In this sense, the art of teaching ESL is 'the art of actively engaging in making something—opportunities for and facilitation of our students' effective language learning—in a

[49] Interestingly, one group went so far as to ask their local teacher to leave the room before they started talking about their designed dream schools; while their motives were not explicitly stated, this might be due to a desire to avoid inadvertently offending the teacher in what appeared to be a rejection of the system of schooling he was perceived to represent.

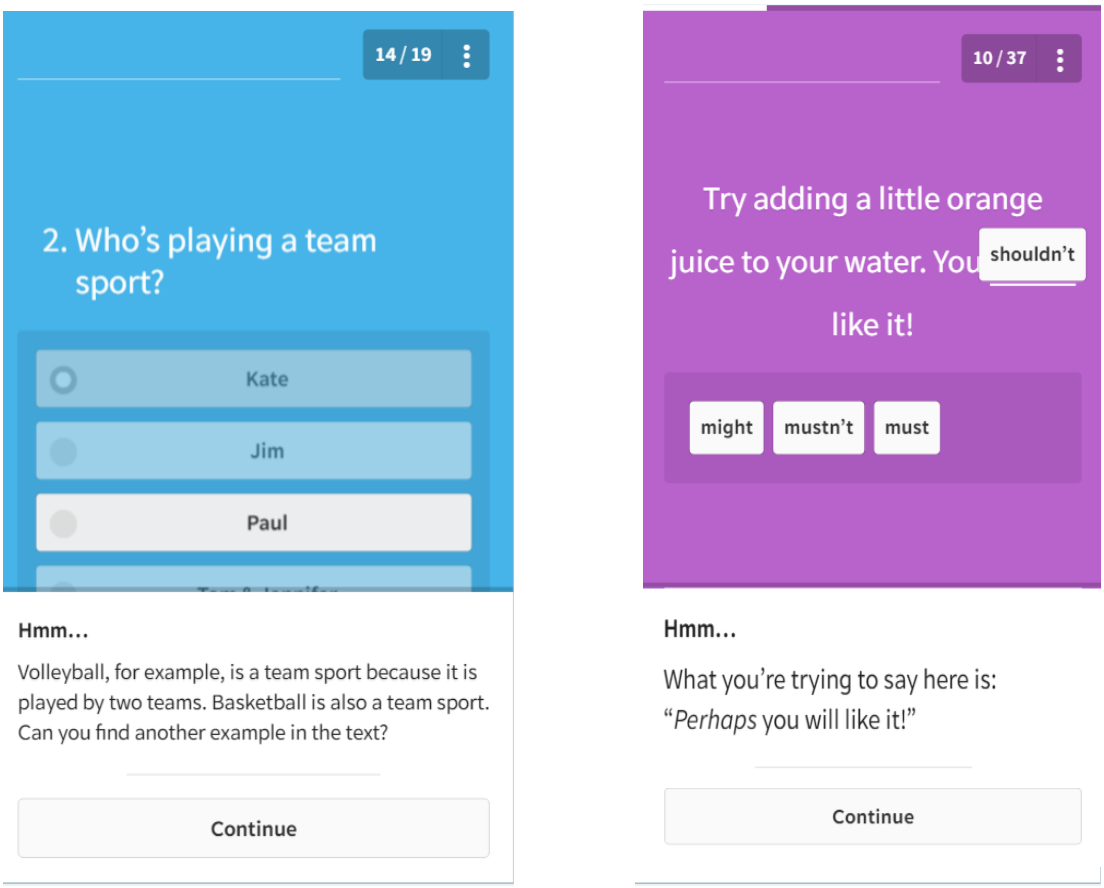
deliberate way, using imagination' (*ibid.*, p.41). Robinson (2011, p. 270) terms this 'teaching for creativity' and asserts that it involves asking open-ended questions where there may be multiple solutions; using imagination to explore possibilities; encouraging the expression of personal ideas and feelings; making connections between different ways of seeing; and exploring the ambiguities and tensions that may lie between them. In other words, teaching for creativity involves the ability and preparedness to fully engage in the creative process alongside one's students.

7.3.3 Timely, automated scaffolding

As noted in Section 3.5, the EFL content with which the online courses were populated constituted no innovation in itself during this intervention. Instead, for generalisability purposes, a decision was made early on in the design phase of this project that the learning materials of the asynchronous component would replicate those provided by the Ministry of Education in textbook format. Nonetheless, a digital mode of delivery was anticipated to enhance children's learning through embedded technological affordances such as interactivity; gamified exercises; the possibility to present new content in an easily-digestible format through bite-sized learning modules and use of multiple modes of communication (i.e., linguistic, visual, audio, and video); personalisation, whereby children were able to access content on-demand and progress at their own pace; and automated scaffolding through timely feedback. With respect to the latter, results from the qualitative strand of the analysis indicated that some children were able to benefit from the availability of automated scaffolding, which, rather than simply provide them with right/wrong feedback, aimed at prompting children's thinking in their pursuit of a suitable answer. Figure 25 shows two examples of automated scaffolding on *EdApp* after the learner has provided an incorrect answer in a reading skills (left) and a grammar (right) lesson at A2.2 level.

As outlined in Li (2017), effective online feedback is timely, appropriate for learners' language levels, motivating, and it allows students to act on it. While *EdApp* did not allow for the provision of individualised corrective feedback to learners, focus group data suggested that more advanced learners acknowledged the pedagogical value of the implicit (or indirect) corrective feedback (calling the error to the learner's attention without giving the correct form). One plausible explanation is that this type of feedback can provide learners opportunities for higher levels of cognitive processing, such as reflection and problem-solving (Ai, 2017).

Figure 25 Examples of automated scaffolding on *EdApp* after an incorrect answer has been provided, taken from a reading skills (left) and a grammar lesson (right) of the A2.2 course



7.3.4 Gamification and visible learning

Another finding that emerged from the interview data pertains to students' expressed need to keep track of their progress in the online course, either through tangible rewards such as point scores and star bars which increased as learners worked their way through the material, or simply through achieving progression to the next level (or lesson). This finding corroborates results in previous research suggesting that incorporating gameplay features such as badges, points, levels, and progress bars into the learning process not only can trigger positive engagement amongst primary and secondary learners (Mystakidis, *et al.*, 2014) but can also encourage children to take ownership of their own learning (Halloluwa *et al.*, 2018). This is explainable through an appeal to self-determination theory (Deci & Ryan, 2012)—arguably the most-commonly cited psychological theory in gamification research to date (Seaborn & Fels, 2015)—which suggests that points and progress visualisation serve as informational feedback that satisfies learners' need for competence and mastery, thereby increasing motivation and perseverance.

Nevertheless, different students ascribed different meanings to these rewards. For instance, attitudes towards gamified rewards differed depending on the degree to which learners had internalised the value of learning for its own sake, or, instead, whether they perceived its benefits as being conditioned on the existence of particular external controls. In addition, depending on each child's innate drive to achieve, such design features were experienced either as intrinsically motivating competence boosts or more extrinsically motivated ego boosts likely to instil unhealthy competitiveness amongst peers. High-performing children with increased self-efficacy levels tended to fall under the first category, whereas those who stated being rather indifferent to external reinforcement had typically exhibited lower levels of both self-efficacy and engagement with the self-paced component, and were generally low-to-average achievers.

Given that high self-efficacy tends to support student confidence and autonomy (Bandura, 2010; Shen *et al*., 2013), it is likely that there was no perceived alignment between the online course material and this latter subset of students' needs (van Roy & Zaman, 2017). Students with lower self-efficacy levels and less capacity for self-regulation, for example, could have felt that navigating the online materials in a more autonomous fashion posed a significant challenge for them and that they were not able to manage it without adequate support. *EdApp* constraints such as the inability to communicate with students directly via the app or comment on their online activity is thought to have facilitated such feelings of frustration in these learners. In this sense, the findings are consistent with Barata *et al.* (2015) who found that personal differences (achievers, disheartened, late awakeners, and underachievers) affected how learners interacted with the same gamified course.

7.3.5 Perceived digital competence and attitudes towards the use of technology

The results of this study also replicate those reported in previous research involving adult students, as the direction of the qualitative findings shows that learners' perceived digital competence and their attitudes towards the autonomous use of a web-based learning platform as a medium of study were fundamental factors in their quantity and quality of interactions with the asynchronous component of the BL intervention (Wichadee, 2018; Prior *et al.*, 2016; Tang & Chaw, 2016). Prior and colleagues (2016) examined the effects of attitudes towards ICT and digital literacy on self-efficacy, as well as the effects of self-efficacy on interaction with the web-based learning platform in postgraduate distance education students. In their study they found that not only student attitudes and digital literacy both contributed positively to self-efficacy, but

that there were also positive links between high self-efficacy and interaction with the online learning platform. Therefore, it may be suggested that students with high digital literacy and a positive disposition towards the use of technology are likely to engage more with the online course materials and experience positive interactions with the asynchronous component of a BL programme.

The findings of the present and previous studies have serious implications for the importance to learning of conscientious attention to learners' perceived and actual digital competence, and the need to problematise discourse surrounding the alleged natural affinity of so-called 'digital natives' to use technology in a sophisticated way (Prensky, 2001). This becomes even more important in light of previous evidence that personal preference, choice, or desire to use particular digital technologies vary and are not necessarily associated with proficiency (Janssen *et al.*, 2013). That is to say, children and teenagers may be well versed in the use of Web 2.0 technologies for content and media sharing such as *YouTube* and *TikTok*, but it does not follow that they will be prepared to make use of such tools for learning purposes in the context of formal education.

7.3.6 Macro environment factors

While the focus of this research is not at a macro level so much as on influences in the participants' micro- and meso-contexts, the highly centralised nature of the Greek educational system means that it is important to take into account preconditions at the state level which are deemed key to the development and successful implementation of EFL blended learning programmes in primary education. During the interviews, almost all parents and head teachers made explicit reference to the lack of equity which permeates the country's educational system. They perceived systemic inequities primarily between the urban and small rural school provision, with the latter excluding rural students from access to core areas of the national curriculum such as English and ICT, thereby severely limiting their opportunities for cognitive and intellectual development. What is more, the lack of access to foreign language learning in small rural schools was believed to further exacerbate existing equity issues by 'forcing' families of higher socioeconomic status to seek out private alternatives whereas those who lack the financial capacity to do so are effectively left behind. Students attending the country's small multigrade schools were also thought to be offered suboptimal learning opportunities due to chronic underfunding compared to their urban counterparts, with school leaders having to rely

on citizens' and corporate donations for the procurement of necessary technological equipment and infrastructure.

The marginalisation of rural students in the public education system as a means of economising and on the grounds of geographical barriers has been widely recorded in the international literature, with reference to both developing (see Zhang, 2006; Luschei & Carnoy, 2010; Luschei, 2012; Tayyaba, 2012; Agrawal, 2014; Shi & Sercombe, 2020) and, to a lesser extent, developed countries (Doyle, 2014; LeBeau *et al.*, 2020). While, at the time of writing this, financial data on regional disparities in spending on primary and secondary education are not available for Greece, population-based estimates suggest that it is most likely that per class spending in rural schools is much lower than in their urban counterparts, while per student spending is much higher (OECD, 2018b). This is because the small size of rural student populations inevitably makes the provision of education much more expensive on a per-student basis than in cities, especially in single teacher schools with few students per teacher and building (OECD, 2019b). If resource allocation is based on enrolment rather than equity, then schools in sparsely populated areas are less likely to benefit from scale economies, thereby effectively being put at a disadvantage. Moreover, the participants noted that adverse weather conditions in some of these locations during winter made it difficult for teachers to commute from nearby areas. In the case of specialist (e.g., EFL) teachers, mobility would be a prerequisite for reaching a full-time workweek (see Section 6.2). This, then, might constitute another barrier to equitable learning opportunities for children in remote areas.

Head teachers and parents underscored two further factors which they saw as instrumental to children's learning: (a) relevant and actionable teacher training and ongoing support on how to facilitate children's deep language learning in a BL environment, and (b) commitment to building a culture of lifelong learning. As Tzotzou (2017) notes, in Greece, state EFL teacher education and continuing professional development (CPD) have traditionally not been considered a top priority of the national education agenda. While there is some provision for newly appointed teachers in state schools, in-service teacher education is very limited. Moreover, where this does exist, it is generally concerned with the transmission of knowledge, reflecting a technocratic view of teaching whereby CPD is 'delivered' to the teacher by an 'expert', with the agenda determined by the provider, and the participant expected to assume a passive role (Kennedy, 2005). While potentially useful for introducing new knowledge, the head teachers of this study held the view that this rather decontextualised training model fails

to impact upon the manner in which this knowledge can be translated into practice within their everyday classroom realities. This issue becomes even more salient when it comes to the use of new technologies in teaching. Tzifopoulos (2020) cites findings from a recent study investigating the professional digital competence of Greek philologists working in state schools located in the country's second largest city, Thessaloniki. What he found was a discrepancy between these teacher's stated levels of familiarity with technology and their ability to integrate it into their teaching in pedagogically meaningful ways. It is telling that the identified skill shortage was found to be more pronounced for practitioners with more years of service (11+ years), a finding which serves to add credence to the proposition that for BL models to be implemented successfully at scale, how to practically support meaningful learning in a BL environment needs to be the subject of statutory CPD as well.

7.4 RQ3: What is the relative cost of the blended learning intervention compared to the education-as-usual programme?

The present research indicated that, overall, delivering the blended EFL learning programme in the 522 multigrade schools operating with either one or two generalist teachers across the Greek mainland and islands would incur approximately 90 per cent of the incremental costs that were estimated for the education-as-usual format of the course. Costs remained lower even after taking into account initial teacher training and yearly CPD costs. While the latter were calculated on the basis of two-day training events per year —a relatively limited amount of in-service training compared to similar provision in other developed nations —it's worth noting that this study is taking a pragmatic approach, whereby it considers the contextual limitations surrounding these schools and what can be realistically expected in the short to medium term given the realities of the wider socioeconomic context within which they operate. As argued in the previous section, if due consideration is given to the ways in which to optimise training, then even a relatively limited CPD provision is highly likely to constitute a significant improvement on the status quo.

Teacher costs seemed to drive the total cost for both approaches, similarly to other studies (McEwan, 2012). Even though the asynchronous element of the intervention was a core part of the BL approach, the cost analysis used in this study did not assume a reduced amount of classroom hours for this format. Rather, there was an emphasis on how live contact time could be optimised, how time was spent outside of class, and changing what activities were completed in class. Additionally, while per-pupil cost was much higher in single teacher schools with few students per teacher, it was found that the BL programme would be able to retain its relative

advantage over the face-to-face format provided it was permitted to benefit from economies of scale by being implemented across multiple school units—in this case a total of 522 were included in the estimation. Thus, when designing a blended learning programme, it appears pertinent to consider not only what aspect of learning is being changed, but how many people the change will influence (Maloney *et al.*, 2015).

The lower values in the BL approach can be attributed to the fact that the remote learning format significantly decreases extra personnel expenditure such as the Difficult Access Area Allowance and mileage costs that would otherwise be incurred if teachers were commuting to multiple school units every week. Additionally, given that the online learning component utilised a freely available learning platform hosted on a third-party server, there were no new costs attributed to software, licensing, or IT support.

Finally, increases appear to be the result of startup costs relating to teacher training and online content development, both of which should be taken into account by educational systems embarking on BL approaches. A need to maintain realistic expectations for the short to medium term mandated that I assume a centralised online content development process during cost analysis, at least during the early stages of systematic BL programme development. Yet, wider adoption of print-on-demand approaches and an increased emphasis on teacher-generated content (a trend reflected in the 'Educate All' initiative) could lead to a gradual reduction in costs associated with mass textbook production and printing, thereby mitigating the initial high inputs resulting from online materials development in future iterations of the BL course (MacIntosh, n.d.).

The absence of a comparison group in this intervention, together with a complete lack of national achievement data at the primary level, made it impossible to determine which of the two approaches provides educational effectiveness at least cost. While it is true that geographical constraints deprive some of these settings of the luxury of choice, identifying the most cost-effective options available to these locales would arguably provide a fuller picture of how to allocate scarce resources across a range of competing approaches. However, before data from more rigorous evaluations are available, no firm conclusions can be made on cost-effectiveness of BL compared to face-to-face learning. Further, as this evaluation included only the state's perspective, no conclusions can be made on the full societal costs of BL, as for example students' costs were not included. Nonetheless, the present evaluation provides an indicative cost

description of offering a BL course in these primary school settings, including all inputs needed to start-up and run the courses, as opposed to just actual purchases by a specific project. Thus it can be used as preliminary data on cost structures related to designing and implementing BL in teaching English to primary students attending small multigrade schools across the Greek territory— a kind of provision which is currently not available to these populations.

7.5 Summary

Overall, results on three out of five measures suggest positive benefits from participation in the blended distance learning intervention with respect to children's L2 vocabulary and grammar knowledge as well as their aural comprehension skills, thereby contributing to a divided and weak discourse on the efficacy of blended L2 learning in low-resource K-12 settings. The findings also add to a paucity of information in the literature on the complex interrelationship between the synchronous and asynchronous elements of a blended learning programme delivered to primary school children in low-resourced settings. In addition, a combination of factors were found to have contributed to these findings. Evidence from the student focus groups, head teacher and parent interviews, together with informal observations over the course of the fieldwork, suggests that key reasons students were motivated to engage with the BL intervention, and therefore able to achieve high attainment, included ample opportunities for *meaningful* social interactions during the live sessions; opportunities to explore the real world in novel ways (e.g., through real-time simulations), be creative and think beyond the confines of their own micro-reality; and latitude to take ownership of their own learning, provided their progress was made visible to them. These insights lend support to the argument that a blended remote model informed by the pedagogical underpinnings of deep language learning, and therefore centred around the principles of collaborative enquiry, authenticity, and self-paced mastery, constitutes a promising access route to quality language learning in areas where geographical constraints give rise to significant staffing challenges. Equally noteworthy are indications that, overall, the blended EFL learning programme could be delivered at a comparable cost level to that estimated for the education-as-usual format of the course. More about whether and under what circumstances the blended remote model can be scaled is reviewed in the implications section of the next chapter.

Chapter Eight – Conclusion and the Way Forward

8.1 Introduction

The previous chapter discussed the findings of this study in depth, mainly through critically revisiting the research questions in relation to previous evidence and theory. This chapter further reflects upon the results of the overall study, while noting the contribution to knowledge, implications for policy and practice, and limitations and challenges of this doctoral journey. Directions for future research conclude this chapter and therefore the thesis.

8.2 Contribution to Knowledge

This research contributes to knowledge and understanding about blended distance learning in low-resource settings in three ways. As discussed in Chapter Two, the study fills in missing gaps in the existing body of international research on the effectiveness of blended distance learning in primary education (Barbour, 2014; Waters, Barbour & Menchaca, 2014), and Greece, in particular, where—at least until the Covid-19 pandemic broke out in March 2020—there had been no systematic efforts to integrate distance learning models into the country's existing educational structure at the K-12 level (Miminou & Spanaka, 2013; Anastasiou, Androutsou & Georgalas, 2015). First then, at the most basic level, this thesis presents an evaluation of a novel approach to learning that shows promise in improving academic attainment in EFL learning, especially amongst primary learners (ages 8-12) from disadvantaged backgrounds. This provides a basis for the further development of the field, by scaling up the BL approach to determine whether these positive findings can be replicated in other small multigrade schools operating in remote parts of the country and suffering from long-standing systemic marginalisation.

Second, and related to the first, the BL model implemented in this study draws on Tochon's (2019) framework for reconceptualising language learning through a 'deep' lens involving L2 mastery; the nurturing of creativity and original thought through engagement with interdisciplinary, collaborative, real-world-aligned projects; and, identity development through intrapersonal insight. To this end, it combines a number of evidence-informed pedagogical practices, centred around three key principles: collaborative enquiry, authenticity, and self-paced mastery. As a complex intervention, it is therefore likely that the benefits accrued from the BL

programme emerged from a combination of factors. Evidence from the student focus groups, head teacher and parent interviews suggests that key reasons students were motivated to engage with the BL intervention, and therefore able to achieve high attainment, included ample opportunities for *meaningful* social interactions during the live sessions; opportunities to explore the real world in novel ways (e.g., through real-time simulations), be creative and think beyond the confines of their own micro-reality; and latitude to take ownership of their own learning, provided their progress was made visible to them. New pedagogical approaches for teaching English as a foreign or second language might be inspired by this work so that children who may not have desire or confidence to do English might be interested due to a new-found link between this subject and other domains, including inter- and intrapersonal dimensions. This may result in new perspectives on learning potential and in unique applications to the primary school curriculum.

Importantly, the model developed as part of this study (see Figure 24) provides a detailed theoretical mapping of the causal pathways linking exposure to the blended learning intervention with changes in child outcomes, including key determinants of its effectiveness at different levels of the ecological environment within which the learners are situated. It is hoped that this will encourage further interdisciplinary research — pulling from both the learning and developmental sciences — together with the use of robust statistical techniques to test and potentially refine the complex interrelationships identified in the present study.

Finally, statistical insights on the ways in which the two strands of the blended programme appeared to have worked together in complementary ways can further contribute to knowledge in the field and help answer questions regarding the merits and demerits of deploying online (rather than blended) models of learning at the primary level. Perhaps the results from this study can spark an interest amongst researchers and teachers to look more specifically at ways to cater to the socio-affective needs of children who, for a range of reasons, may rely exclusively on e-learning models for their formal education.

8.3 Research Implications

8.3.1 Implications for policy and pedagogy

The findings of the present research have wide implications for policy development at the national and international level. In an appeal to international agreements on ensuring inclusive and equitable quality education for all children (Goal 4 of the SDGs), along with evidence that

several months into a global pandemic that has forced a widespread pivot to remote learning the latter remains out of reach for at least 500 million students (UN-DESA, 2020), this thesis calls upon policymakers to uphold a commitment to equity in education by ensuring that children's individual personal or social circumstances do not present obstacles to accessing learning and achieving their educational potential.

At the national level, the current study has provided an indication that, in the case of small multigrade primary schools in Greece, a blended distance learning approach is likely to be effective at raising EFL attainment amongst learners at a comparable cost level to that of face-to-face programmes. This not only appears to be consistent with findings from international initiatives to promote equity and inclusion by providing technology-enabled distance education to remote and rural communities that suffer from a lack of teachers and other educational resources (such as Brazil's Amazonas Media Center and Uruguay's *Ceibal en Ingles* programme discussed in Section 2.6), but also expands on existing international provision by addressing two previously neglected factors: (a) it demonstrates the importance of prioritising pedagogical uses of technology that increase the breadth and depth of learning, together with practical examples of how this has been achieved in the present study, and (b) it includes the ways learners' attributes, together with their level of cognitive, social and emotional dispositions, interact with academic achievement in a blended remote environment, thereby offering insights into what aspects of such an educational model work favourably, and for whom, in a given context. Specifically, on the basis of the findings of the present research, this thesis recommends pedagogical and curricular reforms that are better aligned to an overall vision for L2 education that is underpinned by principles of deep language learning (Tochon, 2019). Findings from this study indicate children to regard meaningful peer collaboration, personalisation, and opportunities to exercise autonomy and self-direction, as well as to explore, discover, and leverage imagination and creativity, as salient factors in their positive attitudes towards L2 learning. Taking care to design blended remote learning approaches that are centred on these core principles is likely to offer a vehicle for accelerating opportunities not only for children's L2 attainment but also their inter- and intrapersonal development. Such principles could be adopted as a quality benchmark in improving children's learning chances.

In light of the effects of individual difference observed in the study, however, it seems pertinent to propose that the following areas be addressed in professional training of teachers so they are equipped to meet the needs of all learners:

- enhance children's capacity for effective collaboration: (a) through explicit discussion and in-depth reflection on the potential social and cognitive benefits of working collaboratively; (b) by nurturing their ability to identify and leverage their partners' strengths as well as their own in order to engage in peer cognitive scaffolding in mixed-ability partnerships (e.g., by teaching them the difference between 'scaffolding' and 'explicit corrective feedback', or adopting a 'plussing' approach, whereby the goal is to 'amplify' rather than undermine each other's contributions; see Robinson's [2017] discussion of Pixar's established collaboration principles); and (c) by including levels of teamwork, cooperation competency and initiative competency—in other words, collaborative skills—into cross-disciplinary curricular aims to serve as markers of successful group task completion;
- create L2 learning environments that act as incubators of creativity and design thinking processes by framing communicative tasks as open-ended challenges for students to address collaboratively, leveraging technology and authentic online content to expose them to alternative realities, allowing space for playfulness within the language structures, and triggering use of imagination to explore new possibility within existing constraints; build a culture of lifelong learning and openness to experience and experimentation in teaching;
- direct efforts towards systematically supporting students' capacity for self-regulation in a self-paced online environment (e.g., setting goals and self-organising; using performance feedback for self-reflection, including making attributions about their success or failure to meet goals and recalibrating; developing a growth mindset); this includes self-reliance when it comes to making use of the technology at school as well as at home, and employing resourcefulness in troubleshooting, as a way of counteracting the effect of differential digital competence amongst parents.

Therefore, this study reiterates Warschauer and Ames's (2010) concerns that failure to recognise and account for variability in students' existing social and human capital as a moderator of academic success in a technology-rich remote learning environment might in fact take us even further away from our goal of promoting inclusion and social justice by causing existing inequities to play out in even stronger terms.

8.3.2 Implications for the development and selection of technology for blended L2 learning within primary education

Findings from this research also have important implications for the future development and selection of technology by stakeholders for blended L2 learning within primary education.

First, as noted, the app software itself could be improved by providing learners with individualised corrective feedback and thereby support learners based on their responses and their current levels of understanding. This support may benefit children who are still at an early stage of their development towards autonomy and self-regulation by guiding their trial and error process—one of the basic building blocks of hypothetico-deductive reasoning skills. Moreover, given links between academic self-regulation and self-efficacy (Pintrich & Schunk, 2002; Duckworth *et al.*, 2009), it is reasonable to expect positive influences on children's self-beliefs, too.

Second, given that I observed many children repeatedly attempting the same online activities in order to improve their point scores and stars, software adjustments could be made so that children are provided a 'perseverance score', alongside qualitative feedback centred on positive reinforcement and concrete guidance for improvement based on user data. Acknowledging that this might be a somewhat simplified view of a rather complex psychological construct, such an affordance might nonetheless serve to highlight the ability to persevere not only as an academic success mechanism but also as a valuable skill in its own right.

Third, embedding communication tools within the technology, such as a live chat feature and a separate space for questions and answers, comments, or media sharing, alongside a full-text search functionality, would likely enhance social presence on the online tool. Notably, *EdApp* has since developed a 'Peer Learning' feature, which aims to facilitate forum-like discussion amongst learners or between learners and teachers, as well as collaboration amongst teachers/ e-learning developers.

Lastly, the app software might be further developed to natively support Web 2.0 features, thereby facilitating student content creation. While it is currently possible to embed third-party software such as *LyricsTraining*, *Google Docs* or video animation tools such as *Powtoon*, the lack of built-in functionality often makes it impossible to save user activity and therefore track progress and

online learning behaviour. Such an adaptation could thus better support the alignment of the synchronous and asynchronous components of a BL environment.

In this regard, it is encouraging that *EdApp* have already invited me to submit a brief with recommendations for further development of the software, based on insights gained from the present study. It is therefore likely that following this research, the educational technology startup supported by UNITAR will consider expanding beyond adult training to reach school-age populations with an adapted product.

8.4 Limitations

Despite the many strengths of this study, it is important to also acknowledge some key methodological limitations. These have implications for the validity of findings and the conclusions that can be drawn. Outlining these shortcomings is also helpful for informing future research with improved methodological designs.

8.4.1 Limitations of the quasi-experimental design

Although steps were taken to address possible threats to reliability and validity within the quasi-experimental design used in this study (see Section 3.9), it is uncertain whether the gains made by the participants in their EFL attainment were due to their exposure to the BL intervention. Potential confounders (e.g., English learning outside school and extra-curricular contact with the L2) were anticipated and controlled for in the regression models, yet there is a possibility that some differences in unknown confounding variables remained between the participants. Inclusion of a comparison group in the current study was not feasible for reasons explained in Section 3.4.1, but it would have been valuable in determining the relative impact of the BL intervention compared to face-to-face instruction with no online component, or other interventions. It would have also reduced the possibility that any differences were, at least in part, due to a potential Hawthorne effect, given that children were aware that they were participating in a research investigation. Again, however, as outlined in Section 3.9.2, several steps were taken to try and mitigate this.

Another limitation is that the sample size of the present study may have had limited statistical power to detect a statistically significant intervention effect on key outcome variables. For example, technical difficulties during data collection for the oral fluency measure at pre-test resulted in a significant data loss, eventually leaving me with a much smaller sample size (N =

29) for said measure. Technical difficulties during the recording process are impossible to preclude, especially when data are being collected remotely, however, future research would do well to employ a backup recording method, alongside the main one. Today's many digital recording tool options make this a cost-effective safeguard. Pausing between participants to check the quality of previous recordings and rectify potential issues will not always be a feasible option given the time constraints that researchers tend to work within, yet doing so at regular intervals might be effective at preventing further data loss.

The small scale of the study (N = 47) also suggests some caution in generalising the results. While the sample in this study was small, the children were, nonetheless, drawn from eight different locations all over Greece, and therefore provide a good representation of the children who attend small multigrade schools across the country. Moreover, demographic details of students and schools are provided to support interpretation of the possible relevance of the results in other contexts. Yet the question of whether these promising findings can be replicated in schools with similar demographic profiles remains to be seen. In this case, the intervention was delivered by a junior researcher with over ten years' EFL experience, and two postgraduate qualifications in teaching and learning. Moreover, implementation of this intervention was carefully controlled by providing ongoing parent support on issues pertaining to the use of the technology at home (primarily for younger participants), making sure to reschedule classes within the same week, wherever possible, and by ensuring a quick turnaround of written homework assignments. Being a lone researcher, I was also able to 'own' the intervention, and be responsive to the changing needs of the students, their teachers, and their parents. These processes may not reflect a top-down implementation of an identical programme and, thus, it would probably be unrealistic to expect the kinds of results reported here to be obtained under radically different circumstances. Nevertheless, the findings of this small-scale study provide a basis for extending this approach to schools if a similar whole-school staff commitment and involvement could be achieved.

Related to this is the possibility that the effects reported here were influenced by the participants' characteristics, some of which constituted criteria for inclusion in the study. A potential selection bias might be present through the selection of schools where head teachers had the technological skills necessary to provide children with the support required during the live sessions (see Section 3.4.5), and were prepared to arrange for supervision during after-school hours in order to allow students who did not have access to a computer at home to make use of the school facilities (see

Section 3.9.2). The same applies to parents who agreed to host the live sessions in their homes and were required to be on hand in case support with the technology was needed. While after-hours supervision would not normally be necessary should the blended EFL learning programme be implemented as part of the school timetable, based on this study it would make sense to consider whether it would be realistic to expect participants with no access to appropriate technological equipment at home to benefit from this approach, or whether they would be further marginalised as a result. In the present study, the need to make adjustments for a lack of access to a computer at home was, fortunately, limited, and therefore possible to accommodate[50]. Nevertheless, given the limited amount of equipment available in these schools, additional demands would have called for an overhaul of the programme design.

8.4.2 Limitations of researcher-generated measures

Another possible limitation of this study is the use of non-standardised EFL measures. While due consideration was given to some of the most widely used instruments at the design stage of this research (see Section 3.6), and given the lack of available standardised assessments for primary English learners in Greece, it was eventually decided that the most appropriate course of action was to employ adapted versions of existing international measures, or, design assessments that fit the purpose and context of the present study (e.g., see aural comprehension measure). Despite the fact that good internal consistency values were achieved for the measures where statistically significant results were obtained, there is a need for instruments that provide a more comprehensive picture of attainment that covers a wider area of the taught syllabus at each level. This would make it possible to compare results across a range of studies.

8.5 Directions for Future Research

In reviewing the intent of this study, to help children develop their EFL attainment in a blended learning environment delivered at least partially remotely, further research that seeks the most effective educational policies and practice within primary schools is needed. Below are listed some ideas towards improving the current design, as well as theoretical areas that are worth pursuing in future research and scholarly activity.

First, this study appears worth repeating as the results provided a strong indication of efficacy, but there is now a need for more rigorous evaluation studies that are able to generate evidence on

[50] This was only proved necessary for one student.

children's relative progress compared to their counterparts receiving face-to-face EFL instruction in some of the bigger primary schools of the country. This will also make it possible to determine whether the two approaches provide educational effectiveness at comparable cost. Future cost-effectiveness analyses should also include costs incurred by the need to outfit a certain percentage of the student population with reliable connectivity, and where appropriate, technological equipment to enable them to work from home. As noted earlier, this did not prove necessary in the present study.

Next, it would be beneficial to do this study again, this time making sure that participants are tested in linguistic areas on which it was not possible to assess them in this research (i.e., reading skills) so as to obtain a more comprehensive picture of their L2 attainment. Ideally, an integrated assessment design would be adopted which would be based on sociocultural perspectives; this might involve collaborative group projects with a focus on group interaction processes and open-ended problems, whilst actively incorporating clear performance expectations for each linguistic skill. By video recording these interactions and the ensuing linguistic product(s), it would be possible to assess students' authentic collaboration processes, alongside relevant cognitive goals (assuming relevant training would be available to children as part of the intervention, as outlined in Section 8.3.1). It is perhaps worth noting, however, that, should an alternative assessment design be employed such as the one described above, a certain degree of flexibility would be required to be embedded within the assessment criteria. This is because, absent explicit linguistic instructions, it is highly likely that students will not necessarily produce the language that the researcher expects or hopes to see. Indeed, this was a phenomenon that I observed in this research during the children's oral presentations and is something to be expected in project-based work where explicit instructions on language use are not typically provided. 'Depth' in Tochon's (2019) deep approach to language learning is relative, not absolute, and, as such, the dialogical learning process should take precedence over the outcomes. While the specification of observable performance can be a useful tool, learners can be empowered by tasks which grant them 'a margin of freedom' and which are flexible enough to accommodate the unforeseen that comes with differentiated approaches (*ibid.*, p. 327). For assessment purposes, linguistic progress could therefore be determined on the basis of quantitative criteria such as relative breadth of lexical knowledge or syntactical complexity demonstrated.

There was some evidence from this research that participants regarded certain teacher attributes such as openness to experience and experimentation in one's teaching practice, curiosity,

inquisitiveness, and zest as important factors in triggering children's imagination and creativity during the intervention. Given a growing emphasis on the value of teachers' affective and dispositional qualities for student achievement (Smith & Schmidt, 2012; Dietrich *et al.*, 2015; Keller *et al*., 2016; Stronge, 2018), future quantitative studies might employ sufficiently large samples to explore the direct and indirect effects of these characteristics on student L2 attainment in a BL environment, potentially using multi-level modelling techniques.

Lastly, the findings of this study suggested that the BL intervention may have been less beneficial for lower attaining children with low levels of self-efficacy and self-regulation skills. Further research might explore the extent to which this impact differential could be minimised through interventions with an explicit and systematic focus on supporting students' growing capacity for self-regulation in a self-paced online environment, together with a focus on building children's digital competence in a way that is relevant to their use of technology within the framework of a BL approach (as outlined in Section 8.3.1). Moreover, incorporating these costs into the cost-effectiveness evaluation of the intervention would provide valuable insight into the feasibility of holistic interventions such as this—an area of research which is still at a nascent stage, not least in the Greek context.

8.6 Concluding Thoughts

This study is, to the best of my knowledge, the first attempt to systematically investigate the efficacy of blended remote learning in low-resource K-12 settings in Greece. The present research has demonstrated that this novel approach holds promise for improving academic attainment in EFL learning, especially amongst primary children (ages 8-12) attending the hundreds of small multigrade schools across the country that continue to this day to face systemic exclusion from this area of the national curriculum. What is more, it has provided an indication that it can do so at a comparable cost level to that of face-to-face programmes. The study also advances second language teaching and learning discourse by expanding the conceptualisation of L2 learning to involve not only the mastery of the various linguistic patterns necessary for effective communication, but also a capacity for meaningful social interaction and peer collaboration; an ability to leverage imagination and creativity; an interest in exploring and discovering new possibilities; and a preparedness to self-manage during the learning process in a manner that is commensurate with one's developmental stage. The findings of the current study provide a basis for the further development of the field, by scaling up the BL approach to determine whether these positive findings can be replicated in other small multigrade schools operating in remote

parts of the country and suffering from long-standing systemic marginalisation. Future work will aim to address some of the methodological shortfalls in this thesis, but the theoretical and practical aspects are likely to remain constant. This is because a deeper approach to second language learning appears to have an important role to play in creating successful L2 learners who are able to harness their socio-affective as well as cognitive capital, even in settings where educational resources are not necessarily in abundance.

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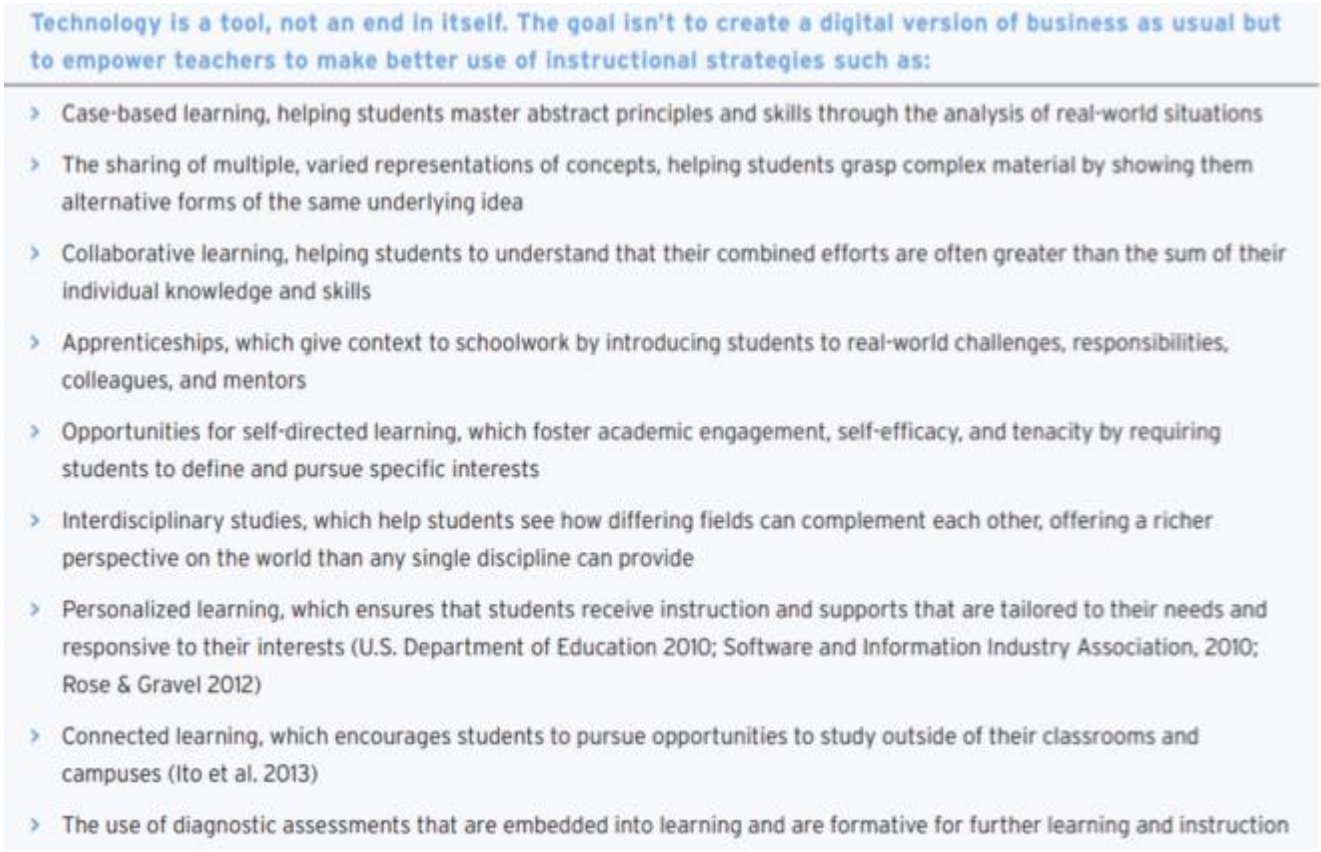
Appendix 1 – Tech-compatible Instructional Approaches for Deeper Learning

Figure 26 Technology-compatible instructional strategies that can support deeper learning (taken from Dede, 2014, p. 2)



Appendix 2 – Letter to Schools (translated)

Dear Sir or Madam

This letter is to invite your school to participate in my doctoral research which is being designed at the Newcastle University School of Education, Communication and Language Sciences in the UK. The study seeks to promote English language learning amongst children living in small, rural areas in Greece who are not currently being taught English in their schools. Participation in the programme is entirely free.

The study will involve the implementation of an educational intervention which will last for 3 months (with the possibility of extension upon mutual agreement) during the period October 2018 - January 2019, at the end of which and in order to measure the effects of the intervention the children's English language skills will be tested. Please note that the sessions will take place weekly and will be outside of normal school hours. As a result, permission from the Ministry of Education is not deemed necessary on this occasion, according to the Institute of Educational Policy (Decision No. 3738/30-3-2018).

During the months of May and June 2018, I plan to arrange visits to all schools that have expressed an interest in participating in the study in order to establish their eligibility and to present the scope of the study to both parents and pupils themselves, as well as to establish their current learning needs.

If you are interested in finding out more, please reply to this e-mail with a convenient day and time when you would be available for an introductory phone call.

Thank you very much for your time.

Yours sincerely,
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Appendix 3 – Synchronous Learning: Overview of Lessons 1-12

Lessons	Curriculum Topic	Linguistic Focus per Level	Procedure	Resources
1 & 2 (2 x 45 min)	*My School*	**Pre-A1:** Numbers 1-10 Letters A-Z School vocabulary (e.g., *school, teacher, classroom*) **A1.1:** Days of the week School subjects *There is – there are* **A1.2:** Vocabulary related to school & school premises (e.g., *computer lab, chemistry lab, library, school, canteen, schoolyard, gym, toilets, dining hall, teachers' office, head teacher)* Present Simple **A2.1:** Words & adjectives describing characteristics, personality and skills (e.g., *ugly, serious,*	**Part 1. Warm-up** Pupils watched a short video about the 10 most unusual schools in the world, with the following question in mind: '*Which of these schools is your favourite/least favourite, and why?*' They were allowed to turn on the Greek subtitles, adjust the pace of the video, discuss their ideas with each other, or write them down if they preferred to, before they shared their thoughts with the class. **Part 2. Action** Pupils were asked to design and present their dream schools. They were encouraged to think outside the box, and even go beyond what they believed to be realistic in their own context, the key message being: "Stretch your imagination - the more unusual the school you design, the better''. They were given the freedom to choose whether they wanted to produce a piece of writing to read out, create a poster to present to the class, or choose another format. Most groups chose to design a group	**1.** YouTube video *10 Most Unusual Schools in The World* (available from https://www.youtube.com/watch?v=AuWfpTmds0I) **2.** A4/A3 paper & pens

		dangerous, tiny, huge, large, horrible, lovely, kind, smart, *(un)friendly, (un)pleasant, (un)attractive)* Present Simple **A2.2:** Collocations with *have* and *take* Present Simple (Review)	poster. The following questions were brainstormed, and subsequently used as a springboard for ideas: • *What is the name of the school? Where is it?* • *What does the building look like?* • *What time do lessons start and finish? Where do they take place? Who teaches you? Say something about your teachers.* • *What subjects do you study? Can you choose the subjects you study each term?* • *How do you learn? Do you work in groups in class? Do you use technology?* • *How often do you take tests? How often do you have a break?* **Part 3. Consolidation and Connections** Feedback on task achievement and consolidation of 'emergent learning opportunities' (ELOs). Reflection on the work done and the ways it connects to the curriculum.	

Lessons	Curriculum Topic	Linguistic Focus per Level	Procedure	Resources
3 & 4 (2 x 45 min)	*Hobbies & Feelings*	**Pre-A1:** Letters A-Z Words to describe hobbies & sports (e.g., *play, football, guitar*) **A1.1:** Vocabulary for sports & hobbies (e.g., *cycling, singing, painting dancing, listening to music, reading, collecting things, watching TV, taking photos, meeting friends, playing board games, playing computer games)* *I like* *I don't like* **A1.2:** Talking about likes, dislikes and preferences: *enjoy + verb* *like/don't like + verb* *prefer + verb* *hate + verb*	**Part 1. Warm-up** Pupils started by watching a 7-minute excerpt from a TED talk on what makes a good life. The assigned while-watching task involved answering the following question: '*What makes people happy, and what makes them unhappy, according to the video?'* As before, they were allowed to turn on the Greek subtitles, adjust the pace of the video, discuss initially their ideas with each other, or write them down if they preferred to, before they shared their thoughts with the entire class. My role during the whole-class feedback stage remained the same: to make the task accessible to all by asking strategic questions of each participant depending on their proficiency level. Output could vary from one word to extended answers, and was delivered orally. **Part 2. Action** After a brief discussion on the concept of surveys and the reasons for using these, pupils set out to find out more about each other, with a view to identifying what makes children happy, as well as what makes them unhappy. To this end, they devised short questionnaires (2-3 questions) and they were subsequently given time to go around and interview 2 or more of their peers. Phase 2 of the task involved coming together in	**1.** Robert Waldinger's TED talk *What makes a good life? Lessons from the longest study on happiness* (available from https://bit.ly/robert_waldinger_what_makes_a_good_ilfe) **2.** Pens & paper

		A2.1: Words & adjectives describing feelings (e.g., *I'm scared, I'm afraid)* Present Continuous Review: Talking about likes, dislikes and preferences: *enjoy + verb* *like/don't like + verb* *prefer + verb* *hate + verb* **A2.2** Language for discussing preferences, emotions & opinions (e.g. *excited, nervous, worried, agree/disagree, in my opinion/view)* Modal verbs for giving advice and expressing necessity/obligation *(e.g., should, must, have to, need to)*	groups, comparing findings, and then preparing a brief oral report, in response to the original question (1-2 min per group). Pupils at a beginner level were encouraged to work in mixed-ability pairs. **Part 3. Consolidation and Connections** Feedback on task achievement and consolidation of ELOs. Reflection on the work done and the ways it connects to the curriculum.	

Lessons	Curriculum Topic	Linguistic Focus per Level	Procedure	Resources
5 & 6 (2 x 45 min)	*Food*	**Pre-A1:** Letters A-Z Food vocabulary (e.g., *apple, fish, jam, nuts, yoghurt, cheese, chips)* **A1.1:** Numbers 20-99 Talking about quantity (*some/a/an*) Food vocabulary (e.g., *bread, butter, eggs, fruit, milk, salad, sweets, cheese, ham, sugar)* **A1.2:** Talking about prices Food vocabulary (e.g., *bread, butter, eggs, fruit, milk, salad, sweets, cheese, ham, salt, pepper, sugar)* (Review)	**Part 1. Warm-up** As a way of easing the pupils into the topic, this lesson too started with a video, this time a short animation of an unusual recipe, called *Western Spaghetti*. Before sharing the link and having them play the video, I told them that their task was to try and remember as many of the ingredients used in the recipe as they could. The animation did not contain any dialogue or voice-over so there was no need for adjusting the speed or inserting closed captions. However, groups were allowed to watch twice, if they wished. After the end of the video, they were shown a list of the objects that the recipe had used and were given between 60 seconds and 2 minutes (depending on group size and ability) to put them in order of appearance. Larger groups (8 and above) were asked to work in pairs/small groups for this. As this activity was projected from within *EdApp* (using the screen sharing feature in Hangouts), I was able to have everyone share their answers and receive feedback immediately. As a final step, I asked them to work out the ingredient that each item from the previous task had replaced, and write these down. This was done for three reasons: (1) to provide the lower levels some writing practice, (2) to introduce them to some key food items, and (3) to help activate everyone's relevant schemata, in preparation for the product assignment in Part 2.	**1.** *Western Spaghetti* animation by PES (available from https://www.youtube.com/watch?v=qBjLW5_dGAM **2.** Links to two supermarket websites: https://www.ab.gr/en-gr/responsible/products https://www.tesco.com/groceries/en-GB/ **3.** Pens & paper

		A2.1: Vocabulary for expressing quantity: words related to containers, units of weight, size, shape (e.g., *a carton of milk, a loaf of bread, a packet of butter/flour/sugar, a box of strawberries, a bar of chocolate, a jar of jam, a bottle of orange juice, a can of tuna*) Countable/uncountable nouns (e.g., *a/an, some, any, how much, how many*) Comparisons of adjectives & adverbs **A2.2** Vocabulary related to food & cookery (e.g., *beef, steak, tuna, pasta, peas, cereal, dairy, poultry, delicious, dish, prepare, recipe, amount, boil, grill, roast, calorie, weight)* Talking about quantity: *some/any/(a)few/(a) little* Comparisons of adjectives & adverbs	The children were encouraged to work in pairs or small groups for this activity. A complete answer is shown below: *Pick-up sticks* → *spaghetti/pasta* *Plastics eyes (from a doll)* → *salt* *Aluminium foil* → *(olive) oil* *A Rubik's cube* → *garlic* *Pin cushions* → *tomatoes* *A one-dollar bill* → *basil (or other herb)* *A dice (or 'die)* → *sugar* *Post-it notes* → *butter* *A ball of wool* → *cheese* *Glitter (from a kaleidoscope)* → *pepper* Whole-class feedback followed. **Part 2. Action** The prompt for the product assignment read as follows: *Now design your own unusual recipe to share with me. As you know, I live in England but I often travel back to Greece to visit my family. My question is: is it cheaper for me to make your dish in Greece or in England?* The assignment then consisted of two stages: (a) Pupils had to work in groups or pairs to design their own unusual recipe. Only two rules were given: recipes had to be original (could be as unusual/crazy/(un)appetizing as they wanted them to be), but they had to be kept simple – a	

			maximum of seven food ingredients were allowed. A timer was projected on the screen I was sharing to help them manage their time (however, time limit varied across the 9 groups). (b) For the second stage, the children had to carry out some research. They were given the link to the website of one big supermarket chain in either country, and were asked to look up the price for each ingredient in their recipe in order to come up with the total cost for the dish in each country. They were encouraged to pay attention to the quantity to make sure they were comparing like with like. Given that there was only one computer available in each school, larger groups (8 and above) took turns to use this, and were allocated a time limit to allow all groups to do their research. The oral presentation involved an overview of the recipe and a comparison of the cost in the two countries, along with their conclusion as to which country seemed to be less expensive as far as the ingredients in question were concerned. The higher-level pupils were also encouraged to carry out a price comparison at the ingredient level and advise accordingly. **Part 3. Consolidation and Connections** Feedback on task achievement and consolidation of ELOs. Reflection on the work done and the ways it connects to the curriculum.	

Lessons	Curriculum Topic	Linguistic Focus per Level	Procedure	Resources
7 & 8 (2 x 45 min)	*Places*	**Pre-A1:** Letters A-Z Numbers 1-10 Vocabulary to describe places (e.g., *town, park, sea*) **A1.1:** *There is - There are* (Review) Vocabulary for describing places (e.g., *city, area, street, building, post office, theatre, museum, café, cinema, shopping centre, sports park, church, bank, supermarket, centre, people, mountain, beach river*) *Have got* **A1.2:** Adjectives & collocations to describe places (e.g., *busy streets,*	**Part 1. Warm-up** The lesson started with a Google Street View of the pupils' school projected on the screen. A brief exploration of the surrounding area followed, whereby the pupils were helping me virtually walk around the streets of their village and navigate to various points of interest (e.g. the church, the village *kafeneio*, and so on) by giving me directions. **Part 2. Action** The main task of the lesson had the pupils engaged in a collaborative writing task using the Google Docs application. Taking an iterative approach to writing development, the participants were asked to work in pairs or small groups to edit the written work they had recently submitted to *EdApp*, based on the feedback that had been provided to them. Since each group would be working separately, a different link was created for each. This enabled me to have live access to all the edits that were being made, as well as edit the document myself. Restrictions regarding the availability of electronic equipment meant that in classes larger than eight, the learners had to work on paper first, then take turns to come to the only computer available and copy their edits into the Google document.	**1.** Google Street View software application (see https://www.google.com/streetview/) **2.** Google Docs software application (freely available from https://docs.google.com/) **3.** Pens & paper

		high mountains, beautiful, quiet, modern, home, gym, village, countryside) Asking for & giving directions (e.g., *How can I get to X*?, *go/walk along X street, turn left/right into X street, go straight (ahead), go back, X is on your right/left, X is at the end of this street)* Methods of transport (e.g., *on foot, by bus/car/motorbike/taxi/train)* **A2.1:** Vocabulary for landforms and geography (e.g., *peninsula, plain, border, hills,* *terrain, mountainous, temperature*) Present Simple (Review)	**Part 3. Consolidation and Connections** Whole-class feedback on task achievement and consolidation of ELLOs. Reflection on the work done and the ways it connects to the curriculum.	

		A2.2 Vocabulary to describe places, cultures and customs (e.g., *climate, border, national, foreign, wonderful, amazing, popular, explore, neighbour, neighbourhood, steps, public, event, celebrate, celebration, take place, organise/r*) Present Simple v Present Continuous		

Lessons	Curriculum Topic	Linguistic Focus per Level	Procedure	Resources
9 & 10 (2 x 45 min)	*Space*	**Pre-A1:** Letters A-Z Colours Parts of body (to describe certain constellations e.g., *eyes, legs, hands*) **A1.1:** Numbers *20-99* Vocabulary to talk about countries and regions around the world (e.g., *country, capital, Greece, Europe, United Kingdom, England*) Telling the time (e.g., *What time is it?, It's …o'clock/half past/(a) quarter to/past…)* Prepositions of place *(e.g., between, next to)*	**Part 1. Warm-up** To engage the pupils in the topic, we began this lesson with a short trivia game about stars and the night sky using the application *Quizlet*. The lesson proceeded with looking at the sky in real time via a freely available planetarium software called *Stellarium* (https://stellarium-web.org/). Once you type in your live location, *Stellarium* will let you explore the sky and identify stars, constellations, planets, comets, satellites such as the ISS, and other deep sky objects in real time in the sky above you. It also allows 3D rendering of the major planets and their satellites. At this stage, the children were free to explore and talk about anything that caught their eye. They were given full control of the telescope and could navigate freely in whichever direction they chose. At the same time, I tried to prepare them for the main task by drawing their attention to different colours, sizes, and so on. We also switched between my location and theirs and discussed the differences. These were particularly pronounced in the early morning when my sky was still dark whereas in theirs there was already daylight. This led on to brief discussions about time zones, Earth rotation and the geographical location of England in relation to Greece, amongst others. **Part 2. Action** Next, the pupils were told that they were going to watch a video about stars. They were given a list of questions to guide their listening and introduce some potentially unknown vocabulary	**1.** *Quizlet* application & purpose-built quiz**.** **2.** *What are stars?* video by SciShow Kids (available from https://www.youtube.com/watch?v=ZrS3Ye8p61Y&t=4s) **3.** *Stellarium* software (web version available from https://stellarium-web.org/). **4.** Pens & paper

		A1.2: Vocabulary to talk about countries and regions around the world (e.g., *Greece, England, UK, Europe, Australia)* Prepositions of place (Review) and time (e.g., *in the sky, next to the Sun, on the right/left, at midnight, in the morning, in winter, in March)* **A2.1:** Adjectives and expressions to describe characteristics and appearance, incl. size (e.g., *It looks like*, strange tiny, huge, large) Countable/uncountable nouns (e.g., *a/an, some, any, how much, how many, (a) few, (a) little*) (Review) Comparisons of adjectives & adverbs (Review) Comparisons with *(not so)*/*as…as*	which would be key to their understanding. The questions were graded and were as follows: 1. *How many stars are there in the sky?* 2. *Are all stars the same or are they different?* 3. *Are all stars white?* 4. *Are all stars the same size?* 5. *What is a star?* 6. *What is there in the centre of a star that gives it its light?* 7. *Is the Sun a star or a planet? Or something else?* 8. *Is the Sun really huge compared to other stars?* 9. *Is Rigel hotter or colder than the Sun? Or is it as hot as the Sun?* 10. *Are all stars hot?* 11. *What colour are cool stars usually?* 12. *What is the nearest star to our Sun?* 13. *What colour is the nearest star to our Sun?* 14. *Can we see this star (the one nearest to the Sun) from the Earth without a telescope?* It was explained that their main task would be to watch and identify the most surprising pieces of information about the stars and the night sky, or simply any facts that they had never heard of before and they found (at least somewhat!) interesting. They would then work in their pairs or small groups to bring their ‘discoveries’ together and prepare a short paragraph to present to the rest of us (and, on some occasions, their class teacher). They were allowed to use some of the questions above, however, the more advanced levels especially were encouraged to come up with their own ideas.	

		A2.2 Words relevant to the topic and the conversation this is likely to generate (e.g., *explore, (too) far, further, move, area, science, per day/year)* Talking about quantity: *some/any/(a)few/(a) little* (Review) Comparisons of (irregular) adjectives & adverbs (Review) Comparisons with *(not so)*/*as…as*	In the interest of making the task accessible to everyone, and consistent with previous lessons, Greek subtitles were allowed and the speed of the video was reduced. Additionally, they could watch more than once, pause, rewind, as they saw fit. No specific number of questions or 'facts' was set as a requirement due to the range of readiness levels, however, it was generally advised that 4 to 5 (or more) observations would make an interesting 1-2 minute presentation. Equally, they were encouraged to talk about other things they knew and which were not mentioned in the video. Lastly, the pupils had access to tools such as Google translate or other similar applications to facilitate their understanding and assist with their presentation preparation. **Part 3. Consolidation and Connections** Whole-class feedback on task achievement and consolidation of ELOs. Reflection on the work done and the ways it connects to the curriculum.	

Lessons	Curriculum Topic	Linguistic Focus per Level	Procedure	Resources
11 & 12 (2 x 45 min)	*Planet Earth*	**Pre-A1:** Letters A-Z Colours (Review) Vocabulary to talk about the natural world (e.g., *sea, (polar) bear, fish)* **A1.1:** *There is - There are* (Review) *Can* (Review) Numbers *20-99* (Review) Vocabulary to talk about the weather (e.g. *It's cloudy/windy/raining/snowing/sunny/hot/warm/cold*) Seasons of the year **A1.2:** Expressing an opinion & making suggestions (e.g., *I think/don't think that…/It seems to me that…/In my opinion, …/Why don't we…? / How about … / Let's …*) Present Simple (Review)	**Part 1. Warm-up** The lesson started with a picture of a mother walrus and her baby sleeping next to each other on a patch of ice in the Arctic (taken from the BBC documentary *Blue Planet II*, Series 1:1, 'One Ocean', 2017). The pupils were asked to take a few minutes to observe the picture and discuss with each other what they thought it showed. Whole-class feedback. Groups/pairs shared their thoughts. Then the screen switched to a second picture, this time showing more clearly the mother walrus with her offspring sleeping on top of her, against an Arctic backdrop. There followed questions that sought to elicit the location, weather/temperature/season, what the mother and her calf appeared to be doing, how they were feeling, and so on. **Part 2a. Action** An interactive version of a short excerpt from the documentary (40:30 - 48:10) was created using H5P (a free, open technology authoring tool; see https://h5p.org/interactive-video), wherein questions and text popped up at various points while the video was streaming. The pupils watched with English captions turned on and worked in mixed-ability pairs or small groups to consider the pop-up questions as they went along. Once the questions had been answered, the video resumed. As always, questions were graded, and appeared as follows (answers	**1.** Picture of mother and baby walrus sleeping (*Blue Planet II*, 2017) (available from https://bit.ly/33UMkwE) **2.** Picture of mother and baby walrus lying on a slab of ice (*ibid*.) (available from https://bit.ly/2UILJtR) **3.** *Blue Planet II*, Series 1:1, 'One Ocean' (2017) documentary (available from https://www.bbc.co.uk/iplayer/episode/p04thmv7/blue-planet-ii-series-1-1-one-ocean) **4.** H5P authoring tool (freely available from https://h5p.org/) **5.** Pens & paper

		A2.1: Expressing an opinion & making suggestions (e.g., *I think/don't think that…/It seems to me that…/In my opinion, …/Why don't we… / How about … / Let's* ...) (Review) Present Simple & Present Continuous (Review) Comparisons of adjectives & adverbs (Review) **A2.2** Vocabulary for environmental campaigns (e.g., *environment, climate, suggest, suggestion, careful/-ly, careless, solve, solution*) Modal verbs for speculation, necessity/obligation and giving advice (e.g., *must, may, might, have to, need to, should)* Present Simple v Present Continuous (& State verbs) (Review)	provide a gauge of the extent of linguistic challenge involved in each question): 1. *Look at the walrus baby. How heavy do you think it must be?* (appears at 41:45; 80 kg) 2. *Walruses sleep and live next to each other in huge herds. Why do you think they do that?* (appears at 42:10; for protection from polar bears) 3. *Are polar bears white or brown?* (appears at 42:30; simple answer: white) 4. *Which is bigger and heavier – a polar bear or an adult walrus? And can a polar bear eat a walrus then?* (appears at 42:38; an adult walrus is bigger and heavier than a polar bear; it can't kill an adult walrus so it's looking for a walrus baby) 5. *The walruses are going into the sea! Can the bear swim, too?* (appears at 43:20 – yes, it can but there are too many walruses in the sea now) 6. *What's the problem with the icebergs? Why do the mothers look so worried?* (appears at 45:00 – other mothers are lying/resting/sleeping on the icebergs with their young/not enough icebergs.) To make the above look less like comprehension questions and more like 'exploration questions', and therefore allow room for different ideas and opinions to be voiced, most of these were shown *before* the answer was given away in the video. In so doing, answers were rather treated as speculations.	

		Comparisons of (irregular) adjectives & adverbs (Review)	**Part 2b. Action** As a follow-up, participants had to design a mini campaign on behalf of either the walrus or the polar bear calling on people to take action to protect their home and their young. The rubric is provided below: *Can we (e.g, you, me, your teachers, parents, family etc.) help polar bears and walruses? If so, how?* • *If you're A, design a campaign on behalf of the walrus mothers asking people to help them and their little ones.* • *If you're B, design a campaign on behalf of the walrus mothers asking people to help them and their little ones.* Larger classes (≥8) had to design their campaigns on A4/A3 paper, however, smaller ones were given the option to use the computer to create a PowerPoint/Google slide if they preferred. Either hand drawn or digital, visuals were strongly encouraged. The pupils were also directed to some well-known petition websites but were otherwise given the freedom and flexibility to organise their own resources. They were, however, reminded that good campaigns tend to speak to numbers and facts, as well as offer practical steps towards the achievement of their goal. Each campaign was expected to be 1-3 minutes long (depending on group ability) and *every* group member was expected to contribute to the oral exercise following design and preparation.	

			Part 3. Consolidation and Connections Whole-class feedback on task achievement and consolidation of ELOs. Reflection on the work done and the ways it connects to the curriculum (and to our lives!).	

Overview of Lessons 1-12 (Pre-A1 group only, *N* = 4)

Lesson	Linguistic Focus	Procedure	Resources
1 (45 min)	Introduction to the English alphabet & sounds Letters *Aa, Bb, Cc, Dd* & associated words (i.e. *apple, bear, computer, dog)* (read & write)	**Part 1. Warm-up** The lesson began with a game called 'Find Four'. The four children in this group had already completed the first online lesson on their *EdApp* course and therefore were familiar with the fist four letters of the English alphabet and their sounds. Each of them was asked to choose one upper-case letter to write on a piece of paper, then go around their chairs for as long as the ABC song was playing, and as soon as it stopped, stand in the right order to create a human alphabet. These instructions were given in steps and were projected on the screen to allow everyone to process them in their own way and then self-organise. **Part 2. Action** Next, the participants were told that they were going to see four pictures appear on their screen, one after the other. The challenge was to try and remember them in the order in which they appeared, and, working in two pairs, write them down in that order. If they were unsure about spelling, they were advised to go back to their online course and check. Once they were ready, they read their words out loud. **Part 3. Consolidation and Connections** Whole-class feedback on task achievement and consolidation of ELOs. Reflection on the work done, use of resources available (i.e. online materials/tools and peers' input) and quality of pair work.	**1.** *ABC Song with Alphabet Sounds* video (available from https://youtu.be/8SfKfstRfPI) **2.** Pens and paper

Lesson	Linguistic Focus	Procedure	Resources
2 (45 min)	Letters *Aa, Bb, Cc, Dd* (Review) Letters *Ee, Ff, Gg, Hh* & associated words (i.e. *elephant, fish, garden, hat*) (read & write)	**Part 1. Warm-up** After discussing questions which had emerged during their online work, the pupils engaged in a quick warm-up exercise. The two pairs took turns come to the computer, type into the Google search box one of the eight words they had previously learnt in their online tasks, choose an associated image and show it to their peers to elicit the word that had been typed. Points were awarded for each word correctly guessed by the other pair. **Part 2. Action** The main activity of this lesson involved building a crossword puzzle from scratch. Using an online crossword puzzle maker (https://crosswordhobbyist.com/), pupils first made a list of all the English words whose spelling they were familiar with, and then worked as one group to try and identify common letters and arrange them accordingly in the grid. As clues they simply gave the translation of the corresponding word. The words they used were the following: *apple, bear, computer, dog, elephant, fish, garden, hat* **Part 3. Consolidation and Connections** Whole-class feedback on task achievement and consolidation of ELOs. Reflection on the work done, use of resources available (i.e. online materials/tools and peers' input) and quality of group work.	**1.** Online crossword puzzle maker (free version) (available from https://crosswordhobbyist.com/)

Lessons	Linguistic Focus	Procedure	Resources
3 & 4 (2 x 45 min)	Letters *Aa, Bb, Cc, Dd, Ee, Ff, Gg, Hh* (Review) Letters *Ii, Jj, Kk, Ll* & associated words (i.e. *igloo, jam, kangaroo, lizard*) (read & write)	**Part 1. Warm-up** As usual, the lesson started with a brief discussion on the pupils' online work and questions that had arisen from it. As a quick warm-up, the children then played a variation on the game *Name, Place, Animal, Thing*, comprising the following steps: (1) each child set a personal goal out of 4: if they ended up with a score greater than the one they had stated at the start of the game, their final score would be capped at their initially-stated goal; if, on the other hand, they scored less than what they had aimed for, they were not awarded any points at all; (2) to start the game, one pupil recited the alphabet in their head (up to letter *H*), and another said 'Stop' at some point; (3) the first pupil subsequently announced the letter (s)he was on and the rest had to come up with an English word that started with that letter, and write it down on a piece of paper. The same procedure was repeated until every child had had a chance to guess a word in three rounds and recite in one. After a total of four rounds, each pupil added up their scores from each round and points were awarded in accordance with step (1). Before a winner was announced, however, his or her peers were called on to check the accuracy of the spelling, which they had to unanimously agree on. **Part 2. Action** The main exercise involved the collaborative creation of a short story which contained at least ten of the following words: *apple, bear, computer, dog, elephant, fish, garden, hat, igloo, jam, kangaroo, lizard*. To enable immediate feedback following task	**1.** Pens and paper **2.** *Google Docs* software application (freely available from https://docs.google.com/)

		completion, the pupils worked on a Google document for this. No word limit was set, and no other instructions were given, other than that the sentences had to follow on logically from one another, thus succeeding in telling a coherent story. In order to make the task accessible to the learners and to facilitate a kind of creative and contextualized use of the target language which would otherwise have not been possible, the pupils were allowed to engage in translanguaging; that is, they were asked to produce their story in Greek while at the same time integrating the target language into critical points. In so doing, rather than encourage a mechanistic production of the output using tools such as Google Translate as a means of compensating for the pupils' limited linguistic repertoire in the second language, it was reasoned that a meaningful and simultaneous use of both languages would potentially give rise to a range of learning opportunities mediated by a follow-up syntactic comparison of the two systems (e.g. differences regarding subject usage: contrary to English, Greek inflects verbs for *every* subject, thus eliminating the need for subject occurrence in instances where this can be inferred from the context). Nonetheless, a degree of flexibility was afforded in that they were indeed free to look up any words that they would prefer to use in English, rather than Greek. The exercise concluded with the participants taking turns to read out excerpts from their jointly produced text. **Part 3. Consolidation and Connections** Whole-class feedback on task achievement and consolidation of ELOs. Reflection on the work done, as well as the quality of collaboration amongst the pupils.	

Lesson	Linguistic Focus	Procedure	Resources
5 (45 min)	Letters *Aa, Bb, Cc, Dd, Ee, Ff, Gg, Hh, Ii, Jj, Kk, Ll* (Review) Letters *Mm, Nn, Oo, Pp* & associated words (i.e. *monkey, nut, octopus, park*) (read & write)	**Part 1. Warm-up** In the first part of this lesson, pupils were shown a sequence of images and animated GIFs that corresponded to the four new letters that had been introduced to them that week via their online tasks. For each of these, they were asked to write down the associated word (working individually). This was done to give pupils an opportunity to practise their handwriting skills. After each image, the word in question was subsequently projected on the screen, thus inviting pupils to self-correct and peer review. **Part 2. Action** The main part of the lesson had the pupils engaged in a series of rounds of a game called *Back to the Screen* (a made-up hybrid of *Back to the Board* and *Taboo)*, which consisted of the following steps: (1) Pupils split up into two mixed-ability pairs; (2) They entered all 16 words they had learnt thus far into an online random choice generator (https://bit.ly/3dEXvhC) (in the interest of time, they copied and pasted these from a list that I had shared with them); (3) In each pair there was one Clue-giver and one Word-guesser. The latter sat down with their back to the screen while the former generated a random word via said online tool. The Clue-giver then had to get their partner to say the guess-word on the screen without using a direct translation of the word nor the umbrella category that it belonged to (e.g., if the	**1.** Pens and paper **2.** Online random choice generator (*Textfixer* freely available from https://bit.ly/3dEXvhC)

		guess-word was *apple*, they could not say *milo* (Greek for *apple;* transliterated*)*, nor *frouto* (Greek for *fruit;* transliterated). Each pair had 60 seconds to try and successfully guess as many of the randomly generated words as possible. (4) If a taboo word was used by Pair A, then Pair B had to sound the buzzer, which caused the current guess-word to be discarded, and Pair B to be awarded the point. (5) Once time ran out, the pairs were swapped and the roles were reversed. (6) At the end of each round points were tallied for each pair, and in the end the winner was declared by the pair with the most points. My own role was limited to starting and keeping the timer, as well as resolving any disputes regarding the use of taboo words. **Part 3. Consolidation and Connections** Whole-class feedback on task achievement and consolidation of ELOs. Reflection on the work done and the ways it connects to the curriculum, as well as the quality of collaboration amongst the pupils.	

Lesson	Linguistic Focus	Procedure	Resources
6 (45 min)	Letters *Aa-Pp* (Review) Letters *Qq, Rr, Ss, Tt* & associated words (i.e. *queen, room, sea, tiger*) (read & write)	**Part 1. Warm-up** The first part of this lesson replicated the warm-up task done in Lesson 5, only with a new set of words; pupils were shown a sequence of images and animated GIFs that corresponded to the four new letters that had been introduced to them that week via their online tasks. For each of these, they had to write down the associated word (working individually). As before, this was done to (a) help establish a routine, and (b) give pupils the opportunity to practise their handwriting. **Part 2. Action** The core stage of the lesson comprised a game largely based on the concept of Venn diagram design. The aim of the activity was to get the pupils thinking about the semantic (or morphological) relationships between the words they had been learning, and most importantly, encourage them to think creatively in establishing their own unique semantic networks (however strange or counter-intuitive these might seem to others), and have a bit of fun whilst doing so. The steps that were followed are outlined below: (1) After a quick demonstration of the task, pupils split up into two mixed-ability pairs. (2) An *EdApp* Jeopardy game was projected on the screen, with 15 questions spread across three levels of difficulty. Once selected, each question revealed a combination of two words (amongst the 20 they had already learnt). (3) Each pair then had a maximum of three minutes to try and come up with a way in which the morphology or concepts	**1.** Pens and paper **2.** *EdApp* Jeopardy game (prepared in advance, screenshots available from https://bit.ly/3aJ1g3M and https://bit.ly/2RbhpXR) **3.** Google Scoreboard to keep track of score (freely available from https://bit.ly/2UPP36t).

		represented by the two words related to each other. In cases where this relationship was not self-evident, the pupils were encouraged to think freely and without limitations to the form these connections might take, as long as their proposition could be logically supported (e.g., 'Both a hat and a park are used when it's sunny' or 'Both the word *queen* and *room* contain two identical letters'). (4) If, by the end of the three minutes, neither pair had come up with an idea, a new round was started, with new words. (5) Once a point of similarity had been used for a pair of words, it could not be used again. This was to avoid pupils repeating ideas such as 'They both have two eyes/legs', and so on. (6) If the same idea was used by both pairs in a single round, no points were awarded. This was to encourage originality in the answers. (7) The opposite pair, with my support, then evaluated the proposed relationship, and together we agreed on whether it merited a point. (8) Play continued until enthusiasm had fizzled out, or time/questions had run out, whichever came first. (9) In the end the winner was declared by the pair with the most points. **Part 3. Consolidation and Connections** Whole-class feedback on task achievement and consolidation of ELOs. Reflection on the work done and the ways it connects to the curriculum, as well as the quality of collaboration achieved.	

Lessons	Linguistic Focus	Procedure	Resources
7 & 8 (2 x 45 min)	Letters *Aa-Tt* (Review) Letters *Uu, Vv, Ww* & associated words (i.e. *umbrella*, *vase*, *window*) (read & write) **(Lesson 7)** Letters *Xx, Yy, Zz* & associated words (i.e. *box*, *yogurt*, *zebra*) (read & write) **(Lesson 8)**	**Part 1. Warm-up** A routine had been established by that point, and for the first part of each of these two lessons the pupils were again shown a new sequence of images and animated GIFs that corresponded to the three new letters that had been introduced to them that week via their online tasks. For each one of these, they had to write down the associated word (working individually) and then self-assess, as well as review each other's work. As before, this was done to give pupils the opportunity to develop their handwriting, before moving on to use the keyboard for the remainder of the lesson. **Part 2. Action** As a way of reviewing previously learnt letters and sounds, for this part of the lesson the pupils engaged in a listening and writing exercise, which then led on to an interactive task building assignment. In Phase A, the children were divided up into two pairs and took turns to watch the music videos of two different ABC songs on the educational website Lyricstraining (https://lyricstraining.com/). Their task was to fill in the missing lyrics as they listened to the song, with Pair A listening to the *ABC* song (https://bit.ly/2w2YI1g) and Pair B to *ABC Train* (https://bit.ly/39yF4bc). Both pairs were allowed to choose the level of difficulty that would be assigned to them, and thereby choose the number of words they wished to complete (e.g., Beginner: 3 out of 26, Intermediate: 7 out of 26, Advanced: 13 out of 26, and Expert: all the words). However, it was explained	**1.** Pens and paper **2.** Lyrics-based exercises and authoring tool (both available from https://lyricstraining.com/). **3.** *ABC Song with Alphabet Sounds* video (available from https://youtu.be/8SfKfstRfPI)

		that both pairs had to choose the same level of difficulty. The level that was recommended to them was Intermediate, and the Write Mode option was selected. After they had got a grasp of the basic idea around how the website worked, together with its educational goals, they were invited to contribute to the learning community by adding a similar song and creating an original exercise around it (Phase B). The video that was chosen was one that they were already familiar with from Lesson one (*ABC Song with Alphabet Sounds*, available from https://youtu.be/8SfKfstRfPI). The task building exercise required them to listen to, identify and type out the letters that they could hear during the song (making up a total of 33 words), excluding all other parts where phrases or full sentences were being used. Once they had completed their assignment, they were ready to publish the interactive task for use by other members of the community. Phase B was completed as one group. **Part 3. Consolidation and Connections** Whole-class feedback on task achievement and consolidation of ELOs. Reflection on the work done and the ways it connects to the curriculum, as well as the quality of collaboration achieved.	

Lesson	Linguistic Focus	Procedure	Resources
9 (45 min)	Letters *Aa-Zz* & associated words (Review)	**Part 1. Warm-up** A collaborative focussing activity was set up for the first few minutes of the lesson. The pupils stood up, formed a circle, closed their eyes and one after the other had to give one letter of the alphabet starting from A, with a view to getting to the final letter without talking over each other once (that is, Pupil A started with A, Pupil B then said B, Pupil C continued on to C, and so on). If they did talk at the same time, they had to go back and start over. This encouraged the children to wait, listen and use their turns judiciously to achieve the common goal. **Part 2. Action** For this part of the lesson the pupils engaged in a review activity, which, as in previous lessons, they completed in collaboration with a partner. A game-based multiple-choice quiz was developed using the learning platform *Kahoot!* (https://kahoot.com/), and was projected to the children through screen-sharing. *Kahoot!* quizzes normally require that each player uses her own device to connect and submit her answers, however, in this case this was not feasible, and therefore the pupils first wrote their answers in their notebooks and once the time had run out they gave their answers orally for me to submit on their behalf. The opposite pair ensured that original answers had not been changed. This adjustment made it possible to award round points and keep track of scores. The quiz consisted of a total of 10 multiple-choice and Yes/No questions, all of which were timed (from 20 to 90 seconds,	**1.** Pens and paper **2.** A-Z Quiz (available from https://bit.ly/2WUGMRA)

		depending on level of challenge), and aimed to help raise the pupils' morphological and semantic awareness. This *Kahoot*! is available from https://bit.ly/2WUGMRA (no sign-in required). **Part 3. Consolidation and Connections** Whole-class feedback on task achievement and consolidation of ELOs. Reflection on the work done and the ways it connects to the curriculum, as well as the quality of collaboration achieved.	

Lesson	Linguistic Focus	Procedure	Resources
10 (45 min)	Colours: *red, blue, purple* (read & write) Forming short phrases (e.g., a *red apple, a blue box, a purple hat*)	**Part 1. Warm-up** To ease the pupils into the new topic, this lesson started with a short video (0:00-0:45) which they had already come across in their online tasks that week, and which had introduced them to the first set of colours: *red, blue,* and *purple*. This was followed by a quick game of *I Spy Colour*, where instead of using letters, I said ‘‘I see something red’’. Pupils then tried to guess the object in the room and go and touch it as fast as they could (N.B.: the relatively small size of the room and carpeted floor made this game easier to play). **Part 2. Action** As part of the main task, the children first split up into two pairs. A cartoon picture of a busy junction was projected on the screen and they were given approximately 20 minutes to write down as many phrases as possible to describe what they could see. The phrases had to be three words long and include an article (*a/an*), a colour and an object (e.g., ‘a red cat’). It was explained that for words that they did not know how to say in English, they were allowed to write the Greek equivalent in order to create the phrase. However, for words that we had studied before, the word had to be written in English or no point would be awarded for the phrase (due to a lack of sufficient equipment, it was not possible for both pairs to access online translation tools and therefore this option was not made available to the pupils). At the end of the 20 minutes, each pair read out their phrases, and points were awarded according to the number of phrases produced which	**1.** *Kids vocabulary - Color - color mixing - rainbow colors* video (available from https://www.youtube.com/watch?v=ybt2jhCQ3lA) **2.** Pen and paper **3.** Cartoon picture of a busy junction (available from https://bit.ly/2xPAQ1x)

		accurately described the picture. These were then added in the form of stars to everyone's online profiles on *EdApp* accordingly. **Part 3. Consolidation and Connections** Whole-class feedback on task achievement and consolidation of ELOs. Reflection on the work done and the ways it connects to the curriculum, as well as the quality of collaboration achieved.	

Lessons	Linguistic Focus	Procedure	Resources
11 & 12 (2 x 45 min)	Colours: *yellow, green, orange* (read & write) *red, blue, purple* (Review) Forming short phrases (e.g., *a yellow fish, a green lizard, an orange box*)	**Part 1. Warm-up** Lesson 11 started with a quick review of all six colours that the pupils had been learning online. This time they watched Disney's video *Learn Colors with Pixar Pals*, reading out loud each colour as it came up on the screen. They did this as one group. Then, they watched once more, this time focussing on the objects and their colours. After the video, I started calling the objects one by one and their task was to say what colour each one was in the video, and make a phrase out of it (e.g., *an orange dog*). Help was given with unknown words (i.e. *robot, ant, dinosaur, monster*). **Part 2. Action** Next, the children got into two pairs to do some colouring. Each pair was invited to choose a page to colour from those available on Disney's website (https://bit.ly/39GyWxs). The task was set up as follows: (1) Pupils A and B in each pair chose the page they wished to colour (each pair had to select different pages to work with). (2) Pupils B left the room temporarily to allow their partners to prepare. (3) Pupils A wrote on a piece of paper the colouring instructions for their partner using short phrases (e.g., *Pumbaa: purple eyes, Timon: brown, green tree*). They were free to look up any unknown words using an online translation tool and then copy them down, however, I remained on hand to resolve queries regarding translation or spelling. I then collated these words into	**1.** *Learn Colors with Pixar Pals* video by Disney Family (available from https://bit.ly/2xINTlt) **2.** Pens and paper **3.** Disney's colouring pages (available from https://bit.ly/39GyWxs)

		a Google slide to make available to Pupils B once they came back in and started working on the task. In the interest of time, both colouring pages were downloaded from the website in order to be shown on the screen simultaneously. Pupils A were allowed to collaborate at this stage. (4) Approximately five minutes later, Pupils B came back into the room. (5) Each of them had a set number of minutes (normally 30 seconds per phrase/instruction produced by their partner) to colour their page as per the instructions read out by their partner. No Greek was allowed at this point, however, Pupil B was directed to the Google slide for any unknown words (accessible by switching tabs). Help with the pronunciation of unknown words was provided. (6) One point was awarded for each item successfully coloured within the time limit. (7) The pairs alternated in having a go, then swapped roles and played again using new colouring pages/themes. (8) At the end of the game, round points were tallied and added to each participant's online profile in the form of stars. N.B.: Before the activity the children were given some time to familiarise themselves with the colouring interface and make sure they all felt confident in using it. **Part 3. Consolidation, Connections and Course Wrap-Up** Whole-class feedback on task achievement and consolidation of ELOs. Reflection on the quality of collaboration. Recap of learning areas addressed since the beginning of the course.	

Appendix 4 – Parent Questionnaire

This questionnaire is aimed at collecting some data about the family that each child that chooses to participates in this study is growing up in. Please note that there are some sensitive questions included in this questionnaire including household income, parents' marital status and educational background. It is important for us to collect this information as it will enable us to determine the way in which certain factors may influence the child's learning and as such, affect their final test results. For this reason, please give your answers sincerely as only this will guarantee the success of the investigation.

Any information you provide will be treated with full confidentiality and will not be made accessible to anyone else other than the researcher. For security purposes, you will not be asked to provide a name in this questionnaire. Instead, we will only ask you to provide the personal identifier (ID number) you have been assigned by the researcher. In this way, no one will be able to link the data to your name. However, if you decide you would rather not answer a question, you are allowed to skip it and move to the next one.

This questionnaire should take 15-20 minutes to complete. You can save your answers at any time and resume later. The questionnaire will open right where you left off.

Thank you for your cooperation and participation!

Page 1 of 3 - SOCIODEMOGRAPHIC DATA

33%

ID number *

Age *

- 25-30
- 31-35
- 36-40
- 41-50
- 51 and over

Sex *

Male Female

Country of Birth *

How many years have you lived in Greece? *

How many people are currently living in your household, including yourself? *

Of these people, how many are children? *

Of these people, how many are adults? *

Of the adults, how many bring income into the household? *

Marital status *

- ○ Single, never married
- ○ Married or domestic partnership
- ○ Widowed
- ○ Divorced
- ○ Separated

What is the highest degree you earned? *

- ○ Primary school diploma
- ○ Secondary school diploma
- ○ High school diploma or equivalency
- ○ Associate degree
- ○ Bachelor's degree
- ○ Master's degree
- ○ Doctorate
- ○ Other (specify)

What is the highest degree the child's other parent earned? *

- Primary school diploma
- Secondary school diploma
- High school diploma or equivalency
- Associate degree
- Bachelor's degree
- Master's degree
- Doctorate
- Other (specify)

What is your level of English language proficiency overall? *

- Very high
- Quite high
- Intermediate
- Very low
- Non-existent

What is the level of English language proficiency overall of the child's other parent? *

- Very high
- Quite high
- Intermediate
- Very low
- Non-existent

Which of the following best describes your current main daily activities and/or responsibilities? *

- Working full time
- Working part-time
- Unemployed or laid off
- Looking for work
- Keeping house or raising children full-time
- Retired
- Unable to work

Which of the following best describes the current main daily activities and/or responsibilities of the child's other parent? *

- ○ Working full time
- ○ Working part-time
- ○ Unemployed
- ○ Looking for work
- ○ Keeping house or raising children full-time
- ○ Retired
- ○ Unable to work

With regard to your current or most recent job activity:

a. In what kind of business or industry do (did) you work?
(For example: agriculture, fishing, mining, healthcare, cleaning, car manufacturing, tourism, education, commerce, insurance, IT, etc.) *

b. What kind of work do (did) you do? (Job Title)
(For example: registered nurse, personnel manager, supervisor of order department, car mechanic, welder, etc.)

If the job title sounds rather vague, simply explain what it is that you do (did). *

With regard to the current or most recent job activity of the child's other parent:

a. In what kind of business or industry does (did) s/he work?
(For example: agriculture, fishing, mining, healthcare, cleaning, car manufacturing, tourism, education, commerce, insurance, IT, etc.) *

b. What kind of work do (did) s/he do? (Job Title)
(For example: registered nurse, personnel manager, supervisor of order department, car mechanic, welder, etc.)

If the job title sounds rather vague, simply explain what it is that s/he does (did). *

Continue

These days, children your child's age often like to spend time on social media, TV and the Internet. Some children seem to enjoy this more and others less. What about your child?

How many hours does your child spend doing each of the following in the average day? (If you have more than one child, please answer with reference to the one that participates in our study only.) *

	Not at all	Up to 1 hour	1 hour to 2 hours	2 hours to 3 hours	More than 3 hours
watching English or American films on TV or the Internet	○	○	○	○	○
watching videos in English on the Internet (this could be anything other than video clips)	○	○	○	○	○
listening to songs in English	○	○	○	○	○
reading in English on the Internet	○	○	○	○	○
completing exercises on the Internet in order to learn English	○	○	○	○	○

Continue Previous

Finally, please answer these few questions in order to enable us to determine the current circumstances of your child regarding his or her language learning experience.

Is there a computer (desktop, laptop or tablet) in the house where you live? *

○ Yes ○ No

Is your child allowed to use it? *

○ Yes

○ Yes, but only during the weekend.

○ No.

○ Other (please specify)

Is your child currently learning English outside school, e.g. at a language school? *

○ Yes ○ No

How many hours of English class does s/he have there every week? *

Do you or other members of your family ever help him/her with his/her English homework? *

- ( ) Yes, always.
- ( ) Yes, sometimes.
- ( ) Rarely.
- ( ) No, never.

At what age did your child start learning English (either at school or at a language school)? *

Has your child ever been abroad? *

( ) Yes ( ) No

In which country? If more than one, type them all in the box. *

How long did s/he stay in each of these countries you listed in the box above? *

e.g. Bulgaria - 5 days

This is the end of the questionnaire. Please click 'Submit' below before you exit.

Submit Previous

Appendix 5 – Student Questionnaire

This questionnaire asks about your previous experience of learning English and other foreign languages, your feelings towards it, your study habits and extracurricular activities as well as your future aspirations. The usefulness of this or any other survey depends on the thoughtful responses of those who are asked to complete it.

The information obtained from you and other students who participate in this survey will help us understand how certain factors may affect your learning over the duration of this study. For this reason, please give your answers sincerely as only this will guarantee the success of the investigation. Remember that this is not a test so there are no good or bad answers.

At first glance, you may think it will take a long time to complete this questionnaire, but it can be answered in about 20 minutes or less. You do not have to write your name on the questionnaire. But as you will see, to be able to link this information back to you, an ID number will be given to you and will have to be added to the relevant box when prompted.

Thank you for your cooperation and participation!

Page 1 of 5 - BACKGROUND INFORMATION

20%

ID number *

Date of Birth *

DD / MM / YYYY

Sex *

- boy
- girl

Country of Birth *

How many years have you lived in Greece? *

What language do you speak at home? *

Continue

These days children your age often like to spend time on social media, TV and the Internet. Some children seem to enjoy this more and others less. What about you?

How many hours do you spend doing each of the following in the average day? *

	Not at all	Up to 1 hour	1 hour to 2 hours	2 hours to 3 hours	More than 3 hours
watching English or American films on TV or the Internet					
watching videos in English on the Internet (this could be anything other than video clips)					
listening to songs in English					
reading in English on the Internet					
completing exercises on the Internet in order to learn English					

Is there a computer (desktop, laptop or tablet) in the house where you live? *

Yes No

Are you allowed to use it? *

Yes

Yes, but only during the weekend.

No.

Other (please specify)

Continue Previous

Now there are going to be statements some people agree with and some people don't. We would like to know to what extent they describe your own feelings or situation. After each statement you'll find five boxes. Please choose the box which best expresses how true the statement is about your feelings or situation.

Remember: there are no good or bad answers - we are interested in your personal opinion.

*

	Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
I like English.	○	○	○	○	○
I think knowing English would help me to become a more knowledgeable person.	○	○	○	○	○
English is important in the world these days.	○	○	○	○	○
Learning English is important in order to learn more about the culture and art of its speakers.	○	○	○	○	○
I am prepared to expend a lot of effort in learning English (even if it is hard).	○	○	○	○	○
Knowing English would help me a lot when travelling abroad in the future.	○	○	○	○	○
Knowing English would help my future career.	○	○	○	○	○
I would like to sound like the people who speak English, e.g. people from England, the USA or Australia.	○	○	○	○	○
I would like to travel to the UK.	○	○	○	○	○
I would like to travel to the USA.	○	○	○	○	○
I would like to travel to Australia.	○	○	○	○	○
I like meeting foreigners (e.g. tourists) from English-speaking countries.	○	○	○	○	○
I like American films (Choose 'Not sure' if you don't know any).	○	○	○	○	○
I like American TV shows (Choose 'Not sure' if you don't know any).	○	○	○	○	○
I often meet foreigners (e.g. in the street, restaurants, public places) coming from English-speaking countries.	○	○	○	○	○

Continue Previous

As before, we would like to know to what extent the following statements describe your own feelings or situation. Please choose the box which best expresses how true the statement is about your feelings or situation.

*

	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
I am sure I will be able to learn a foreign language well.	○	○	○	○	○
I think I am the type who would feel anxious and ill at ease if I had to speak to someone in a foreign language.	○	○	○	○	○
People around me tend to think that it is a good thing to know foreign languages.	○	○	○	○	○
I don't think that foreign languages are important school subjects.	○	○	○	○	○
I often watch foreign programmes.	○	○	○	○	○
My parents do not consider foreign languages important school subjects.	○	○	○	○	○
Learning foreign languages makes me fear that I will feel less Greek because of it.	○	○	○	○	○
Learning a foreign language is a difficult task.	○	○	○	○	○

If you could choose, which foreign languages would you choose to learn next year at school? Please mark three languages in order of importance. *

1.
2.
3.

What are your top three favourite subjects at school?
Please mark them in order of preference. *

1.
2.
3.

Continue Previous

Finally, please answer these few personal questions.

Are you currently learning English outside school, e.g. at a language school? *

- ○ Yes
- ○ No

How many hours of English class do you have there every week? *

Do your parents or other members of your family ever help you with your English homework? *

- ○ Yes, always.
- ○ Yes, sometimes.
- ○ Rarely.
- ○ No, never.

At what age did you start learning English (either at school or at a language school)? *

Are you currently learning any other foreign languages outside school, e.g. at a language school? *

- ○ Yes
- ○ No

Which one(s)? *

Have you ever been abroad? *

- ○ Yes
- ○ No

In which country? If more than one, type them all in the box. *

How long did you stay in each of these countries you listed in the box above? *

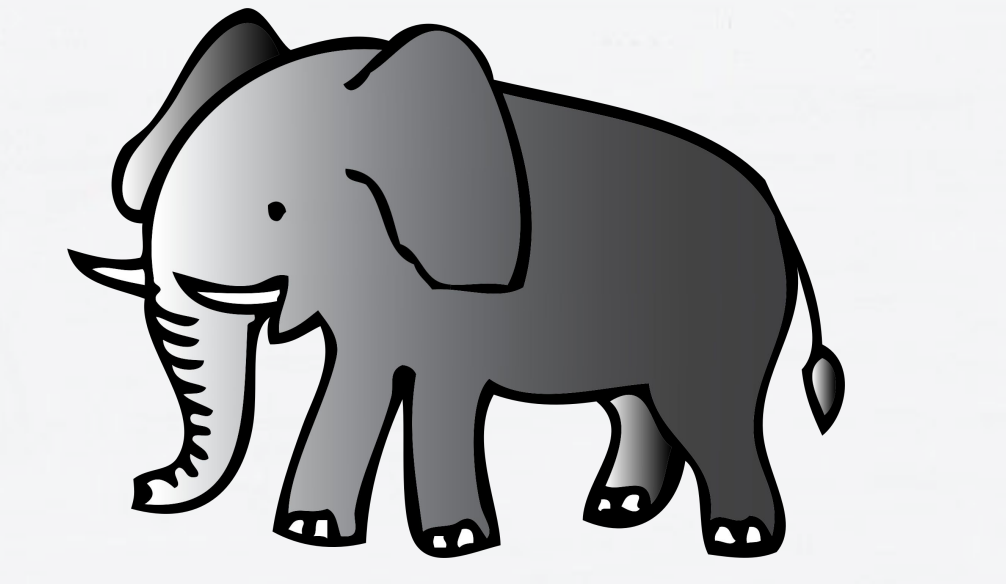
e.g. Bulgaria - 5 days

What would you like to be when you grow up? Why? *

Submit

Appendix 6 – Vocabulary Knowledge Test

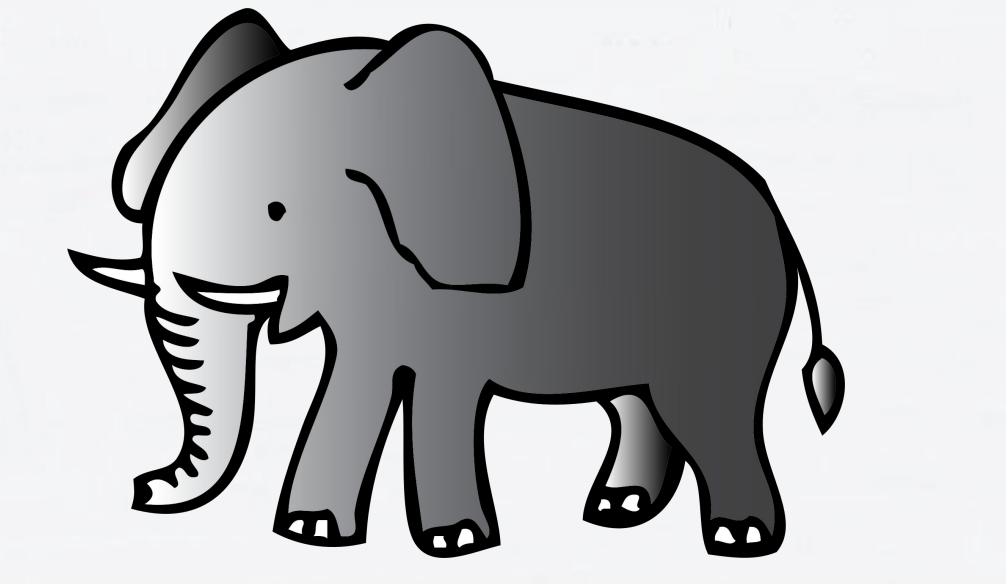
(0) Γράψε ΄Σωστό’ ή ‘Λάθος’ στο χαρτί σου



elephant

Σωστό

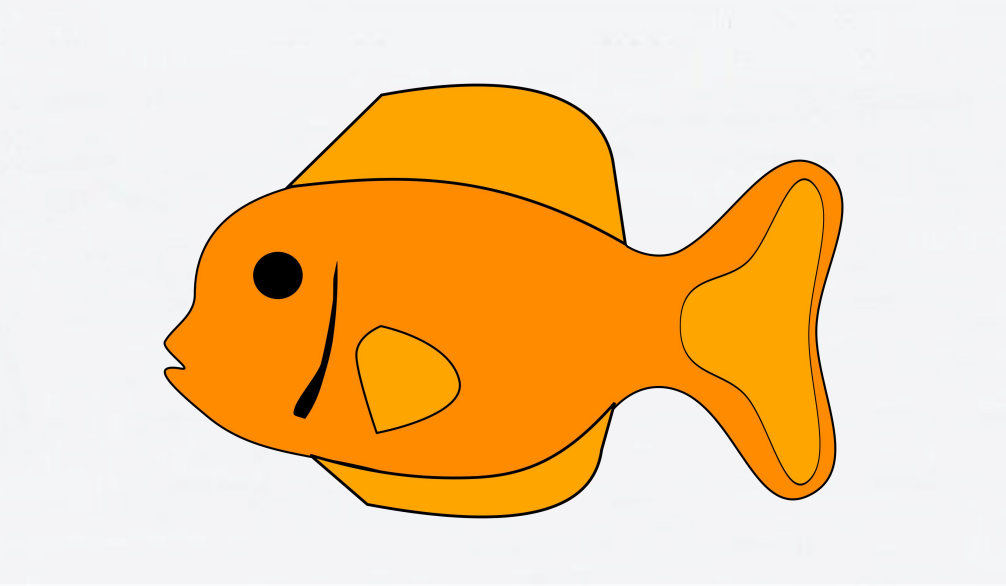
(0) Γράψε ΄Σωστό’ ή ‘Λάθος’ στο χαρτί σου



cat

Λάθος

(1) Γράψε ΄Σωστό’ ή ‘Λάθος’ στο χαρτί σου



box

.....

(2) Βάλε τα γράμματα στη σωστή σειρά και γράψε τη λέξη στο χαρτί σου

_ _ _ _ _ _ _ _

L M R U E A B L

(3) Γράψε τη λέξη στα Αγγλικά

Διάβασε την πρόταση και διάλεξε τη λέξη που ταιριάζει από τις παρακάτω 3. Γράψ' την στο χαρτί σου

This is my **(4)** _____ ! It's got many parks and houses.

town

bedroom

bathroom

Welcome to my **(5)** _____ ! Can you see the trees from my window? And I've got a cute teddy bear, too!

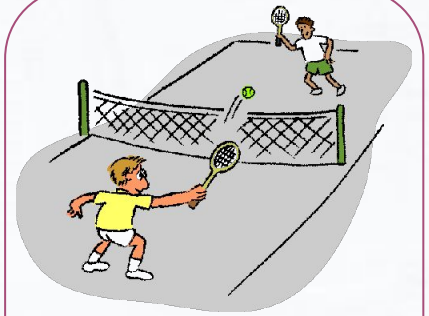
town

bedroom

bathroom

Διάβασε το παρακάτω κείμενο και διάλεξε μια λέξη από τις παρακάτω για κάθε κενό.

Hi! I'm Mark and I live in Athens, the capital of Greece. I like it because it's a city with many beautiful **(6)** _____ and **(7)** _____ . There is a big sports centre in my area, too - I go there at the weekends to play **(8)** _____ with my classmates.

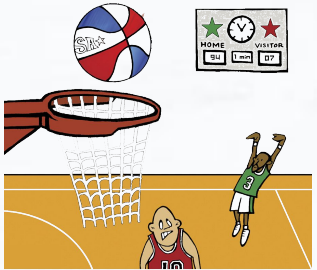


tennis

museums

buildings

basketball court

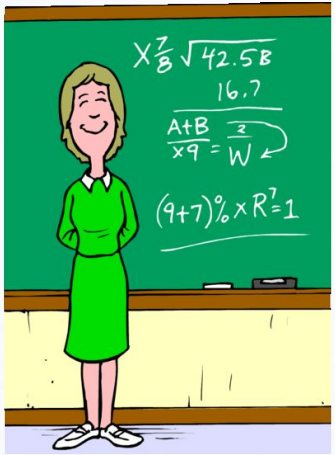


countries

Βρες τη λέξη και γράψ’την στα Αγγλικά. Κοίτα τις εικόνες για να βοηθηθείς.

(9) Κάποιος (ή κάποια) που πηγαίνει στο σχολείο για να μάθει. _____

(10) Ο χώρος του σχολείου που παίζουν οι μαθητές ή περνούν συνήθως το διάλειμμα (όταν έχει καλό καιρό!). _____



Διάβασε τον παρακάτω διάλογο και διάλεξε μια λέξη από τις παρακάτω για κάθε κενό (υπάρχουν 2 έξτρα).

- Jon, where are you from?
- I'm from Perr - a small **(11)** _____ in England with a population of only about 80 people! It's very, very small!
- Wow. So can you go everywhere **(12)** _____ then?
- Oh yes! My Dad is a **(13)** _____ and he just walks to work every day. He loves living in Perr. The only problem is that there isn't a bank there yet!

on foot

bank clerk

village

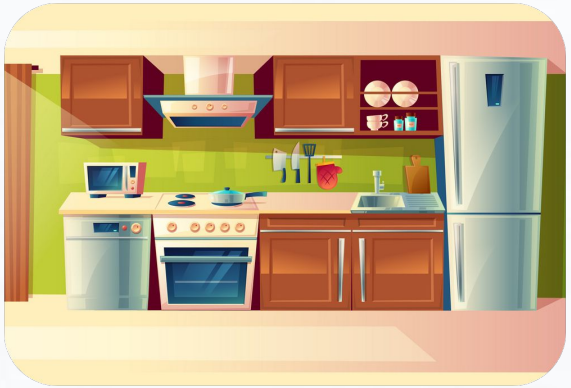
shop owner

by car

Βρες τη λέξη και γράψ’την στα Αγγλικά. Κοίτα τις εικόνες για να βοηθηθείς.

(14) ο χώρος του σπιτιού όπου τρώμε συνήθως όταν έχουμε καλεσμένους (**όχι** η ‘*κουζίνα*’ όμως) _____

(15) Ένας άλλος τρόπος να πούμε ‘house’. _____



Διάβασε το παρακάτω κείμενο και γράψε τη λέξη που λείπει σε κάθε κενό. Το πρώτο γράμμα σου δίνεται.

- *I'm sorry I'm late! I had to go to the bakery first and buy a* **(16) l**_____ *of bread.*

- *No problem. Mmmm, what kind of bread is this? It tastes* **(17) l**_____ *red pepper!*

- *That's right! It's got* **(18) t**_____ *pieces of red pepper! Very, very small ones.*

- *Nice, I like it!*

- *Hi, Elina! How is Kostas? Is he happy in his new school?*

- *No, not really. He is actually very* **(19) u**_____ *there.*

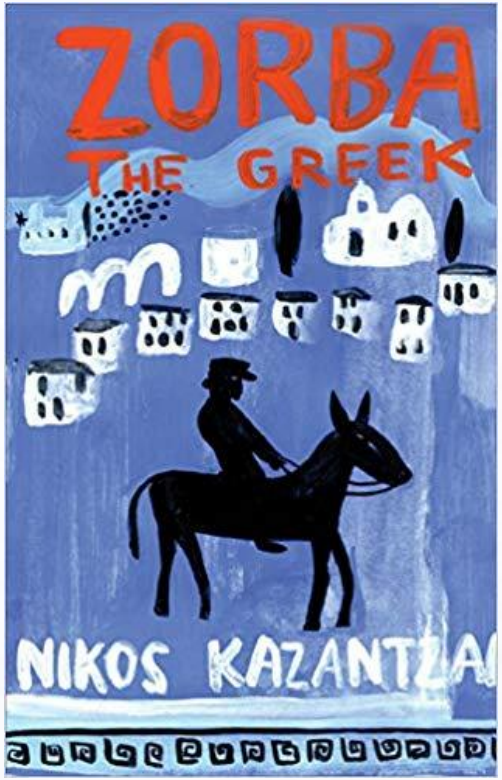
- *Oh no! Why is that?*

- *Well, his teachers are all* **(20) lov**_____ *and really smart but the problem is that they give the students too much homework. So he doesn't enjoy that.*

Teacher: *Does anyone know the name of the* **(21) a**_____ *of the book 'Zorba the Greek'?*

Student 1: *Yes! Nikos Kazantzakis?*

Teacher: *Well done. I hope you remember this next week because we are going to* **(22) t** _____ *a test! Ok, shall we* **(23) h**_____ *a 10-minute break now?*



All: Yes!!!

Teacher: *Wait, everyone! Who does this mobile phone* **(24) b**_____ *to? Please don't leave anything in the classroom!*

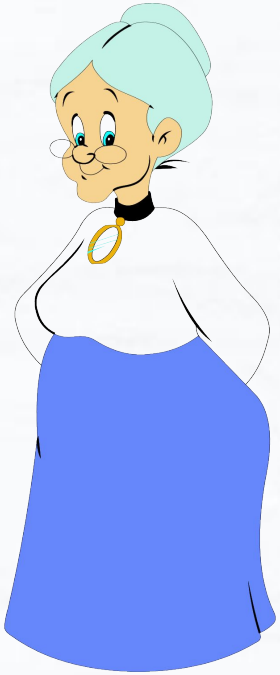
Student 2: *Oh, it's mine. Thank you very much.*

Teacher: *Well, make sure you don't lose it then! I'm sure it cost your parents quite a large* **(25) a**_____ *of money …*

Appendix 7 – Grammar Knowledge Test

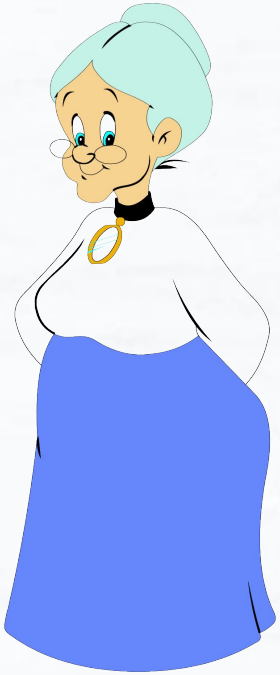
(0) Διόρθωσε την πρόταση και γράψ’ την ολόκληρη στο χαρτί σου.

This my grandma.



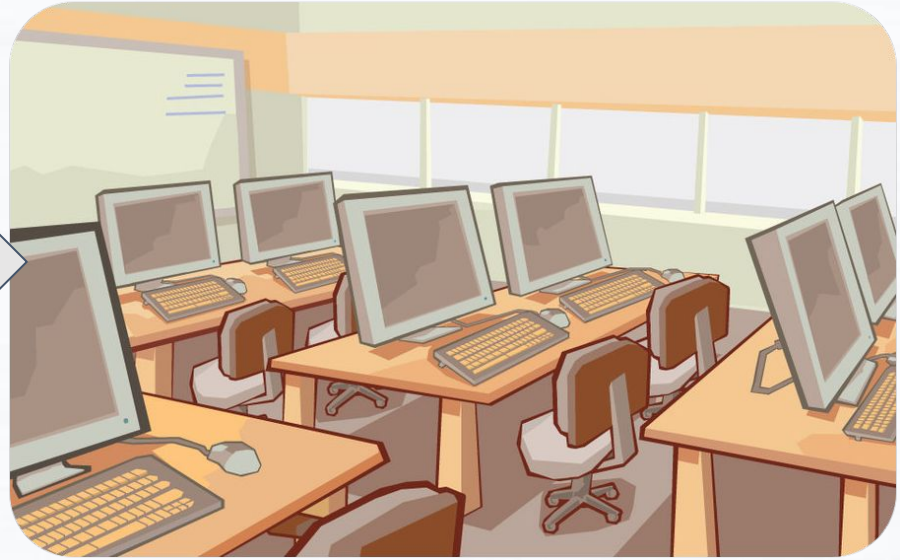
(0) Γράφουμε *ολόκληρη* την πρόταση!

This **is** my grandma.



(1) Διόρθωσε την πρόταση και γράψ’ την ολόκληρη στο χαρτί σου (μην αλλάξεις τον αριθμό!)

7 computer



(2) Ξαναγράψε μόνο την πρόταση που έχει το λάθος διορθωμένη.

- Can you dance?

- No, I can. ☹

(3) Κοίτα την εικόνα και βρες το λάθος στην πρόταση. Ξαναγράψε την πρόταση διορθωμένη.

Daddy fat!

(4) Κοίτα την εικόνα και βρες το λάθος στην πρόταση. Ξαναγράψε την πρόταση διορθωμένη.

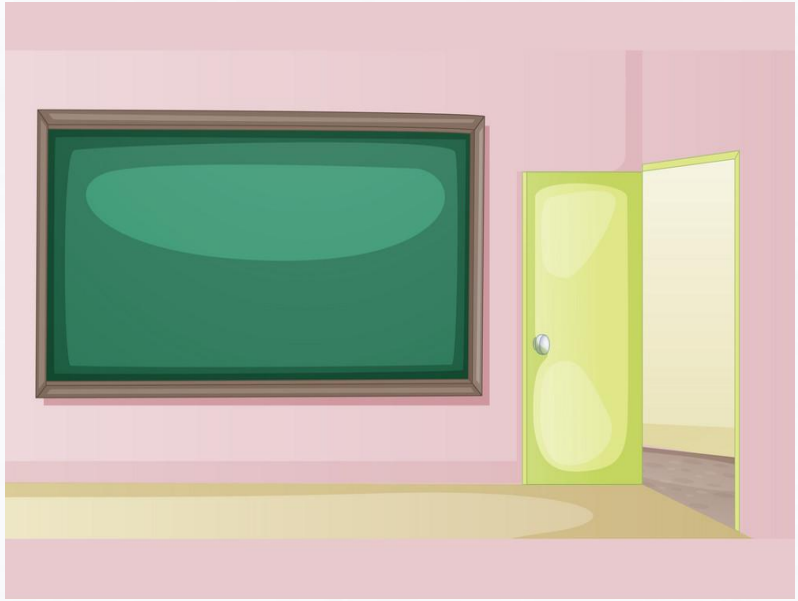
The pencil case is under the desk.

(5) Κοίτα την εικόνα και βρες το λάθος στην πρόταση. Ξαναγράψε την πρόταση διορθωμένη.

The dog is under the garden.

(6) Κοίτα την εικόνα και βρες το λάθος στην πρόταση. Ξαναγράψε την πρόταση διορθωμένη.

There are any desks in the classroom.



(7) Ξαναγράψε μόνο την πρόταση που έχει το λάθος.

- *You have got a red pen?*

- *Yes, here you are!*

(8)

Elena have got English every Monday.

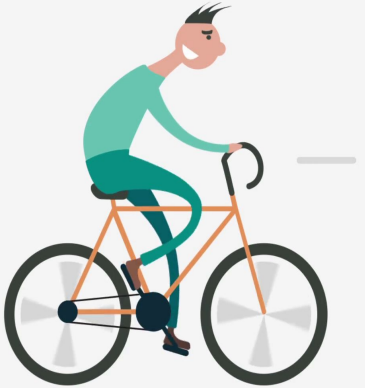
(9)

My Dad don’t like cooking!

(10) Ξαναγράψε μόνο την υπογραμμισμένη πρόταση διορθωμένη.

- *You do like cycling?*

- *Yes, I do! I go cycling every Sunday!*



(11)

My brother studys
French and he loves it!

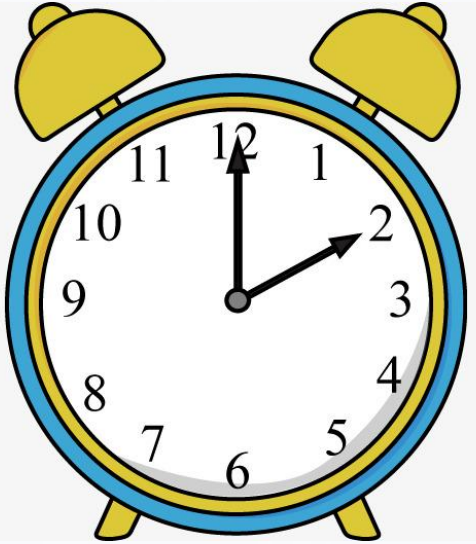
(12)

I was born on 2009!

(13) Ξαναγράψε μόνο την πρόταση που έχει το λάθος.

- What time do you finish school every day?

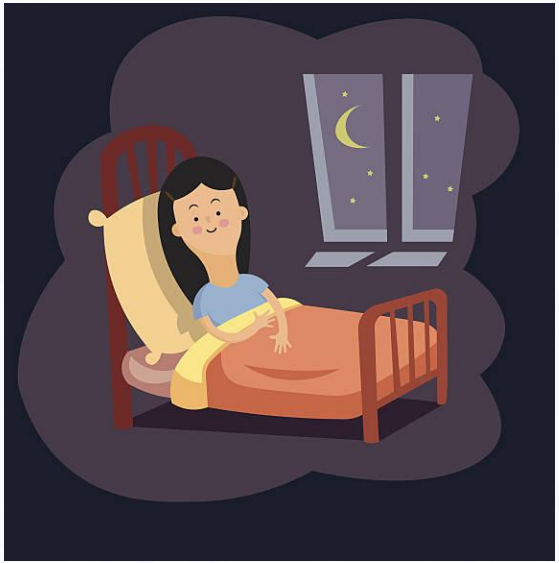
- On 2 o'clock.



(14) Ξαναγράψε μόνο την πρόταση που έχει το λάθος.

- What time do your parents go to bed?

- In midnight!



(15)

Do you enjoy read books in your free time?

(16)

My dad doesn’t drive as slowly my mum!

(17)

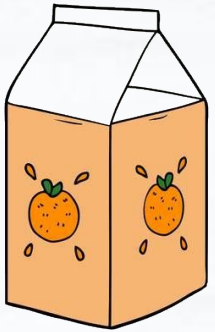
Can I have a few more water, please?

(18) Ξαναγράψε μόνο την πρόταση που έχει το λάθος.

There is a very little food. I don’t think it’s enough for everyone!

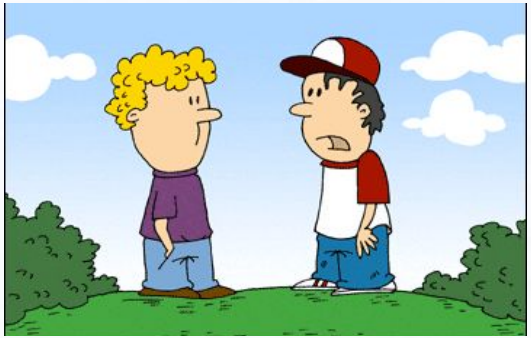
(19)

Is there some orange juice in the fridge?



(20)

My house is far away than yours so let’s go to yours!



(21)

I’m not understanding Spanish films because I can’t speak Spanish.

(22) Γράψε την υπογραμμισμένη πρόταση διορθωμένη.

You have to go on a diet! You are in a good shape!

(23) Γράψε την υπογραμμισμένη πρόταση διορθωμένη.

If you want to getter better marks in your school report, then I think you might work harder!

(24) Γράψε την υπογραμμισμένη λέξη διορθωμένη.

Stefanos wasn’t at school this morning.
He <u>can</u> be ill.

(25) Διόρθωσε την υπογραμμισμένη λέξη. Χρησιμοποίησε διαφορετική λέξη από αυτή που χρησιμοποίησες στην προηγούμενη ερώτηση.

- *I'm trying to call Jane but there's no answer.*

- *She <u>can</u> be in the bathroom.*

The end! 

Appendix 8 – Aural Comprehension Skills Test

Here's a description of my view this morning! Guess where I am!

1. From my window I can see the sky. **(1 mark)**

2. Under the sky there is a river. **(2 marks)**

3. Some people are taking photos next to the river. **(3 marks)**

4. ...and some are listening to music! **(1 mark)**

5. On the right, there is something that looks like a ghost! **(2 marks)**

6. He is VERY friendly! **(1 mark)**

7. And on the left, I can see a purple unicorn. **(2 marks)**

8. He is wearing a pair of trainers. **(2 marks)**

9. Between the ghost and the unicorn there are two HUGE apples!!! **(3 marks)**

Appendix 9 – Picture Prompt Used in Writing Skills Test

[Elena Yaroshenko] © 123RF.com

Appendix 10 – Writing Skills Test: Examples of Participant Responses

Scooll
Wait Chilliver
Green
Seven apples

There is one school.
There are eleven childens.
There three trees apples.
There childens dance and reading books.
There are flowers.

A children the play Playground 1 school 3 trees 28 windows 1 open book
1 bag 11 childeens 2 books blue sky 18 flowers 28 aplees 1 closes book
6 girls 5 boys our

Hi, techer

I spy one school. one big o'clock. The students play the garden he the garden is three trees and aplees under the garden. Two childrens a reed, the (a??o) read up stear. He garden have very flawers.

The school very big withows. Order school three cloowd

There are eleven kids. Is out of the school and some kids playing, some dancing and some sitting and reading books. There are so many flowers and also there are two trees with apples. All the kids are so happy. The kids playing and sitting on the grass. Also, there are apples on the ground. The school is so tall and large. The flowers have different colours. On the ground there are a school bag and a book.

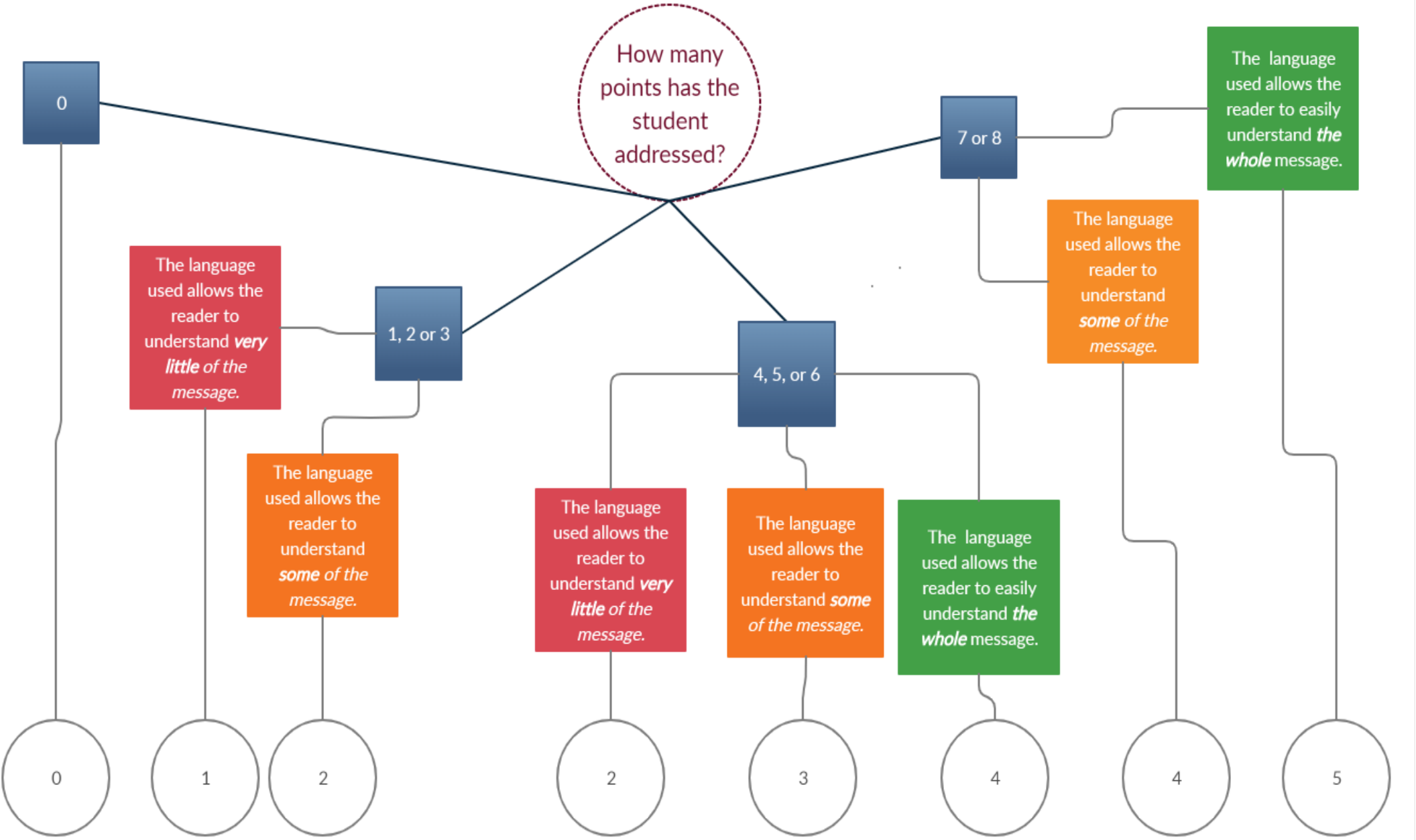
First of all, I see a mountain with three trees with appler. Some apples have fallen in the greand full of colorful flowers.

I can also see, that six children are dancing under the hot sun. Some other kids are lying under the trees while they are studing. In the top of the mountain there is a school with a red flag on top. Under the flag there is a big clock which is showing as that the time is a quarter past twelve. In front of the school there are two children who they are holding their hands and they are smiling

Appendix 11 – Writing Skills Test: Holistic Assessment Criteria

Score	Task Fulfilment & Language Control
5	‣ The language used allows the reader to easily understand the whole message. ‣ All/almost all of the points below have been addressed (ie seven to eight): 1. Number of children in the picture/simple reference to children (eg *boys, girls, kids, pupils, students*) 2. Children's positions (eg *under the tree, on the left/right, outside of the school, near the school, behind, in the playground, on the grass, around the kids are trees*) 3. Children's actions (eg *reading, dancing, waving, jumping, playing, running, sitting, studying*) 4. Children's feelings (eg *happy, glad, having fun, smiling*) 5. Description of children's clothes 6. Location of/simple reference to the school /description of landscape (eg *in the forest/town, apples fallen out of trees, flowers, trees, grass*) 7. Description of objects (eg *books, notebook, bag, clock, flag*) 8. The weather (eg *sunny, cloudy, it's summer/spring, sun is shining, it's hot, sky is blue*)
4	*Writing at this band has a combination of elements from Bands 3 and 5*
3	‣ Addresses required number of the points above (eg four to six)
2	*Writing at this band has a combination of elements from Bands 1 and 3*
1	‣ Addresses limited number of the points above (eg one to three) ‣ Poor achievement of the communicative aim (eg difficult to follow for the reader)
0	‣ Task not attempted ‣ Paper void ‣ No performance to evaluate

Appendix 12 – Writing Skills Test: Guidelines for Applying the Holistic Assessment Criteria



Note. Responses comprising single words, where no use of independent clauses has been made will be capped at 2.

Appendix 13 – Oral Fluency Test Instructions (translated)

The following instructions were read out to every participant prior to the administration of the oral fluency measure:

This test is like a game. I'd like you to tell me some things about yourself and keep on talking for as long as you possibly can. This is because I want to see how much you can communicate about yourself in English at this point in your learning. You can start by giving me your name, your age, you can talk about your family, best friend, school, hobbies, or anything else that is important to you and you would be happy to share with me. Once you run out of things to say, or you get stuck because you can't think of a way to say what you want to say in English, and you want to stop, say ***'Stop'****. Also, if you pause for four seconds or more, I will ask you if you are finished and you can say yes or no.*

You cannot use Greek but what we'll do is I'll give you two minutes right now to quickly jot down topics and things you'd like to talk about—you can do that in Greek if you prefer, however, you cannot write down full sentences! Once you've done that and you're ready, we can begin. Now, if you haven't learnt yet how to say those things in English, don't worry, that's absolutely fine, you can just introduce yourself, and then only say what you can.

Appendix 14 – Head teacher Interview Guide (translated)

Part A – Background information

1. How many years have been in this school?
2. What reasons led to your decision to become involved in the study?
    - Are there any students who are not learning English outside the school?
    - What are some reasons for that?
3. Has the school always operated as a multigrade school? For how many years?
4. What are the biggest challenges facing the school?
5. Have specialist subjects such as PE, Music, Art, IT/Computing and English ever been taught at the school?
    - If so, how many years ago, and for how long?
    - Why did such provision cease to exist?

Part B – Attitudes towards the intervention

6. What are your thoughts on the intervention in general?
7. Can you think of any positive and negative aspects of the programme that we implemented?
8. You know these students better than I do as you have been with them for much longer. What are your thoughts on their level of engagement and response to the intervention, based on your observations over the past few months?
9. Do you have any suggestions as to what we should do differently if we did it again?
10. Do you believe that implementing such a learning model on a year-round basis would be a viable possibility for the learning and teaching of English in small rural schools operating multigrade classrooms?
    - What makes you think that?
    - What challenges do you anticipate?

Is there anything further that you would like to say about your experience of participating in this programme?

Appendix 15 – Parent Interview Guide (translated)

1. What reasons led to your decision to become involved in the study?
2. Is there a private language academy in your locality?
    - How close is the nearest one?
3. What were your child's initial thoughts on the possibility of participating in the study?
    - Did she decide to take part on her own accord?
    - If so, what do you think were some of the reasons that led to that decision?
    - If not, what made her change her mind eventually?
4. How far do you think that your child benefitted from her participation in this programme?
    - Why do you think that?
5. What were (a) some challenges that you encountered as a parent, and (b) some challenges that your child encountered during this programme?
6. Do you have any suggestions as to what we should do differently if we did it again?
7. How similar or how different was the methodology employed in this programme to the methodology to which your child is exposed in her regular lessons at school?
8. Do you believe that implementing such a learning model on a year-round basis would be a viable possibility for the learning and teaching of English in small rural schools operating multigrade classrooms?
    - What makes you think that?
    - What challenges do you anticipate?

Is there anything further that you would like to say about your experience of participating in this programme?

Appendix 16 – Focus Group Schedule (translated)

General warm-up questions about their school day; exchange of news.

A. Attitudes towards the intervention

1. What was it that you liked most about your lessons (if anything)?
2. Of the tasks that you engaged in, did you have a favourite one?
    - Which task was that?
    - What specifically made this task more interesting than others?
3. Is there anything you would rather we hadn't done?
    - Why do you think that?
4. Was there anything that we could have done differently that might have helped you more?
    - Did others feel the same way?
5. Did you find our lessons together to be any different from other lessons you attend in school, or not?
    - How so?

B. Attitudes towards collaboration

6. What is your preferred mode of work in the classroom? Work on your own, as a group, or does it depend?
    - On what?
    - *(rephrase, if necessary)* Do you find it easier to work on your own or in a group? Or does it make no difference to you?
    - Why do you think that is?

C. Attitudes towards the use of technology

7. Would you rather complete your homework in your book, or complete those tasks on the computer?
    - Why?
8. Some of you were not able to complete your online course. What stopped you from doing so?
9. Did the fact that you were earning starts for each task you completed successfully affect your motivation at all?
    - If you hadn't been earning stars for each task you completed, do you think you would have completed fewer tasks, same number, or more?
    - Why do you think that? *(Probe more on feelings)*

Is there anything further that you would like to say about your experience of participating in this programme?

Appendix 17 – Information Sheet (translated)

Information Sheet

Research Project Title*:*

Investigating EFL proficiency attainment in primary schools operating in remote areas of Greece

I. Research aims

This research will develop and test an educational intervention seeking to investigate its impact on English as a Foreign Language (EFL) learning.

II. Why is the research important?

It is anticipated that any results obtained from the study will help us reach meaningful conclusions as to the ways in which alternative pedagogical models designed for schools operating in remote areas of the country with a small number of children, and therefore unable to offer English instruction, could help us achieve 'more with less' and as such ultimately accomplish educational equity across the country.

Students who participate in the research will take part in live learning sessions and will also be given access to accompanying online English resources specifically designed for the purpose of this study. They will receive feedback on their performance as well as guidance and are likely to make significant progress in their spoken and written English proficiency. Participation will be 100% free of charge.

III. Research procedure

1. Students and parents complete an initial screening questionnaire to determine eligibility.

2. A standardised cognitive ability test suitable for their age group is administered to the students. Please note that results will remain confidential and will *only* be made available at the end of the study if parents *and* children wish to find out.

3. Students complete five English language skills tests which will enable us to establish their level at the start of the intervention.

4. Students participate in one 45-minute long online session with a teacher every week over the duration of three months (October 2018-February 2019). Students will also be supported by an interactive digital interface that has been designed specifically for the purposes of this study and which will only be accessible to students, parents and the researcher. Immediate feedback will automatically be given to them as they complete tasks. Students' performance and opinions will influence the choice of topics to be investigated throughout the duration of the study.

5. At the end of the experimental period, children's English skills will be tested again to measure progress.

6. Finally, children will take part in a brief focus group interview (i.e. a group interview alongside their classmates) which will be conducted by the researcher and where they will be asked to share their views on the intervention they received.

IV. Risks/challenges involved

Effect on learning

This research is aimed at children who do not have access to any other form of English instruction at school, and as such it is designed to maximize any potential benefits they could receive in learning through this intervention.

Online safety & screen time

To prevent undesirable material from being viewed by children while working on the computers during the live sessions, filters will be placed via the browser that will block access to all unsuitable content. Additionally, caution has been taken to design this study in such a way as to ensure that it does not require that students exceed the amount of daily screen time recommended by the scientific community for children aged 6 years and older.

Suitability to work with children

A Certificate of Good Conduct has been obtained from the Greek Police certifying the researcher's suitability to work with children. Also, the researcher has worked with young people for 11 years both in Greece and overseas.

V. Anonymity/Data protection

If you agree to allow your child to take part in the research, then a consent form needs to be signed. We have been very careful to consider ethical implications of this research, in other words we want to make sure that our research is done in an ethical way. Participation is voluntary, and you have a right to withdraw at any time without explaining why. Confidentiality will be maintained using procedures of anonymisation and secure data storage in password-protected electronic folders accessible only to the researcher. All names will have been pseudonimised, and place names and any other identifying details will be altered. Limits to confidentiality

We have a legal duty to inform someone if during the course of this research you give us information that might present harm to you or to other people.

Sharing our results

There are several ways that the data we collect in this project will be shared. Aside from the publication of the final thesis that this research forms part of, we may also include them in academic or news articles, books, conference presentations or on our website. Lastly, they may also be used for teaching purposes. As mentioned above, you will not be identified in

any of these publications. You will be able to access the results and conclusions of this research as soon as the researcher has published her thesis.

VI. Contact Information

This research has been reviewed and approved by the **Faculty of Humanities and Social Sciences Ethics Committee** of Newcastle University. If you have any further questions or concerns about this study, please contact the researcher:

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Appendix 18 – Information Sheet (Greek)

Συνοπτικό Δελτίο Έρευνας

Τίτλος Επιστημονικής Έρευνας*:*

''Ερευνώντας την εκμάθηση των Αγγλικών ως ξένη γλώσσα από μαθητές σε δημοτικά σχολεία που λειτουργούν σε απομακρυσμένες περιοχές της Ελλάδας''

Υπεύθυνη Επιστημονικής Έρευνας: Λεωνιδία Λυμπέρη, Υποψήφια Διδάκτωρ, Πανεπιστήμιο Νιουκάστλ, Ηνωμένο Βασίλειο

I. Σκοπιμότητα Έρευνας

Η έρευνα αυτή έχει σκοπό να αναπτύξει και να δοκιμάσει μια εκπαιδευτική παρέμβαση και έπειτα να εξετάσει τον αντίκτυπο των στην εκμάθηση της Αγγλικής ως ξένη γλώσσα.

II. Αναμενόμενα οφέλη από την έρευνα

Αναμένεται ότι τα αποτελέσματα που θα προκύψουν από τη μελέτη θα μας βοηθήσουν να καταλήξουμε σε ουσιαστικά συμπεράσματα σχετικά με τους τρόπους με τους οποίους εναλλακτικά παιδαγωγικά μοντέλα σχεδιασμένα για σχολεία που λειτουργούν σε απομακρυσμένες περιοχές της χώρας με μικρό αριθμό παιδιών και ως εκ τούτου που δεν μπορούν να προσφέρουν την Αγγλική ως μάθημα.

Οι μαθητές που θα λάβουν μέρος στην έρευνα θα συμμετάσχουν σε ζωντανά μαθήματα και θα έχουν επίσης πρόσβαση σε συνοδευτικούς ηλεκτρονικούς πόρους για την εκμάθηση της Αγγλικής γλώσσας ειδικά σχεδιασμένους για τους σκοπούς της παρούσας μελέτης. Θα λαμβάνουν σχόλια σχετικά με την απόδοσή τους καθώς και καθοδήγηση και πιθανόν να σημειώσουν σημαντική πρόοδο στην προφορική και γραπτή τους ικανότητα στα Αγγλικά. Η συμμετοχή θα είναι 100% δωρεάν.

III. Διαδικασία έρευνας

1. Τα παιδιά και οι γονείς συμπληρώνουν ένα αρχικό ερωτηματολόγιο.

2. Στη συνέχεια, θα διεξαχθεί ενα τεστ γνωστικών ικανοτήτων στα παιδιά κατάλληλο για την ηλικία τους (τα αποτελέσματα θα παραμείνουν αυστηρώς απόρρητα και θα γνωστοποιηθούν στο τέλος του προγράμματος μόνο εαν και εφόσον οι εν λόγω γονείς *και* τα παιδιά το επιθυμούν).

3. Τα παιδιά έπειτα θα αξιολοξηθούν μέσω πέντε τεστ γλωσσικών δεξιοτήτων προκειμένου να καθοριστεί το επίπεδό τους στα Αγγλικά.

4. Τα παιδιά θα συμμετέχουν σε μία διαδικτυακή συνεδρία την εβδομάδα με έναν δάσκαλο διάρκειας 45 λεπτών για ένα διάστημα 3 μηνών (Οκτώβρη 2018 - Φεβρουάριο 2019). Επίσης, τα παιδιά θα κατευθύνονται στις κατάλληλες online ασκήσεις και βίντεο στην ψηφιακή πλατφόρμα που έχει σχεδιαστεί ειδικά για τους σκοπούς της παρούσας μελέτης και η οποία θα είναι προσβάσιμη μόνο στους μαθητές, τους γονείς και την ερευνήτρια. Σχόλια και διορθώσεις θα τους δίνονται αυτόματα καθώς ολοκληρώνουν τις ασκήσεις. Οι επιδόσεις και οι απόψεις των μαθητών θα επηρεάσουν την επιλογή των θεμάτων που θα διερευνηθούν καθ 'όλη τη διάρκεια του προγράμματος.

5. Στο τέλος της πειραματικής περιόδου, το επίπεδο των παιδιών στα Αγγλικά θα εξεταστεί ξανά για να μετρηθεί οποιοαδήποτε τυχόν πρόοδος.

6. Τέλος, τα παιδιά θα λάβουν μέρος σε μια σύντομη ομαδα εστίασης (δηλαδή μια ομαδική συνέντευξη μαζί με τους συμμαθητές τους) η οποία θα διεξαχθεί από την ερευνήτρια και όπου θα τους ζητηθεί να μοιραστούν τις απόψεις τους σχετικά με το πρόγραμμα στο οποίο συμμετείχαν.

IV. Πιθανοί κίνδυνοι

Επιπτώσεις στη μάθηση

Η παρούσα έρευνα στοχεύει σε παιδιά που δεν έχουν πρόσβαση σε καμιάς μορφής εκμάθηση της Αγγλικής στο σχολικό πλαίσιο, και έχει σχεδιαστεί για να μεγιστοποιήσει οποιαδήποτε πιθανά οφέλη που θα μπορούσαν να λάβουν μέσω αυτής της παρέμβασης.

Ασφάλεια στο Διαδίκτυο και χρόνος μπροστά στην οθόνη

Για να αποφευχθεί η προβολή ανεπιθύμητου υλικού κατά την εργασία των παιδιών στους υπολογιστές κατά τη διάρκεια των ζωντανών συνεδριών, θα τοποθετηθούν φίλτρα μέσω του προγράμματος πλοήγησης που θα αποκλείουν την πρόσβαση σε ακατάλληλο περιεχόμενο. Επιπλέον, η παρούσα μελέτη έχει σχεδιαστεί κατά τέτοιο τρόπο ώστε να διασφαλιστεί ότι οι μαθητές δεν θα υπερβαίνουν τον ημερήσιο χρόνο μπροστά στην οθόνη που συνιστά η επιστημονική κοινότητα για παιδιά ηλικίας 6 ετών και άνω.

Καταλληλότητα για εργασία με παιδιά

Έχει ληφθεί Πιστοποιητικό Λευκού Ποινικού Μητρώου από την Ελληνική Αστυνομία που πιστοποιεί την καταλληλότητα της ερευνήτριας για εργασία με παιδιά. Επίσης, η ερευνήτρια εργάζεται με παιδιά εδώ και 11 χρόνια, τόσο στην Ελλάδα όσο και στο εξωτερικό.

V. Ζητήματα Δεοντολογίας

Θέλωντας να διασφαλίσουμε ότι η έρευνά μας γίνεται κατά απόλυτα ηθικό τρόπο, ως γονέας/νόμιμος κηδεμόνας θα πρέπει να υπογράψετε ένα έντυπο συναίνεσης ώστε να μπορεί το παιδί σας να λάβει μέρος στο πρόγραμμα αυτό. Η συμμετοχή είναι προαιρετική και μπορείτε να την αποσύρετε οποιαδήποτε στιγμή χωρίς να μας εξηγήσετε το λόγο. Το απόρρητο της έρευνας θα διατηρηθεί μέσω ανωνυμίας και ασφαλούς αποθήκευσης προσωπικών δεδομένων σε κλειδωμένους ηλεκτρονικούς φακέλους στους οποίους θα έχει πρόσβαση μόνο η ερευνήτρια. Όλα τα ονόματα θα μετατραπούν σε ψευδώνυμα ενώ θα τροποποιηθούν επίσης τα ονόματα των περιοχών καθώς και τυχόν άλλες λεπτομέρειες ταυτοποίησης.

Άρση απορρήτου

Είμαστε υποχρεωμένοι από το νόμο να ενημερώσουμε κάποιον εάν κατά τη διάρκεια αυτής της έρευνας μας δώσετε πληροφορίες που μπορεί να βλάψουν εσάς ή κάποιον άλλον.

Δημοσίευση των αποτελεσμάτων

Τα δεδομένα που θα συλλέξουμε από αυτήν την έρευνα θα διαδοθούν με διάφορους τρόπους. Εκτός από τη δημοσίευση της διδακτορικής διατριβής στην οποία εντάσσεται αυτή η έρευνα, μπορεί επίσης να τα συμπεριλάβουμε σε ακαδημαϊκά ή ειδησεογραφικά άρθρα, βιβλία, παρουσιάσεις σε συνέδρια ή στην ιστοσελίδα μας ή για διδασκαλία. Όπως προαναφέρθηκε, δεν θα μπορείτε να ταυτοποιηθείτε σε καμία από αυτές τις εκδόσεις. Θα έχετε πρόσβαση στα αποτελέσματα και στα συμπεράσματα αυτής της έρευνας μόλις η ερευνήτρια δημοσιεύσει τη διατριβή της.

VI. Στοιχεία επικοινωνίας

Η παρούσα έρευνα έχει ελεγχθεί και εγκριθεί από την Επιτροπή Ηθικής και Δεοντολογίας της Σχολής Ανθρωπιστικών και Κοινωνικών Επιστημών του Πανεπιστημίου του Newcastle. Εάν έχετε οποιεσδήποτε περαιτέρω ερωτήσεις ή ανησυχίες σχετικά με τη μελέτη αυτή, παρακαλείσθε να επικοινωνήσετε με την ερευνήτρια:

Λεωνιδία Λυμπέρη
King George VI Building
School of Education, Communication and Language Sciences
Newcastle University
Newcastle upon Tyne
NE1 7RU
Τηλ: +44 7729 701556 | +30 697 2598843
E-mail: l.lymperi2@newcastle.ac.uk

Επίσης, μπορείτε να επικοινωνήσετε με τους επιβλέπωντες καθηγητές της:

Prof James Tooley
Room 1.42 King George VI Building
School of Education, Communication and Language Sciences
Newcastle University
Newcastle upon Tyne
NE1 7RU
Τηλ: +44 7976 403113
E-mail: james.tooley@ncl.ac.uk

Dr James Stanfield
B83 King George VI Building
School of Education, Communication and Language Sciences
Newcastle University
Newcastle upon Tyne
NE1 7RU
Τηλ: +44 7966 865 860
E-mail: james.stanfield@ncl.ac.uk

Appendix 19 – Participant Consent Form (translated)

Participant Consent Form

Newcastle University

Research Project Title*:*

Investigating EFL proficiency attainment in primary schools operating in remote areas of Greece

Research investigator: Lydia Lymperi, PhD candidate, Newcastle University

Note: For Questions 5, 6 and 7 please tick **one box** only. If you do **not** wish your child to be photographed or videotaped, then please leave all boxes blank. Your child will still be able to participate in the research.

By signing this form, I confirm that (please tick box as appropriate):

1.	I have read and understood the information about the project, as provided in the Information Sheet.	☐
2.	I understand my child does not have to participate in the project and I voluntarily agree for him/her to do so.	☐
3.	I understand my child can withdraw (i.e. leave the project) at any time without giving reasons and that we will not be penalised for withdrawing nor will we be questioned on why he/she has withdrawn. In that case, all data collected from him/her will be destroyed and not used.	☐
4.	The procedures regarding confidentiality have been clearly explained (e.g. use of names, pseudonyms, anonymisation of data, etc.) to me.	☐
5.	I consent to my child being photographed/videotaped for this project and to photographs and/or video excerpts being used in the way and for the purposes outlined in the Information Sheet.	☐
6.	I consent to my child being photographed/videotaped for this project and to photographs and/or video excerpts being used in the way and for the purposes outlined in the Information Sheet **as long as his/her image is changed** to such an extent that (s)he would be unidentifiable.	☐
7.	I consent to my child being photographed/videotaped for this project and to photographs and/or video excerpts being used in the way and for the purposes outlined in the Information Sheet **as long as his/her image *and* voice are changed** to such an extent that (s)he would be unidentifiable.	☐
8.	If applicable, separate terms of consent for interviews, audio, video or other forms of data collection have been explained and provided to me.	☐

9.	The use of the data in research, publications, teaching, sharing and archiving has been explained to me.	☐
10.	I understand that other researchers will have access to these data only if they agree to preserve the confidentiality of the data and if they agree to the terms I have specified in this form.	☐
11.	I have been given the opportunity to ask questions about the project and my child's participation.	☐
12.	I understand that I am free to contact the researcher and/or her supervisor(s) with any questions I may have in the future and I have been given their contact information.	☐

If you do wish your child to participate, please sign and return the form to the researcher by 15 October 2018.

Participant's Legal Guardian:

_____	_____	_____
Name of Participant's Legal Guardian	Signature	Date

Name of Participant:

_____
Child's name & surname

Appendix 20 – Participant Consent Form (Greek)

Έντυπο Συναίνεσης Γονέων

Τίτλος Επιστημονικής Έρευνας:
"Ερευνώντας την εκμάθηση των Αγγλικών ως ξένη γλώσσα από μαθητές σε δημοτικά σχολεία που λειτουργούν σε απομακρυσμένες περιοχές της Ελλάδας''

Υπεύθυνη Επιστημονικής Έρευνας: Λεωνιδία Λυμπέρη, Υποψήφια Διδάκτωρ, Πανεπιστήμιο Νιουκάστλ, Ηνωμένο Βασίλειο

Σημείωση: Για τις ερωτήσεις 5, 6 και 7 βάλτε ένα [✓] σε **ένα** μόνο από τα τρια κουτιά. Εάν δεν επιθυμείτε το παιδί σας να φωτογραφηθεί ή να βιντεοσκοπηθεί, αφήστε και τα τρια κουτιά κενά. Η επιλογή σας *δεν* θα επηρρεάσει τη δυνατότητα του παιδιού σας να συμμετάσχει στην έρευνα.

Υπογράφωντας το παρόν έντυπο επιβεβαιώνω ότι (συμπληρώστε τα παρακάτω κουτιά με ενα [✓] αν συμφωνείτε):

1.	Διάβασα το συνοπτικό δελτίο έρευνας και κατανοώ τις διαδικασίες που περιλαμβάνει η παρούσα έρευνα.	☐
2.	Κατανοώ ότι το παιδί μου δεν είναι υποχρεωμένο να συμμετάσχει στην έρευνα αυτή και συμφωνώ οικειοθελώς να του επιτρέψω να συμμετάσχει.	☐
3.	Κατανοώ ότι είμαι ελεύθερος-η να διακόψω τη συμμετοχή του παιδιού μου οποιαδήποτε στιγμή θελήσω χωρίς να εγηξήσω το γιατι και οτι δεν θα μας επιβληθούν κυρώσεις ούτε θα ερωτηθούμε για ποιο λόγο αποχωρεί. Σε αυτήν την περίπτωση, όλα τα δεδομένα που έχουν συλλεχθεί απο εκείνο θα διαγραφούν και δεν θα χρησιμοποιηθούν.	☐
4.	Οι διαδικασίες σχετικά με την προστασία των δεδομένων μου έχουν εξηγηθεί με απόλυτη σαφήνεια (π.χ. χρήση ψευδωνύμων, ανωνυμοποίηση των δεδομένων, κλπ.).	☐
5.	Συναινώ στη φωτογράφηση/βιντεοσκόπηση του παιδιού μου ως μέρος αυτού του προγράμματος και στο να χρησιμοποιηθούν οι φωτογραφίες και/ή αποσπάσματα βίντεο με τρόπο και για τους σκοπούς που περιγράφονται στο συνοπτικό δελτίο έρευνας.	☐
6.	Συναινώ στη φωτογράφηση/βιντεοσκόπηση του παιδιού μου ως μέρος αυτού του προγράμματος και στο να χρησιμοποιηθούν οι φωτογραφίες και/ή αποσπάσματα βίντεο με τρόπο και για τους σκοπούς που περιγράφονται στο συνοπτικό δελτίο έρευνας, **εφόσον η εικόνα του/της αλλαχθεί** σε τέτοιο βαθμό που θα είναι μη αναγνωρίσιμος/η.	☐
7.	Συναινώ στη φωτογράφηση/βιντεοσκόπηση του παιδιού μου ως μέρος αυτού του προγράμματος και στο να χρησιμοποιηθούν οι φωτογραφίες και/ή αποσπάσματα βίντεο με τρόπο και για τους σκοπούς που περιγράφονται στο	☐

	συνοπτικό δελτίο έρευνας, **εφόσον η εικόνα *και* η φωνή του/της αλλαχθούν** σε τέτοιο βαθμό που θα είναι μη αναγνωρίσιμος/ η.	
8.	Όροι συγκατάθεσης για συνεντεύξεις, ηχογράφηση, βίντεοσκόπηση ή άλλες μορφές συλλογής δεδομένων μου έχουν εξηγηθεί με απόλυτη σαφήνεια (εάν ισχύουν στην περίπτωσή μου)	☐
9.	Ο χειρισμός των δεδομένων όσον αφορά την έρευνα, δημοσίευση, διδασκαλία, κοινή χρήση και αρχειοθέτηση μου έχουν εξηγηθεί με απόλυτη σαφήνεια.	☐
10.	Κατανοώ ότι άλλοι ερευνητές θα έχουν πρόσβαση σε αυτά τα δεδομένα μόνο αν συμφωνούν να διαφυλάξουν την προστασία των δεδομένων και εάν συμφωνούν με τους όρους που έχω καθορίσει σε αυτό το έντυπο.	☐
11.	Μου έχει δωθεί η ευκαιρία να κάνω ερωτήσεις και να ζητήσω διευκρινίσεις σχετικά με την έρευνα και τη συμμετοχή του παιδιού μου σε αυτή.	☐
12.	Κατανοώ ότι μπορώ να επικοινωνήσω με την ερευνήτρια ή/και τους επιβλέπωντες καθηγητές της για οποιεσδήποτε ερωτήσεις που μπορεί να έχω στο μέλλον και μου έχουν δοθεί τα στοιχεία επικοινωνίας τους.	☐

Νόμιμος Κηδεμόνας:

_____	_____	_____
Ονοματεπώνυμο νόμιμου κηδεμόνα	Υπογραφή	Ημερομηνία

Συμμετέχων/-ουσα:

_____
Ονοματεπώνυμο συμμετέχοντως παιδιού

Ερευνήτρια:

_____	_____
Όνομα ερευνήτριας	Ημερομηνία

Αν επιθυμείτε το παιδί σας να συμμετάσχει στην παρούσα έρευνα, παρακαλούμε υπογράψτε και επιστρέψτε το έντυπο στην ερευνήτρια μεχρις τις 15 Οκτωβρίου 2018.

Appendix 21 – Interview Consent Form (translated)

Interview Consent Form

Research Project Title*:*
Investigating EFL proficiency attainment in primary schools operating in remote areas of Greece

Research investigator: Lydia Lymperi, PhD candidate, Newcastle University

Thank you for agreeing to be interviewed as part of this research project. Please note that the interview is expected to take approximately 60 - 90 minutes.

Ethical procedures for academic research undertaken from UK institutions require that interviewees explicitly agree to being interviewed and how the information contained in their interview will be used. This consent form is necessary for us to ensure that you understand the purpose of your involvement and that you agree to the conditions of your participation. Would you therefore read and then sign this form to certify that you approve the following:

• the interview will be audio recorded and a transcript will be produced;

• the transcript of the interview will be analysed by the research investigator;

• photos of excerpts from the interview transcript, summary interview content, or direct quotations from the interview, may be made available through academic publication or other outlets such as teaching, however, they will be anonymised so that you cannot be identified, and care will be taken to ensure that other information in the interview that could identify yourself is not revealed;

• anonymised transcripts will be retained indefinitely for future research use;

• the actual recording will be kept in an encrypted file on the research investigator's hard drive and will only be accessible to her. It will be permanently deleted after completion of the project.

Quotation Agreement

Your words may also be quoted directly. With regard to being quoted, please tick any of the statements that you agree with:

	I wish to review the notes, transcripts, or other data collected during the research pertaining to my participation.
	I agree to be quoted directly provided that my name is not published and a made-up name (pseudonym) is used.
	I agree that the researchers may publish documents that contain quotations by me provided that my name is not published and a made-up name (pseudonym) is used.

Interview Consent Form

All or part of the content of your interview may be used;

- In academic papers, policy papers or news articles
- In any media that we may produce such as spoken presentations or a website
- On other feedback events
- In an archive of the project as noted above
- In teaching

By signing this form I agree that;

1. I have read the Information Sheet, as well as the information on the first page of this form;
2. I am voluntarily taking part in this project. I understand that I don't have to take part, and I can stop the interview at any time, in which case all data collected from me will be destroyed;
3. The transcribed interview or extracts from it may be used as described above;
4. I don't expect to receive any benefit or payment for my participation;
5. I can request a copy of the transcript of my interview and may make any edits I feel necessary to ensure the effectiveness of the agreement made about confidentiality, or for other reason, as specified by me;
6. I have been able to ask any questions I might have, and I understand that I am free to contact the researcher and/or her supervisor(s) with any questions I may have in the future.

Participant:

_____	_____	_____
Name of Participant	Signature	Date

Contact Information

This research has been reviewed and approved by the **Faculty of Humanities and Social Sciences Ethics Committee** of Newcastle University. If you have any further questions or concerns about this study, please contact the researcher:

Lydia Lymperi
King George VI Building
School of Education, Communication and Language Sciences
Newcastle University
Newcastle upon Tyne
NE1 7RU
Tel: +44 7729 701556 | +30 697 2598843
E-mail: l.lymperi2@newcastle.ac.uk

… or her academic supervisors:

Prof James Tooley Room 1.42 King George VI Building School of Education, Communication and Language Sciences Newcastle University Newcastle upon Tyne NE1 7RU Tel: +44 7976 403113 E-mail: james.tooley@ncl.ac.uk	**Dr James Stanfield** B83 King George VI Building School of Education, Communication and Language Sciences Newcastle University Newcastle upon Tyne NE1 7RU Tel: +44 7966 865 860 E-mail: james.stanfield@ncl.ac.uk

Appendix 22 – Interview Consent Form (Greek)

Τίτλος Επιστημονικής Έρευνας*:*

"Ερευνώντας την εκμάθηση των Αγγλικών ως ξένη γλώσσα από μαθητές σε δημοτικά σχολεία που λειτουργούν σε απομακρυσμένες περιοχές της Ελλάδας''

Υπεύθυνη Επιστημονικής Έρευνας: Λεωνιδία Λυμπέρη, Υποψήφια Διδάκτωρ, Πανεπιστήμιο Νιουκάστλ, Ηνωμένο Βασίλειο

Σας ευχαριστούμε που συμφωνήσατε να κληθείτε σε συνέντευξη ως μέρος της παρούσης έρευνας. Η συνέντευξη αναμένεται να διαρκέσει περίπου 60 - 90 λεπτά.

Οι ηθικές προδιαγραφές για τη διενέργηση επιστημονικής έρευνας από Βρετανικά πανεπιστήμια απαιτούν οι συμμετέχοντες σε αυτή να συμφωνούν ρητά να δώσουν συνέντευξη καθώς και με το πώς θα χρησιμοποιηθούν οι πληροφορίες που περιέχονται στη συνέντευξή τους. Αυτό το έντυπο συναίνεσης είναι απαραίτητο για να διασφαλίσουμε ότι έχετε κατανοήσει το σκοπό της συμμετοχής σας και ότι συμφωνείτε με τους όρους αυτής. Επομένως, παρακαλούμε να διαβάσετε και στη συνέχεια να υπογράψετε αυτή τη φόρμα για να πιστοποιήσετε ότι εγκρίνετε τα παρακάτω:

• Η συνέντευξη θα ηχογραφηθεί και έπειτα θα παραχθεί απομαγνητοφώνηση.

• Η ανάλυση της απομαγνητοφώνησης της συνέντευξης θα πραγματοποιηθεί απο την υπεύθυνη της έρευνας.

• Φωτογραφίες από μικρά αποσπάσματα από την απομαγνητοφώνηση της συνέντευξης, περίληψη περιεχομένου συνέντευξης ή αποσπάσματα από τη συνέντευξη μπορεί γίνουν διαθέσιμα μέσω ακαδημαϊκών δημοσιεύσεων ή άλλων μέσων όπως η διδασκαλία, ωστόσο, θα είναι ανώνυμα έτσι ώστε να μην μπορείτε να ταυτοποιηθείτε και ιδιαίτερη προσοχή θα δωθεί ώστε να εξασφαλιστεί ότι τυχον πληροφορίες μέσα στη συνέντευξη που θα μπορούσαν να σας ταυτοποιήσουν δεν θα αποκαλυφθούν.

• Η ανώνυμη απομαγνητοφώνηση θα διατηρηθεί επ 'αόριστον για μελλοντική ερευνητική χρήση.

• Η αρχική ηχογράφηση θα φυλαχθεί μέσα σε ηλεκτρονικό αρχείο το οποίο θα προστατεύεται με κωδικό πρόσβασης στον προσωπικό σκληρό δίσκο της ερευνήτριας και θα είναι προσβάσιμη μόνο από την ίδια. Μετά το τέλος της έρευνας η ηχογράφηση θα καταστραφεί.

Συναίνεση για παράθεση περιεχομένου λέξη προς λέξη

Το περιεχόμενο της συνέντευξης μπορεί επίσης να παρατεθεί λέξη προς λέξη. Παρακαλούμε συμπληρώστε τα παρακάτω κουτιά με ενα [✓] δίπλα από τις δηλώσεις με τις οποίες συμφωνείτε:

	Επιθυμώ να δω τις σημειώσεις, απομαγνητοφωνήσεις ή άλλα δεδομένα που θα συλλεχθούν κατά τη διάρκεια της έρευνας που αφορούν την συμμετοχή μου.
	Συναινώ στο να παρατεθούν τα λόγια μου λέξη προς λέξη υπό την προϋπόθεση ότι το όνομά μου δεν θα δημοσιευθεί και στη θέση του θα χρησιμοποιηθεί ένα ψευδώνυμο.
	Συναινώ στη δημοσίευση περιεχομένου της συνέντευξης λέξη προς λέξη από τους ερευνητές της παρούσης έρευνας υπό την προϋπόθεση ότι το όνομά μου δεν θα δημοσιευθεί και στη θέση του θα χρησιμοποιηθεί ένα ψευδώνυμο.

Σύνολο ή μέρος του περιεχομένου της συνέντευξής σας μπορεί να χρησιμοποιηθεί σε:

• ακαδημαϊκά έγγραφα, έγγραφα πολιτικής ή άρθρα ειδήσεων
• οποιοδήποτε μέσο που μπορεί να παράγουμε, όπως για παράδειγμα προφορικές παρουσιάσεις ή ιστιοσελίδες
• άλλες εκδηλώσεις ενημέρωσης
• αρχείο που θα διατηρηθεί της έρευνας, όπως προαναφέρθηκε στην προηγούμενη σελίδα
• διδασκαλία

Υπογράφωντας το παρόν έντυπο επιβεβαιώνω ότι:

1. Έχω διαβάσει το Συνοπτικό Δελτίο Έρευνας, καθώς και τις πληροφορίες στην πρώτη σελίδα του παρόντως εντύπου.

2. Συμφωνώ οικειοθελώς να συμμετάσχω στην παρούσα έρευνα. Κατανοώ ότι δεν είμαι υποχρεωμένος/η να συμμετάσχω αν δεν θέλω και ότι μπορώ να αποχωρήσω από τη συνέντευξη ανά πάσα στιγμή. Σε αυτήν την περίπτωση, όλα τα δεδομένα και οι πληροφορίες που έχουν συλλεχθεί απο εμένα μέχρι εκείνη τη στιγμή θα διαγραφούν και δεν θα χρησιμοποιηθούν.

3. Η απομαγνητοφώνηση της συνέντευξης ή αποσπάσματα αυτής μπορεί να χρησιμοποιηθούν όπως ορίζεται παραπάνω.

4. Δεν περιμένω να λάβω κάποιο όφελος ή πληρωμή για τη συμμετοχή μου.

5. Μπορώ να ζητήσω ένα αντίγραφο του κειμένου της απομαγνητοφώνησης της συνέντευξής μου και να κάνω αλλαγές που πιστεύω ότι είναι απαραίτητες για να διασφαλιστεί η

αποτελεσματικότητα της όποιας συμφωνίας έχει γίνει σχετικά με την τήρηση του απορρήτου, ή και για άλλο λόγο.

6. Μου έχει δωθεί η ευκαιρία να κάνω ερωτήσεις σχετικά με την έρευνα και τη συμμετοχή μου σε αυτή και κατανοώ ότι μπορώ να επικοινωνήσω με την ερευνήτρια ή/και τους επιβλέπωντες καθηγητές της για οποιεσδήποτε ερωτήσεις που μπορεί να έχω στο μέλλον.

Συμμετέχων/-ουσα:

_____	_____	_____
Όνομα συμμετέχοντως/-ουσας	Υπογραφή	Ημερομηνία

Στοιχεία επικοινωνίας

Η παρούσα έρευνα έχει ελεγχθεί και εγκριθεί από την Επιτροπή Ηθικής και Δεοντολογίας της Σχολής Ανθρωπιστικών και Κοινωνικών Επιστημών του Πανεπιστημίου του Newcastle. Εάν έχετε οποιεσδήποτε περαιτέρω ερωτήσεις ή ανησυχίες σχετικά με τη μελέτη αυτή, παρακαλείσθε να επικοινωνήσετε με την ερευνήτρια:

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Επίσης, μπορείτε να επικοινωνήσετε με τους επιβλέπωντες καθηγητές της ερευνήτριας:

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Appendix 23 – Participant Motivational Disposition towards English (Section 4.2.3)

Extra-curricular contact with the L2 and its speakers: Triangulating self- and parent-report data

In assessing the degree of consistency between self- and parent-report data on children's extra-curricular contact with the L2 and its speakers, an exploratory design was used, and a factor analysis was first run on the five Likert-type questions representing self-reported contact in order to group the items into a single latent variable. Principal axis factoring (PAF) with Promax rotation was used to determine whether questionnaire responses would load onto a particular factor. Inspection of the initial communalities met the conditions set by not having any item(s) vary greatly from the rest. The final Kaiser Meyer Olkin (KMO) measure of sampling adequacy was inspected at 0.6, and was considered suitable for carrying out factor analysis (>0.50, Tabachnick & Fidell, 2007). Bartlett's test of Sphericity was statistically significant ($p < 0.001$), thereby reinforcing the factorability of the data.

PAF revealed there to be a single latent factor that had an eigenvalue greater than one, explaining 48.6% of the total variance. The indicators had loadings between 0.779 to 0.425, thus suggesting that all five items included in the scale were stable and reliable (Table 33; Brown, 2015). The factor's internal consistency was assessed using Cronbach's alpha. The alpha levels reported a low yet borderline acceptable level 0.67 for the five terms.

The same processes were performed for the analysis of the parents' responses on the learners' extra-curricular contact with the L2. The KMO measure was found just about adequate at 0.48, yet Bartlett's test of Sphericity was not statistically significant ($p = 0.19$). However, inspection of the correlation matrix (Table 34) met the requirements by having at least one coefficient greater than 0.30 (Tabachnick & Fidell, 2007; Brown, 2006 cited in Humble, 2020, p.39). Consequently, the utilisation of factor analysis was deemed appropriate. PAF revealed there to be two factors that had eigenvalues greater than one: (1) "contact for educational purposes" and (2) "contact for fun", explaining 28.4% and 27.2%,

respectively of the total variance. Visual inspection of the scree plot in Figure 27 shows the inflection point and cut off for each of the two components, while Table 35 displays the final factor model, which shows that all items reported being over 0.3, thereby implying that each item had some common variance with other items in the final model (*ibid*.). Finally, Table 36 shows the correlation matrix for all three factors.

Table 33 Factor loadings for Self-reported Extra-curricular Contact with English

	Extra-curricular contact with the L2 (TV, Internet, music; Factor 1)
Reading English online	0.799
Watching English or American films on TV or the Internet	0.756
Learning English online	0.509
Listening to English songs	0.506
Watching YouTube videos in English	0.425

Extraction Method: Principal Axis Factoring

Table 34 Correlation matrix for items measuring Parent-reported Extra-curricular contact with English

	Watching English or American films on TV or the Internet	Watching YouTube videos in English	Listening to English songs	Reading English online	Learning English online
Watching English or American films on TV or the Internet	1.00				
Watching YouTube videos in English	0.13	1.00			
Listening to English songs	0.10	0.36*	1.00		

Reading English online	0.01	0.01	0.05	1.00	
Learning English online	0.13	-0.16	0.04	0.31*	1.00

*p < 0.05

Figure 27 Scree plot of parent-reported extra-curricular contact with English (parent responses) eigenvalues >1

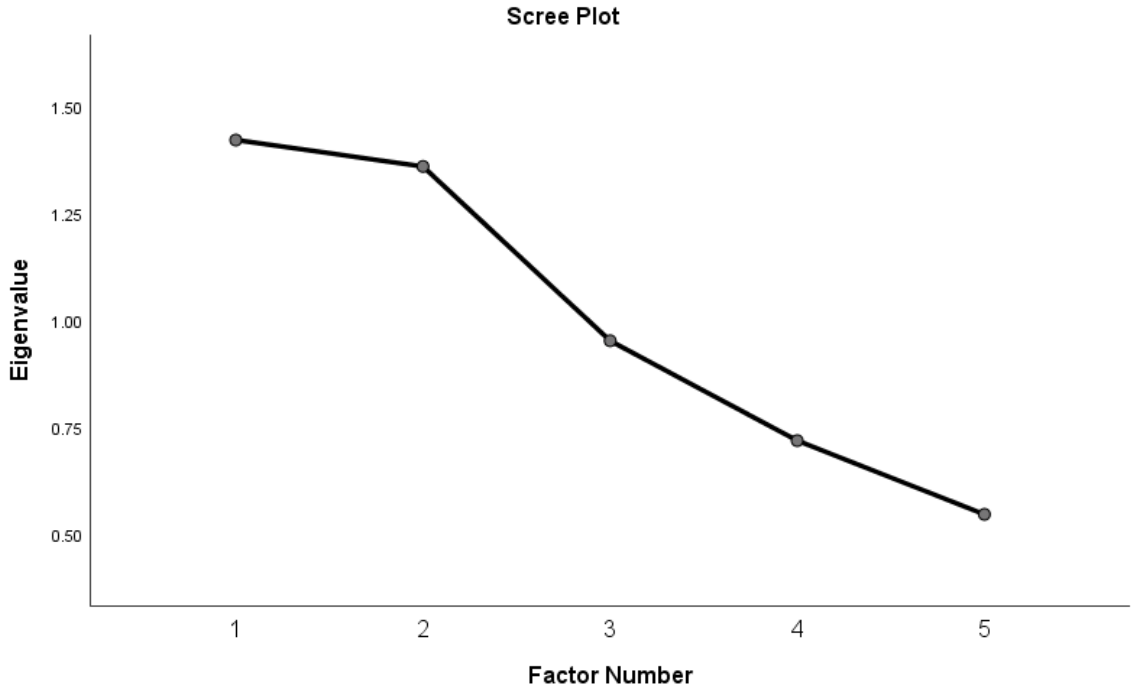


Table 35 Factor loadings for Parent-reported Extra-curricular Contact with English

	Contact for Educational Purposes (Factor 1)	Contact for Fun (Factor 2)
Learning English online	0.862	
Reading English online	0.366	
Watching YouTube videos in English		0.745
Listening to English songs		0.498
Watching English or American films on TV or the Internet		

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.
Note: items <.3 are suppressed

Table 36 Correlation matrix for Self- and Parent-reported Extra-curricular contact with English

	Self-reported Contact	Parent-reported Contact for Educational Purposes (Factor 1)	Parent-reported Contact for Fun (Factor 2)
Self-reported Contact	1.00		
Parent-reported Contact for Educational Purposes (Factor 1)	-0.17	1.00	
Parent-reported Contact for Fun (Factor 2)	0.34*	-0.20	1.00

*p < 0.05

Questionnaire Dimension Reduction

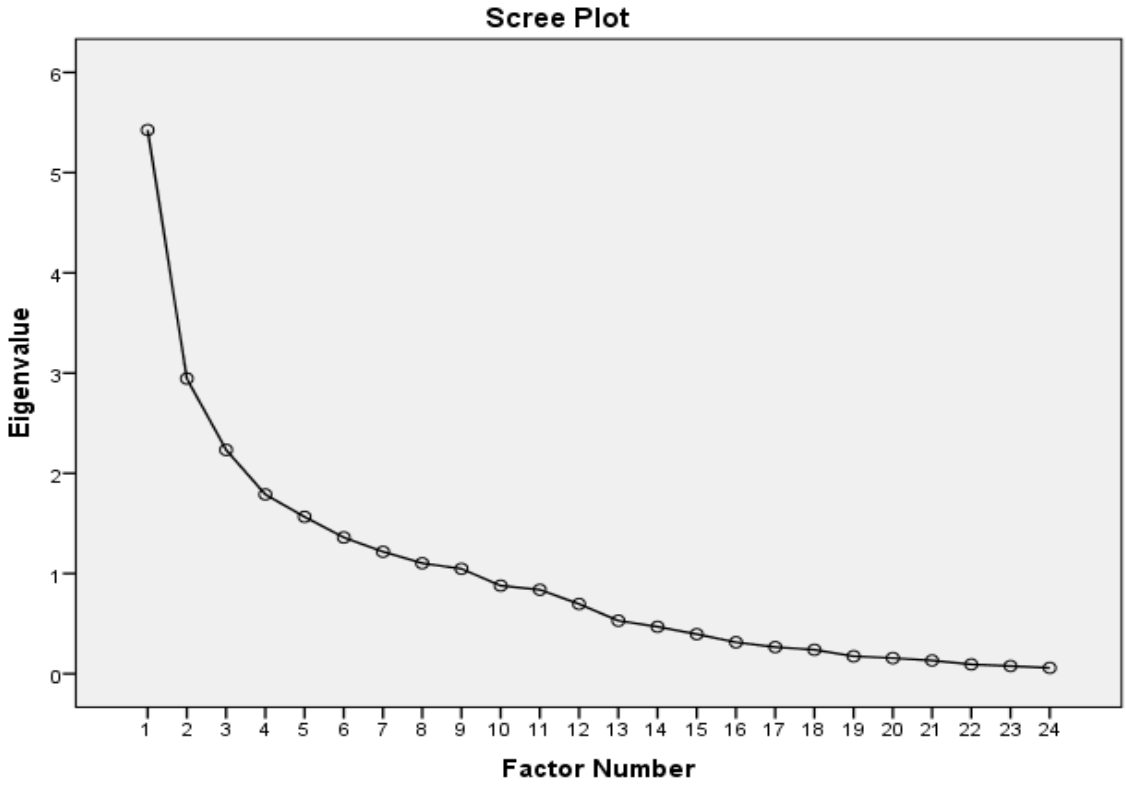
Following checks confirming that the preliminary analysis satisfied the assumptions for factor analysis[51], a total of 24 items[52] (see Table 11) were subjected to PFA with Promax rotation. Nine factors were revealed to have eigenvalues greater than one, explaining a cumulative percentage of 77.9% of the total variance. Visual inspection of the scree plot in Figure 28 shows the inflection point and cut off for each of the nine factors.

In an attempt to produce a solution that was more parsimonious, an iterative approach was employed and the analysis was run once again, this time requesting extraction of only four factors; this decision was based on the cumulative percentage of variance criterion, with the threshold applied being > 50% (*ibid.*). In this case, the cumulative percentage of variance explained by the four factors with the highest eigenvalues (> 1) was 51.6%. Three themes appeared interpretable and were retained based on general guidance provided by Tabachnick and Fidell (2001) for desirable number of items, loadings and crossloaders in solid factors. The eigenvalues and percentages of variance explained by

[51] KMO measure of sampling adequacy = 0.555; and Barlett's Test of Sphericity = 529.88, $p < 0.001$. As such, the sample was deemed sufficient and the correlation matrix factorisable.

[52] The five items previously having been found to load on the factor "extra-curricular contact with the L2" were excluded from the analysis. Similarly, responses on the two questions "parental support" and "would like to travel to England" had no inter-item correlations ≥ ± 3 and were therefore also dropped.

Figure 28 Scree plot of Motivational Disposition towards English eigenvalues >1



the three factors were 5.4 (22.6%), 2.9 (12.3%), and 2.2 (9.3%), respectively. The final matrix of factor loadings is presented in Table 37; this demonstrates that 23 out of 24 indicators are kept and had a primary factor loading > .3, with items 1, 4, 5, 7-14, 16 and 24 loading onto factor one, items 2, 3, 18 and 21 onto factor two, and items 15, 17, 19, 20, 22 and 23 onto factor three. Interpretations of the loadings are also reported, the three themes having been interpreted as "attitudes towards English and the L2 community" (Factor 1), "English as a means to better future prospects" (Factor 2), and "attitudes towards foreign language learning in general" (Factor 3).

All indicators had positive loadings, with the exception of item 24 (parents' level of English proficiency), which showed a negative correlation of -.367 with Factor 1. At first glance this may seem counter-intuitive, however, if we consider that 49% of the parents stated that they either did not speak any English at all, spoke very little of it, or 'so-so', yet a majority of the participants appeared to be positively predisposed towards English, then the item's negative loading becomes less surprising.

Table 37 Factor loadings for Motivational Disposition towards English (*N* = 45, items = 24)

	Attitudes towards English and the L2 community (Factor 1)	English for better future prospects (Factor 2)	Attitudes towards foreign language learning (Factor 3)
1. I like English.	0.419		
2. I think English would help me become a more knowledgeable person.	-0.321	0.832	
3. English is important in the world these days.		0.747	
4. Learning English is important in order to learn more about the culture and art of its speakers.	0.557		
5. I am prepared to expend a lot of effort in learning English (even if it is hard).	0.456		
6. Knowing English would help me a lot when travelling abroad in the future.			
7. Knowing English would help my future career.	0.451		
8. I would like to sound like native speakers do.	0.739		
9. I would like to travel to the USA.	0.634		
10. I would like to travel to Australia.	0.426		
11. I like meeting people (e.g., tourists) from English-speaking countries.	0.589		
12. I like American films.	0.429	0.580	
13. I like American TV shows.	0.378	0.485	
14. I am sure I will be able to learn a foreign language well.	0.662		
15. I think I'd feel anxious and ill at ease if I had to speak to someone in a foreign language (RC).			0.411
16. People around me tend to think that it is a good thing to know foreign languages.	0.602		
17. I don't think that foreign languages are important school subjects (RC).			0.714
18. I often watch foreign programmes.		0.744	

19. My parents do not consider foreign languages important school subjects (RC).			0.684
20. Learning foreign languages makes me fear that I will feel less Greek because of it (RC).			0.365
21. Learning a foreign language is difficult (RC).		0.420	
22. If you could choose, which foreign languages would you choose to learn next year at school?			0.420
23. What are your three favourite school subjects?			0.408
24. Parents' level of English proficiency	-0.367		

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization (items <.3 are suppressed).
RC=reverse-coded

Reliability and correlation analyses for the final, three-factor Motivational Disposition towards English construct

Internal consistency for each of the new factors was assessed using Cronbach's alpha. The alpha levels reported acceptable coefficients 0.74 for the 13 items within the "attitudes towards English and the L2 community" factor, 0.70 for the four items within the "English as a means to better future prospects" factor, respectively, and a low alpha 0.65 for the six items within the "attitudes towards foreign language learning in general" factor. Deleting three items (*I think I'd feel anxious and ill at ease if I had to speak to someone in a foreign language, Which foreign languages would you choose to learn next year at school?,* and *What are your three favourite school subjects?*) contributed to alpha reaching an acceptable score 0.76, and higher item loadings for Factor 3. Table 38 displays the new pattern matrix[53]. Following PAF analysis, Kendall's tau was used to examine the correlation structure between these three latent constructs and the results are shown in Table 39. The matrix shows that all of the correlations were positive and that most were significant. The only non-significant correlation appeared to be that between "English as a means to better future prospects" and "attitudes towards foreign language learning" ($\tau = 0.156$, $p = 0.13$). The remaining τ-values ranged from 0.345 to 0.362 ($p = 0.001$, and < 0.001, respectively),

[53] KMO measure of sampling adequacy = 0.592; and Barlett's Test of Sphericity = 433.63, $p < 0.001$.

suggesting a moderate correlation between "attitudes towards English and the L2 community" and each of the two factors "English as a means to better future prospects" and "attitudes towards foreign language learning".

Table 38 Final pattern matrix for Motivational Disposition towards English (*N* = 45, items = 20)

	Attitudes towards English and the L2 community (Factor 1)	English for better future prospects (Factor 2)	Attitudes towards foreign language learning (Factor 3)
1. I like English.	0.467		
2. I think English would help me become a more knowledgeable person.	-0.326	0.840	
3. English is important in the world these days.		0.739	
4. Learning English is important in order to learn more about the culture and art of its speakers.	0.524		
5. I am prepared to expend a lot of effort in learning English (even if it is hard).	0.473		
6. Knowing English would help my future career.	0.430		
7. I would like to sound like native speakers do.	0.730		
8. I would like to travel to the USA.	0.654		
9. I would like to travel to Australia.	0.456		
10. I like meeting people (e.g., tourists) from English-speaking countries.	0.559		
11. I like American films.	0.430	0.577	
12. I like American TV shows.	0.335	0.511	

13. I am sure I will be able to learn a foreign language well.	0.665		
14. People around me tend to think that it is a good thing to know foreign languages.	0.565		
15. I don't think that foreign languages are important school subjects (RC).			0.719
16. I often watch foreign programmes.		0.717	
17. My parents do not consider foreign languages important school subjects (RC).			0.861
18. Learning foreign languages makes me fear that I will feel less Greek because of it (RC).			0.548
19. Learning a foreign language is difficult (RC).		0.481	
20. Parents' level of English proficiency	-0.356		

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization (items <.3 are suppressed).
RC=reverse-coded

Table 39 Correlation matrix for three Motivational Disposition towards English factors (τ)

	Attitudes towards English and the L2 community (Factor 1)	English as a means to better future prospects (Factor 2)	Attitudes towards foreign language learning (Factor 3)
Attitudes towards English and the L2 community (Factor 1)	1.00		
English for better future prospects (Factor 2)	0.36**	1.00	
Attitudes towards foreign language learning (Factor 3)	0.35**	0.16	1.00

**p<0.01

Appendix 24 – Assessing Bias, Normality, and Homogeneity of Variance (Section 4.3)

Inspection of boxplots for pre-/post-test data revealed there to be no extreme outliers[54] in any of the five L2 constructs (vocabulary, grammar, aural comprehension, writing skills, and oral fluency), with Shapiro-Wilk values showing significant deviations from normality for both types of scores. The distributions of the group's scores are reported in Table 40 below.

Table 40 Results showing extent of deviation from normality for each test

L2 measure	Distributions	
	Pre-test	**Post-test**
Vocabulary	W(47) = 0.95, p = 0.034	W(46) = 0.95, p = 0.039
Grammar	W(41) = 0.91, p = 0.004	W(41) = 0.94, p = 0.035
Aural Comprehension	W(45) = 0.95, p = 0.047	W(42) = 0.92, p = 0.004
Writing Skills	W(45) = 0.90, p = 0.001	W(45) = 0.90, p = 0.001
Oral Fluency	W(29) = 0.92, p = 0.039	W(29) = 0.90, p = 0.008

Homogeneity of variance was assessed using Levene's test, which was used to determine whether the variance in scores for each of the measures was equal across the sample at all five proficiency levels. The test found there not to be significant departures from equality amongst variances for three of the measures, with the exception of the baseline scores on the vocabulary knowledge test and post-test scores on the oral fluency assessment, $F(4, 42) = 3.23$, $p = 0.021$ and $F(4, 36) = 6.22$, $p = 0.001$, respectively.

[54] Four outliers were present in the Oral Fluence pre-test, however, none of these values were more than 3 times the IQ range, and, therefore, the corresponding cases were retained.

Appendix 25 – Hierarchical Multiple Regression Procedures & Outcomes (Section 4.4)

General Information on Model Validity

VIF values for each of the four models were all well below 10, indicating that there was no multicollinearity amongst predictors (Bowerman & O'Connell, 1990). Furthermore, adjusted R^2 values were found to be close to the values of R^2, indicating a good cross-validity for the four models, albeit with a degree of unsystematic variance included. Table 41 provides a comparison of the two values for each language construct.

Table 41 Regression Model Cross-validity

	R^2	Adjusted R^2
Vocabulary Knowledge	0.873	0.855
Grammar Knowledge	0.854	0.833
Aural Comprehension	0.734	0.690
Writing Skills	0.705	0.660

Finally, winsorization of the cognitive ability data by replacing the two extreme values below the 25th per centile with the next largest value did not result in any significant changes in the fit for any of the for models (see Table 42 below); thus, results before winsorization are reported in the main analyses (Tables 43-46).

Table 42 R^2 Change after winsorization of the cognitive ability data

	R^2 Change	*p*
Vocabulary Knowledge	0.003	0.318
Grammar Knowledge	0.000	0.821
Aural Comprehension	0.000	0.883
Writing Skills	0.001	0.793

Table 43 Hierarchical multiple regression on vocabulary knowledge at post-test

Model		B	SE	*β*	*Sig.*	95% CI for B		Adjusted R^2	*Sig.* F change
						Lower Bound	Upper Bound		
1	Constant	12.476	14.522		.396	-17.005	41.956		
	timeonline	.029	.010	.216	**.009***	.008	.050		
	livecontact	-.023	.025	-.074	.361	-.074	.028		
	level	3.629	2.090	.172	.091	-.614	7.872	.855	.000
	englishoutside	-.832	1.195	-.050	.491	-3.257	1.593		
	prevocab	.874	.127	.713	**.000***	.616	1.132		
2	Constant	7.820	14.267		.587	-21.174	36.814		
	timeonline	.030	.010	.224	**.006***	.009	.050		
	livecontact	-.026	.024	-.083	.288	-.075	.023		
	level	3.591	2.021	.170	.085	-.516	7.699	.864	.073
	englishoutside	-.882	1.156	-.053	.451	-3.231	1.466		
	prevocab	.893	.124	.729	**.000***	.642	1.145		
	home	2.327	1.257	.109	.073	-.228	4.881		
3	Constant	-.309	15.357		.984	-31.553	30.935		
	timeonline	.025	.010	.192	**.020***	.004	.047		
	livecontact	-.023	.024	-.072	.353	-.072	.026		
	level	2.652	2.118	.125	.219	-1.657	6.961	.867	.190
	englishoutside	-.712	1.149	-.043	.540	-3.051	1.626		
	prevocab	.928	.125	.757	**.000***	.674	1.183		
	home	2.225	1.245	.105	.083	-.308	4.758		
	cognab	.115	.086	.087	.190	-.060	.289		

*Significant predictors of vocabulary knowledge at post-test

Table 44 Hierarchical multiple regression on grammar knowledge at post-test

Model		B	SE	*β*	*Sig.*	95% CI for B		Adjusted R^2	*Sig.* F change
						Lower Bound	Upper Bound		
1	Constant	2.492	15.592		.874	-29.195	34.180		
	timeonline	.027	.011	.198	**.024***	.004	.050		
	livecontact	-.032	.027	-.103	.238	-.086	.022		
	level	9.663	2.462	.398	**.000***	4.659	14.667	.833	.000
	englishoutside	-2.631	1.377	-.143	.065	-5.429	.168		
	pregram	.779	.153	.541	**.000***	.467	1.090		
2	Constant	3.578	16.203		.827	-29.387	36.543		
	timeonline	.026	.012	.196	**.028***	.003	.050		
	livecontact	-.031	.027	-.099	.265	-.086	.025		
	level	9.561	2.518	.394	**.001***	4.437	14.684	.828	.763
	englishoutside	-2.653	1.398	-.145	.066	-5.496	.190		
	pregram	.777	.156	.540	**.000***	.461	1.094		
	home	-.471	1.549	-.021	.763	-3.622	2.680		
3	Constant	5.990	17.925		.740	-30.522	42.502		
	timeonline	.027	.012	.203	**.030***	.003	.052		
	livecontact	-.032	.028	-.101	.262	-.088	.025		
	level	9.670	2.573	.398	**.001***	4.428	14.912	.823	.739
	englishoutside	-2.715	1.429	-.148	.066	-5.625	.195		
	pregram	.782	.158	.543	**.000***	.460	1.105		
	home	-.417	1.578	-.019	.793	-3.632	2.798		
	cognab	-.034	.102	-.025	.739	-.243	.174		

*Significant predictors of grammar knowledge at post-test

Table 45 Hierarchical multiple regression on aural comprehension at post-test

Model		B	SE	*β*	*Sig.*	95% CI for B		Adjusted R^2	*Sig.* F change
						Lower Bound	Upper Bound		
1	Constant	-6.177	23.722		.796	-54.624	42.271		
	timeonline	.043	.018	.294	**.022***	.007	.079		
	livecontact	-.008	.043	-.022	.857	-.096	.080		
	level	15.435	3.220	.586	**.000***	8.860	22.010	.690	.000
	englishoutside	.419	2.194	.020	.850	-4.062	4.900		
	preaural	.282	.143	.242	.058	-.010	.574		
2	Constant	-6.036	24.294		.806	-55.723	43.652		
	timeonline	.043	.018	.294	**.024***	.006	.080		
	livecontact	-.007	.044	-.021	.867	-.098	.083		
	level	15.399	3.353	.585	**.000***	8.542	22.257	.679	.961
	englishoutside	.422	2.232	.020	.851	-4.144	4.987		
	preaural	.285	.154	.244	.075	-.031	.600		
	home	-.129	2.611	-.005	.961	-5.470	5.212		
3	Constant	-8.710	27.085		.750	-64.191	46.770		
	timeonline	.042	.019	.285	**.040***	.002	.081		
	livecontact	-.006	.045	-.018	.892	-.099	.087		
	level	15.168	3.542	.576	**.000***	7.912	22.424	.668	.812
	englishoutside	.521	2.307	.025	.823	-4.204	5.247		
	preaural	.283	.157	.243	.083	-.039	.604		
	home	-.188	2.666	-.007	.944	-5.649	5.273		
	cognab	.040	.165	.027	.812	-.298	.378		

*Significant predictors of aural comprehension at post-test

Table 46 Hierarchical multiple regression on writing skills at post-test

Model		B	SE	*β*	*Sig.*	95% CI for B		Adjusted R^2	*Sig.* F change
						Lower Bound	Upper Bound		
1	Constant	6.938	25.449		.787	-44.839	58.715		
	timeonline	.004	.019	.025	.843	-.036	.044		
	livecontact	.013	.047	.034	.788	-.083	.108		
	level	3.686	3.087	.140	.241	-2.594	9.967	.660	.000
	englishoutside	-1.347	2.230	-.066	.550	-5.884	3.191		
	prewrit	.787	.126	.771	**.000***	.531	1.042		
2	Constant	6.044	26.094		.818	-47.107	59.195		
	timeonline	.004	.020	.025	.841	-.036	.044		
	livecontact	.012	.048	.032	.800	-.085	.109		
	level	3.609	3.149	.137	.260	-2.805	10.023	.650	.814
	englishoutside	-1.394	2.271	-.068	.544	-6.020	3.233		
	prewrit	.790	.128	.774	**.000***	.529	1.050		
	home	.621	2.611	.023	.814	-4.697	5.939		
3	Constant	7.342	28.878		.801	-51.556	66.240		
	timeonline	.005	.021	.029	.826	-.038	.047		
	livecontact	.012	.049	.032	.809	-.087	.111		
	level	3.685	3.269	.140	.268	-2.981	10.352	.639	.911
	englishoutside	-1.435	2.336	-.070	.544	-6.198	3.329		
	prewrit	.791	.131	.775	**.000***	.525	1.058		
	home	.639	2.657	.024	.811	-4.780	6.058		
	cognab	-.020	.172	-.012	.911	-.371	.332		

*Significant predictors of writing skills at post-test

Appendix 26 – Reducing the Motivational Disposition towards English Construct for Use in SEM (Section 5.2.1)

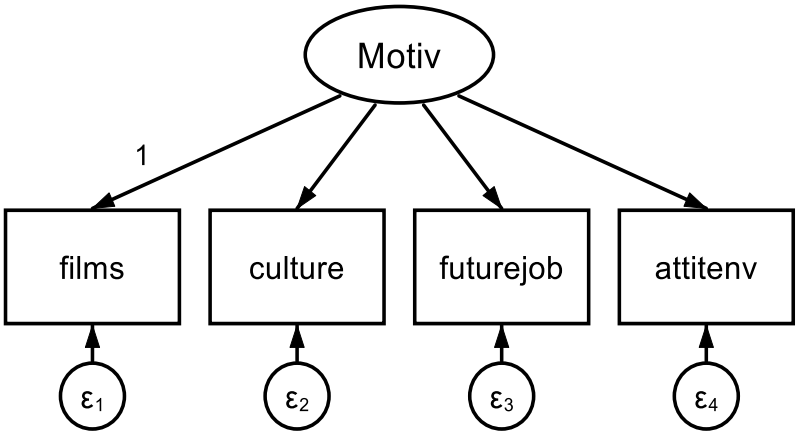
In order to subject the motivational disposition construct to structural equation modelling (SEM) techniques, and given the sample size of the present study, a decision was made to retain a single measure which would consist of up to four reflective indicators.

Towards this end, an exploratory factor analysis was first run on the 20 items shown in Table 38 (Appendix 23) together with the five items representing the extra-curricular contact construct (self-report; Table 33) and a single factor solution was requested. Principal axis factoring (PAF) with Promax rotation was used with factor loadings $\lambda < 0.6$ being suppressed (this was done in order to obtain a factor solution that would comprise the most stable variables). Inspection of the initial communalities met the conditions set by not having any item(s) vary greatly from the rest. The final Kaiser Meyer Olkin (KMO) measure of sampling adequacy was inspected at 0.536; Barlett's Test of Sphericity = 637.18, $p < 0.001$. As such, the sample was deemed sufficient and the correlation matrix factorisable. The single factor solution had an eigenvalue = 5.4, explaining 21.6% of the total variance. Five indicators had loadings $\lambda = > 0.6$ and one of these was dropped, based on its strength and conceptual relationship to the construct and the remaining items. The remaining factor loadings varied from $\lambda = 0.601$ to $\lambda = 0.728$ and an internal consistency analysis of the scale reported an acceptable level 0.73 for the four terms.

Appendix 27 – Confirmatory Factor Analysis (CFA) on Participant Motivational Disposition towards English (Section 5.2.1)

The hypothesised measurement model for the four-item Motivational Disposition towards English scale is presented in Figure 29. This specifies the latent motivation variable, 'motiv', and the four indicator variables that were thought to load on this.

Figure 29 Hypothesised measurement model for four-item Motivation scale



The first item was set as a reference indicator and was therefore fixed at 1.0 to allow for scaling and identification of the latent construct (Acock, 2013). Fixing loadings also results in fewer parameters being estimated thus leading to positive degrees of freedom. This means that the model is 'overidentified' and can therefore be estimated. Inspection of boxplots generated for each of the four factor indicators revealed there to be no extreme outliers, excess kurtosis or skewness in most, yet a violation of normality was observed in *futurejob* (skewness and kurtosis values = -2.40 and 5.29, respectively). As a result, and given that the factor indicators were ordered categorical variables (i.e., fewer than 15 scale points; Jöreskog & Sörbom, 1996), rather than continuous variables, the model was fitted using maximum likelihood estimation (ML) accompanied by the Satorra–Bentler scaled chi-squared statistic to obtain standard errors that were robust to nonnormality (Satorra & Bentler, 1994). With robust maximum likelihood (MLR), observed data can be assumed to be "approximately" continuous if, as is the case for the latent measure of motivational disposition, the number of response categories for each item is sufficiently large, viz., equal to or greater than five (Rigdon, 1998; Raykov, 2012; Rhemtulla, Brosseau-Liard & Savalei, 2012).

Appendix 28 – Model comparison between SEM-Vocab with and SEM-Vocab without *films* and *attitenv* (Section 5.2.4)

Table 47 Model comparison between SEM-Vocab with and SEM-Vocab without *films* and *attitenv*

	Chi-squared_SB	**df**	***Sig.***	**RMSEA_SB**	**CFI_SB**	**TLI_SB**	**R^2 (overall)**
Model 1 (with)	32.37	30	0.35	0.05	0.98	0.97	98.1%
Model 2 (without)	7.56	6	0.27	0.08	0.99	0.97	92.9%
Difference	24.81	24	0.42	0.03	0.01		5.2%

Appendix 29 – Some Photos from the School Sites (June 2018)


Arsinoe, Epirus, north-western
Greece, June 2018

End-of-year play at Morphe Primary School, June 2018

Waiting for the end-of-year play to start at Morphe Primary School, June 2018

Appendix 30 – Extract from a 'Dream School' Presentation

https://youtu.be/yLavWAZTuiU - This is a brief audio clip taken from a group's presentation of their 'Dream School' during Live Session 2. Right after expressing their disappointment that 'we can send humans to the Moon, but in school we still write with pen and paper', the students went on to share more of their inspiring vision.

Transcript:

"Something that [is] very important for the [children] is the communication. Why we have to think so hard for something that it's very difficult to ask, but in real life we can ask help from someone else and just do it? I think that's easier. To ask one child from another it's much, much more important than to learn better [in] lesson. Because you are not gonna need so much this because every child is better at something and I think it's better for everybody [to be] better at this thing than the others. Because in the real work, in the real life you don't have to do everything, but everything, yourself. You can ask help from someone else…And that's why you can ask help in this school."

- Morphe Primary School Students, 2019