A Narrative Study of Technology-Oriented Academics' Autonomy within the Context of Cloud Computing and Cloud-Based Services in Higher Education

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Abstract

This study aims to develop an in-depth understanding of the intersections between academics' technology-orientation, autonomy, and pedagogical practices with cloud computing and cloud-based services within higher education. Two purposes framed this study. The first is to understand how technology-oriented academics conceptualise and utilise cloud computing platforms and services in their pedagogical practices. The second is to explore how these experiences intersect with academics' autonomy within the context of higher education. This study's motivation was the current confluence on academics' autonomy due to higher education structural changes and cloud-based services emergence.

Nine academics from a Gulf Cooperation Council higher education institution were recruited using 'criterion-based purposeful selection' (Schensul & LeCompte, 2012). The selection process considered their orientations towards using technology in their pedagogical practices. Using qualitative narrative methodology (Moen, 2006; Willis, 2008; McAlpine, 2016), data sources included a series of individual, paired depth and group interviews, participants' reflections, researcher's notes, and relevant material. Triangulation of methods, ongoing iterative dialogue with the participants, and thematic analysis (Clarke & Braun, 2018) contributed to this study's rigour.

The findings show that academics' technology-orientations positively influence their critical perspectives and decision-making towards utilising cloud-based services in their professional development and pedagogical practices. Their orientations, backgrounds, capacities, roles, and objectives influenced their autonomy to variable degrees. The participants' technology orientation aligned with their autonomous pedagogical practices with cloud-based services. CC and CBS's design and features within the participants' work conditions seem to afford and equally constrain their cloud-based pedagogic experiences. This paradox yielded three modes of academics' autonomy, Constrained, Guided, and Self-Directed, intersecting four modes of cloud-based pedagogies, Expanding the Curriculum, Redefining Pedagogy, Cautious Pedagogy, and Visionary Pedagogy. These findings indicate bounded academics' autonomy in the context of cloud-based pedagogy. This thesis extends the field of intersectional studies between technology and higher education. It contributes to understanding academics' pedagogic experiences at a time of change in higher education. It also raises important questions concerning the implications of academics' autonomy and institutional autonomy impacts upon the ethical cloud-based practices.

Acknowledgements

This thesis results from self-reflection on my twenty years of professional experience as an executive, educator, and academic and discussions with my supervisors and colleagues in light of relevant philosophies and theories. It asserts that autonomy remains fundamental for academics' practices, students' learning, and education and society at full.

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Dedication

To Dad.

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List of Abbreviations

AI	Artificial Intelligence
BL	Blended Learning
CBS	Cloud-Based Service
CC	Cloud Computing
CS	Computer Science
CSL	Collaborative and Social Learning
EdTech	Education Technology
EXL	Experiential Learning
EU	European Union
GCC	Gulf Cooperation Council
HE	Higher Education
HEI	Higher Education Institution
ICT	Information and Communication Technology
IDT	Innovation Diffusion Theory
IoT	Internet of Things
KM	Knowledge Management
LaD	Learners as Designer
MA	Machine Learning
PBL	Problem Based Learning
PjBL	Project-based Learning
SAMR	Substitution Augmentation Modification Redefinition
SDT	Self-Determination Theory
SoL	Self-Organised Learning
TAM	Technology Acceptance Model
TPACK	Technology Pedagogy Competence Knowledge
US	United States
UK	United Kingdom
VLE	Virtual Learning Environment

Study at a Glance

Title	A narrative study of technology-oriented academics' autonomy within the context of cloud computing and cloud-based services in higher education.
Short Title	Academics' autonomy with cloud computing
Design	An embedded case study of one higher education institution and multiple cross-sectional cases of teaching academics and academic managers.
Participants	Nine technology-oriented academics, experienced in using technology in their pedagogic practices +2 years, motivated to experiment with emerging technologies, engaged in continuing technical skills development and self-confident about their ability to use technology, work within the same higher education institution.
Duration	17 Jan 2017 - 18 July 2020 Data gathering April 2018 - May 2019
Aim	To develop an in-depth understanding of technology-oriented academics' autonomy intersections with their pedagogic practices with cloud computing and cloud-based services within higher education.
Research Question	How do technology-oriented academics' pedagogic experiences within the contexts of cloud computing and cloud-based services intersect with their autonomy?

Chapter 1. Introduction

1.1. Overview

This study concerns academics' autonomy, technology orientation, and pedagogic practices within the context of specialist and education technology (EdTech). It draws upon an empirical and systematic work that examined nine technology-oriented academics' conceptions of their autonomy and teaching and learning practices within the context of emerging cloud computing (CC) and cloud-based services (CBS) in a higher education institution (HEI) in the Gulf Cooperation Council (GCC). This chapter introduces the study's rationale, scope, impact, researcher's experience, motivation and an overview of the thesis chapters.

The term 'academics' denotes higher education (HE) faculty members who are the first contact with students through pedagogical practices within and outside their classrooms and institutions. Knight (2002) and Macfarlane (2007), have shown us that being a teacher in HEIs entails multiple responsibilities, including research, supervision, and administration. Macfarlane (2007) asserted that HE teachers are expected to be leading 'citizens' who engage and teach in relevance to their contexts and participate in 'critical dialogue' in chaotic times. This notion links with the state of academics in the research site that focuses on practical, hands-on and problem-based learning. However, the research site is also required to provide curricula and instruction underpinned by academic research, concepts and theories and teaching staff who engage with external contexts besides their teaching practice. Therefore, academics' diverse roles, orientations, and pedagogic experiences in the current contexts of emerging technology in HE can provide an understanding of their autonomy (2002) within ethical conduct frames (Macfarlane, 2007).

These aspects portray academics' technology-orientation signifying their tendencies, capacities, and readiness to use technology in their day-to-day practices (Bhat & Beri, 2016), continually experiment with new technologies, and persistently develop their technical skills. Several scholars (Hooper & Rieber, 1995; He & Freedman, 2009; Bhat & Bashir, 2018) considered technical competence imperative to technology's autonomous use. This notion informed the selection of potential participants who could provide reflections and narratives that would help construct academics' accounts (Willis, 2008; Cilesiz, 2011; Neuman, 2014; Savin-Baden & Tombs, 2017). Teaching academics' experiences characterise them as 'key informants' (Marshall, 1996b) who formed critical opinions. Based on the reviewed literature, and this study's findings, academics' technology-orientation seem to intersect with their flexible mindset and ability to make proactive decisions with technology.

Academics' autonomy is pivotal for their pedagogic practices, health, well-being, and retention (Gibbs, 2018). It is becoming imperative in light of the increasing move towards online, remote, and blended learning with emerging CC and CBS. These technologies offer user control that entails proactive responses to technology changes. Particularly with emerging CC and CBS, academics' autonomy intersects their freedom of choice and decision-making (Filippi, 2013) and digital agency (Passey, et al., 2018). This notion suggests that autonomy is fundamental for agile and proactive use of CBS. Cloud services are continually and rapidly evolving (Filippi, 2013) and externally hosted and controlled (Filippi & McCarthy, 2012); hence, academics' autonomous use of CC is crucial for digital ethics and conduct in light of the increased exposure to data, that in turn jeopardises users' privacy (de Bruin & Floridi, 2017). Academics' autonomy is critical for their well-being since it influences their self-motivation (Ryan & Deci, 2020), self-identity (Henkel, 2005), positive self-theories (Young, 1986; Gibbs, 2018). Their pedagogic practices with university students need to provide autonomy-supportive learning within the increasing demands (Niemiec & Ryan, 2009; Duchatelet & Donche, 2019; Yasué, Jeno, & Langdon, 2019). This notion indicates the need for academics to be autonomous and practice autonomy-supportive teaching with their students. Hence, the discussion of academics' autonomy should answer what influences academics' autonomy in the current contexts? To what extent are academics autonomous? And what is required to support their autonomy? Such questions demand in-depth conceptualisation and understanding.

Three clarifications. First, the meaning of academics' autonomy differs from academic freedom. Although both concepts denote independence from external influences (Berdahl, 1990; Eisenberg, 1988; Knight, 2002; Ramsden, 2003; El-Amine, 2010), their nuanced natures distinguish their meaning (Cummins, 2014). Academic freedom has been associated with individual academics denoting their universal right to pursue the truth and work independently impartial of any external influences. It is manifold with negative connotations that it must be proclaimed or granted (Berdahl, 1990; Bonilla, 2017; Aberbach & Christensen, 2018). While autonomy refers to individuals' self-ideal (Young, 1986), self-governance (Haworth, 1986) self-directed ethical conduct (Shell, 2009), orientations, motivations (Niemiec & Ryan, 2009), informed, independent, and authentic decision-making (Dworkin, 1988; Hogan R. a., 1983). Hence, It can be understood as personally and cooperatively developed ideology, value, and prerequisite to independent and ethical conduct (Haworth, 1986). Thus, autonomy definitions that consider freedom alone, in my opinion, are inadequate since it entails intrinsic and extrinsic constituents to ascend to self-governed thoughts, emotions, and behaviours. It is a composite concept that can be global (Haworth, 1986) and local linked with individuals' cognitions, conditions, and contexts (Dworkin, 2015; Ryan R. , 2016).

Second, the debate that academics' autonomy is absolute freedom (Priestley, Biesta, & Robinson, 2018; Riley, 2011; Parker, 2017) that shapes their 'commitment' and ethical practices and enhances their potential change and action, confounds the utility of autonomy to promote positive behaviour. Some scholars, akin to Parker (2017) and Priestley et al. (2018) prioritised agency over autonomy, positing agency as averred by objective and obligation while possibility and probability confound autonomy. However, and guided by Passey (2018) and the Kantian, my argument in this study is that autonomy is fundamental for informed and ethical decision-making. This leads to one conclusion of this thesis: self-agency is underpinned by autonomy.

Despite the various interpretations of autonomy, there is no clear and explicit definition of academics' autonomy within HE and emerging technology contexts. Some philosophical debates (Haworth, 1986; Young, 1986; Dworkin, 1988; Shell, 2009) described personal autonomy, merely the "ability to self-govern behaviour". This description does not discount autonomy's complexity, multidimensionality; and paradoxical (Dworkin, 2015; Ryan R. , 2016). The confusions associated with autonomy may have emanated from the distinction and overlap between groups, social structures (an organisation, a community or a region), and individuals' autonomy. The Cambridge Online Dictionary (2020) combines these designations by defining autonomy as "governments', 'organisations', and 'individuals' independence and freedom from external control". While the Oxford Lexico (2020) separates autonomy into two meanings "the right or condition of self-government" and "individuals' freedom from external control or power". This segregation frames autonomy as a personal, social and political concept, and quality and an attribute that resembles a virtuous state for regions, groups, and individuals; hence, there is a confusion about its positive and negative impacts and implications on individuals, contexts, and society at wide.

In the GCC, the research site's location, and the Middle East at wide, few scholars have drawn systematic research on autonomy's social and philosophical expositions. One strand is the political frames outlined on the successive colonisations, fragmentations, and occupations on the Arab world that set against their need for independence (1978, Republished 2019). These issues have painted autonomy possible but loaded with political contentions. Another strand examined autonomy from a religious perspective. In biomedical ethics, Al Bar et al. (2015) alluded to autonomy from Islamic perspectives, arguing that it entails knowing the truth, afar from deception, to make informed decisions.

Unlike Kant's notion of religious doctrines (Shell, 2009), Al Bar et al. (2015, p. 17) argued that religion imparts emancipation from ignorance, slavery, and obedience, thus expands the possibility of autonomous action. They also noted that autonomy entails social and economic contracts formed based on trust in a regional and national level so that self-governance and independent decision-making rise. However, long before this notion, Said's 'Orientalism' (1978, Republished 2019) contended the western depictions of Islam accusing it of confining autonomy with social structures, cultures, and norms. These notions indicate conflicting philosophical interpretations of autonomy within the Middle Eastern literature.

This study benefits from several scholars' (Haworth, 1984; Shell, 2009; Dworkin, 2015; Parker, 2015; Wermke & Salokangas, 2015) works that alluded to the etymological autonomy's root. Since the 17th-century, the ancient Greek used the word 'autonomia' or αυτονομία (aftonomía) composed of 'auto-: αυτο, a prefix that denotes the 'self', and 'nomia', 'nomoi', 'nome', or 'nomos: νόμος', a suffix '-onomy' such as in taxonomy and economy, that refers to the 'laws', 'norms' or 'provisional codes' (habits or customs) of social and political behaviour, or 'nome' the territorial division or district. When combined, they denote one who enacts and follows the law. The Greeks used 'autonomia' to refer to 'normative social behaviour' that collectively defended a 'state of a territory'. Autonomia was used to describe a city's capacity to enact laws, regulate its internal and social affairs, and formulate military forces to control and protect its sovereign amongst other nations. Haworth (1986) gathered that these conditions distinguished Sparta's city-state and its citizens from intruders as Spartans formally trained to stand out in a time of sovereignty. However, their autonomy and authority did not warrant their city's self-governance since most of its workers were 'perioeci', free dwellers. However, Shell (2009) noted that despite the lack of internal rules and breakdown, Sparta had been portrayed as an optimal political state due to the supremacy of its 'homoioi', elite social class, that defined its relationships with external forces.

Although the meaning of autonomy has been evolving, there is no explicit capture of academics' autonomy within the current contexts. The modern philosophical debates suggest that 'personal autonomy' can be understood as individuals' capacity to self-govern and decide and choose actions according to personal preferences. On the other hand, institutional autonomy has been described as the ability to determine expansive directions and internal operations (Güla, Gülb, Kayab, & Alican, 2010; Turcan, Reilly, & Bugaian, 2016; Casson, 2019; EUA, 2020).

Within these broad philosophies, pedagogical autonomy has been limited to teacher's freedom to decide and undertake activities within the scope of their classrooms such as determining the curriculum, students' enrolment, and teaching and learning resources (Knight, 2002; Bédard, 2015; Parker, 2015; Prichard & Moore, 2016; Erss, 2018; Woodhouse, 1990). Hence, academics' autonomy is understood as an 'action-based' or behavioural concept imperative for informed and ethical decision-making. It combines self-governance, competence, critical reflection and motivation to enhance academics' practices and experiences (Macfarlane, 2004; McKenna, 2005; Davis, 1996). However, these descriptions and definitions are inconclusive within HE contexts. Therefore, in this study, the synthesised definition is:

> Academics' autonomy is a composite of independence, competence, self-governance, and self-reflection that support their motivation, informed decision-making, and ethical conduct with emerging technology. It manifests in their capacity to develop positive self-theories, define their identity, and engage in institutional decision-making inline with their interests.

Based on the reviewed literature and findings of this thesis, Figure 1 depicts this definition. It presents autonomy as core and fundamental to academics' independence, self-governance, competence, self-reflection. These intrinsic capacities are prerequisites (Haworth, 1986; Dworkin, 1988) to their intrinsic motivation (Ryan & Deci, 2020), identity (Henkel, 2005), and positive self-theories (Young, 1986). Academics' capacities rise and fall with their autonomous decision-making (Dworkin, 1988) and technology-orientations (Bhat & Bashir, 2018) that promote their ethical (Passey, et al., 2018) cloud-based pedagogies in the current HE contexts. Institutional support, engagement and development opportunities, emerging CBS (Filippi, 2013), policy, governance and regulatory (Henkel, 2005; Berdahl, 2010; Ginsberg, 2011; Hall, 2018) also influence academics' autonomy and pedagogical practices.

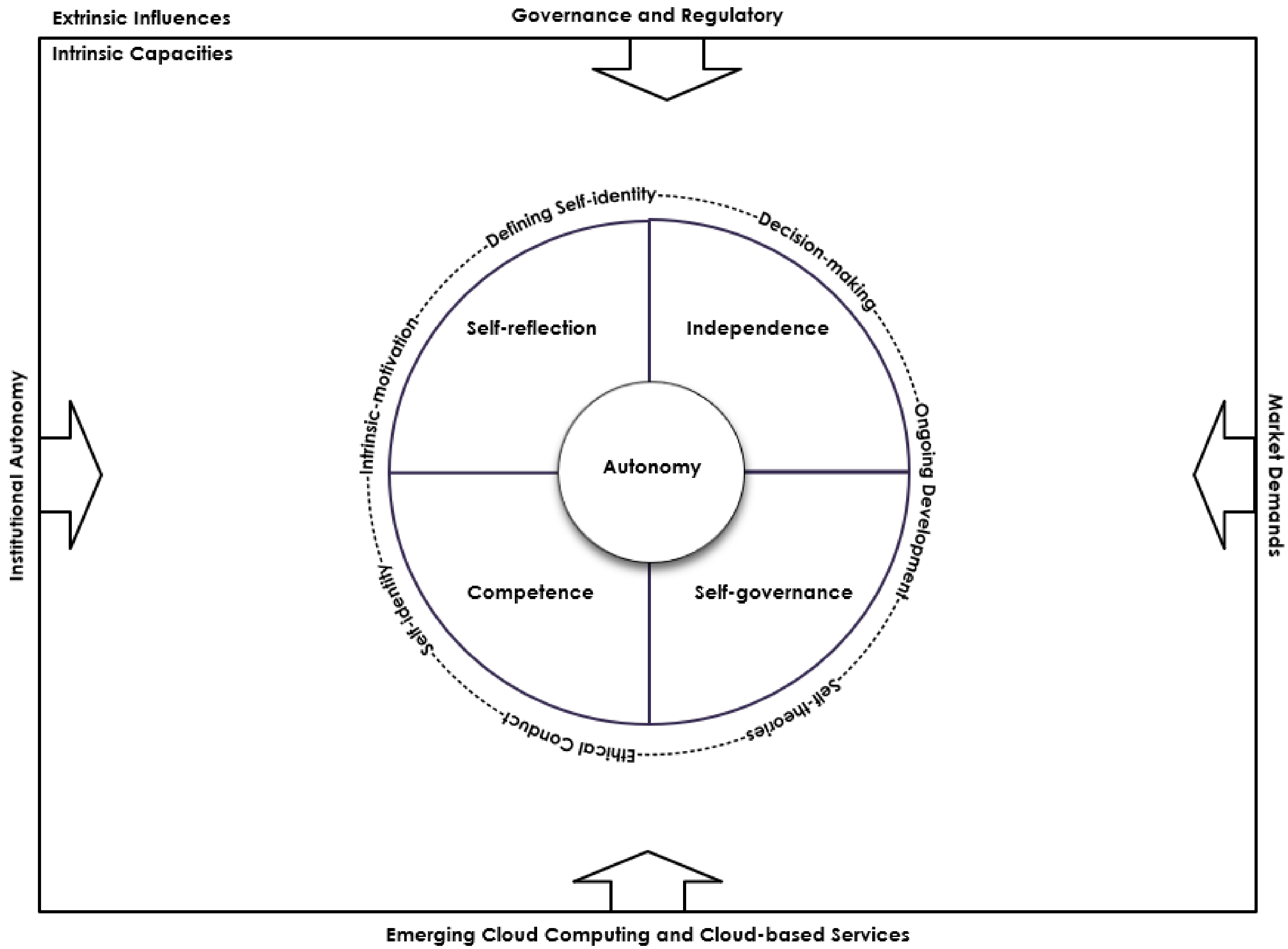

Figure 1. A conceptual model of academics' autonomy within the current HE contexts

Third, since the inception of CC in the early 2010s, it emerged as a new way of provisioning technology as a service (Mell & Grance, 2011). Although it is not new since the first mention of a virtual machine and the client-server model, CC's bases were in the 1950s (Durao, Carvalho, Fonseka, & Garcia, 2014; Varghese, 2019). CC technology, use models, platforms, and services emerged in education in EdTech and specialist technologies. Broadly, the Association for Educational Communications and Technology (AECT) defines EdTech:

> *Education Technology is the study and ethical application of theory, research, and best practices to advance knowledge and mediate and improve learning and performance through the strategic design, management and implementation of learning and instructional processes and resources* (AECT, 2018).

Specialist technologies are related to specific disciplines and used in HE to prepare university students with technical skills comparable to market standards. Hence, EdTech applies to any technology and process used within educational contexts for specialist or pedagogical purposes. With the current prevalence of CC (BSA, 2018), EdTech is moving towards CBS. Despite the opaque meaning, the National Institute of Standards and Technology (NIST) definition, broadly used and accepted, describes CC:

> *Cloud Computing is a model of enabling ubiquitous, convenient, on-demand, network access to a shared pool of configurable, pooling, elastic and measurable services (For example, Networks, computing, storage, applications, and services) that can be rapidly provisioned with minimal management effort or provide interaction in private or public modes (Mell & Grance, 2011).*

The NIST definition classifies private cloud as physical hardware within the users' environment, and public cloud as infrastructure outside its context (Mell & Grance, 2011). The NIST also signifies CC and CBS with five features:

1. On-demand: the allocation of resources autonomously without any human interactions
2. Broad network access: ubiquitous access to the cloud through communication networks
3. Pooling: the allocation and deallocation of resources to users
4. Elasticity: autonomous changes in services size (downward and upward)
5. Measured: the ability to quantify resource usage

These features have been enabled by the internet and virtualisation, the bedrock of CC. The internet development aided the use of Information and Communication Technology (ICT) as a service based on virtualisation, a concept of provisioning ICT (software, hardware, operation) as software and user interfaces (Varghese, 2019). Therefore, in this study, the term ‘emerging technology’ denotes CC and CBS (externally hosted EdTech and specialist technologies) employed in any discipline (Mell & Grance, 2011). Further, ‘CC’ and ‘the cloud’ refer to its model and platforms (Amazon web services, Microsoft Azure, Google Cloud, VMWare, etc.) and ‘CBS’ to refer to cloud-based, online and browser-based applications including Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), online services and applications that are externally hosted at providers and provisioned over the internet.

1.2. Rationale: Academics' Autonomy in the Context of Cloud Computing

This section presents the study rationale. I discuss the significance of academic autonomy within the current contexts of emerging CC and HE structural and policy changes worldwide and in the GCC[1] where the research site is situated. Pedagogical autonomy within educational contexts has been described as teachers' ability to independently determine their curriculum, activities, resources, and assessment (Knight, 2002; Bédard, 2015; Parker, 2015). This description is inconclusive within HEIs contexts in which policies and structures have a significant influence on academics and educators' practices (Coffield & Williamson, 1997; Clark, 2004; Tight, 2009; Knight, 2002). Besides, academics are expected to consider contextual demands (Knight, 2002; Macfarlane, 2007; Brink, 2018; Wentworth & Middleton, 2014).

Therefore, ethical and rationalised behaviours (Shell, 2009), awareness and dispositions of academics' professional identity (Henkel, 2005), informed and critical participation in decision-making (Ginsberg, 2011; Carvalho & Videira, 2019) within the context of technological advancement (Habib & Johannesen, 2020) and structural HE changes (Casson, 2019), have been examined as imperative for their educational practices. The specificity of this study location charts the boundaries of the participating academics' work contexts. Since the early 2010s, the GCC and the Middle East have been enacting new strategies to diversify and sustain their economies (Altbach, 2011) and political changes, economic recession, and mergers of government entities (Azzi, 2018). Education regulators have also been enacting reforms to accentuate the role of HEIs in exploiting the potentials of emerging technologies in response to market demands to level with economic changes (Azzi, 2018; World Bank Group, 2015; Buckner, 2011).

These reforms entwined with the technology transformation to CC and CBS across all sectors, including HE (Sultan, 2010; Alharbi, 2012; Alharthi, Alassafia, Alzahrani, Walters, & Wills, 2017). New directions embraced the rapid development of CC and CBS to support the GCC governments in achieving their economic goals. In turn, this state manifests in enacting policies that promote CC as the number one choice for ICT infrastructure in the GCC (MENA Cloud, 2019; Azzi, 2018). Elsewhere, studies in the UK and worldwide show increasing emphases on cloud-first policies and strategies in governments and industries; indicating a global prevalence of CC and CBS (BSA, 2018). These trends imply demands for a calibre with matching cloud skills and interests in exploiting CC and CBS potentials in new deployment models (BSA, 2018; Price Waterhouse Coopers, 2018).

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1 The exact location of this study is anonymised for confidentiality reasons.

Despite these motivations, the reviewed research showed consistent stagnation in HEIs capacity to provide evidence of tangible changes from the use of pre-cloud technologies. This gap indicates a rising pressure for further development towards effective use of EdTech (Kirkwood & Price, 2013; Tamim, Bernard, Borokhovski, Abranmi, & Schmid, 2011; Hew, Lan, Tang, Jia, & Lo, 2019). Academics are expected to be central to knowledge development impartial to contextual influences (Berdahl, 1990; Ramsden, 2003; Knight, 2002; Educause, 2019; Convery, 2009) with the increased technological interoperability and data curations afforded by CC. Such issues have been considered imperatives for scientific discoveries (EUA, 2019; Selwyn, 2019).

The shift to HEIs internationalisation towards management efficiency in the GCC has been borne by increasing size, complexity, and market demands; contributing to confining academics’ autonomy (GMrabet, 2010; Vardhan, 2015). Academics’ autonomy fosters their engagement in knowledge development and pedagogic practices (Knight, 2002; Niemiec & Ryan, 2009; Duchatelet & Donche, 2019; Yasué, Jeno, & Langdon, 2019). However, most of the reviewed studies showed direct connections between academics’ technology utilisations and autonomy in three main dimensions in the current contexts and shift to online learning. First, engaging academics in institutional decision-making that links to their professional practice has proven critical for fostering autonomy (Ginsberg, 2011). Second, supporting academics’ autonomy reinforces their professional identity (Henkel, 2007), and enhances their self-satisfaction, well-being, motivation, and sense of commitment to best their practices (Niemiec & Ryan, 2009; Gibbs, 2018). This brings academics to increasing conflict and questioning technological decisions and discourses that poise with institutional ‘interventions (Habib & Johannesen, 2020). An third, academics who understand the nature of autonomy can apply it in their pedagogical practices towards students’ autonomy-supportive learning (Niemiec & Ryan, 2009; Duchatelet & Donche, 2019; Yasué, Jeno, & Langdon, 2019). Autonomy-supportive pedagogy manifests in encouraging students’ self-organised, independent and autonomous learning, freedom to decide their objectives and learning approaches, accepting their learning challenges, frustration, and failures throughout the pedagogic process (Niemiec & Ryan, 2009; Duchatelet & Donche, 2019; Bédard, 2015). Hence, academics’ autonomy is critical in facilitating students’ independent and opportunities for lifelong learning. Despite concerns about the socio-technical challenges that entwine CC, evolving issues with ethical practices, security, accessibility, human rights (Pourreau, 2017), comfort, sovereignty, power, and autonomy (Filippi, 2013; de Bruin & Floridi, 2017), the educational utilities of its platforms, services and features for academics’ practice and students continue to grow. However, there is still inadequacy in examining academics’ autonomy in the contexts of CC and CBS.

1.3. Problem: The Confluence on Academics’ Autonomy

Despite technology transformation towards CC and CBS (BSA, 2018; World Economic Forum, 2018; Computer Weekly, 2018; Deloitte Insights, 2018), it is unclear how such a new use model affects academics’ orientations, pedagogic practices with EdTech and specialist technologies, and autonomy in the contexts of higher education. Arguably, academics’ autonomy is challenged with the emergence of EdTech and various specialist technologies in HE in which they are expected to deploy and utilise in their pedagogical practices (Noble, 1998; Selwyn, 2017; Turcan, Reilly, & Bugaian, 2016; Aberbach & Christensen, 2018; Habib & Johannesen, 2014).

Academics are expected to play an active role in meeting the societal and economic demands in line with citizenship’s ethos (Macfarlane, 2007; Brink, 2018; Azzi, 2018; Fullan, 2020). However, several studies showed that the structural HE changes confine academics’ autonomy (Ginsberg, 2011; Gibbs, 2018; Hall R. , 2018; Martin C. , 2018) and this has particularly shown in the process of deploying emerging technology (Habib & Johannesen, 2014; Pourreau, 2017). The advent of CC enables leveraging ubiquitous, on-demand, interoperable, and rapidly developing technology resources; implying democratic access, more control, and limitless educational potentials (Sultan, 2010; Alharthi, Alassafia, Alzahrani, Walters, & Wills, 2017; Woods, 2018). Equally, these affordances exhibit dual impacts on academics’ autonomy due to lack of control, certainty, and trust (Filippi & McCarthy, 2012). My professional experience (See Section 1.5) as a HE academic and educator and extant literature on CC assert these issues.

This confluence reinforces the need to urgently and deeply understand the intersections between academics’ autonomy and their current pedagogic practices with CC and CBS. Indeed, academics’ autonomy is becoming increasingly problematic. There is a global discourse on the increasing prevalence of CC in all sectors (BSA, 2018). Several reports (BCS, 2018; Global Knowledge, 2018) report indicated a rapid switch towards CC in industry and the rise of issues associated with this prevalence. Specific to HE, an EDUCAUSE Horizon report on the worldwide state of technology diffusion in HE (2020) indicates an increasing growth in deploying emerging CBS. The report also identified HE academics’ acceptance and engagement as the biggest challenge in exploiting these technologies (EDUCAUSE, 2020), which necessitates understanding their CC and CBS perspectives. Currently, the state of an abrupt switch towards online learning due to the pandemic outbreak the hit the world in 2019 reiterates these concerns (Adams, 2020; McMurtrie, 2020).

Academics’ abilities to utilise cloud-based technologies in their practices rest primarily on their orientations, self-theories, and institutional support strategies (Mishra, 2019; Martin, Ritzhaupt, Kumar, & Budhrani, 2019; Bhat & Bashir, 2018). Academics’ autonomous practices are central to the integration of emerging technologies in HE. However, the global turn towards institutional autonomy paralleled with structural changes, administration expansion, the emergence of a corporate and performativity cultures, has been stifling academics’ autonomy (Henkel, 2007; Ginsberg, 2011; Hall, 2018; Carvalho & Videira, 2019). Although these changes aim to enhance HEIs self-reliance, managerial efficiency, and economic sustainability (Casson, 2019), they failed to show positive impact on academic practices, particularly in the Middle East (Casson, 2019), they failed to evidence positive influence on academic practices, particularly in the Middle East (El-Amine, 2010). However, institutional autonomy has been conflicting with academics’ autonomy and undermining their participation in critical decision-making (Carvalho & Videira, 2019), particularly in emerging technology’s evaluation, design and acquisition (Habib & Johannesen, 2020). Several studies (Turcan, Reilly, & Bugaian, 2016; Selwyn, 2017) showed that academics’ disconnect links with the divergence between their practices and technology’s utilisation objectives. While academics use technology to enhance their pedagogical practices (Roblyer & Hughes, 2019; Mishra & Koehler, 2006), HEIs are driven by issues of competition, growth, and sustainability.

To level with socio-economic demands, HEIs focus on preparing university students with the knowledge and skills that could engage them as active citizens in their societies (Brink, 2018; Casson, 2019; Fullan, 2020). Such motivations have increased the pressure on academics’ practices; forming significant barriers to achieving the desired teaching excellence (Hall R. , 2018; Brink, 2018). Therefore, changes in institutional structures and emerging technology have been forming a confluence on academics’ autonomy. However, the reviewed literature shows gaps in examining the implications of academics’ autonomy in their pedagogical practices. These global educational trends prevail in the GCC; the location of this study. Although HE governance in the GCC remains centralised by official entities (Wiseman & Anderson, 2012; Vardhan, 2015; Azzi, 2018), several HEIs have been shifting towards corporate-like structures, adopting total quality management models and enacting educational reforms to enhance their efficiency and sustainability (Azzi, 2018, pp. 6,7; El-Amine, 2010). These initiatives accentuate preparing university students to meet the demands of developing GCC economies (Azzi, 2018; Wiseman & Anderson, 2012). The new directions in the GCC HEIs support the economic diversification by focusing on human capital.

Therefore, most GCC universities have been focused on science and technology to prepare citizens equipped with market standard skills; embracing CC as a platform for digital economies (World Economic Forum, 2018; Price Waterhouse Coopers, 2018). However, studies that examined the influence of these changes on academics practices and students learning in the GCC are limited. This is linked with the lack of critical perspective and freedom of expression of in the GCC and the Middle East at wide (Romanowski & Nasser, 2010; Wiseman & Anderson, 2012; Azzi, 2018; El-Amine, 2010). Early studies that explored the emergence of CC and CBS in HEI in the GCC context considered new dawn (Sultan, 2010), roadmap (Masud, Yong, & Jianming Huang, 2012), and innovation (Lina & Chenb, 2012) that could level up with structural and financial constraints and ascend to the aims of developing knowledge-driven and diversified economies (Wiseman & Anderson, 2012). Initial motivations were focused on overcoming educational budget constraints, prolong acquisition processes and a lack of technical expertise (Sultan, 2010; Alharthi, Alassafia, Alzahrani, Walters, & Wills, 2017). These issues fall under first-order barriers to integrating learning technologies in teaching and learning in all educational levels. Internet access aimed at 'democratic technology' (Beira & Feenberg, 2018; Yamakami, 2019); that underpins CC and CBS that promote users' control over resources (Pike, Pittman, & Hwang, 2017).

Following studies showed a shift towards practical deployments of CC and CBS in pedagogical activities; exploring its potentials to enhance teaching and learning (Sommerville, 2013; Denton, 2012; Al-Samarraie & Saeed, 2018). Hence, HEI interests in CC and CBS rest on its operational and educational potentials. Nevertheless, the reviewed literature shows limited evidence of functional changes to pedagogic practices from the ones with pre-cloud technologies. This state indicates a conceptual gap in understanding the variances in their applications. Despite their potentials, some studies in technology policy showed that CC and CBS provisioning model and features are associated with issues of ethics, control, trust, and accountability that pose threats to users' autonomy (Filippi, 2013; de Bruin & Floridi, 2017). These issues raise many questions concerning academics' ability to devise autonomous practices with CC; mainly HE's current changes. But more importantly, these issues made me question why education scholars are disregarding academics' autonomy with emerging technologies within the sheer of changing structures and rapid transformations. Hence, this study addresses these gaps.

1.4. Background: Technology in Higher Education, a Socio-Political Impact

Several researchers noted that the university’s idea from the needs for social, economic and political demands for change and continuous developments (Turcan, Reilly, & Bugaian, 2016, p. 26; Selwyn, 2017, p. 125). These ‘external imperatives’ have reinforced the diffusion of technology in HE (Altman & Ebersberger, 2013, p. 117; Simpson & Marinov, 2016). and led to cross, inter and sub science and technology disciplines such as educational technology, engineering technology and bioinformatics (Macfarlane, 2007, p. 164; Selwyn, 2019). This direction raised interests in cross-disciplinary frameworks and nurture innovation (Mishra, Henriksen, & Mehta, 2015). Continuing Noble’s (1998), legacy, Selwyn (2017, p. 194) gathered that technology’s external imperatives and prevalence influence its emergence in education. Nevertheless, there has been an ongoing debate on the utility value of technology in and for teaching, learning and knowledge development in all educational levels; significantly HE expected to support the society (Turcan, Reilly, & Bugaian, 2016, p. 26; Selwyn, 2017, p. 125).

On the one hand, proponents of technology consider the deployment of various technologies such as eLearning, simulation systems, knowledge base systems and portable devices, critical for teaching and learning and developing HE at wide in the frame of internationalisation (Deardorff, Wit, Heyl, & Adams, 2009), globalisation and equal access to HEIs (Hazemi & Hailes, 2002; Robins & Webster, 2002; Price Waterhouse Coopers, 2018). Within this frame there is a dominant discourse that technology could disrupt teaching, learning, research and cause radical changes to HE (Hayter, Lubynsky, & Maroulis, 2017; Fischer, Schaeffer, Vonortas, & Queiroz., 2018). Since the 1980s, the inception of the personal computers has been perceived as liberating from conventional teaching and learning by enabling access to technologies limited to few industries and government entities (Coffield & Williamson, 1997). New pedagogies, such as Computer-Aided Instruction (CAI) that denoted using computers to teach and learn a given topic supporting individualised and Self-Organised Learning (SoL) and computer-managed instruction (CMI) that denoted employing computers for curriculum and instructional design, emerged as modern pedagogies (Coffield & Williamson, 1997). These teaching strategies have been supported by technology for pedagogic practices classroom utilisation and ‘behind-the-scenes’ instructional design and administration (Selwyn, 2019, p. 77; Roblyer & Hughes, 2019). Roblyer and Hughes (2019) gathered that introducing technology in education enabled the convergence of instructional and constructional approaches to teaching.

Some scholars argued that technology's productive uses could afford progressive, in-depth and critical learning (Laurillard, 2002; Mishra & Koehler, 2006). Laurillard (2002), for example, suggested that using technology as a medium for communication amongst academics and students promotes deep and critical learning. In doing so, Laurillard (2002), accentuated the need to devise appropriate instructional design, deep understanding and critical thinking approaches to exploit a tangible value of technology and focus on academics and students as front-line stakeholders in teaching and learning. Kirkwood and Price (2016), also suggested that the effective use of technology in HE enhances communications and collaborations. The current proliferation of the internet backs these notions as it enhances the ubiquity and modality of collaborative learning and engagement within, HE and its broader ecology (Martinez-Lopez, Anaya-Sánchez, Aguilar-Illescas, & Molinillo, 2016). Universal learning environments (For example, virtual learning environments (VLEs), MOOC, wikis and social networking) have been expanding teaching and learning to blended, distant, flexible and universal approaches (Selwyn, 2019; Bodily, Leary, & West, 2019; Martin, Kelly, & Terry, 2018). However, these platforms have been targeted towards 'pedagogy of abundance' (Selwyn, 2019, p. 99), raising questions about academics' ability to make sense of their utility value for their development and teaching practices (Martin, Kelly, & Terry, 2018). Hence, exploiting technology seems imperative for teaching, learning knowledge development and engagement in the heart of social interactions in HE. This led several scholars to agree that technology's educational affordances are in line with fundamental teaching and learning theories such as Dewey's experiential learning (EXL), Bruner's constructionist learning, and Vygotsky's social learning (Aubrey & Riley, 2018).

Some scholars, akin to Krause (2020), suggested that enhancing pedagogy is contingent on curriculum development that could provide a more in-depth view of how the HEIs respond to their external imperatives as it concerns courses structure, content, resources, teaching and learning strategies and assessment. This notion rightly echoes Biggs and Tang's (2011) idea on the need to align curriculum, pedagogy and assessment. In this sense, Krause (2020) gathered that the growing discourse on reforms, renewal and transformation in the context of technology indicates curriculum changes specific to the 21st century. Examples of these changes include creating micro, customisable and online models that enhance the freedom of development from institutional control. However, the postpositivist stances accentuate that the complexity of academics' disciplines background, expertise, beliefs, conceptions and practices and, as Tamim et al. (2011) noted, the lack of evidence on the efficacy of technology confounds its influence on teaching and learning (Knight, 2006; Turcan, Reilly, & Bugaian, 2016; Kirkwood & Price, 2016).

On the other hand, opponents of technology argue that it intervened with the primary aims of HE. Akin to Noble (1998), some scholars contended the integration of technology in HE on the premise that it interferes with academics’ values and practices and the ethos of the education. Noble (1998) argued that the mutual interests between the education administrators, who aim to commercialise and marketise education, and industry and technology providers who consider education a profitable market, have been contributing to academics’ resistance. Some studies (For example, Selwyn, 2011; 2016; Convery, 2009; Livingstone, 2012; Tamim et al. 2011; Johnson, 2013; Kirkwood & Price, 2014) contended the lack of evidence of positive impact and outcomes of technology has been behind this opposition. Laurillard (2002), for example, cautioned against procedural and shallow learning while Selwyn (2016) gathered that overuse and misuse of technology cause adverse implications on students’ learning such as plagiarism, information overload, and distracting, disrupting and interrupting learning. Likewise, these issues seem to amplify with cloud-based technologies such as AI and IoT (Calvo, Peters, Vold, & Ryan, 2020) combined with a lack of critical perspectives of the design, development, and value of technology.

Convery (2009) contended the effect of ongoing optimistic, overstated rhetoric and ‘dominant discourses’ about technology on the premise that these deprive academics of developing autonomous practices and declaring critical perspectives and distract them from their primary mission. The reviewed literature on CC and CBS showed similar positivists trends with emerging CC and CBS (Baldassarre, Caivano, Dimauro, Gentile, & Visaggio, 2018). Hence, several scholars (For example, Convery, 2009; Selwyn, 2011; Hinrichsen & Coombs, 2014; Giroux, 2020) opposed stance the reductionist and deterministic views that frame technology as the single cause of change and the neutrality, idleness and acceptance to its negative implications on people’s work and well-being. Selwyn (2011) considered these implications obscuring to academics informed and self-governed decision-making. Several empirical studies (For example, Johnson, 2013, Pourreau, 2017; Habib & Johannesen, 2014, 2020) examined distancing academics from strategic decisions on the premise that this contradicts with the addition of ‘engagement’ as the fourth mission of HE that aim to devise relevant and meaningful education and maximise collaboration between all stakeholders within HE (Coffield & Williamson, 1997; Clark, 2004). These aims target institutional management, students learning, teaching practice and knowledge development (Kirkwood & Price, 2016; Johnson, 2013) that could reinforce digital discoveries and engagement with the society and economy (EUA, 2019; Price Waterhouse Coopers, 2018).

1.5. Researcher's Motivation

My work experience as an ICT academic and educator informs my stance in this study. I started my career as computer science (CS) schoolteacher in 1999. Akin o many ICT specialists (Willis, 2008), I was anchored in the 'virtues' of utilising technology in teaching and learning and help students think critically about its utility to solve relevant problems. In the Middle East, CS was not compulsory in school systems (Wiseman & Anderson, 2012) and did not attract administrators' attention. This bestowed me the autonomy and freedom of choice, and equal responsibility to develop my courses with little administrative support and resources that were critical for my pedagogic practice. Moving to tertiary institutions, I found myself in the middle of formality, bureaucracy and contexts demands, particularly when I took on additional roles, on top of teaching. Although HE is teaching is discipline-specific (Knight, 2002), I felt obliged to maintain maximum competence. In the sheer of my responsibilities, I engaged in a web of interactions and activities within and outside my work duties that left me overwhelmed and feeling as Brookfield termed (2017) imposter and able to orchestrate technology use and deployment and pedagogy.

The training I undertook exposed me to educational paradigms unknown to me. However, I was in doubt of their viability as most of the approaches I learned seemed idealistic and visionary and could not apply. Defaulting about what I 'must' do as opposed to what I 'can' do was a deterring to someone who is an improvisational and technology emp. However, it brushed my perspective of technology. Besides, as a pragmatist (Willis, 2008) my emersion in interactions with colleagues informed me that teaching in HE is a function of social and contextual interactions and ethical practices, power, and tensions that made me think about the impact of my practice not only on me but on my students, institution, and community. These prevailed as I commenced my role as a capstone projects coordinator. Launching resources for courses under my responsibility stirred my understanding of the influences that could confine technology use. I realised the intersection of socio-technical aspects with technology deployment in HE; as Noble (1998) contended, rarely driven by the demands of teaching and learning. Besides, issues that entwine the use of technology in pedagogy and assessments increase the complexity of its integration (Trigwell, Prosser, Martin, & Ramsden, 2005). This intrigued my interest in the utility of CC and CBS.

Recognising this complexity, many technology providers developed grant schemes for educational institutions and training programmes to qualify academics and students equally as expert cloud users; that I seized. Initially, I employed grants with limited credits; bringing to the fore administrative delays, access issues, and lack of technical support. Soon after, CC and CBS became the recommended infrastructure, alternatives to pre-cloud technologies within my institution that pioneered in adopting CC for most of its ICT services. I demanded access to CC and encouraged other academics to consider it for their courses. I led CC's deployment, offered it to students in capstone projects across all faculties. I negotiated the institutional CC laying the grounds of use protocol for academics and ICT services. My involvement in these activities absorbed my interests in understanding whether external demands, institutional contexts, and the technological and challenges associated using CC influence academics' autonomy.

Although I developed a flair in using cloud's features, the philosophical narratives on justice, democracy, ethics, and various effects posed by CC and CBS were new. I started thinking about the implications and real value of integrating CC and CBS academics' practices. This raised a question of utility, ethics and impact that led me to explore its value in a study (Zahran, Walker-Gleaves, & Walker-Gleaves, 2017) I undertook in 2016 Education at Durham University. I explored the meanings of the cloud challenges and affordances that beset academics in utilising it in their teaching practice. I knew the possible difficulties of using the cloud, but it was unclear how technology-savvy students would utilise it and perceive it in their approach. This study's motivation influenced by aspects of my teaching practice, scientific and positivist discipline that entailed adjusting to the multiple-realities and subjectivityacademics'ics' experience.

1.6. Study Scope

This study examines the influence of academics’ technology orientation on their pedagogic experiences in the context of CC and CBS in HEIs. The aim is to understand how their autonomy becomes constructed with these experiences within the current HE changes. It is cross-disciplinary as it draws upon the intersections between education and technology. It is based on the concepts of combining appropriate technologies with pedagogic strategies that fit the need of the subject content and the ethical and social aspects from a critical perspective. Accordingly, this study considers the theories that underpin academics’ autonomy and the ethical dilemmas associated with their pedagogic practices with CC and CBS.

Ontologically, the philosophical theories of social constructivism (Silverman, 2017) that regard knowledge construction is interpretive and entwined with the participants’ perspectives underpin this study. Epistemologically, constructing academics perspectives regarding their autonomy can be attained through their experiences (conceptions and practices) (Cilesiz, 2011) with emerging technology within their unique work settings. Therefore, a qualitative (Willis, 2008; Neuman, 2014; Savin-Baden & Tombs, 2017), narrative (McAlpine, 2016; Moen, 2006) approach is employed in a single case study embedded with multiple cases (Yin, 2018). Relevant to this study is examining personal autonomy in the context of technology in Fox’s (1985) collectivist view of the psychological sense of community.

As Henkel (2005) suggested, the ideological HE changes contradict the social and ethical characteristics of academics’ identity. The extent to which these influences could affect academic’ autonomy is mediated by their technology orientations (Bhat & Bashir, 2018). However, policy changes, as Carvalho (2018) examined the tensions between institutional autonomy and academics’ participation in decision-making. The implications of their lack of engagement seem to amplify with the emergence of technology (Johnson, 2013; Habib & Johannesen, 2020). Besides, the emerging features of externally hosting, abstraction and autonomation of emerging technologies, as Calvo et al. (2020) suggested stifling human autonomy. These studies evidence that employing a qualitative narrative approach to academics’ pedagogic practices with CC and CBS within their institutional contexts could yield a great understanding of their autonomy.

1.7. Research Question

This study aims to develop an in-depth understanding of technology-oriented academics' autonomy intersections with their pedagogic practices with cloud computing and cloud-based services within higher education. I address this aim by the main research question that asks:

How do technology-oriented academics' pedagogic experiences within the contexts of cloud computing and cloud-based services intersect with their autonomy?

The four sub-questions are:

1. How do academics' technology-orientations influence their pedagogic experiences?
2. How do technology-oriented academics experience cloud computing and cloud-based services in their pedagogic practices?
3. How do technology-oriented academics conceive autonomy in their cloud-based pedagogic experiences?
4. How do academics' autonomies become constructed by these experiences?

A schematic structure of this study's questions, objectives, theoretical concepts, researcher stance and methods, is presented in Figure 2. Mapping the research questions, objectives and methods and Figure 3. Representation of the whole study.

1.8. Schematic Structure

Aim	Primary Question	Methodology
To develop an in-depth understanding of technology-oriented academics' autonomy intersections with their pedagogic practices with cloud computing and cloud-based services within a GCC higher education institution.	How does technology-oriented academics' autonomy intersect with their pedagogic experiences within the contexts of cloud computing and cloud-based services in a GCC higher education institution?	Qualitative narrative research

Objectives	Sub-Questions	Methods
1. To gain an in-depth understanding of how technology-oriented academics conceptualise and utilise cloud computing platforms and services in their pedagogic practices, and	1. How do academics' technology-orientations influence their pedagogic experiences? 2. How do technology-oriented academics experience cloud computing and cloud-based services in their pedagogic practices?	Interpretive and constructionist epistemology: 1. Embedded case study 2. Cross-sectional multiple cases 3. Participant screener 4. Narrative 5. Documentary analysis 6. Multiple interviews 7. In-depth interviews 8. Paired depth 9. Focus group 10. Researcher's notes
2. To explore how these experiences, intersect with their autonomy within higher education from their perspectives.	3. How do technology-oriented academics conceive autonomy in their cloud-based pedagogic experiences? 4. How do academics' autonomies become constructed by these experiences?	

Figure 2. Mapping the research questions, objectives and methods

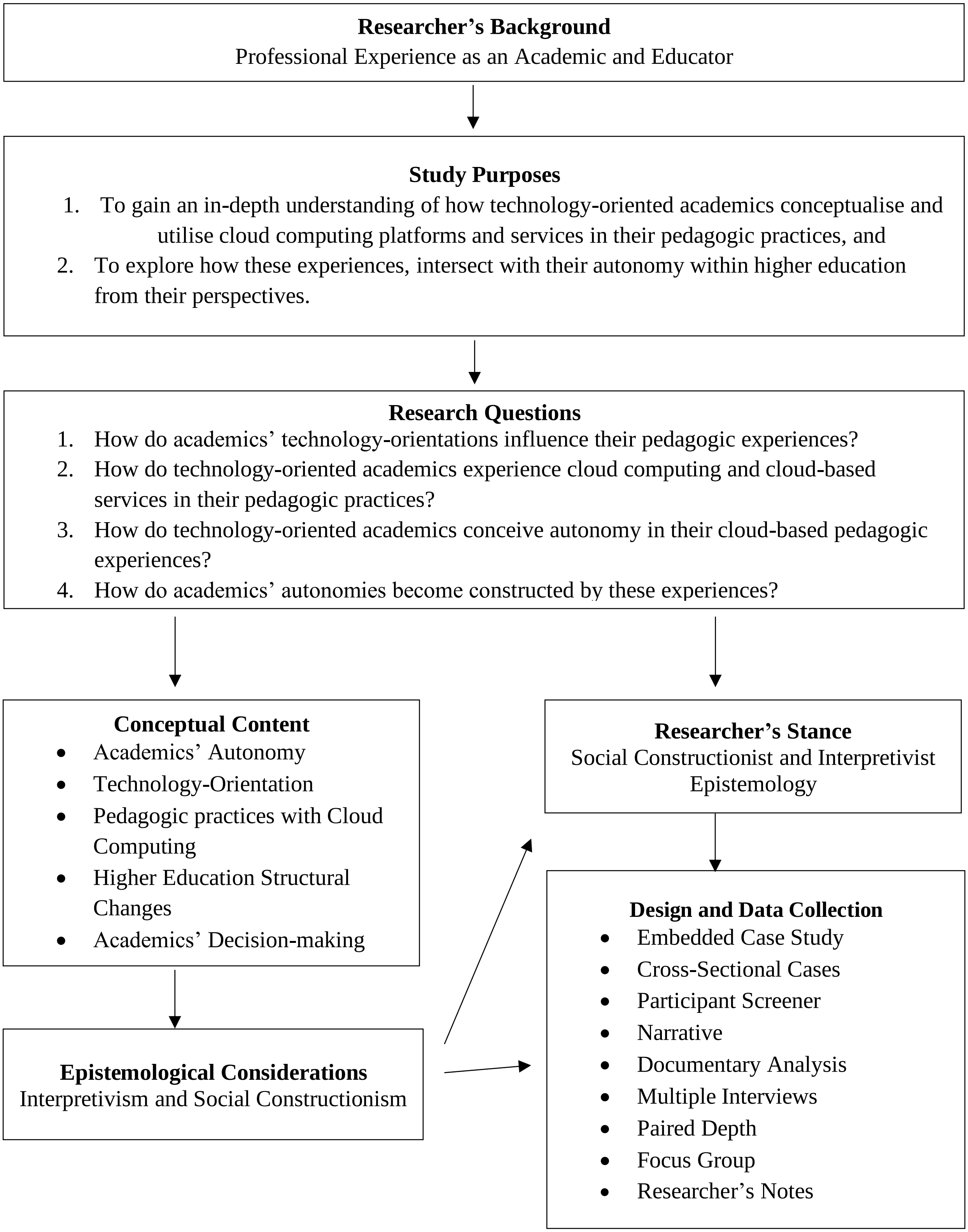

Figure 3. Representation of the whole study

1.9. Contribution and Impact

This study contributes to the field of intersectional studies between technology and HE contexts. It aims to develop an in-depth understanding of technology-oriented academics' autonomy intersections with their pedagogic practices with CC and CBS within HE. This aim emanates from the reviewed literature that evidenced the scarcity of philosophical alignment of academics' technology-orientation and autonomy outside western contexts. Ontologically, this study is underpinned by the shift in literature towards the influence of HE changes on academics' autonomy (Henkel, 2007; Ginsberg, 2011; Hall, 2018; Carvalho & Videira, 2019) within the current neoliberal turn in HE towards performativity and marketisation (Tight, 2019) and contentions on the influence of CC on the ethics of autonomy. The scope of this study transcends from the individual perspective of autonomy to the influences of academics' contexts, orientations, practices on their autonomy. However, it does not examine the broad and complex settings; instead, it focuses on the intersections between academics' technology orientations, practices and autonomy.

However, examining the realism and idealism (Cilesiz, 2011) of academics' orientations, concepts, practices and autonomy with CC would be partial to consider singular foci. Therefore, adopting a qualitative narrative approach, in this study contributes to understanding academics' experiences with CC and CBS from an individual and a social perspective at a time of HE changes. Epistemologically, the literature showed a conceptual gap in understanding the meanings and implications of deploying CC and CBS in HE contexts (Qasem, Rusli Abdullah, Atan, & Asadi, 2019). This means that the current deployments of CC will rest on a lack of understanding of its pedagogical potentials and implications (Laurillard, 2007; Neuman, 2014). Therefore, this study contributes to understanding academics' orientation, experiences and autonomy at a time of HE changes. It also raises important questions concerning the implications of academics' autonomy and institutional autonomy impacts upon the ethical practices with emerging technology.

Methodologically, research in EdTech has been criticised for its positivist approaches (Willis, 2008; Neuman, 2014). This prevailed in the dominance of quantitative studies on CC. Therefore, a qualitative narrative approach (McAlpine, 2016; Moen, 2006) was employed to examine nine technology-oriented academics. A contemporary approach that fits with the qualitative nature of this study (Savin-Baden & Tombs, 2017) entailed group and individual interviews (Yin, 2018), boundary-crossing and boundary objects (Akkerman & Bakker, 2011). These were used in 'paired depth' and 'focus group' to stimulate discussions and bridge the gap between academics' practice in physical and digital spaces.

1.10. Thesis Structure

This thesis consists of six chapters. In this chapter, I introduced the study motivation, scope, impact and links to my professional experience, why I believe academics' autonomy matters to their educational practices and why I undertook this research with a focus on the CC and CBS. Chapter 2 presents the reviewed studies from three viewpoints. The first examines the meaning of autonomy to lay the grounds of understanding academics' autonomy. This also helped in setting focus on the second viewpoint that explores the emergence of CC and CBS in HE and the influence on pedagogic practices. The third explores the intersections between autonomy and pedagogic practices with CC and CBS. Chapter 3 presents the overarching methodology and quality measures that address the study aims and questions. In line with the nature of autonomy and pedagogic practices with technology, a constructivist qualitative approach was most suitable. Chapter 4 presents the findings of the gathered data using narrative and thematic analysis. The analysis initially yielded a hundred and fifty-five themes, condensed to eleven themes and three outcomes that summarise the participants accounts of their technology orientations, pedagogic experiences with CC and CBS and autonomy. Chapter 5 presents a discussion of the links between these findings and the literature. I argue that academics' professional orientations, practices and conceptions in the context of cloud-based pedagogy give a new structure to their autonomy. I conclude with Chapter 6 by reflecting on my experience as a researcher and an internal academic. I present my notions that would be useful for academics, policymakers, managers technology leaders, and scholars who encounter CC and CBS in their practices, strategies and scholarship. The conclusion highlights the limitations of this study and recommendations for future research.

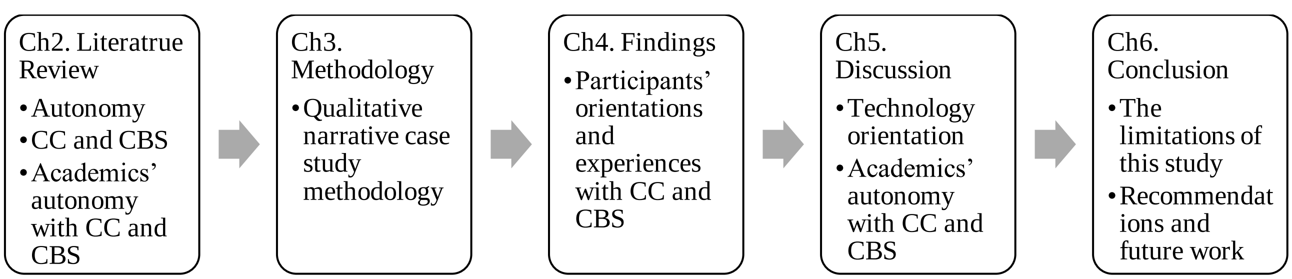

Figure 4. The layout of this thesis

Chapter 2. Literature Review

2.1. Introduction

This chapter presents the theoretical framework of this study, exploring the construction of HE academics’ autonomy within the context of their pedagogic experiences with CC and CBS. Evident from the reviewed literature is the scarcity of studies on academics’ autonomy with emerging technology within the GCC context. While this gap asserts the need for expanding knowledge in this area, it led me to draw upon diverse, yet interconnected studies. The theoretical framework developed in this study combines academics’ (1) academics’ autonomy, (2) technology orientation, (3) pedagogic experiences with CC. Therefore, it is organised into three sections. The first explores the meaning of autonomy and personal autonomy to develop grounds for academics’ autonomy within HE contexts. This review summons the structural HE changes, beginning with the ‘golden age’ of academics’ autonomy in the 1960s that contracted into a performative culture and the emergence of technology in the 1980s and the current state of the neoliberal turn towards institutional autonomy. The second explores academics’ technology orientations and their pedagogic experiences with CC and CBS. It presents the chronology of CC and CBS emergence in HE and research focus. These two strands set out the intersections between academics’ orientations, autonomy, and practices with CC within institutional and contextual structures.

Moving on, I introduce the research concerning the concept of autonomy as academics’ capacity and vehicle for self-directed behaviour individually, socially and structurally constructed within HE (Henkel, 2007; Carvalho & Videira, 2019). I aim to step in the current state of academics’ pedagogic experiences with CC that emerged in the frame of ‘democratising’ knowledge development (Beira & Feenberg, 2018) through ubiquitous and affordable access to ICT resources and data (Filippi & McCarthy, 2012). Therefore, the reviewed literature is based on research that:

1. Examined developing philosophical and practical bases of academics’ autonomy that has been increasingly confined with the emergence of technology.
2. The increasing EdTech utilisation in and for instructional and curriculum design and pedagogy across all educational levels.
3. CC (model, services, and platforms) to understand how and why academics make decisions about utilising, or abstaining from utilising, it in their pedagogic practices.
4. The disruptive nature of technology interventions questioning autonomy, risks and ethical decision-making and a focus on technologies that enticed ethical dilemmas.

2.2. Conceptualising Autonomy in Higher Education: Philosophies and Tensions

2.2.1. Personal Autonomy: Value, Possibility and Dynamics

Autonomy continued to merely denote a political status of a city, an organisation or a group of people until the18th century when Immanuel Kant (1724-1804) first invented it as a fundamental concept for human ethics and morality (Shell, 2009; Al-Bar & Chamsi-Pasha, 2015, p. 115). Kantian's theory proposes that personal autonomy denotes actions following logical judgement, reasoning and rationalisation (Shell, 2009). It treats autonomy as an equal to 'subjective', but personal autonomy expositions chiefly ethical and moral, decision-making (Shell, 2009). This notion was revolutionary since it departed from the religious and political obedience and doctrine dominant to logical and scientific reasoning; bounded by morality and ethics. Therefore, the Kantian's limits of autonomy and reasoned morality expounded a paradox about its nature and feasibility (Shell, 2009).

Ontologically, personal autonomy has been situated as an individual and social concept. During the 1980s, some western collections examined its value, antecedents and possibility. Several philosophers (For example, Dearden, 1972 and 1983, Young, 1986; Dworkin, 1988; Haworth, 1986) joined Kant in dealing with autonomy as a possible capacity with ethical, reasoned and informed decision-making. Most of their personal autonomy expositions examined it from a psychological, behavioural, social, and political perspective.

The Value of Autonomy

Several philosophers (For example, Ryan, Mims, & Koestner, 1983; Young, 1986; Haworth, 1986) agreed that the intrinsic value of autonomy rests on the individuals' capacity to reach their mental ideal. Young (1986, p. 29) accentuated that autonomy is a value for self-ideal; suggesting that it is subject to intrinsic and extrinsic influences, hence, positive and negative outcomes. This notion indicates that autonomy is a local, contextual, temporal, and changing concept. Conversely, Hogan (1983) suggested that complacency leads to autonomy (or vice versa) granted that self-aware individuals who can define their social roles are more conscious of their actions; hence, more engaged and mature. This idea indicates that autonomy links with the constituents of self-identity that Hogan (1983) measured through capacities, feelings, values, aspirations, and behaviours.

This means that mature individuals develop autonomy as a global attribute that characterises their identity. Likewise, Haworth (1986, p. 183) argued that autonomy is inherent in all individuals’ personalities since birth; however, it entails a fostering ecology. His notion also indicates that individual autonomy can be a global attribute. Its value manifests in its capacity to mediate individuals’ self-esteem; hence, it can only be perceived through their behaviour.

However, Dworkin (1988) believed in the split or hierarchical self and individuals’ ‘free will’ and independently reason what they initially thought desirable. In Dworkin’s (1988) sense, individuals’ behaviours rest on the authenticity of their motives; thus, Dworkin’s (1988) defined autonomy as a function of authenticity, independence and control, relying on individuals’ capacity to take actions. Likewise, most autonomy philosophers (For example, Ryan, Mims, & Koestner, 1983; Haworth, 1986; Dworkin, 1988; Young, 1986; Shell, 2009, Deci & Ryan, 2012) agreed that competence (knowledge and skills) is key to autonomous behaviour. Ryan et al.’s (1983) Cognitive Evaluation Theory (CET) suggested that combining competence with autonomy and relatedness enhances individuals’ well-being and self-motivation through making authentic and informed decisions. They also indicated that extrinsic motives could be altered to intrinsic when individuals independently realise their value. Their theory was backed by Dworkin’s (1988) notion that individuals’ volition of decision-making relies on their knowledge all the available options that enable them to rationalise and evaluate before taking action.

Links between autonomy, decision-making and behaviour have been recursively explored through the outcomes of autonomy. Although Hogan’s (1983) suggestion that the level of individuals’ ownership of decisions, and mediating influences and choices, indicates the authenticity of actions regardless of their outcomes. However, Haworth (1986), denied a dichotomous view of autonomy by suggesting that it proceeds in a continuum of behaviour between minimal (attempts to take action) and normal (efforts lead to actual functions and critical reflection) autonomous action. Haworth (1986) further discerned between autonomous and non-autonomous decision-making based on its positive value to support autonomy, indicating the bidirectional relationship between autonomy and decision-making. Autonomous decision-making also materialised in Ryan and Deci’s (2020) work on Self-Determination Theory (SDT) that suggests individuals’ competencies and intrinsic motivations determine the level of their self-regulation (See Figure 5). SDT is a macro theory, as Ryan described it to me *“a framework for understanding factors that facilitate or undermine motivation*”. Supported by autonomy, competence and relatedness, SDT draws on individuals’ capacity to regulate their intrinsic influences and reasoning within a continuum of least to most autonomous decision-making.

In addition to individuals’ distinct features, SDT comprises intrinsic and extrinsic motivations and frames these classifications within a relative autonomy continuum. Some forms of extrinsic motivation (those that are well internalised) are relatively autonomous. However, it considers the volatility of autonomy as a sense of initiative and ownership in individuals’ behaviour. The SDT also suggests that the weakness of the will and absence of freedom can limit functional capacities to make decisions and undertake actions, weighing more on individuals’ intrinsic motivations, volitions and causation. SDT lends itself to theories of personal autonomies and human motives to control their actions and behaviours. It reframes Young’s (1986) thought that individuals operate within their self-ideal and contextual settings, and Dworkin’s (1988) argument that individuals strive to make decisions that support their autonomy. However, the taxonomy of SDT seems to partially assume that individuals’ perceptions and responses are the defining characteristics of their behaviour.

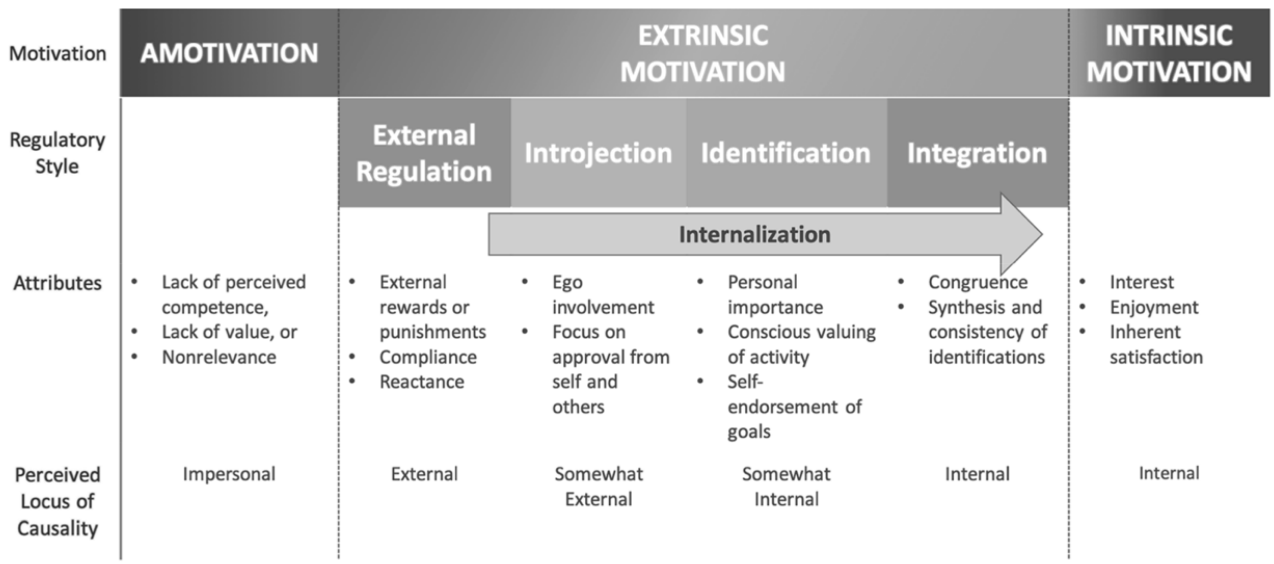

Figure 5. Ryan and Deci’s (2020) view of the taxonomy of the Self Determination Theory

Nevertheless, according to these theories (For example, Ryan, Mims, & Koestner, 1983; Haworth, 1986; Dworkin, 1988; Young, 1986; Shell, 2009, Deci & Ryan, 2012), personal autonomy is understood as a composite and positive capacity that can be developed and maintained within appropriate contexts and resources. It manifests in its indicators and constituents including:

- Freedom and Independence from External Influences
- Self-Control, Self-Governance, Self-Regulation
- Competence and Self-Efficacy that Support Informed Decisions
- A Critical Reflection that Influence Action, Development, Change and Ethical Conduct
- Intrinsic Motivation

The Possibility of Autonomy

In contrast, some philosophers contended the possibility of personal autonomy given its subjectivity. Opposed to Rayan's (2016) notion that rewards undermine intrinsic motivation, Skinner (2003), negated autonomy, assuming that individuals operate within specific structures and are influenced by others' ideas. He believed in computers or 'learning machines' that could receive behaviour and provide feedback and reinforcements. In support of his view, Skinner (2003) coined 'operant conditioning', a branch of behaviourism that frames the impact of positive or negative reinforcement on individuals' behaviours. Although his model has been the bedrock of educational technologies and games that provide the learner with immediate feedback to stimulate their learning, it mistakenly reduces pedagogy into a routine process and directions. It essentially suggests that pedagogy relies on extrinsic motivations, while evidently, pedagogy seems a much more complicated process (Aubrey & Riley, 2018). However, examining autonomy in organisational contexts other than education bears a similar ideology. Davis (1996), argued that personal autonomy, in the sense of self-governance and initiation of actions, might counteract organisational authority and professional code of conduct. He alluded to enabling autonomy by leaving a 'domain' of power concerning their work activities. This notion ties with Haworth's levelled and Kantian's limited autonomy. Davis agreed with Dworkin's assumption that individuals could be autonomous when they have the choice to undertake a specific action regardless of their source and nature. Although decisions, rationalisation and critical reflection may hinder decision-making and change or result in adverse effects (Dworkin, 1988). This means that autonomy might fail to support efficient selection and decision. Young (1986) suggested that the value of autonomy rests on its positive return. Therefore, it can be valued if it helps individuals achieve change in knowledge and behaviour (Haworth, 1986; Dworkin, 1988). Such confusion is underpinned by theories that link autonomy with authenticity. Authenticity can be considered a multifaceted concept that connects to individuals' conceptions and behaviours. Hogan (1983) held that individuals reach maturity when their identity integrates with cultural and social contexts.

In comparison, Haworth (1986) suggested that autonomous individuals must have their capacities, competencies, ideas, beliefs and values that construct their identity and authentic self. To Haworth, these prerequisites are imperative for critical reflections and informed decisions. In this sense, Dworkin (1988) suggested that making informed decisions that satisfy individuals' first-order desires far from paternalistic influences leads to authentic actions. Based on these theories, the possibility of autonomy remains questioned.

The Dynamics of Personal Autonomy

Personal autonomy's positive and negative effects emanated from the subjectivity of human behaviour, their values and interactions with, and responses to, their social network or elements within their ecology (Young, 1986; Haworth, 1986). Confusion about the meaning of autonomy emanated from the lack of understanding of its nature (Dworkin, 1988). The literature is not settled whether autonomy is as a capacity, human right, disposition, ethical responsibility or an obligation. Ontologically, autonomy rests on intrinsic and extrinsic antecedents (Young, 1986). Central to this philosophy is emphasising its value (Young, 1986; Shell, 2009).

Some scholars (For example, Young, 1986; Deci & Ryan, 2012) focused on the intrinsic values of autonomy for personal and social benefit through ethical and moral behaviour (Shell, 2009), self-satisfaction, character-ideal (Young, 1986), desirable change (Haworth, 1986), reasoned decision-making (Dworkin, 1988) and motivation and self-determination (Deci & Ryan, 2012). Essentially, self-governance reinforces competence development and critical reflection, while competence reinforces informed action and change (Haworth, 1986; Young, 1986). However, these imperatives might get lost in the continuum of overly individualised and overly socialised societies that manifest the dual impact of autonomy (Dworkin, 2015). Several philosophers viewed autonomy from an idiosyncratic perspective by proposing that it is the capacity to endorse personal decisions, emotions and actions that require nurturing to enable informed decisions, development and positive change. However, proponents of autonomy considered its utility to support others.

From this perspective, Walker-Gleaves (2010) exposition of the ethics of care suggests that despite the high expectancy of commitment, moral responsibility and obligation, academics might decide, or be compelled, to employ ‘pedagogy of care’ voluntarily. Walker-Gleaves suggested that care is personal and equally social and aims at motivating university students’ attainment and development. Her articulation of care being self-determined, although motivated by satisfying students’ needs, shows that the value of autonomy is contingent on its applications. This notion supports Ryan et al.’s (1983) ideas that intrinsic motivation comprises relatedness to social benefits, competence and autonomy. In making sense of these controversies, Davis (1996) discerned personal autonomy from moral autonomy by describing the latter evaluating individuals’ responsibilities and ethics, while former as protection against undesirable influences. Although these connotations indicate tensions between collective and individual autonomy, they assert that their meaning and impact vary based on its applications (Davis M. , 1996).

Central to the philosophical and ethical frame of autonomy is its application in diverse contexts. In the field of bioethics, individuals' autonomy manifests in patients' consent to decisions concerning their health regardless of their ability to make a sound judgement (Al-Bar & Chamsi-Pasha, 2015). In business, it involves professionals' conduct, identities and capacities to operate, fulfil duties while adhering to policies, standards and procedures, raising questions of equity and professionalism (Davis, 1996). In politics, it involves rules and laws; but questions paternalism and sovereignty (Fox, 1985). In engineering and technology, it could refer to instrumental, social and legal aspects of dealing with automation according to predefined instructions, counteracting human control and certainty (Skinner, 2003). There has also been increased attention to feminist studies, women's autonomy and their ability to participate in decisions pertinent to essential matters concerning their futures, lives and household (Agarwala & Lynch, 2006). The conceptions of issues that arise within these contexts assert the complexity and duality of autonomy and its association with individuals (Dworkin, 2015). Hence, autonomy can be considered a global and local attribute that is attached to individuals' identity and affects. However, it is overwhelmingly questionable how academics level their interests with students learning (Duchatelet & Donche, 2019).

Regardless of its impact, the applications and implications of autonomous and self-determined behaviour can be used to measure effective professional practice (Deci & Ryan, 2012). However, some autonomy philosophers (For example, Haworth, 1984; 1986; Young, 1986, Dworkin, 1988, 2015; Gibbs, 2018) cautioned that predicting the implications of autonomy in a 'consequential' or even 'presupposition' approach is a complex undertaking. They rightly alluded to the subjectivity and infinity of consequences when a behaviour concerns personal autonomy. Despite being desirable, scholars weighed the possibility of adverse outcomes of autonomy which instigated debates on its dual effects. Examples include Young (1986) who insisted that autonomy must be treated critically and should not be perceived as an optimal good and reasoned that individuals' will, judgments, interests and preferences are often contextual, limited, contradicting or conflicting. This means that autonomy could have adverse and positive effects on its holders and their social networks (1986). In similar veins, Dworkin (1988) cautioned that individuals' autonomy and group autonomy could be a cause of tensions due to individuals' lack of sound judgement or group's paternalistic intrusions. He contested that committing to the whole's welfare could cause conflict with individual autonomy and reasoned that individuals could remain autonomous when they purposefully decide to give precedence to others' needs over their needs (Dworkin, 1988). However, one could argue that tensions could arise from stifling individuals' autonomy.

Going back to Kantian's (Shell, 2009) theories, collective autonomy negates individuals' self-governance as it bests obedience, compliance and orientations towards others' preferences (Shell, 2009). Despite his defence of individuals' right to decide what to believe and reason what to do, Dworkin (1988) maintained that apathy to group's interests could inevitably cause injustice. Dworkin argued that the conditions or antecedents of autonomy (competence, self-governance, critical reflection and motivation) are normative standards for desirable behaviours. These parameters could be sources of power and tensions that could paradoxically end in confining autonomy. These different and dual trajectories indicate that autonomy is examined as a psychological and socio-political tension that could contradict justice, authority, and sovereign (Dworkin, 2015). The implications of autonomy have been associated with the sensitivity of different contexts (healthcare, engineering, politics, etc.). The application of autonomy in the fields of the healthcare, biomedical or bioethics sciences, showed that practice is constrained by patients' consent (Dworkin, 2015; Al-Bar & Chamsi-Pasha, 2015). The need to evaluate what healthcare providers are aware that their decisions could be determined by complex factors (Al-Bar & Chamsi-Pasha, 2015). Likewise, education is concerned with individuals' minds, capacities, developments and endeavours, which posits autonomy as problematic and contradictory (Ginsberg, 2011).

The dynamics and dual-track of autonomy might not merely rest on its nature (right or obligation) (Hawthorne, 1986), value (intrinsic or instrumental) and outcomes (positive and negative) (Dworkin, 2015), applications in different contexts), but also on its possibility (presence and absence), ethical applications and implications (Haworth, 1986; Dworkin, 1988; Young, 1986; Shell, 2009, Deci & Ryan, 2012). Autonomy has been associated with ethical qualities (For example, dignity, integrity, human right, character ideal, self-realisation, self-satisfaction, self-efficacy, critical reflections, motivation achievement of outcomes), and equally with unethical practices (For example, apathy, passivity, malfunction, prejudice, dishonesty and injustice) (Cummins, 2014). Understanding its impacts is much more complicated than understanding its nature and antecedents (Dworkin, 2015). However, autonomy's dual-track enhanced the understanding of the philosophical underpinnings of academics' autonomy within HEIs contexts. To sum, this review presented the etymology of autonomy, what it means and its characteristics regarding individuals in general contexts; but what does autonomy mean for HEIs in the current policy changes and the emergence of externally hosted technology services? And why it is imperative? In the next subsections, I present an overview of the literature on institutional and academics' autonomies; exploring some of what Neil Selwyn (2019) called 'pre-digital theories' that might explain academics' encounter with emerging technology.

2.2.2. Autonomy in Higher Education: An Aim or a Utility?

Autonomy is an inherent and fundamental concept for HEIs (Berdahl, 2010; Wermke & Salokangas, 2015; Coffield & Williamson, 1997; Turcan, Reilly, & Bugaian, 2016). It links to the aims of HEIs extended to teaching and learning, research and knowledge development, and engagement (Coffield & Williamson, 1997; Clark, 2004). It has been pivotal for supporting these aims and defining academics’ practice (Turcan, Reilly, & Bugaian, 2016). Frostenson (2015) envisaged that autonomy in HEIs contexts entails three dimensions: the individual academic’s autonomy, department’s autonomy and management’s autonomy. While this triad classifies the ‘social boundaries’ within HE (Dworkin, 2015), it overlooks crucial elements such as students’ autonomy, policies, strategies, operations and resources that govern these boundaries (Hall R. , 2018). I assert these boundaries from my professional experience, which informed me of the variances in academics’ and departments’ power and authority. My capstone projects, coordination showed me that decision-making related to allocating projects, matching students with supervisors, scoping ideas and acquiring resources is a venue for tension (Fincher, Petre, & Clark, 2001). Fincher, Petre, and Clark (2001) cautioned that these tensions prevail when resources are involved. Within these processes, students’ autonomy aims to enable their independent learning (Duchatelet & Donche, 2019). However, autonomy in HE cannot be reduced to a set of interactions between actors (Maton, 2006). On this notion, focusing on role structures is partial to conceiving autonomy in HE contexts. Tracing back the history of autonomy in HEIs could provide an understanding of its underpinning theories.

A Historical Look back at Academic Autonomy

According to Giroux (2020) a critical sense entails a view of historical developments; hence, an authentic look back at academics’ autonomy could better understand their current state. Western universities until the 1960s were rooted in liberal education, and academic autonomy represented faculties’ collective capacity and authority (Jencks & Riesman, 1968; Gosden, 1969; Dearden, 1983; Maton, 2006). Jencks and Riesman (1968) and Gosden (1969) typified a similar image of academics in the US and UK, respectively. Academics enjoyed affinity, power and trust, freedom to make decisions, and ‘privileges’ to earn a reasonable income and afford extravagant work-life style (Gosden, 1969). Their intellectual renown bestowed them power and an elite work-life (Jencks & Riesman, 1968; Gosden, 1969; Dearden, 1983).

In the UK, during the 1900s, the golden era was followed by communities establishing civics universities, as Macfarlane (2007) noted, despite sustaining faculties' autonomy, civics universities were expected, in return, to serve their communities by offering applied curriculum and fair access. However, academics continued to maintain a closed 'collegial'[2] structure representing their exclusive fraternity (Gosden, 1969; Jencks & Riesman, 1968). Jencks and Riesman (1968) reasoned that academics' consensus was a result of confidence in and agreement on ways of operation and future outlooks. Peers within their discipline often reviewed their intellectual work (Jencks & Riesman, 1968). Due to these means, academics claimed professional status and freedom to make their decisions[3], indicating their autonomy. Although academics' autonomy was a sign of professional integrity, resilience to external influences (For example, politics and market) and critical for their scholarship, their excessive spending and extravagance lifestyle was perceived a 'burden' on the society and as vicious habits. Their affinity indicated their idleness, passivity and lack of engagement with the market and societal demands; indicating a dual impact of their autonomy (Gosden, 1969; Campbell, 1975; Baldridge, Curtis, Ecker, & Riley, 1973). Their practices passed on to their students who followed the same path to the extent that they became accustomed to demanding incentives to learn (Gosden, 1969; Jencks & Riesman, 1968). Although all expectations universities were not obliged to evidence quality (Jencks & Riesman, 1968; Gosden, 1969), instead, 'discipline' and 'good conduct' through objective research and merely meeting between tutors and tutees were considered sufficient.

The 1980s witnessed two congruent; however, conflicting turns, the enactment of quality and response to employability and market demands. The economic recession, as Macfarlane (1992) noted, caused a stagnation in the employment rates that provoked university graduates' competition to join the job market. A culture of utility, skills and performativity stimulated changes towards student-centred approaches, increased assessment and quality standards disrupted academics' autonomy (Macfarlane, 2001). The enactment of quality standards was motivated by safeguarding outcomes and universities' and academics' worth to their societies. Departing from traditional internal peer reviews (Gosden, 1969), quality ever since has been debatable across all educational levels (Coffield & Williamson, 1997; Macfarlane, 2001).

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2 The collegial structure emanated from the concept of 'university' coined by Bologna's universitas magistrorum et scholarium, which means "community of teachers and scholars".
3 Jencks and Riesman (1968) also noted academics in the US gained their power from contributing to scientific development and skills during and post the war era.

Despite improving students’ attainment, the external evaluations were perceived as an intrusion on the academic profession (Macfarlane, 2001). However, the increasing number of students and institutions sizes into what was termed as ‘massification’ challenged quality education. Attracting industry for funding research and employing students and the emergence of ‘marketisation’ amplified pressure on academics to meet quality standards (Coffield & Williamson, 1997). The university started to turn into complex structures with multiple functions and service departments (Macfarlane, 2007). The orientation towards market demands and the emergence of utility and performativity cultures ascended threats on academics’ values. The American superseded the British HE in turning towards collaboration with industry and responding to market demands. Such directions have been problematic for academics’ autonomy. Eisenberg (1988) disputed the explosion of administration size and authority in American universities that entwined legally abiding academics to engage in collaborations with industry. Eisenberg’s (1988) cautioned that engaging academics in sponsored scholarships distorts their ethics and values.

On the other hand, there have been views that such directions are necessary for economic development and vitality of the academics’ practices. Stanfield (2008) noted that vocational and entrepreneurial education cultures had been rooted in the establishment of US for-profit colleges. Stanfield (2008) accentuated the successful outcomes that yielded from the entrepreneurial models, indicating that an association between HE and market yield rewarding outputs. However, Stanfield noted the need to discern the different types of education (academic, vocational and entrepreneurial). Nevertheless, discourses about the influence of diverting institutional directions towards economic and political cultures have been ascending neoliberal ideologies (Tight, 2019).

A Contemporary Perspective of Academic Autonomy

Since the 1990s, academic autonomy has been redefined to separate institutional autonomy from academics’ autonomy. Berdahl (1990) signified academic autonomy into ‘substantive’ referring to the institution’s freedom to decide its fundamental aims, vision and mission and ‘procedural’ institutions ability to determine processes to achieve these aims. This definition showed that authority and decision-making in HEIs have become distributed amongst multiple levels. Concerns about the influence of external power on the academy were alarming. Berdahl (1990) contended the termination of public funds from the British HEIs on the premise that it coerced them to seek alternative sources of funding to maintain their sustainability.

Berdahl's (1990) contention emanated from the concerns about the influence of directing universities attention to external power. However, this ideology discounted the ramifications of institutional on the individual academic autonomy within the academy. Several universities worldwide have been proclaiming institutional autonomy to promote efficiencies and sustainability and freedom from government power (Carvalho & Diogo, 2018; Enders, Boer, & Weyer, 2013; Nokkala & Bladh, 2014; Casson, 2019). Maassen et al. (2017) described institutional autonomy as the relationship between HEIs and external authorities. This is similar to Bourdieu's notion of relational autonomy in HE that has been weekend due to increasing 'marketisation' and competing for industry funding (Maton, 2006). Although the European University Association (2020) emphasises autonomy as a necessary means for HEIs' successes and societal and economic developments, these aims paralleled demarcating institutional autonomy into layered autonomies related to academic (For example, several students, admission requirements, degree programs, curriculum, admission and graduation requirements), managerial (For example, finance to support assets and human resources management, organisational (For example, policies and quality assurance) (Nokkala & Bladh, 2014; EUA, 2020). This turn surfaced a corporate culture exemplified in centralised executive authority, governances, and semi organisational structures expanded with academic and research directorates. Ginsberg (2011) and Hall (2018) contended that the administrative power is increasingly growing within HEIs as it reduces academics' influence on decision-making, leading to complex and deeply seated questions of how academics may be reasonably expected to undertake ethical decision-making.

Within this study, the ethical decision-making is bounded by academics informed, independent, and self-governed decision-making that bestows them critical reflection and responsible pedagogic practices using CC and CBS. This frame benefits from Macfarlane's (2007) notion on the changing role of academics towards working in partnership with their institution on enacting work processes, decision-making, and engagements with the internal and external contexts. It also lends itself to the Kantian (Shell, 2009) theory of moral autonomy that entwines rational judgement, reasoning and sound decision-making. While this study does not engage with the ethical, pedagogical conduct in Macfarlane's (2007) sense, it explores academics' tendencies to develop their digital competence and autonomy (Passey, et al., 2018) to make informed decisions and whether academics stumble upon the ethics of using CC and CBS independently and with their peers, managers, and students as a critical aspect of their pedagogic practices with the increasing exposure of personal data and intellectual property (de Bruin & Floridi, 2017; Filippi, 2013).

Likewise, Ginsberg (2011) argued that undermining academics' autonomy has been partly academics' responsibility due to their lack of engagement in critical decision-making and negative framing of practices that harmed their integrity, ethical conduct and reputation. These contentions indicate that autonomy has become an issue of internal tensions and power within HEIs. Although, Macfarlane (2004) noted that despite the decline in power and enactment of assessment and quality standards and directions towards market demands, academics maintained a reasonable degree of autonomy within practices. These views allude to the complexity of HE changes and the contextual influences on academics' autonomy.

2.2.3. Academics' Autonomy: A Capacity for Ethical Conduct

According to the reviewed literature, academics' autonomy falls between their capacity, status and behaviour. Several scholars (Ryan & Deci, 2020; Gibbs, 2018; Aberbach & Christensen, 2018) examined academics' autonomy from multiple perspectives, including their mental health and well-being, professional conduct and pedagogic practices. Gibbs (2018) and Hall (2018) and Calvo et al. (2020) suggested that stifling academics' autonomy could adversely affect their self-satisfaction, mental well-being, motivation and engagement. As Niemiec and Ryan (2009) noted, these implications are imperative for the sustainability of academics' self-determination and effective performance. Duchatelet and Donche (2019) found that academics' autonomous practice is proportional to their autonomy-supportive pedagogy, indicating links between academics and students' autonomy.

Academic autonomy emanates from the primary aims of the university. Some studies (For example, Jencks & Riesman, 1968; Gosden, 1969; Morrison & McIntyre, 1975; Shell, 2009) suggested that HEIs establishment was aimed at knowledge development and enhancing societies' living quality. Hitherto, these aims hold despite the controversies on the impact of HE changes that redefined academics' authority (Coffield & Williamson, 1997; Clark, 2004). This obligation towards the society prevailed in the expansion of the aims of HE to include engagement. With this in mind, academics remain central in achieving the goals of HE (Coffield & Williamson, 1997).

Hence, academics are expected to maintain the highest level of competence and performance. Their competence necessitates not only knowledge development but also critical reflection, informed decision-making and internal and external engagement (Macfarlane, 2004, p. 55; Coffield & Williamson, 1997). For development to happen some scholars (Van Manen, 1995; Brookfield, 2017) accentuated the need to embrace critical perspective and reflection.

Such an argument is consistent with Haworth's (1986) notion of the need for critical perspectives for incurring change. However, there have been concerns that academics' critical reflection could cause uncertainty and distrust by their students and social contexts, which in turn could threaten their credibility and reputation. As Brookfield (2017) cautioned, criticising oneself and others could lead academics to imposter syndrome, cultural suicide, and innocence loss. Despite these risks, Brookfield (2017) argued that critical reflection in the frame of ethical pedagogy scrutinises academics and students' understanding of themselves and their contexts, which led him to suggest that it helps them depart from the normative into progressive ways of thinking. Likewise, Giroux (2020) called for 'critical' pedagogies that sway away from normative practices.

Hence, academics' self-reflection is directly linked with their development, practice and competence; however, it is problematic in the absence of self-governance. Their self-governance is imperative for their independent thinking, proactive behaviour and informed decision-making. Gibbs (2018) argued that academics' professionalism rests on their ability to deliver without continuous supervision and guidance. Davis (1996) and Lester (2014) argued that professionals' need for a considerable level of knowledge, independent judgment, and ethical conduct in a similar vein. However, Lester contended enacting codes of conduct that could confine professionals' practice and innovation since standards often settle with 'satisfactory' or 'minimum' level of competence. Lester (2014) discerned between the 'potential' of performance encapsulated in qualification capacity and 'evident' conduct at a certain quality standard that denotes competence. Hence, academics practices are more indicative of their competence. However, Lester (2014) accentuated that individuals' self-governance is a means for a higher competence order. Likewise, Davis (1996) contended the benefits of standardising professional practice. He further argued that professionals could be autonomous, had determined their work practices within the frame of structural and organisational contexts. These notions suggest that academics' autonomy is feasible within professional conduct.

Although several professional codes of conduct have been perceived as necessary for academics' practice, in Schurr's (1982) and Gibbs's (2018) sense, such standards stifle autonomy. The Professional Standards Framework (PSF) (Advance HE, 2011) in the UK situates HE academics' practices in the frame of competence, values, ethical conduct and behaviour. Similarly, the Council of Europe model of Competencies for Democratic Culture (Council of Europe, 2020)frames values, attitudes, skills, knowledge and critical understanding as critical competencies that should be addressed by educators, particularly multicultural educational environments.

The Professional Standards Framework (PSF) (Advance HE, 2011) in the UK situates academics’ practices in competence, values, ethical conduct and behaviour. Similarly, the Council of Europe model of Competencies for Democratic Culture (Council of Europe, 2020) frames values, attitudes, skills, knowledge, and critical understanding as critical competencies that educators should address, particularly multicultural educational environments. Common to these standards expecting academic to teach, assess, give feedback, maintain their competence, act ethically, instil values of ethics and democracy in their students. Such expectations indicate that academics need agile, proactive and informed capacities, (Knight, 2002; Ramsden, 2003). Likewise, some scholars (For example, Schwimmer & Maxwell, 2014) suggested that regulating autonomy within educational contexts is possible when the standards and policies are flexible, moralistic and designed in agreement with all stakeholders. However, Niemiec and Ryan (2009) accentuated that academics’ intrinsic motives should drive their practices, self-governance, competence and critical reflection. In this sense, teaching frameworks and teaching practice codes are better used for guidance rather than regulations. Academics’ autonomy in HE seems to be treated as a capacity and potential rather than conduct and practice. Kerr (2002) described autonomy as a form of relationship between individual academics and others. While Paulsrud and Wermke (2019) suggested that academics may seem, rather than be, autonomous when they have more tendencies to succumb to external influences.

In this sense, Academics’ ability to decide their professional development, pedagogic practices, assessment and engagements, has been linked to their awareness of their identity. Raaen (2011) examined autonomy from a Foucauldian perspective by defining teachers’ identities through their capacities and practices. His analysis led him to link teachers’ identity with their ability to work independently. This notion contradicts with the reality of HE academics whose practices and identities are socially constructed and situated within the broader contexts of their institution and society. In her study on the influence of the knowledge society on academics, Henkel (2005) reasoned that academics’ identity is borne with societal traditions; however, she soundly alluded to the role of values and boundaries in shaping academics’ identity. Her view is in line with Hogan’s (1983). Likewise, MacFarlane (2007) reasoned that academics’ ‘dual identity’, as academics and professionals, bestow them social acceptance as individuals who can do what they teach. Hence, academics’ identity awareness links directly with autonomy. To sum, defining academics’ autonomy must consider the individual, collective and contextual aspects based on four facets. First, academics are expected to be adept in their area of practice due to the duration they spent in developing their competencies (Knight, 2002).

Second, they are expected to handle a wide range of duties and roles that extend teaching responsibilities, pedagogy and curriculum design common to schools (Knight, 2002). Third, their work is often situated within the institutions’ contexts that encompass a range of disciplines, departments, support services (Hall R. , 2018). Fourth, HE academics’ roles entail preparing students for future jobs (Ramsden, 2003); hence, they are expected to respond to the contextual demands (Macfarlane, 2007) particularly in this digital era (Clark, 2004; Turcan, Reilly, & Bugaian, 2016). Hence, the next section presents connections between academics’ autonomy and pedagogy.

2.2.4. Autonomy: A Utility for Pedagogic Practice

Academics’ autonomy and practices are personal (Knight, 2002; Macfarlane, 2004; Tight, 2004). Emerging from the literature, academics’ autonomy implications on pedagogic practices can be understood in two dimensions; namely, autonomy-supportive learning (Niemiec & Ryan, 2009; Duchatelet & Donche, 2019; Yasué, Jeno, & Langdon, 2019) and autonomous practices (professional development, research, instructional design and internal and external engagements). Academics’ engagement in autonomy-supportive learning means that they need to articulate the meaning of autonomy to be able to apply it in their practices (Knight, 2002; Niemiec & Ryan, 2009; Gibbs, 2018; Vansteenkiste, et al., 2012; Duchatelet & Donche, 2019). Academics’ autonomous practice indicates their ability to operate and make decisions (Knight, 2002) while autonomy-supportive learning denotes specific practices that encourage autonomous learning and adjust students’ guidance (Duchatelet & Donche, 2019; Vansteenkiste, et al., 2012).

Autonomy-Supportive Learning

John Dewey’s work was seminal for subsequent contentions on prescribed learning, facts assimilation and filling students with static concepts in a paternalistic approach (Aubrey & Riley, 2018; Dewey, 1922; Benson, 2007). Dewey promoted progressive learning through hands-on and EXL; drawing on his belief that students must ‘learn to learn’ to be able to live in educational contexts and beyond (Aubrey & Riley, 2018; Dewey, 1922; Benson, 2007). Following this notion, Paulsrud and Wermke (2019) cautioned against academics’ autonomous practice that could adversely result in attracting students towards specific ideologies and constrain their nuanced and innovative thinking. As Macfarlane (2004) noted, such practices confine not only students’ knowledge but also jeopardise academics’ ethical conduct. Ginsberg (2011) gathered academics’ unethical incidents that could have caused this treason on their freedom and autonomy. Hence, the aims of autonomous practices and autonomy-supportive learning must be carefully regarded.

Specific to HE, Malcolm Knowles (2005), accentuated that academics should account for their students' experiences by promoting self-directed, independent, long-life learning in what he referred to as 'andragogy' to discern adult learning from school students' 'pedagogy' (Aubrey & Riley, 2018). This account promotes academics' role in vitalising students' learning. Studies that examined the impact of autonomy-supportive learning have shown variances in identifying its constituents. Vansteenkiste et al. (2012) suggested that SDT (Ryan & Deci, 2020) and its implications rest on academics' instructional design and teaching configurations underpin autonomy-supportive learning. This notion indicates that clear expectations support students' self-regulation and motivation for learning (McLachlan & Hagger, 2010).

Empirical studies (Vansteenkiste et al., 2012, Oriol-Granado et al., 2017; Duchatelet & Donche, 2019; (Costello, 2019) Ryan & Deci, 2020) showed that academics' autonomy-supportive practices have emotional and behavioural implications on students. Ryan and Deci's (2020) collection on motivation maintained that internalising motivation indicates positive outcomes across all educational levels. They gathered that autonomy-supportive pedagogic practices motivate students' confidence, sense of responsibility, well-being and learning internalisation, autonomy in employment. Duchatelet and Donche (2019) examined these implications from the students' perspectives and found that autonomy fosters their achievement, lifelong learning, self-efficacy and competence. Likewise, Oriol-Granado (2017) found that it enhances students' confidence, engagement and attainment. I can assert these positive implications from my capstone and industry projects' coordination experience. Enabling students to make decisions for their projects' idea, requirements, design and development, promotes their sense of ownership and responsibility. Fincher et al.'s collection (2001) of the politics of capstone projects validated such claims.

Conversely, if not effectively implemented, autonomy-supportive learning might be negatively perceived. For example, during the first years of learning, students face complex learning challenges that require expert interference; otherwise, they tend to lose their intrinsic motivations to learn. In such cases, autonomous and independent learning could impede their progress (Duchatelet & Donche, 2019). Students often perceive academics' exodus from their struggle with learning as signs of incompetence, idleness, and passivity (Walker-Gleaves, 2010; Costello, 2019). Therefore, academics should attune their autonomous-supportive practices to their students' needs through setting clear goals, ongoing interaction, tailored assessment, guidance, feedback, and timely responses (Duchatelet & Donche, 2019). Such evaluation considers students' nuances imperative for determining whether, how and when to employ autonomy-supportive strategies (Duchatelet & Donche, 2019) and, as Knowles noted (2005), attune to the students' needs.

Academics’ Autonomous Practice

Academics’ practice is increasingly predicated upon questions of ethics and morality (Macfarlane, 2004; Knight, 2002). Their ability to timely adjust their practices requires a sense of commitment, experience, and social and cultural sensitivities (Macfarlane, 2004; Knight, 2002). Their work-life involves a range of responsibilities such as curriculum development, instructional design, pedagogy, assessment, supervision and research(Macfarlane, 2004; Ramsden, 2003). These duties entail self-competence, self-efficacy, informed and ethical judgment and decision-making (Macfarlane, 2004; Knight, 2002). Biggs and Tang (2011), proposed an ‘alignment’ between learning objectives and outcomes by matching curriculum, practice and assessment to enhance the quality of teaching and learning in HE; however, they stressed that this should not prescribe academics’ practice, instead, it should inform proactive considerations.

Besides, adjustment and changes, within the emergence of constructivist, and expectancy theories, entail academics’ emotional intelligence, proactiveness, responsiveness (Castle, 2006; Clark, 2004) and engagement in social interactions at several levels and in various modes and contexts (Knight, 2002). However, Biggs and Tang (2011), accentuated that tertiary level academics’ practices are often influenced by contextual factors that confound their practices. Such complexity is expected to instigate ethical dilemmas that require academics’ discretion, informed decision-making and sound judgement (Macfarlane, 2004; Knight, 2002). These means indicate that autonomy-supportive learning is profoundly contingent on academics’ autonomy (Gibbs, 2018; Duchatelet & Donche, 2019). I side with Ryan and Deci (2020) argument that academics need to be autonomous themselves to exercise autonomy-supportive practices. As Knight (2002) and Bédard (2015) noted, teachers’ autonomy manifest in their ability to decide their curriculum, teaching and learning practices and resources. However, the turn towards neoliberalism in HE featured redefinition of autonomy and changes in the domain of decision-making (Tight, 2019; Hall R. , 2018; Casson, 2019; Wermke & Salokangas, 2015).

Besides, personal autonomy theories indicate the dual implications negatively framed academics’ autonomy (Macfarlane, 2007). This perhaps led to the enactment of outcome-based learning and quality policies (Manatos, Rosa, & Sarrico, 2017a). Although stressing academics performances might undermine their motivation and autonomy (Knight, 2002; Ginsberg, 2011; Niemiec & Ryan, 2009) and the ability to employ aligned and practical curriculum, instructional design, pedagogy and assessment strategies (Habib & Johannesen, 2014; Turcan, Reilly, & Bugaian, 2016). Hence, academics need a considerable level of autonomy within the framework of learning outcomes (Cotelnic, et al., 2015; Casson, 2019), quality standards and teaching (Manatos, Rosa, & Sarrico, 2017b; Biggs & Tang, 2011). Given the perception that academics’ autonomy could potentially undermine their commitment, engagement, informed and ethical decisions (Macfarlane, 2004; Riley, 2011; Cummins, 2014), there is a need to examine the dual and complex intersections between their autonomy and pedagogic practices in such an increasingly growing technological and data-driven era. Hence, in the next section, I explore these intersections from the broader view of academics’ technology orientation before narrowing it down to the angle of CC and CBS. Accordingly, autonomous-supportive learning practices include:

- The use of non-controlling and non-directive language (The use of ‘can’ versus ‘must’)
- Supporting students’ in varying their learning approaches
- Empathising with students’ learning challenges and failures
- Provisioning informative instructional language
- Devising fair expectations and soliciting students’ opinions and engagements

2.3. Academics' Pedagogic Experiences with Cloud Computing

2.3.1. Academics' Orientations Towards Technology

Technology orientation can be understood from individuals' self-theories (confidence, efficacy and competence); supported by knowledge, skills, experiences and situated within their contexts (Hooper & Rieber, 1995; He & Freedman, 2009; Bhat & Bashir, 2018). Devis (1989), He and Freedman (2009) framed individuals' orientation and attitudes towards technology within their acceptance and conceptions of its affordances. Links between conceptions and practices also prevailed in extant EdTech studies. Hooper and Rieber (1995), described academics' reorientations as an essential step to conceptualising the purpose of employing technology in pedagogy. This means that academics' flexible mindset, as Martin et al. (2019) also noted, is critical to engaging technology effectively in academics' practice. Bhat and Beri (2016) gathered that academics' orientations must lead to applying knowledge and understanding to practical uses of the technology. However, akin to many EdTech scholars, Bhat and Beri (2016) adopted a positivist approach by proposing a scale that measures academics' technology perceptions; discounting the contextual influences that affect these conceptions.

Conversely, this review shows that academics' orientations are contingent on their intrinsic (perceptions, beliefs, self-theories, etc.) and contextual influences (institutional and discipline demands, social norms, etc.). It also shows academics' practices, and conceptions could indicate their orientation (Bhat & Beri, 2016) and equally, their orientations could indicate their conceptions and pedagogic practices (Bhat & Bashir, 2018). This section will discuss academics' technology orientation from intrinsic and extrinsic influences, professional development, critical reflection and pedagogic practice.

Intrinsic Influences

Several empirical studies (Ertmer & Ottenbreit-Leftwich, 2013; Bhat & Bashir, 2018; Tondeur, Braak, Ertmer, & Ottenbreit-Leftwich, 2017; Ottenbreit-Leftwich, Anne, Liao, Sadik, & Ertmer, 2018; Kim, Kim, Lee, Spector, & DeMeester, 2013) maintained the importance of beliefs in mediating teachers' self-theories, visions, perceptions, attitudes, intentions regarding technology and pedagogy. Most of these studies found that teachers and academics' successful and exemplary pedagogic practices with technology rest on the alignment between their teaching and learning beliefs and perceptions of the practical utility of the technology. However, such alignment has been contingent on teachers' willingness to adjust and change their conceptions.

Ertmer et al. (2013) maintained that teachers’ beliefs mediate their attitudes and willingness to change their curriculum, pedagogy and assessment practices. The same is true for HE academics (Kpolovie & Awusaku, 2016). This idea aligns with Bhat and Bashir’s (2018) suggestion that academics’ conceptions about technology can indicate the level of their technology orientation and tendencies to accept and utilise it in their pedagogic practices. Hence, academics’ willingness to accept technology contribute to their reorientations (Hooper & Rieber, 1995) and pedagogic practices. In Dweck’s theory, this notion calls that intrinsic motivation discerns flexible from fixed mindsets and development is accessible to individuals who are willing to change (Aubrey & Riley, 2018). Martin et al.’s (2019) study showed that academics’ positive attitudes materialised in their willingness to learn, experiment and spend time and effort in design and implementing teaching and learning activities with technology. This notion has been previously noted by Ertmer (2006) who maintained that sustaining effective use of technology entails self-efficacy escorted by intrinsic motivation. As suggested by Deci and Ryan’s (2012), inherent motivation promotes autonomous engagement and enables innovative actions. Hence, intrinsic motivation also prevails as essential for academics’ motivation towards technology.

Conversely, a lack of alignment between pedagogic beliefs and conceptions of technology is likely to constrain academics’ orientations towards technology. Some scholars (For example, Ottenbreit-Leftwich et al., 2018 & Tondeur et al.,2019) suggested a complex association between these capacities enable academics to overcome barriers to technology integrations more than others. In this sense, technology-oriented academics’ intrinsic influences are dominant over extrinsic influences. However, progressive learning theories suggest that self-theories and conceptions are mutable with critical reflection (Aubrey & Riley, 2018).

Professional Development

Recently there has been a paradigm shift from examining academics’ beliefs of technology into changing these beliefs by developing their digital efficacy. In this sense, most of the work examined schoolteachers’ technology-oriented and professional development, discounting HE academics’ specific contexts (Shelton, 2017). Shelton (2017) noted that HEIs assume that they hold expertise and capacities to regulate their learning, leading to limiting interest in their development and academics’ reluctance to employ technology in their practice. Passey et al. (2018) argued that individuals’ digital competence that extends digital literacy to a much deeper and tangible level is core to safely and securely exploit technology’s affordances as consumers and produces.

Likewise, Mishra and Koehler (2006) maintained that teachers’ competencies manifest in their ‘Technology Pedagogy Competence Knowledge’ (TPACK). They argued that updating Shulman’s pedagogy and content knowledge (PCK) with digital efficacy is necessary for effective pedagogy in the 21st century(Koehler & Mishra, 2009). They recently stressed contextual awareness on competence development (Mishra, 2019). To put these notions into practice, Jaipal-Jamani (2018) examined TPACK in the context of HE academics’ professional development and found that self-efficacy promotes self-confidence to use technology in pedagogic practices. Such a notion aligns with Bandura’s self-efficacy influence on self-regulation and behaviour control (Aubrey & Riley, 2018) and Taylor and Todd’s (1995) role of individuals’ experience in using ICT. Therefore, academics’ awareness, knowledge, experience and ongoing development are critical for their technology orientations.

However, a debate on whether development should be self-directed or formally organised remain standing. Knight (2006), Shelton (2017) and Rijst et al. (2019) gathered that university academics’ development is often self-driven, informal and ‘on-the-job’. Albion and Tondeur (2018) suggested that schoolteachers should activate their self-agency to develop and use technology in their practices on the premise that it is challenging to predict teaching and development demands in such rapidly changing technology and social contexts. Hence, employing agency indicates self-directing academics’ learning. Priestley et al.’s (2018) described agency as a phenomenon and an active contribution to shaping teachers’ work conditions and farther argued that academics’ intrinsic capacities manifest in their agentic behaviours and future aspirations. This account extends to Bandura (2019) ‘social cognitive theory’ that implies the need for an agentic perspective to support individuals taking charge of bettering their lives through enhancing their mastery and self-efficacy. Hence, academics’ technical skills development might link to their self-theories and their intentions and aspirations, which explains why attitude and intentions have been examined as critical indicators of academics use of technology (Bhat & Beri, 2016). Rijst et al. (2019) found that facilitating academics’ development within the right environment is likely to stimulate their on-the-job learning, experiment with new tools, and reflect on teaching with technology; asserting the importance of their motivation and agency.

Critical Reflection

Academics' reflections and conceptions seem to be mutually contingent on one another. As Brookfield (2017) maintained, critical thinking and perspective are essential for developing academics' emotional stability and informed decision-making. Some scholars reasoned that technology is entrenched in a social ideology that stimulates critical thinking. Hansen (1995) argued that critically conceptualising the meaning of employing technology in teaching stimulates making sense of its design, affordances and usage implications. Hansen (1995) and Brookfield (2017) agreed that critical reflection is a conception that entails abstracting, questioning and rivalling assumptions, self-practices and ideas and imagining new solutions.

In such sense, Hooper and Rieber's (1995) reorientation is considered a means to critically reconceptualising the aims of using technology in practice. However, Giroux (2020) maintained that the shift in educational paradigms towards a technocratic, positivist, and performative cultures has contributed to undermining conceptual-empiricism and critical perspectives. Likewise, Selwyn (2019) cautioned against the current technological determinism that undermines critical thinking and promotes passivity towards technology's value and implications in education; aligning with Convery's (2009) notion of the overstated rhetoric on its affordance to deliver change.

Despite the value of critical thinking, the issue with academics' adoption, as Brookfield (2017) weighed, is its association with political tensions and negative implications. Questioning educators' self-awareness and experience could undermine their competence while critiquing their peers or superiors' practices could end up with social suicide. In contrast and specifically, with technology, Hansen (1995) gathered that critical reflection contributes to individuals' emancipation and autonomy through engaging in deep learning and decision-making. To many scholars, (For example, Haworth, 1986; Hansen, 1995; Brookfield, 2017; Giroux, 2020) reflection could ascend to behavioural change when it entwines anticipation of possibilities. This notion holds for the use of technology in education as it relies predominantly on potentials, transition and change. Once again, Hansen (1995) and Brookfield (2017) agree that critical thinking entails imagination and visionaries of the possibilities that could entwine change. On balance, technology development has been predominantly contingent on its affordances and potentials and equally challenges (Selwyn, 2019). This indicates that developers and users need to conceptualise the potentials and contextual impact of technology. It also raises questions on why technology, although perceived individualised, is designed for 'public pedagogy' and universal use (Selwyn, 2019); hence, socially and contextually situated (Hansen, 1995; Hooper & Rieber, 1995; Beira & Feenberg, 2018).

Extrinsic Influences

Despite the importance of individuals' intrinsic influences and capacities, the literature showed that social and extrinsic barriers are likely to affect academics within HE more than any other educational contexts. Lai et al. (2018) survey on 169 HE academics found that their motivations to develop and sustain innovative pedagogies demand appropriate resources, time and efforts to learn, design, and deliver. They argued that extrinsic motivations are often required in the absence of positive self-theories. Likewise, Mumtaz (2000) found that technology access and utility value, an incentive for change, peer support and organisation and national policies are amongst the barriers to utilising technology. Ottenbreit-Leftwich et al. (2018) classified the obstacles that beset teachers' technology integration into structural, cultural, technological. These barriers intensify with the increasing HE cultural complexity (Coffield & Williamson, 1997; Laurillard, 2002; Selwyn, 2017).

Social pressure, subjective norms or 'expectancy' in the form of students influence, peers influence, managers or superiors influence, and HE stakeholders seems to influence academics' orientation towards technology. These pressures could have a dual effect on individuals' performance. Jaipal-Jamani et al. (2018) found that academics who led technology integration projects experienced high motivation to develop their technical skills compared with their peers.

These findings indicate that the changes in academics' role increased the expectancy that produces a positive effect. Equally, Chang et al. (2015) found that academics managers were more autonomous than their subordinate; however, they were more driven towards institutional strategies, which means that academics are influenced their superiors' expectations to meet these strategies. Students' learning, particularly with the current changes to service seem to pose expectancy that academics would respond to their varying modes of educational demands (Macfarlane, 2007). This notion draws resemblance to Ertmer's (2012) finding that teachers are mostly driven to utilise technology in their practices by their students' learning. This notion is different in HE that is influenced by factors beyond teaching and learning. Academics' engagement with the contextual demands indicates that they are expected to integrate technology into their practices (EUA, 2019). Hence, their technology uses might not emanate from their self-direction and rational decisions.

Besides, academics' disciplines could determine their technical skills (Beasley & Sutton, 1993) and their responses to the contextual changes (Henkel, 2005). However, academics' decisions to use technology are mostly influenced by the emergence of cross disciplines that are mostly integrated with technology (Selwyn, 2019) and prevalence of technology across all sectors (EUA, 2019).

These trends suggest that academics across all disciplines would integrate technology in their practice. However, Convery (2009) reasoned that the overstated rhetoric about the benefits of technology and academics responsibility to incorporate it in pedagogy is borne with accountability for failures. In Convery's (2009) sense, such rhetoric controls academics interests in devising 'pedagogy of the impressed' to satisfy these expectations.

Institutional strategies also influence academics' technology orientation. On the positive side, Tondeur et al. (2019) found that employing teacher-educator observation and mentoring has proven useful in promoting teachers' digital efficacy. They further concluded that institutional determining the economics and management of technology infrastructure (safety and connectivity) and funding (costs of technology acquisition, maintenance, skills development, staffing and support) are imperative to facilitating academics' use of technology. The lack of resources, adequate training, technical support, workload and time Ertmer (2006) also highlighted are also controlled by these strategies. This brings back Habib and Johannesen (2020) findings that institutional policies that determine the design, acquisition and type of technology have a strong influence on its utility for teaching and learning. Hence, institutional strategy, social pressures and technology raise questions about academics' technology orientations.

Pedagogic Practice

Heidegger (1889-1976) views individuals' practices as an indicator of their being and technology as an indicator of their orientations (Beira & Feenberg, 2018). In this sense, academics' practices with technology could be considered indicators of their orientations' level. Several scholars (For example, Martin, Ritzhaupt, Kumar, & Budhrani, 2019) discerned 'early adopters' and 'innovators' of technology, the ones who hold positive attitudes based on experiences and skills, from 'late adopters' or the 'laggards', 'hesitant' or 'resistant to change' (Shelton, 2017; Howard, 2013). Mumtaz (2000) and Ertmer (2006) suggested that technology-using teachers consistently employ it in instructional design and teaching and learning practices. Bhat and Bashir (2018) explicitly linked orientation to enhancing pedagogic practices. Shelton (2017) found that academics' decision to terminate or replace technology is intentional and based on its perceived potentials and attitudes towards emerging technology. However, academics' attitude might not warrant their use of technology. Mumtaz (2000) also noted that technology-using teachers often use it in new content, indicating their aims for change. These notions assert that academics' practices with technology indicated their orientations.

Nevertheless, there seems a consensus that the effective use of technology is not only predicated upon academics’ Competencies, pedagogic practices but, as Macfarlane (2007) noted, also on their ability to make meaning of these practices and devise enhancements. Ertmer (2006) described technology adept teachers as those who employ it in constructivist and meaningful learning approaches that allow their students to develop, collaborate and engage in learning. While Laurillard (2012) maintained that effective pedagogy relies on academics’ design and (re-design) teaching material and critical exchange of ideas on technology implementations with students. These discourses have also been framed in TPACK that linked pedagogy with competence (Mishra & Koehler, 2006) and recently updated with context (Mishra, 2019). Such emphasis materialised in Martin et al.’s (2019) empirical study concluded that academics’ outstanding practices entail practical pedagogic approaches such as setting a clear definition of outcomes, systematic instructional design, interaction, ongoing assessment, evaluation and adjustment. Although these seem general pedagogies opposed to digital ones, they were supported by the use of technology.

2.3.2. The Emergence of Cloud Computing and Cloud-Based Services

A systematic review of empirical studies on CC in HE since its inception for this study shows increasing progress from aspirations to practical applications and interests in exploiting its educational potentials. This section presents a review of early studies on CC and CBS, aiming to develop an in-depth understanding of the underlying theories and practices. Since the early 2010s, CC emerged as a new way of provisioning technology as a service (Mell & Grance, 2011). CBS benefit from virtualisation, a concept in which ICT is presented in software objects and interfaces (Varghese & Buyya, 2018) connected over the internet; affording ubiquitous access to browser-based services (Varghese, 2019).

Aspirations to Overcome Extrinsic Barriers with Cloud Computing

The transformation of technology towards CC led scholars to explore its meaning and affordances to reduce the barriers impeding effective deployment and utilising of technology in HE (Sultan, 2010; Alharthi, Alassafia, Alzahrani, Walters, & Wills, 2017; Mircea & Andreescu, 2011; Woods, 2018; Ercan, 2011; H.Pardeshi, 2014). These barriers have manifested in the limited access to ICT resources and specialist support, reported as the main barrier against academics' technology integration (Ertmer P. , 1999; Prestridge, 2012; Elzarka, 2012), complex deployment and operation associated with the use technology. Mircea and Andreescu (2011) suggested that some universities offering virtual labs enabled democratic access to ICT.

Democratic access has been primarily linked with data distribution (Beira & Feenberg, 2018), and now the ubiquitous access to CC services (Mircea & Andreescu, 2011) over the internet. However, CC studies mainly focused on the technical, economic and managerial benefits of utilising it in educational settings. For example, Sultan (2010) examined the cloud potentials to reduce the cost of ICT within GCC contexts. His analysis focused on institutionally managed services such as email, eLearning systems and storage; that although enhance academics and students' pedagogical efficiencies and experiences, they were taking place 'behind-the-scenes'. Such attribution indicates that academics and students would be unaware of their use of the cloud or not directly use its affordances. Most studies were focused on utilising the cloud to reduce the costs of ICT equipment and management of its operational services and complexity (Ercan, 2011). Weber (2011) reasoned that importing to countries external to the providers amplified the costs and acquisition delays.

Conversely, some scholars as Weinman (2012) and Mrdalj (2011) cautioned against CC economic value is contingent on the users' consumption of services and providers' service level agreements that might adversely result in cost overrun. Mrdalj (2011) argued using CC in HE is less predictable compared with the industry due to the change and growing size of users. Weinman (2012) argued that CC's running cost is contingent on its potential uses that can only be estimated in centralised organisations. Besides, CC payment models might not match the modes of financing in HE; indicating unsettled economic value views (Ibrahim, He, & Jin, 2011).

Envisaged Knowledge and Professional Development with Cloud Computing

In addition to access to ICT resources, the utility of the cloud in HE was attributed to its impact on knowledge development. The first vein was surveying its service for knowledge sharing as a new collaboration amongst academics and scholars. For example, Thomas (2011) argued that CC could liberate academics from professional development constraints by offering unified platforms to access, exchange and collaborate on teaching, learning and research resources in a public domain. These studies indicate that such model might pave how for novel pedagogies; however, they raise many questions around copyrights, intellectual property, fear of exposure and other issues that weave academics' exchange of experiences, knowledge and data. Open communication with technology, as Macfarlane (2007) stated, is expected to best academics' engagements with their students, peers, managers and external stakeholders; however, it could equally challenge them and amplify their workloads (Johnson, 2013; Kirkwood & Price, 2016).

Besides the time required to develop their skills, academics have to shoulder with unreasonable expectations. On this notion, Johnson (2013) and Kirkwood (2014) agreed that academics eschew technology since it stifles their productivity in primary activities, teaching, development and research. Selwyn (2019) gathered that omnipresence is becoming the norm and the culture of working in modern societies. In this sense, academics' are expected to be always available, tethered, omnipresent or 'locked-in' and working on fragmented tasks (Savin-Baden & Tombs, 2017). However, the prevalence of virtual learning platforms and professional communities indicate the cloud utility for knowledge sharing and communication where the user controls their engagements and selection of content. However, as Zhao et al. (2017), Ramírez-Donoso et al. (2018) and others later showed that universal learning spaces raise questions of fitness for HE academics' teaching practice, lack integration with e-learning systems, and lack of motivation for learning.

Besides, access to information partially aligns with the CC and CBS's concept that aims to provide social and technical interactions and use of packaged resources (Hogan, Liu, Sokol, & Annie, 2011; Gupta & Goyal, 2013) and not merely for communication and accessing information. Hence, the potentials of using the cloud as a space for knowledge exchange remains open for debates.

The second vein was exploring the potentials of CC for innovation. Some scholars (Mrdalj, 2011; Sultan, 2013) examined the use of CC and CBS for knowledge management (KM) in real-world business contexts or business courses. The high specifications of virtual service indicated the potential to solve demanding high computing power to crunch data and perform analytics. Sultan (Sultan, 2013) envisaged that the emergence of CC would expand the use of KM beyond ICT specialists. While Mrdalj (2011) imagined that CC would support data analytics courses; however, cautioned against customisation, cost overrun, and control that hinders these deployments.

Envisaged Pedagogic Practices with Cloud Computing

The concept of the cloud was explored by Mitra (2010) through his idea of the hole in the wall in 1999 that promoted Self Organised Learning Environments (SOLEs) in schools. His focus was on enabling democratic learning in remote areas and links to Schools on Cloud (SoC) project that examined the impact of CC and CBS on Education in Europe. In the context of HE, some studies (For example, Ercan, 2011; Stevenson & Hedberg, 2011; Denton, 2012; Gupta, Seetharaman, & Rudolph, 2013; González-Martínez, Bote-Lorenzo, Gómez-Sánchez, & Cano-Parra, 2015) examined the potentials of using cloud-based EdTech and specialist technologies for teaching and learning. Gupta and Goyal (2013) suggested four modes of CC utilisations in educational settings, purely technical, partly technical, partly pedagogical and purely pedagogical. This classification gives some sense of the potential and current deployments of CC and CBS. Studies that explored expanding the curriculum with CC as new content or as a platform for teaching ICT skills in technology-focused disciplines (For example, Ewuzie, 2012, Murah, 2012; Sommerville, 2013; Sobel A., 2016; Woods, 2018, Bergmayr, et al., 2018) were the first to exploit its features. Some deployments explored the theoretical and practical implications of using CC in classroom activities using Problem Based Learning (PBL) and Project-Based Learning (PjBL) for product developments. Constructionist modes were enabled since the cloud supported academics and students' access to virtual hardware and software. Although scholars embraced the practicality and feasibility of using the cloud, they alluded to deployment challenges.

Examples of these challenges include understanding the concept of CC, having to teach specific and detailed operations, defining the terms and users' roles (Sobel, 2016), selecting CC providers, platforms and services, managing unpredictable students' practices (Woods, 2018). However, Sommerville (2013) critiqued that teaching how to use cloud platforms hardly has any academic value since services are abstracted and simplified.

Hence, further deployments of CC across other disciplines show non-expert user perspectives. An increasing interest in using CC and CBS prevailed in its utility to expand laboratory spaces' capacity and support experiential, hands-on and practical learning. Despite politics and technical complexity, Stevenson and Hedberg (2011), for example, explored cloud-based pedagogies' affordance to facilitate a browser-based participatory culture across multiple HEIs. They envisaged that the cloud could transcend the focus from mainstreaming data on the web into enabling autonomous learning, co-development and scaled productivity of tools, indicating a mix of pedagogical and technical deployments. Such an idea, although visionary, it resonated for other scholars. Xiong et al. (2020), for example, explored sharing laboratory resources across multiple universities that promise not only to reduce the cost on institutions but also facilitate potentials for innovations. However, these ideas are centred on the value of CC as a learning and knowledge exchange platform. However, their analysis overlooked that CC and CBS's concept is not limited to communication and collaboration (Hogan, Liu, Sokol, & Annie, 2011).

On the other hand, Denton (2012) was amongst the first to endorse using CC and CBS in co-constructionist and cooperative learning approaches by personal experience. His reflection was seminal to understanding possible pedagogical design strategies that would support students' interactions across multiple disciplines. In his cloud-based pedagogy deployment, Denton (2012) suggested the alignment between CC and constructionist learning theories, such as cooperative learning, PBL and PjBL. These strategies have been established based on Dewey's progressive learning and Bruner's EXP towards developing a final product (Aubrey & Riley, 2018, p. 55). This notion aligns with Bloom's Digital Taxonomy (Churches, 2010, p. 6) and the Teaching Innovation (LOTI) framework (Moersch, 1995), that situate design and development in the highest order of learning. LOTI's utilisation levels (non-use, awareness, exploration, infusion, mechanical integration, routine integration, expansion, refinement) suggest that teaching with technology is progressive, focusing on the learning process (Moersch, 1995). This ideology remains standing as seen with the Substitution Augmentation Modification Redefinition (SAMR) framework that comprises two primary modes of technology utilisation, enhancement and transformation; progressively encapsulating its four levels (Puentedura, 2014).

Puentedura (2014) recommend using SAMR based on pedagogic demands. In comparison, Hinrichsen and Coombs, (2014) proposed five resources for critical digital literacy and use of technology (decoding, meaning-making, analysis and persona) that span multiple disciplines. Overall, these frameworks seem to agree that academics' use of technology could progress beyond routine practices, explaining scholars' aspirations of CC and CBS. However, Denton's (2012) study discounted clarifying the conceptual changes from pre-cloud to cloud-based technologies.

Akin to Denton, González-Martínez et al. (2015) envisaged that CC and CBS would push some of the conventional EdTech such eLearning systems to background since they offer document management and facilitate innovative deployments such as rendering 3D objects, videos, virtual worlds, data analytics, CAD processing, augmented reality. González-Martínez et al. (2015) analysis of CC and CBS's affordances for education stakeholders (academics, students, ICT staff and institutions) was seminal to understanding the diversity of motivations towards CC. They discerned academics and students' interests in cost, scalability and elasticity from those in management. Instead, they suggested that academics focus on devising new pedagogic activities, and students focus on flexibility while having interests in provisioning the required resources.

In short, early studies illuminated the limitations of pre-cloud technology, which has been seminal in constructing, as termed by Selwyn (2019), a 'critical' and priori perspectives of potential socio-technical challenges with CC and CBS. However, much of these discussions (For example, Ercan, 2011; Stevenson & Hedberg, 2011; Gupta, Seetharaman, & Rudolph, 2013) were in the form of educational potentials and 'visionary' deployments. Some of the ambitious terms, as 'new dawn', 'new roadmap', 'state of the art', reveal the aspirations towards its potentials and a move from the limitations of using technology. Hence, some education scholars, akin to Latchem and Hanna (2010) and Flavin (2012), argued that vision and goals are how to make a radical change with technology and that imaginations should be stimulated and engaged. However, a mere futuristic approach is a shortcoming to understanding implications of leveraging CC and CBS in academics' practice since these potentials could only materialise through practical implementations.

2.3.3. A Shift Towards Cloud-Based Pedagogy

During the past four years, studies that reported the deployment and utilisation of CC and CBS in HE can be divided into two main categories, studies that examined academics and students’ motivations to accept, use and continue to use CC and CBS (For example, Shiau & Chau, 2016; Arpaci, 2017; Ashtari & Eydgahi, 2017; Barak, 2017; Asadi, Abdekhod, & Nadrian, 2019), and studies that evaluated the implications of CC and CBS utilisation on pedagogic practices (For example, Ghoulam, Bouikhalene, Harmouch, & Mouncif, 2016; Pike, Pittman, & Hwang, 2017; Ramírez-Donoso, Rojas-Riethmuller, Pérez-Sanagustín, Neyem, & Alario-Hoyos, 2017; Huang R., 2018). Together, these studies indicate complex and interrelated issues and conceptual gaps associated with CC in HE. Distinctively, using CC across multiple disciplines in HE can be classified into its three deployment models Software-as-a-Services (SaaS), Platform-as-a-Service (PaaS) and Infrastructure-as-a-Service (IaaS). Other models are increasingly emerging, aiming to offer everything as a service (XaaS) (Mell & Grance, 2011; Hogan, Liu, Sokol, & Annie, 2011). Therefore, this section explores three salient issues with these deployments pertinent to this study, a lack of evidence of functional changes to pedagogy, disregarding academics’ experiences and a lack of critical perspective that could ascend CC utilisations to its envisaged potentials.

Pedagogic Practices with Cloud Computing and Cloud-Based Services

Despite its prevalence, contemporary deployments of cloud-based applications, or SaaS, show little evidence of functional changes to academics’ pedagogic practices and students’ learning. SaaS offers access to browser-based applications; however, limited configurations and infrastructure control (Hogan, Liu, Sokol, & Annie, 2011). Most of CC studies reported the utilisations of SaaS (For example, Google Docs, Office 365, Google Sites, Cloud-Based Mobile and Online Learning Systems, Virtual Labs, Dropbox) in Collaborative and Social Learning (CSL) and Constructionist Learning (CL) approaches (Olanrewaju, et al., 2017; Al-Samarraie & Saeed, 2018). CSL is underpinned by Lev Vygotsky’s Zone of Proximal Development that suggests cognitive development is social interactions with other associates within the learner space, including teachers and peers (Aubrey & Riley, 2018, p. 55). While CL is based on Dewey’s and Bruner’s experiential and hands-on learning theories in which the user constructs their knowledge by doing a particular activity (Aubrey & Riley, 2018, p. 55). These theories have been seminal to understanding technology-based pedagogy. CC and CBS are used for the teaching and learning process and the design and development of subject-specific and specialist products.

Al-Samarraie's (2018) systematic review of the use of CC in CSL concluded that using SaaS to create, edit, discuss and share content shaped collaborative learning. However, such uses indicate little evidence of change from pre-cloud pedagogy. This notion has also been drawn from the review of academics' continuance to use CBS, Cloud-Based Learning Management Systems (C-eLMS), Cloud-Based Learning Management Mobile Apps (C-mLA), collaborative tools and virtual labs to store, document, share and communicate curriculum content and design activities with their students (Barak, 2017; Musungwini, Mugoniwa, Furusa, Simbarashe, & Rebanowako, 2016; Zhao, Yang, & Ma, 2017). Students continue to use these services to access, synchronise, retrieve, communicate and share content (Sun & Shu, 2016; Arpaci, 2017; Min, Wang, & Liu, 2018; Wang, 2017). Such forms of use indeed enhance academics and students' ICT experience; however, they are consistent with pre-cloud pedagogies.

However, this review indicates an emerging trend in utilising cloud applications to facilitate students' concurrent collaborations on developing content inside and outside the classroom in groups or individual activities, projects and assignments. These deployments suggest that CC and CBS's use supports a social constructivist perspective that combines cooperative, collaborative and constructionist learning approaches. Some studies (For example, Wang & Huang, 2016; Huang, 2017; Barak, 2017; Mehlenbacher, Kelly, Kampe, & Kittle Autry, 2018; Çakiroğlu & Erdemir, 2018) showed that the utilisation of cloud-based productivity tools such as Google Docs and office 356 support students' collaboration on authoring content (For example, reflections, translations, report writing). Other studies (For example, Suwannakhun & Tanitteerapan, 2017; Chang, Chen, Yu, Chu, & Chien, 2017; Ding & Cao, 2017) examined the use of cloud-based design and development services and virtual labs for students to create subject-specific solutions (For example, websites, network design, engineering models etc.). However, most of these studies reflected on deployments that entailed intuitive use of simple elements to produce basic solutions. Scholars of these studies agreed that students' use of CC and CBS supported concurrent collaboration on co-design and co-production of products, which enhanced their communication and teamwork. Students reported positive experiences despite frequent distractions from tasks, disorganisations, and conflicts in editing and synchronising content. However, there is little evidence of functional changes to employing pre-cloud technologies in PjBL and PBL; although CC seems to enhance students-students and student-academics collaborations.

There is evidence of exploiting PaaS and IaaS for pedagogical deployments through pre-configured and programmed tools, packages, modules and templates on cloud-based platforms. The use of PaaS is expected to reduce the complexity of ICT development and enable users to develop and deploy applications using programming languages hosted on the cloud (Hogan, Liu, Sokol, & Annie, 2011; Mell & Grance, 2011). Studies that examined the use of PaaS and IaaS for developing cloud-based educational solutions (For example, Li, 2016; Ghoulam et al., 2016; Caminero et al., 2016; Zhao et al., 2017; Tsai et al., 2018) spanned across multiple disciplines. For example, Caminero et al. (2016) suggested that deploying PaaS and IaaS to develop a virtual remote lab on a private cloud platform provided engineering academics and students the flexibility, efficiency and connectivity to select, access, edit and delete a range of ICT resources. Caminero et al.'s (2016) study was comprehensive and endeavoured to cover the development and perceptions of CC and CBS from academics and students' perspectives.

Although they accentuated that providing academics with pre-configured templates of services would enhance their ease-of-use and efficiency (Caminero, 2016), this might limit their choices. Hlaoui et al. (2016) reported deploying cloud-based adaptive assessment that uses learning analytics and AI and customised students' profiles. Although their result indicated improvements to students' satisfaction and outcomes, their analysis raises questions on the evidence of these outcomes. Although this solution was designed for academics' use, Hlaoui et al. (2016) discounted reflecting academics' experiences in configuring their assessments. Some scholars (For example, Li X., 2016; Zhao, Yang, & Ma, 2017) reported their development of CBS such as online multimedia recommender and customised eLearning reduced their reporting on the technical aspects; overlooking the social implications. Most of these studies seem to overstate the benefits of deployments on PaaS, indicating a gap in exploring academics' uses in pedagogic practice.

Although PaaS is expected to widen the spectrum of developers beyond ICT specialists through the templates and packages, studies that examined the use of PaaS in pedagogic practices were limited to engineering and ICT-related disciplines. This distinction seems to equal with Hinrichsen and Coombs' (2014) model that situates technology design and development in ICT focused subjects. Examples of PaaS implementation in pedagogy include Tsai et al.'s (2018) work on the impact of employing CC ubiquity and PaaS authoring tools in SoL and Learners as Designer (LaD) approaches to develop students computing skills in a finance course. They argued that although LaD significantly improved students' computing skills, SoL did not enhance students' engagement (Tsai, Shen, & Chiang, 2018).

Such conclusion bears a close resemblance with Ashtari (2017), who noted that students might not necessarily be skilled in utilising technology for learning and innovation despite being used to the internet and social networking Another example is Yildirim et al.'s (2017) work on provisioning a browser-based software development environment to enhance studies technical skills. Yildirim et al. (2017) found that their participants were concerned about the loss of students work and abrupt upgrades of CC services, indicating that leaving students to their SoL with CC means that they could develop confusion due to lack of knowledge or misuse these services.

Few studies examined the influence of using IaaS for deploying and managing multiple CBS on centralised physical infrastructure. The use of IaaS offers users' control to install, configure and operate services (For example, virtual storage, servers and networks) (Hogan, Liu, Sokol, & Annie, 2011). It has been expected to afford academics and students release from the burden of acquiring and deploying physical ICT. Some studies (For example, Bellman & Pupedis, 2016; Caminero, 2016; Pike et al., 2017; Woods, 2018) reported the use of IaaS platforms in students' projects entailed infrastructure deployments, software installation, solution development. These studies indicated that although most of the current implementations were in engineering and ICT courses, they were prone to technical issues that seem to distract academics and students from their primary pedagogical activities and increase their workloads. Bellman and Pupedis's (2016) noted that the institutional policies hindered academics use of public cloud and extended their workload to evaluate alternative resources such as private 'open source' platform.

Despite these challenges, many scholars have recently been interested in examining academics and students' continuance to use CC. Bellman and Pupedis's (2016) use of IaaS in geospatial courses, indicated academics and students' trade-off between the challenges and affordances contributed to their resilience and continuance to use CC platforms and services in their courses. The use of IaaS brought an opportunity for students to experiment with multiple technologies on a virtual 'sandbox' towards developing solutions for given problems; abrupt updates, lack of control and understanding of encountered issues stifled their work duration (Bellman & Pupedis, 2016). In addition to security policies, IaaS is largely influenced by network connectivity; hence, subject to lack of availability that could hinder learning. Pike et al. (2017) and Woods (2018) noted that students encountered issues in using IaaS; although, they could complete the same tasks on pre-cloud platforms, indicating a lack of realisation of CC value.

Overall, most IaaS and PaaS studies did not report CC and CBS's core affordances. Hogan et al. (2011) gathered that the advent of CC exemplifies the flexibility of managing data and services, interconnecting across multiple platforms, moving services between physical and virtual environments, discovering new modes of deployments between various sites interactions amongst and between users. These features chiefly benefit from the ubiquitous access, interoperability between systems, growing catalogues of services, elasticity and different pedagogical deployments. A lack of utilisation of these features indicates a gap in conceptual understanding of the value of CC and CBS. Although Barak (2017) reduced three distinct affordances of CC that could benefit pedagogic practice, namely, enabling flexible changes, data generation and exploration of different ways of implementation.

Some studies shed some light on the reorganisation of academics and students' social structures in these deployments; however, the analysis of academics' practical experiences remains limited. Mehlenbacher et al. (2018) suggested that the mechanics of setting up a CC workspace, distributing students in groups and dealing with technical issues could distract academics from their primary role of providing constructive feedback. This notion has been explored by Gupta (2013). They suggested employing 'education technologist' that can support academics and students in setting up and manage their work environments for teaching and learning. Such a model might partially meet the primary concept of enabling individualised responsibility of provisioned ICT services on the cloud. However, implementing this model in the initial phase could provide some space for academics and students to reorient themselves with CC.

Through discussing the influence of collaborative pedagogy on academics and students' social interactions, Mehlenbacher et al. (2018) recommended in cloud-pedagogies academics maintain the role of advisor or guide to enable students to take responsibility and authority over their work. However, their recommendations were based on best practices and assumptions and not actual experiences. These concerns also prevailed in Ramírez-Donoso et al. (2018) study that suggested a change in academics and students' social structures within their experiences of an embedded collaborative mobile app in MOOC. They noted a shift in academics' power and authority in setting up the learning objectives and approaches to their students due to the nature of cloud-based applications (Ramírez-Donoso, Pérez-Sanagustín, & Neyem, 2018). However, other parameters that undoubtedly contribute to the social interactions between academics and students could confound asserting, such as a claim.

Conversely, by examining the use of virtual debugging lab, Ding and Cao (2017) found that facilitated real-time interactions between students and expert tutors offered students the confidence to explain the encountered challenges and collaborate to their tutors on code fixes. On this notion, Çakiroğlu & Erdemir (2018) noted that the intuitive nature of the cloud seems to shape academics’ role in providing administrative, technical support and guidance to students while it gives the power of know-how to the students. However, this also indicates that administrative roles could inadvertently impose academics’ authority over resources and pressure to provision resource.

To sum, this review showed that the use of CC and CBS spanned variant utilisations such as data management, communication, collaboration, solution design, development and deployment. However, these uses seem to incur little functional changes to academics and students’ regular pedagogic practices with pre-cloud technologies. Selwyn’s (2019) examined the emergence of CBS such as chatbots, intelligent tutors, virtual assistants and automated and conditioned cloud services in HE. In doing so, Selwyn (2019) concluded that these services aim to mimic academics’ pedagogic practices, reduce their workload and provide them and their students with sophisticated SoL. However, Selwyn (2019) reasoned that these developments had been undertaken by specialists ‘behind-the-scenes’ bearing a universal utility. This idea was also echoed by Habib and Johannesen (2020) who suggested a lack of academics and students’ perspectives, expertise, emotional intelligence and ethical sense, reiterating the vitality of academics’ role in shaping informed and ethical education with emerging technologies.

As such, and as identified in several systematic reviews (For example, Baldassarre et al. 2018; Al-Samarraie & Saeed, 2018; Qasem et al., 2019), current CC exploitations remain limited in terms of meeting its envisaged potentials. Despite this curb and the risks associated using CC and CBS, academics and students continue to report positive experiences despite the limited functional changes in their teaching and learning practices. Almost all the reviewed studies maintained a positivist stance by claiming that giving academics and students choice and control using the cloud promotes their critical thinking, decision-making, and innovation. Such conclusions link with Selwyn’s (2011) cautions against ‘determinism’ that denotes accepting that CC is leading a change or ‘neutrality’ that signifies passivity and complete acceptance to the utilisations of technology. As Giroux (2020) noted, such as a lack of critical perspective indicates a gap in current studies characterised by CC implementations.

On balance, CC and CBS's pedagogical value in HE seems to manifest in their alignment with fundamental learning theories. The possibility of employing the cloud in a range of educational strategies (For example, CSL, CL, SCL, BL, PjBL and PBL) indicates increasing opportunities for academics’ teaching and students’ learning; particularly when campus resources are inadequate or absent. This reviewed literature shows that academics’ practices involved evaluating, designing and implementing appropriate educational approaches for students to learn through teamwork, collaboration, cooperation, analysis, design and development of subject-specific products and solutions that enhance their decision-making and problem-solving. Nevertheless, these practices are entwined with challenges, risks and issues. Besides, there is a serious gap in examining their perspectives on these issues. What pre-cloud studies indicated is that academics’ practices rely on their conceptions. Hence, a review of their conceptions might yield some understanding of their experiences.

2.3.4. Academics' Conceptions of Cloud Computing and Cloud-Based Services

Recent studies that examined the perceptions of CC and CBS indicated a shift from gathering responses pre-use to post-use. There has also been a balance in using Technology Acceptance Model (TAM) (Davis F. , 1989) that focuses on the users' perceptions of the technology ease-of-use and usefulness, and CSL centred on users' interactions (Aubrey & Riley, 2018). Studies that examined HE academics' perceptions (For example, Sabi et al. 2016; Barak, 2017; Odeh, 2017; Wang et al. 2017; Yoosomboon & Piriyasurawong, 2017) are centred on the causality of their use and continuance to use CC for collaborative, document management and storage services. While studies that examine students' perceptions (For example, Ashtari & Eydgahi, 2017; Shiau & Chau, 2016; Shana & Abulibdeh, 2017) focused on the influence of using CC on CSL and EXL and creativity. However, much of these studies tip towards positivist rather than post-positivist approaches and on students' rather than academics' conceptions; indicating a narrow view of CC and CBS's possible implications.

Ostensibly, academics' conceptions of CC and CBS are contingent on the level of exposure, skills and knowledge. Bellman and Pupedis's (2016) reflection on course development and delivery over a CC platform showed that academics were committed to providing students with CC experience to give them more choices and enable them to make informed decisions. This motivation is commensurate with the early work of Denton (2012) that employed CBS in PjBL and PBL to support students' EXL. However, they reported challenges out of academics' control and understanding. Barak's (2017) study of 48 teacher trainers who were tasked to teach pre-service science teachers found a disjoint between the teachers' beliefs and practices. His analysis showed that most of the teachers believed that technology was essential for their discipline. Hence, they encouraged students to use it in social constructivist activities. However, the academics did not use CC and CBS beyond data management and communication due to their lack of cloud-efficacy. This notion brings Selwyn (2019) and other scholars' ideas on the need to practically utilise technology to conceptualise and make a sense out of its implications and effect. However, as discussed earlier in the academics' orientation section, effectively using technology requires self-confidence, initiative and appropriate conditions. Some scholars, akin to Howard (2013) and Aharony (2014), suggested that academics' risk aversions of CC changes as they gain more confidence and knowledge and skills that enable them to employ it effectively in their practice.

Aharony (2014) also suggested that academics are often positively challenged more than IT professionals and are more willing to employ emerging technology in their practice. This notion contradicts with the current state of academics' resistance to CC as the reviewed literature shows that they have tendencies towards its ease-of-use. However, Wang et al. (2017) and Arpaci (2017) offered a more profound explanation suggesting that academics' who lack CC and CBS experience and skills tend to select easy-to-use services, while they focus on the utility when they develop skills that guide them towards active deployments in their pedagogic practice.

These ideas align with progressive learning in which individuals' responses to their ecology change with their development (Kirkwood & Price, 2016). This notion indicates that academics' perceptions of CC are contingent on their capacities and skills. Oddone's (2016) showed a change in academics responses from initial resistance to confidence following formal development with a centralised cloud-based platform. However, academics' acceptance of using CC has been linked with many influences, including self-competence, relatedness, administrative support, and CBS's educational value. Besides, academics' time and development are determined by institutional strategies. In a national study on schoolteachers' acceptance of cloud-based learning system, Hew and Kadir (2016) found that teachers' intentions to use a CBS have been primarily determined by their institutional and administrative support strategies. Their findings indicate that appropriate strategies enable academics to develop their competence and confidence to evaluate, use and critically reflect on their CC experiences with their peer and students. Musungwini et al. (2016) attributed academics' lack of competence with formal training. On these terms, teachers' perceptions of themselves, relatedness to their peers, CC and CBS features seem to shape the autonomous use and practices. By examining teachers' cloud-based content design, Al-Harthi et al. (2018) found that teachers required more time to develop their skills and curate their conceptions of cloud-based interactive activities in lesson structure and material. Academics' knowledge and experience with CC and CBS entwine social norms influence on their selection and use decisions.

Wang et al. (2017) found that academics independently decide to use CC and CBS to develop sufficient knowledge and skills and relatedness within their department. They suggested that academics are influenced by social norms in the form of peer opinion when they lack experience. We know from the social constructionist theories that developing academics' skills with technology, is socially constructed. This notion brings back Tylor and Tod's (1995) theories on the influence of social norms and experiences on ICT use.

Hence, formal training programmes provide a space for learning new content and interacting with peers and learning through their experiences. Oddone’s (2016) observed that teachers who were socially engaged were more likely to use CC in their practices. These discourses indicate that developing academics’ confidence in dissemination and sharing seem to extend the process of evaluating and learning the use of technology. Besides, the multifaceted deployments technology in curriculum, content and pedagogical activities increase the complexity of the learning process (Mishra & Koehler, 2006) and indicate the need for critical perspective.

Studies that examined students’ perceptions of a spectrum of CC and CBS services also showed differences from academics’ perceptions. Several scholars (For example, Bhatiasevi, 2016; Ashtari & Eydgahi, 2017; Yildirim, Bölen, & Yildirim, 2017) examined students’ motivations towards using and continuance to use a range of formal and informal CC and CBS. These studies showed that CC and CBS ease-of-use and usefulness influence students. They also showed that students’ acceptance and perceptions of CC is contingent on multiple reasons such as their familiarity with technology (Ashtari & Eydgahi, 2017; Wang J. , 2017), what will support their progression (Bhatiasevi, 2016), their experiences or social norms (Yildirim, Bölen, & Yildirim, 2017). To level with students’ interests, some studies (For example, Ashtari & Eydgahi, 2017, Alashwa, 2019) showed that academics consider their students’ familiarity with CC.

However, CC structures seem to pose different uses for academics and students. This assumption has been drawn from Hogan et al. (2011) delineation between CC users' different roles. Gupta et al.’s (2013) envisaged that users’ roles educational settings include administrators, end-users and educational specialist. However, many studies showed that these roles change with the context and users, and they are not designated to one type of users. Çakiroğlu and Erdemir’s (2018) study showed that academics’ role exemplified in setting up learning spaces, objective and CC objects to apply students’ skills and knowledge in using the cloud to plan, collaborate and develop solutions to given problems, indicating that perceptions differ with CC practices.

To sum, the review of academics’ pedagogic experiences aimed to understand academics’ how they make decisions with CC and CBS. However, the analysis showed three main gaps. The research design in most studies is skewed towards positivists approaches that obscure discussion around the subjectivity CC and CBS encounters. A salient use of frameworks and examining the causality of certain constructs and discounting the analyses of academics’ critical perspectives and experiences contributed to this trend.

2.4. Academics' Autonomy in the Context of Cloud Computing

2.4.1. Academics' Autonomy with Emerging Technology: A General Perspective

Academics' autonomy does not merely denote their freedom; instead, it concerns their self-initiated, driven, informed and ethical decision-making. Within the narrative on neoliberalism and institutional autonomy, technology emerged as a source of knowledge, innovation and value for HEIs and modern societies' autonomy and development(Coffield & Williamson, 1997; Laurillard, 2002; Selwyn, 2017). Technology's power seems to rest on knowledge and innovation distribution and democratising that redefined academics' role boundaries within HEIs (Beira & Feenberg, 2018). The most salient impetus towards the emergence and exploitation of technology is its power to support innovation (EUA, 2019). Akin to many studies, Clark (2004) and Stanfield's (2008) reviews of HEIs that embraced innovation concluded that the future rests on collaborations on research, innovation and entrepreneurship between academia and its ecology. However, this study shows that such directions raise many questions concerning academics and HEI social and ethical values, and most importantly, autonomy (Hall R. , 2018).

Undermining Academic Identity

Associating autonomy and technology goes back to the Greeks' use of the word 'Techne: Τεχν' denoting skill and craftsmanship. Under Heidegger's modernity theory, technicity denotes a form of instrumental action that supports care and orientation towards human needs and challenged what it means to be an autonomous individual in technological and instrumental world (Beira & Feenberg, 2018). In line with this notion, and with the emergence of the internet, McOmber (1999) explored the link between 'technology-as-utility' and autonomy in three meanings. Technology-as-instrumentality denotes how technology standardise and fragment work processes. Technology-as-industrialisation denotes that it is a source of development. While technology-as-novelty posits technology as revolutionary, this positive framing, according to McOmber (1999), contributes to the deterministic perspective of technology. Selwyn (2007) accentuated that the use of technology must allow the user a degree of control and choice (i.e., self-direction) over their interactions and activities. Selwyn (2007) linked technology and power based on the users' ability to leverage its features and make decisions regarding its utility. Hence, it can be argued that technology is becoming a way of living or a function of global culture; raising a question on what it means to 'be' an academic in the context of emerging technology, how does technology affect academics' work-life and capacities and how does that reflect on their self-identity.

Twenty-five years ago, Hooper and Rieber (1995) envisioned that technology could become teachers' 'liberator. Akin to contemporary technology proponents, they embraced technology's affordances in helping teachers reconceptualise their values and role in designing learner-centred classrooms and social engagements that encourage and support learning (Hooper & Rieber, 1995). To them, teaching with technology involves familiarisation, utilisation, integration, reorientation and evolution. This indicates that adopting it requires careful evaluation, practical implementations, and alignment to conceptions before attaining change. However, they did not offer any guidance on how technology could liberate teachers. Instead, they emphasised on teachers' moral responsibility towards their students. This brings back discussions on the dominance of performativity, utility and students as consumers cultures that undermine academics' volition, interests, and autonomy in the frame of teaching excellence (Bahia, et al., 2017). Such state extends to Henkel's (2005) investigation of academics' identity and the replacement of the ideal of academics' bounded autonomy with the increased emphasis on their engagement and agentic role within the context of technology development, knowledge society and government agenda. This state contributed to undermining academics' identity and their ability to make an objective decision.

Participating in Decision-making

Institutional autonomy raised concerns about academics' participation in decision-making that prevailed with the design, acquisition and utilisation of technology. Noble (1998) contested the lack of academics' involvement in the technology changes almost two decades ago and suggested that the chosen technologies were not designed with education in mind. Noble argued that imposing technology on academics for non-educational motives or aims distort them from their primary mission (Noble, 1998). Hitherto, these contentions remain standing. Habib and Johannesen (2014) noted that technology integration in HE is increasingly influenced by factors that are not aligned with the educational demands. Their large-scale study on academics' perceptions of technology acquisition process showed that the lack of their involvement had been either due to their perceptions that such processes are out of their expertise or administration undermining the value of participation in decision-making. Although, their analysis discounted the implications of academics' exclusion from decision-making on their pedagogic practices. Their recent work (2020) also showed that even academic managers join the acquisition process are not exposed adequately to institutional strategies. Hence, academics' experiences with technology remain dependent on provisions extraneous to their work, teaching, research and engagement demands.

Regulating Technical Skills Development

Controlling academics’ participation in decision-making is often entwined with regulating their professional development, workload, performance incentives and engagement (England, Olofsson, & Price, 2017). Formally developing academics’ competence and empowering their practices with technology rest on their access to financial and human resources (Prestridge, 2012). Several scholars established that academics’ ongoing professional development is essential for their effective pedagogic practices as they are expected to devise relevant and contemporary pedagogic approaches (Price & Oliver, 2007; Tondeur, Braak, Ertmer, & Ottenbreit-Leftwich, 2017). With the emergence of technology, their competence manifest in their TPACK (Mishra & Koehler, 2006) and context awareness (Mishra, 2019). However, without self-direction, academics’ development might not be possible. Ryan and Deci’s SDT (2000) situated competence (ability to achieve objectives), relatedness (belonging to a community) and motivation to in a frame of autonomous and self-determined behaviour; indicating the importance of academics’ competence for their practice and considering academics as competent learners lessen institutions’ interests in organising formal professional development (Brookfield, 2017). This is also part of education as a service (Macfarlane, 2007) and the focus on students as the main business. Although some scholars suggested that EdTech, such as online learning management systems, open education platforms and intelligent tutors (Selwyn, 2019, p. 53; Laurillard, 2002), has been remodelling information acquisition; freeing academics from being the sole source of knowledge (Coffield & Williamson, 1997; Laurillard, 2002; Turcan, Reilly, & Bugaian, 2016) while also offer new opportunities for academics’ self-development. Despite the fact that academics have tendencies to develop their technical skills, their formal developments necessitate support strategies, resources and appropriate environment (Rijst, Baggen, & Sjoer, 2019). Indeed, academics’ effective performance in this digital era is contingent on their ongoing professional development that requires institutional support structures in line with their strategies and visions.

Determinism, Neutrality and Critical Reflection

The prevalence of technology extended a lack of critical reflection on its utility value of pedagogy (Macfarlane, 2002; Willis, 2008; Selwyn, 2011). This ‘neutrality’ adversely influences the effective use of technology to support innovation and change (Selwyn, 2011; Willis, 2008; Price & Kirkwood, 2014). Such effects prevailed controversies on academics’ engagement in relevant learning that could support the social and economic developments (Educause, 2019).

Within these concerns there have been debates as to whether technology has disrupted academics' practice, or students' learning and outcomes (Selwyn, 2016; Blin & Munro, 2008; Price & Kirkwood, 2014; Flavin, 2012). The emergence of technology in HE, as Noble (1998) noted, has amplified issues regarding fairness and ethical conduct. Academics' capacities to handle ethical issues such as assessment concessions, plagiarism and progression considered faculties' 'de facto power', has become dominated and 'streamlined' by policies and technology (Macfarlane, 2004). Selwyn (2019) noted that academics feel frustrated when confronted by ethical issues such as (For example, digital divide, intellectual property, copyrights, data privacy, and integrity). Despite developing procedures and technologies to counteract these issues, such as plagiarism detection, the importance of academics' informed decision-making remains standing (Howard, 2013). Hence, academics are subject to be neutral to the existence of technology.

Role Changes

Academics roles are becoming increasingly important for teaching and learning with technology (Selwyn, 2017). Technology contributed to permeating the boundaries of the university by facilitating ubiquitous knowledge acquisition and distribution (Coffield & Williamson, 1997) and reorganising the relationships between and within modern society and industry (Selwyn, 2017). This expansion supported post-secondary learning in informal and virtual platforms to facilitate democratic access to education (Crea & Sparnon, 2017; Rambe & Moet, 2017). Flexible and democratic access to virtual and open learning platforms, the likes of Khan Academy, MOOC, eTutor, Udacity, Coursera and Masterclass, expanded the selection of new modes of teaching and learning (Martin, Kelly, & Terry, 2018). Since these technologies have been targeted towards delivery outside bricks and mortar of the university, they surfaced the issue of academic drift4; threatening the role and vitality of HEIs (Coffield & Williamson, 1997; Garrod & Macfarlane, 2009; Harwood, 2010). This drift has been linked to knowledge acquisition changes from the traditions of HE to the modernity of professional learning (Harwood, 2010). Such debates have been centred on the lack of academic incentives (Marrinan, Firth, Hipgrave, David, & Jimenez-Soto, 2015). Although leading universities have been utilising these platforms for certified courses, hence, their use will continue to add value to flexible learning and create potentials to shape the role of the learning in socio-technical interaction.

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4 Non-university institutions (continuing education and vocational training) aspiring to offer similar standards to universities; offering alternatives to post-secondary education (Garrod & Macfarlane, 2009, p. 9). Another definition describes it as the process whereby knowledge intended to be useful gradually loses close ties to practice while becoming more tightly integrated with one or other body of scientific knowledge.

2.4.2. Indicators of Academics' Autonomy with Emerging Technology

Academics' autonomy indicators varied in the literature. A historical view of how educational scholars developed frameworks teachers' professional autonomy in educational contexts sheds light on the used indicators. Charters (1976) examined schoolteachers' sense of work autonomy (SAS) by reducing measures to their self-reported sense of independent decision-making. His study was motivated by consequential parameters such as dealing with technological changes, improving students' learning and better involvement. It considered autonomy as perceptual; however, ecological since it focuses on personal conceptions of external influences. In my opinion, such scale is partial since it focused on schoolteachers' work in a negative sense of control, distrust and freedom (selected work techniques to teach students and administrators' scrutiny and instructional standards). This shortcoming perhaps encouraged Friedman (1999) to examine autonomy in a positive sense of motivation and empowerment. Therefore, he measured autonomy from a behavioural (For example, working independently, initiating activities, making changes and engage at the institutional level) rather than a perceptual perspective concluding with a new scale. Although his study spanned pedagogical and ecological influences, in my opinion, it partially examined autonomy since it focused on teachers' behaviour and overlooked their conceptions that have long been emphasised as a driver for teachers' practices (Dworkin, 2015).

In short, these measures can be reduced to four main categories that assess the degree of professional autonomy of teachers who:

- Understand the role, purpose and impact of teaching
- Proactively engage in institutional and academic decision-making
- Responsibly and ethically in charge of developing teaching
- Continually undertake relevant professional development

Education scholars have become more interested in the turn towards neoliberalism and its influence on academics' autonomy (Tight, 2019). Carvalho and Videira's (2019) study considered academics' participation in strategic and managerial decision-making that relates directly and indirectly to their practices as a critical indicator of their autonomy. Although the study participants reported control over their teaching practices despite their lack of participation in institutional decision-making, these findings indicate that academics could be immersed in their practices, and lack interest, or understanding of, the links between their practices and their institution's objectives projects and policies (Seeber, et al., 2015).

To emphasise on its importance, Ryan and Deci (2000) suggested that the lack of participation and influence on decision-making could negatively affect individuals’ motivation, understanding of their identity, social boundaries and impact of their practice. Academics who do not engage internally in their institutions’ decisions could end up losing vitality and motivation. Academics’ lack of participation in procedural decisions means that they have no influence or power on decisions, directly and indirectly, affect their practices (Erkkilä & Piironen, 2014).

This notion links with Banduras’ theory of motivation and self-regulation as it has also been used as a measure for autonomy. Karran and Mallinson (2018) found an association between some universities’ ranking and academics’ perception of self-governance; suggesting that it is embraced and valued. Although they found that academics’ participation in decision-making barely recorded any academic success for them or their students, it reinforced their retention and self-satisfaction (Karran & Mallinson, 2018). This means that academics’ self-governance and engagements can foster academic success. To put this notion into practice, the instructional design and teaching and learning environments are contingent upon the institutional financial services. This means that facilitating pedagogic practices with technological resources entails involvement in the acquisition and adoption processes. Financial support can also promote human resource services, such as recruitment and formal professional development programmes that directly affect academics’ workload and professional competence (Passey, et al., 2018). Besides, academics’ lack of engagement in the organisational matters such quality could result in a lack of awareness and commitment and adherence to standards (Melrose, 2006; Manatos, Rosa, & Sarrico, 2017a).

Passey et al. (2018) internalised digital agency, which other scholars also stressed (For example, Albion & Tondeur, 2018; Priestley, Biesta, & Robinson, 2018; Bandura, 2019), suggesting that it a holistic view for engaging with technology in meaningful ways. Although Passey et al. (2018) submitted to the idea that autonomy is essential with competence accountability and confidence being core, they built their assumptions on theoretical concepts and generic stipulation of individuals’ agency to transform capacities into behaviours (See Figure 6). Distinctly, in this study, I focus on academics’ autonomy as a fundamental concept that encapsulates all imperative prerequisites including independence, competence, motivation and critical reflection and manifests in self-awareness, ethics, continual and iterative development asserting its conceptual and behavioural utility.

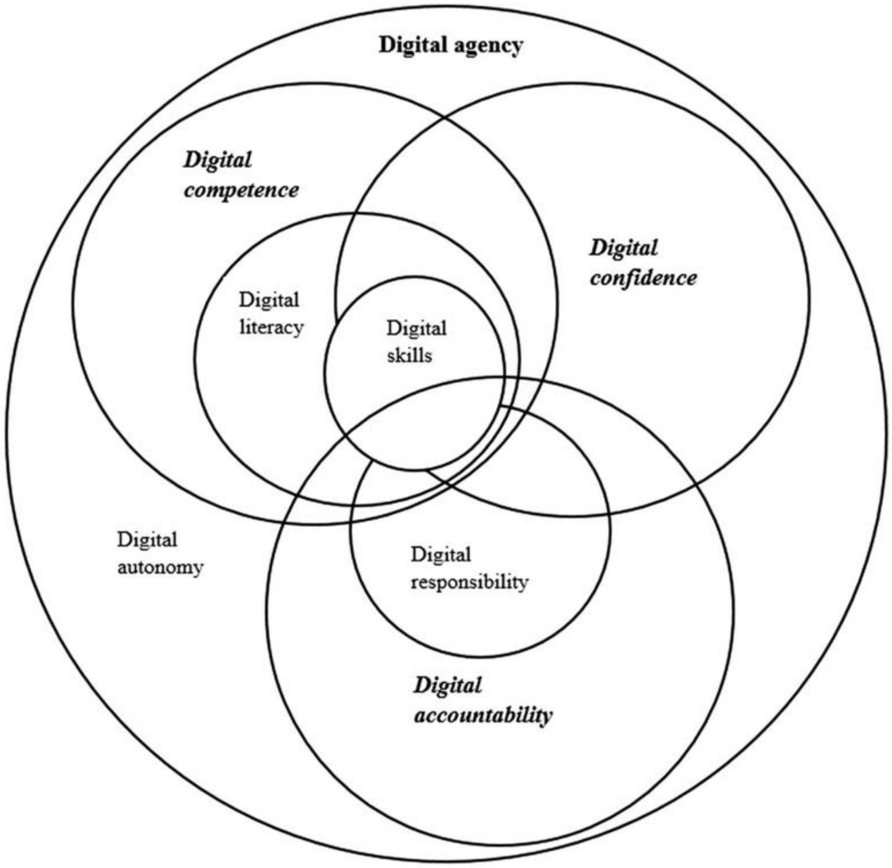

Figure 6. Passey et al.'s (2018) view of digital autonomy as a prerequisite for digital agency

Although autonomy is difficult to encapsulate in a set of criteria due to its complexity (Dworkin, 2015), this study will focus on academics' autonomy in the context of their pedagogic experience with technology. Therefore, the study considers their pedagogic perceptions and practices (Cilesiz, 2011) within the institutional and ecological influences contexts. The following characteristics will be used in the analysis as indicators of academics' autonomy:

- Develop self-awareness and identity in the context of emerging technology
- Proactively engage in institutional decision-making related to pedagogic resources
- Ethically develop pedagogic practices with emerging technologies
- Continually engage in professional and technical skills development
- Engage in activities relevant to their expertise and interests
- Critically reflect on the impact of emerging technology.

2.4.3. The (In)adequacy of Academics' Autonomy on The Cloud

Autonomy (Young, 1986) and teaching are personal (Macfarlane, 2004) and so is the use of EdTech and specialist technologies (Shneiderman, 1996), particularly CC and CBS that support self-organised and individualised ICT resources (Filippi & McCarthy, 2012). Migrating various learning and specialist technologies in HE contexts to the cloud has been associated with aspirations towards pedagogical freedom, fairness and enhanced control (Masud, Yong, & Jianming Huang, 2012; Denton, 2012; Ding, Xiong, & Liu, 2015). Based on preceding deployments of technologies in pedagogy, early studies focused on academics and students' acceptance, adoption and intentions. However, there is a tip towards students' perspectives and futuristic optimism (Zahran, Walker-Gleaves, & Walker-Gleaves, 2017) in line with education as a service (Macfarlane, 2007). This indicated a gap in analysing academics' perceptions and practices and critical perspectives of the current state of 'disruptive' uses and special features of CC and CBS that discern it from pre-cloud technologies. As Flavin and Quintero (2018) noted, disruptive technologies are what reconfigure our practices.

To date, issues highlighted in the literature can be classified into (1) conceptual (For example, users' perspectives of external hosting and provision), (2) technical, (For example, reliance on the internet connection, packaging, black boxing, programmed and autonomous services), and (3) functional (For example, user misuse or ill intention). Table 1 depicts some of the associated risks and implications with CC and CBS specific to academics' pedagogic practices. Persistent concerns, such as setup overload, cost overrun, threats to security, privacy, intellectual property and control are often caused by users' interactions or deployment strategies (Zahran, Walker-Gleaves, & Walker-Gleaves, 2017). As such, discussions have been focused on potential threats to data security, availability, integrity, ownership and intellectual property that aroused academics and students' feelings of uncertainty, lack of trust and aversion (González-Martínez, Bote-Lorenzo, Gómez-Sánchez, & Cano-Parra, 2015). Some scholars clarified that the general perceptions of security in educational contexts vary from industry and business contexts. Arpaci (2017) gathered that the use of knowledge data stored on the cloud in HE contexts does not ascend to decision-making how it prevails in the industry. Security in educational settings could be discerned by relating it to data and services availability, intellectual property, ownership. However, there is a shortage in the literature that examines adverse implications of utilising CC in HE pedagogical practices. Hence, the analysis of CC and CBS features is expected to yield some understanding of the more specific issues to academics' settings and practices.

The implications of using CC and CBS raise issues specific to academics' practices within HE contexts such as compromising ICT resources and data related to curriculum, course content, work activities, identities and well-being. Mrdalj (2011), cautioned against challenges of deploying CC and CBS such as the need for customisation based on curriculum content, students and pedagogical requirements, assessment logistics, consistency. These requirements often amplify when rolling services for multiple academics, and large numbers of sections and students who might unwittingly utilise CC in unexpected ways that could disrupt costs, services and content stability. Bennett and Weber (2015) clarified the complexity of implementing CC and CBS in educational contexts. Primary issues that contributed to the failure of a project entailed privacy, security and vendor lock-in, were contended by various stakeholders, including students themselves and parents. Lim (2015) found similar risk aversions against the lack of security and privacy and alignment of school leaders and policymakers' objectives of CC and CBS deployment. Odeh et al. (2017) also highlighted these concerns from academics' perspectives on the premise that they threaten their identity and data integrity, availability and security. These issues signpost a lack of trust between academics and CC and CBS providers. However, most of these issues were drawn from the general rhetoric rather than practical utilisations in pedagogy. Hence, an analysis of empirical experiences is essential to understand academics' practical concerns and implications of CC and CBS's utilisation.

Outsourcing

Service hosting and provisioning follow business structures that promote commercial models, payments in return of services, contractual terms, loyalty programmes, customer relationships and competitive advantages. These models raise questions around vendor-lock, overreliance and service ownership and proprietary, in which users accord with vendors' terms and governance (Filippi & McCarthy, 2012). Although González-Martínez (2015) gathered that multi-vendor strategy through using party technology administration services could mitigate this issue, this model could amplify contractual complexity and contradict with the cloud vendors business models that rely on competition and direct service; hence, it is not in vendors' interest to facilitate cross-platform access (Filippi & McCarthy, 2012). Besides, it is difficult for academics to be skilled in more than one platform, which might lead to the increasing dominance of one provider over the another within HEIs. Nevertheless, the multi-vendor strategy is recommended in enterprises to mitigate vendor lock (Varghese & Buyya, 2018). Hence, universities might consider this option; however, with a careful definition of governance and responsibilities.

The current shift towards paid online services is creating a culture of capitalism within HE that bring to the fore issues of monopoly, centralised control, financial accountability and the digital divide. For example, Sommerville (2013) cautioned against students' innocent, inadvertent or intentional misuse, unexpected cost or credit expenditure associated with either manual or autonomous configurations. There could be several scenarios for this situation. One of which is operational expenditure (OPEX) payment models that entail commodifying educational resources, pay-per-use, overtime and advance, surge risks of 'cost overrun' due to the elasticity and fully automated responses to users' configurations and demands; that would certainly threaten the academics and students' certainty and awareness (Filippi, 2013). Academics and students' unwhitened (or intentional) misuse and overconsumption of pre-configured credits could lock them out of service and hinder the teaching and learning process from progressing. These scenarios could imperil academics to questions of responsibility and accountability. Academics would then operate with utmost risks, aversions and uncertainties of the implications of students' and academics' use of CC; contradicting education that rely on knowledge development (Howard, 2013).

Controlled Access

Unlike the web, access to the cloud is becoming controlled by users' accounts and privileges since services are associated with data and access to ICT resources (Filippi & McCarthy, 2012). Thus, ICT is becoming customised and tailored to the extent that limits portability and integration amongst different platforms to what is termed the 'walled garden' controlled through users' accounts and privileges (Filippi & McCarthy, 2012). This trend surfaced a dual effect in terms of rightly securing data and resources and unjustly monopolising technology (Varghese, 2019; Evans, 2018). However, it contradicts with the renowned practices of using online resources that promote equal access, transparency, fairness and democracy through resources and data accessibility (Beira & Feenberg, 2018). Specifically concerning data management, Caminero's (2016) study of implementing private cloud IaaS for teaching and learning showed that much of academics' concerns were focused on the integrity and authenticity of students' work, service interruption and lack of control and flexibility. However, their study did not show how these issues practically affect academics' pedagogic practices. Concerns with the authenticity of students' work have also been attributed to online learning using the internet in general, denoting migrating socio-technical issues from the pre-cloud era (Singh & Hurley, 2017).

Ubiquity

The lack of trust and security challenges could pertain to multiple trajectories. The lack of alignment between institutions’ security policies and the distribution of CC infrastructure outside HEIs’ contexts is not endorsed by security policies, particularly in the GCC countries that import technology (Wiseman & Anderson, 2012; Pearson, 2011). Such concerns are often shielded from teaching academics (Habib & Johannesen, 2014) and academic management (Habib & Johannesen, 2020) who are usually kept aside from strategic decision-making. This state also concerns cultural transformation from technology ownership to tenancy and sharing through utility-based services (Rebollo, Mellado, Fernández-Medina, & Mouratidis, 2015). As such, CC users are expected to be oriented towards the idea of shared physical infrastructure and borrowed services. The practical deployments of cloud services indicate that control, digital ethics and competence and amongst the most critical issues that impede unfolding the educational potentials of CC and CBS.

The disjunction between the cloud and its practical deployments indicates a gap in articulating how it could influence academics’ pedagogic decision-making (Sabi, Uzoka, Langmia, & Njeh, 2016; Musungwini, Mugoniwa, Furusa, Simbarashe, & Rebanowako, 2016; Wang, Jeng, & Huang, 2017; Wang, Jeng, & Huang, 2017; Odeh, Garcia-Perez, & Warwick, 2017; Çakiroğlu & Erdemir, 2018). Hence, the socio-technical aspects of CC and CBS seem to intersect with academics’ independence and self-governance. Moreover, external hosting and ubiquity raise risks of ‘digital discovery’ (Filippi, 2013) that level the utility of CC and CBS. Despite the experiential nature of pedagogic practices, academics are becoming vigilant regarding the confidentiality, integrity and availability (CIA) of content under their management (Howard, 2013).

Academics beset unauthorised access to students’ data, research, curriculum and assessment material that threaten to leverage their data integrity and confidentiality. Pike et al. (2017) and Woods (2018) reported students’ encountering service latency and interruption when using public IaaS for web and software development in their ICT-related courses. The lack of ICT resources and data availability threatens users’ control over their academic work processes and products (Filippi, 2013). This means that utilising CC could disrupt academics’ self-governance and authority in provisioning educational resources and activities to a large number of students (Odeh, Garcia-Perez, & Warwick, 2017), which undermines their students, superiors and community confidence in their abilities to control the teaching and learning process and secure data relate to their research, pedagogy and engagements. The ongoing development of the cloud aims to address these concerns through management strategies and innovation (Varghese & Buyya, 2018).

Strategies such as interoperability, multi-vendor, dedicated cloud, private cloud, fog, edge computing and microservices aim to increase users' confidence in CC availability and security (Varghese & Buyya, 2018). These developments not only provide solutions to the current socio-technical and legal issues but also facilitate successive developments of ground-breaking CBS, including, AI, IoT and MA (Varghese & Buyya, 2018). Virtualisation, high computing capacity and packaging have enabled the development and provision of these intelligent technologies over user interfaces that afford usefulness and ease-of-use5. This means that academics and students across all disciplines can exploit these technologies in real-world implementations and research.

Scalability

The 'ongoing and rapid evolvement of the cloud means that academics may not develop enough skills, competence and digital efficacy to critically evaluate, select and utilise CC and CBS in their practices (Sabi, Uzoka, Langmia, & Njeh, 2016). It becomes increasingly necessary for academics to be skilled in adapting to any cloud platform to make sound selections. However, as there is a lack of standardisation and each provider tailors their feature (Hogan, Liu, Sokol, & Annie, 2011), it will be increasingly difficult to become adequately skilled on several platforms. Hence, the ubiquitous access to ICT over the cloud has been associated ethical concerns around compromising data and ICT resources availability, integrity, privacy and security (de Bruin & Floridi, 2017) particularly in the context of HEIs that rest on trust and informed practices (Turcan, Reilly, & Bugaian, 2016). Some studies examined the educational utility of these models.

The literature shows that cloud platforms and CBS, such as the design and development environments have been used for 'digital making', 'computational thinking' and solution design and developments. Examples include Seattle Cloud, Crowd Machine, Virtual Cloud Labs, VMware, Amazon Web Services (AWS) and MS Azure, etc. These platforms support constructionist learning strategies such as students' as designers and developers of innovative solutions. However, they bring a new approach to using technology that combines development with the operation (DevOps) that could indicate limitations to ICT specialist (Airaj, 2017). Academics and students' ability to employ this approach rests upon specialised technical expertise that often resides in technology-based subjects such as engineering and CS. Although Wood (2018) gathered that ICT academics perceive the cloud unsuitable for teaching their curriculum since it hides details from students.

5 User interface design models (For example, Nielsen's Heuristics (1994) which overlaps Schneiderman's golden rules (1996) emphasise real-world experiences, user control, error prevention, consistency, flexibility, learnability and 'don't make me think' concepts.

Packaging

Features that aim to facilitate ease-of-use have also been perceived as limiting instructional design, imposing shallow learning and misuse, discounting teaching and learning demands. Cloud providers are provisioning features that enable users to construct complex systems more efficiently, such as virtual machines with preinstalled operating systems and software. For students, this takes away the details of understanding how these systems work. Pooling, on-demand and elastic services automating resource management aim to facilitate the availability of sufficient ICT resources (Mell & Grance, 2011) and improve academics and students' pedagogic experiences as they are often influenced by ICT service failures and power limitations that stifle their efficiency and productivity (Nielsen, 1994). However, controlling the services by external providers and automating operations through programming have been criticised for equally stifling the users' control and visibility of the services (Filippi & McCarthy, 2012). Broadly, Filippi (2013) underscored the limitations of 'black-boxing', 'packaging' and 'wizard-driven interfaces' assuming that these stifle the users' control and autonomy to make changes. There is a trend of automating technology services, particularly these systems contained with defined algorithms. Calvo et al. (2020) explored individuals' autonomy with AI systems through self-motivation and well-being. They particularly examined the case of video recommender systems that follow specific algorithms to motivate 'or capture' users' interactions. Their findings indicate that most of the emerging cloud-based autonomous technologies are designed to willingly and reluctantly stifle users self-endorsed decision-making(Calvo, Peters, Vold, & Ryan, 2020). Users might choose or be coerced to use these technologies or fall for its designed enticements.

The prevalence of these trends means that academics and students are limited in what they can do with emerging technologies (Mehlenbacher, Kelly, Kampe, & Kittle Autry, 2018), particularly in pedagogic activities entail decomposition, analysis and customisations of alternative solutions. Hence, autonomation, packaging, black boxing6, while can help in many industries and operations, have been criticised for confining users' certainty and limiting their control (Filippi & McCarthy, 2012; Calvo, Peters, Vold, & Ryan, 2020). Although ease of use is stipulated as an important measure of users' experience (Nielsen, 1994), it contradicts with the ethos of teaching and learning in educational settings that centre on fundamental knowledge through problem-solving, understanding, reasoning and analysing (Knight, 2002; Ramsden, 2003).

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6 The idea of Blackbox is that content, thoughts, habits forces and objects are not necessarily considered (2014) alluded to. This concept is key in CC that promotes packaging and user-driven interfaces.

However, buy practically examining CC platforms; one can clearly notice the lack of accessibility features that are common in cloud-based applications. Such lack of control denotes a dual effect of packaging CC services (Mell & Grance, 2011). This means that academics and students across disciplines might be limited to utilising CC and CBS in basic activities such as document management, storage, a collaboration that has been possible with pre-cloud technologies that hinder them from realising the value-added from using CC and CBS in their educational practices. The vitality of academics' role in deploying and using emerging technology such as the cloud manifests in their knowledge, technical expertise and wisdom in Aristotle's philosophy critical for knowledge development (Selwyn, 2017, p. 120; Beira & Feenberg, 2018).

Academics' competence, as stated earlier, is determined by their ability to integrate appropriate technology in practical pedagogical activities that advance knowledge in a specific subject content (Koehler & Mishra, 2009; Roblyer & Hughes, 2019). The TPACK framework, for example, puts technology fitness for pedagogy and content at the heart of teaching (Mishra & Koehler, 2006). This means that the effectiveness of academics' practices rests on their competence and the ability to combine subject content, pedagogy with emerging cloud services. Academics' competence is essential for their engagement (Educause, 2019) in the surrounding contexts that accentuate the use of the cloud (BSA, 2018), and to devise relevant pedagogies (Educause, 2019). However, evaluating the fitness of CC and CBS entails that they familiarise themselves with technology features in meaningful applications (Hooper & Rieber, 1995; Roblyer & Hughes, 2019). Sobel suggested that the cloud challenge is that it brings new meanings of ICT (Sobel A. , 2016).

In this sense, academics' abilities to devise effective pedagogic practices with CC and CBS manifest in their practical experiences in utilising specific CC technologies (Beira & Feenberg, 2018, p. 29). González-Martínez et al. (2015) suggested that academics' and students' awareness, and ICT staff support, and service level agreements could help in combating CC associated challenges. Their collection of mitigation strategies indicates the need for institutional support and integration between all parties to exploit the affordances of CC and CBS. Hence, formally developing academics' digital efficacy rests upon their institutions' support structures (Keengwe, Kidd, & Kyei-Blankson, 2009). These studies show that academics' active, appropriate and autonomous practices are central to enabling students' autonomous and independent learning with contemporary technologies (Duchatelet & Donche, 2019; Fincher, 2012). They tacitly assert academics' autonomy for enabling effective pedagogic practices with CC in all educational levels.

2.4.4. *Contextual Demands for Cloud-Skills*

Developing CC and CBS have been attracting all sectors, including higher education with varying motivations (BCS, 2018; Global Knowledge, 2018; Deloitte Insights, 2018). This indicates that the demand for CC and CBS specialised skills across multiple sectors; however, it is unclear whether and how these demands influence academics' pedagogic practices and autonomy. For industry, CC is an opportunity to develop a new corporate model and maximise the return of digital economies (BSA, 2018; European Commission, 2019). For technology and cloud vendors, there are interests in expanding their market share by attracting the educational sector (Bennett & Weber, 2015; World Economic Forum, 2016). Hence, HE is expected to prepare students with relevant skills in articulating and exploiting technology that matches market demands (Hinrichsen & Coombs, 2014). This economic vision has led several governments in the GCC and globally to enact 'cloud-first' and 'cloud security' policies that promote and govern the use of CC as the first choice for ICT infrastructure (BSA, 2018; MENA Cloud, 2019) and dedicating research budgets for developing CC and CBS and security measures (European Commission, 2019). Such substantial investments aim to create a collaborative quadrant that comprises HE, technology providers, industry and government entities towards the digital and knowledge economy and society (European Commission, 2019; MENA Cloud, 2019).

Social values of cloud services seem to manifest in liberating HE from the austerity and sovereign caused by the seized operational funds in the GCC and worldwide which impeded access to emerging technology (Sultan, 2010; Alharthi, Alassafia, Alzahrani, Walters, & Wills, 2017). Similar to other technologies that emerged during the 1980s, the cloud has been a promising to maximise institutions' competitive advantage in light of their efforts towards massification, marketisation and internalisation (Simpson & Marinov, 2016; Brink, 2018); influencing global markets such as the GCC where there is an aptitude to import education strategies (GMrabet, 2010; Bennett & Weber, 2015). Although the effective use of technology is predicated upon its academics' pedagogic practices (Mishra, 2019; Laurillard, 2002; Hazemi & Hailes, 2002; Selwyn, 2017) these contextual imperatives affect its educational value in three axes.

Firstly, academics' resilience to renew their engagements with the technological developments, risks locking them in the silos of irrelevant educational practice (Selwyn, 2017, p. 101; Price Waterhouse Coopers, 2018; Educause, 2019). This has prevailed in studies that focused on expanding the curriculum with CC content to match with the external demands despite the envisaged challenges (Foster, et al., 2018).

Secondly, unless the cloud is critically utilised in pertinent practices, gaps in university students' and graduates' knowledge and skills will emerge (BCS, 2018; Global Knowledge, 2018; Deloitte Insights, 2018). Such implications indicate the third axes, the core activities of HE within the contemporary performative and digital cultures and academic drift, raise concerns about its sustainability (Coffield & Williamson, 1997; Clark, 2004). This means that the contextual demands pose pressure on academics' autonomous decision-making to deploy and utilise CC and CBS in relevant content, instructional design, pedagogy and assessment (Sabi, Uzoka, Langmia, & Njeh, 2016; Wang, Jeng, & Huang, 2017; Fincher, 2012). Hence, industries and governments around the globe, increasing aptitude towards employing the cloud for development and innovation signposted the need for matching skills globally and in the GCC (BSA, 2018; MENA Cloud, 2019). However, there is limited knowledge about academics' responses to these contemporary HE changes; how research has been recently focused on students' experiences and outcomes. This gap in knowledge indicates a need for a critical perspective in understanding the influence on contextual demands for cloud skills on academics' expertise with CC and CBS and autonomy.

Indeed, it is difficult to conclude the aspects that influence academics' pedagogic practices and autonomy with CC and CBS in one study. In addition to the extrinsic and intrinsic influences (Ertmer P. , 1999; Ertmer P. A., 2005; Prestridge, 2012) that affect academics' use of technology, the literature indicates that its specific affordances influence academics' autonomy with CC and CBS. The challenges and uncertainties in exploiting CC and CBS mean that academics and students will be utilising them with imminent risks.

Table 1.

Synthesised implications of CC on academics’ pedagogic practices

CC and CBS Feature	Risk Applicable to Any Context	Risks Applicable to Pedagogic Practices	Implication on Academics
Outsourcing, external hosting, provision, managed services, providers’ service level agreements	Limited control and certainty, vendor lock-in, service ownership, proprietary and overreliance	Legal responsibility and accountability, conflict with institutional e-policies	Disregarding pedagogic requirements
Internet-based	Insufficient connection, downtime, outage, latency	Digital divide for remote non-connected areas, access interruption	Interruption in pedagogic processes
Controlled access and interoperability	Walled garden	Lack of integration of pedagogic resources	Constrained access to useful resources
Ubiquity, wide access and distribution	Threats to security: integrity, availability, privacy and digital discovery	Threats to ethics, intellectual property, copyrights, trust, authenticity and misuse.	Reinforced accountability
Utility-based provision, licensing and pricing models	Lack of maturity and dependability of the pricing models and cost overrun	Monetary responsibility and accountability, conflict with institutional purchasing policies	Lock from pedagogic resources
Scalability, elasticity, autonomous changes and upgrades, and continuous evolvement	Limited control, flexibility and certainty	Constrained curriculum development, and lack of awareness and cloud efficacy	Reinforced accountability and fear of failure
Packaging, black boxing, wizard-driven, browser and user interfaces	Limited control, flexibility and certainty	Constrained instructional design, pedagogies and hidden details	Shallow learning

2.5. Concluding Thoughts

In this literature review, I started with personal autonomy and found that it entails independence, self-governance, competence, critical reflection (Haworth, 1986) and motivation (Niemiec & Ryan, 2009). Such capacities have been considered antecedents for self-satisfaction, self-ideal, well-being (Young, 1986), volition, informed decision-making (Dworkin, 2015), action and change (Haworth, 1986). Autonomy has been contrasted with the ethics of care, obligation and commitment to social and collective welfare which confounded its utility value. It has also been contested in the frame of authenticity and individuals’ capacities to make independent decisions. This led contentions on the possibility of personal autonomy assuming that individuals are influenced by their social contexts and ecologies (Skinner, 2003) such as in organisational structures where they are expected to follow certain codes of conduct to be considered professionals (Davis M. , 1996). Nevertheless, some models that proposed considering locus of control and domain of autonomy asserted the possibility of personal autonomy given personal capacities and fostering conditions.

However, these conditions might entwine dual effects and potentials that personal autonomy could yield positive or negative outcomes within specific contexts (Young, 1986). Based on this, I drew upon the conceptual understanding of autonomy and issues that beset academics’ pedagogic practices in the context of emerging CC and CBS. The inception of EdTech and various technologies in HE has been surrounded by a confluence of economic and political influences distorting their deployment in academics’ pedagogic practices (Noble, 1998; Habib & Johannesen, 2014; Pourreau, 2017). The reviewed literature showed a trend of using technology in instructional design, pedagogy and assessment from positivists perspectives (Bodily, Leary, & West, 2019; Al-Harthi, Campbell, & Karimi, 2018; Brady, Devitt, & Kiersey, 2019).

This trend contributed to a decline in anchoring research explaining HE changes in structures and designs for future implementations. Some studies showed growing scrutiny on academics’ pedagogic practices and professional autonomy (Henkel, 2007; Ginsberg, 2011; Hall, 2018; Carvalho & Videira, 2019; Aberbach & Christensen, 2018). This scrutiny ushered questioning academics’ capacities to utilise emerging technology in their pedagogic practices (Selwyn, 2017; Shelton, 2017; Educause, 2019; McCune, 2018; Howard, 2013). However, a handful of studies (For example, McOmber, 1999; Filippi & McCarthy, 2012; Filippi, 2013; Beira & Feenberg, 2018) drew a philosophical link between autonomy and capacity of ethical and socio-political utilisation of emerging technologies in HE; revealing a gap in HE EdTech literature.

The notion that academics’ autonomy is a fundamental problem holds in the HE’s current state, particularly with the emergence of CC and CBS that promise individualised control and technology-enabled democracy (Filippi & McCarthy, 2012). Studies that linked HE academics’ autonomy with recent HE changes (Henkel, 2007; Carvalho & Videira, 2019) showed that the change in focus and power that promise to serve sustainability had been adversely undermining academics’ identity and participation in and influence on decision-making. This indicates that academics’ capacity to design and implement practical pedagogical approaches with CC and CBS could be regulated within the administrative processes’ domain, leading to a conceptual gap in these services’ utility. Such confluence threatens to leverage academics’ locus of control on their practice. Some studies (Ertmer P. A., 2006; Ertmer P. A et al., 2012; Martin et al. 2019) showed technology-oriented academics could overcome extrinsic barriers that beset their pedagogic practices. These studies asserted that academics’ beliefs, competence, continuing professional and technical skills development, motivations towards teaching and students’ learning, and flexible and problem-solving mindset regardless of their demographics enable them to utilise technology in innovative pedagogic practices effectively.

The current situation is becoming more complicated with pervasive CC and CBS. Since its inceptions CC in HE research has been focused on its affordances to transform pedagogy through supporting constructionist approaches (Denton, 2012; Almerich, Orellana, Suárez-Rodríguez, & Díaz-García, 2016; Ashtari & Eydgahi, 2017) and removing managerial issues; particularly provision and access to EdTech and various technologies (Sultan, 2010; Masud, Yong, & Jianming Huang, 2012; Alharthi, Alassafia, Alzahrani, Walters, & Wills, 2017). Common issues associated with CC and CBS (For example, security and threats to privacy, lack of technical maturity and reliability, reliance on the internet, packaging and lack of certainty, fear of cost overrun and vendor lock) challenged its adoption and utilisation across all sectors. However, the literature provides little guidance on whether and how these issues influence academics’ perceptions of its value and autonomous decision-making and ethical conduct (personal commitment, intellectual property, data integrity). Therefore, this study addresses these gaps by exploring academics’ autonomy using CC and CBS in an HEI. The following chapter describes the adopted methodology that addresses the research objectives and questions.

Chapter 3. Methodology

3.1. Introduction

This study concerns nine technology-oriented academics (Gilmore, Maher, Feldon, & Timmerman, 2014) from four different programmes (ICT, Engineering, Web Media and Business) within an HEI in the GCC. It focuses on understanding how academics' technology-orientations influence their professional autonomy in the context of CC and CBS within HE. Therefore, and broadly speaking, this study examines the intersections between academics' autonomy and pedagogy in their natural settings to achieve two objectives:

- To gain an in-depth understanding of how technology-oriented academics conceptualise and utilise cloud computing platforms and services in their pedagogic practices, and
- To explore how these experiences, intersect with their autonomy within higher education from their perspectives.

The research questions are addressed through methodological approaches. The primary research question, that developed (Braun & Clarke, 2013, p. 44) throughout the study duration from 2017 to 2020, asks:

How do technology-oriented academics' pedagogic experiences within the contexts of cloud computing and cloud-based services intersect with their autonomy?

This question was operationalised into practical approaches (Kvale, 2007; Silverman, 2020) through four sub-questions that ask:

1. How do academics' technology-orientations influence their pedagogic experiences?
2. How do technology-oriented academics experience cloud computing and cloud-based services in their pedagogic practices?
3. How do technology-oriented academics conceive autonomy in their cloud-based pedagogic experiences?
4. How do academics' autonomies become constructed by these experiences?

This study's empirical work took place over two periods of 40 weeks (two academic years). This duration allowed sufficient time to develop saturation (Silverman, 2020) and in-depth (Tight, 2009) understanding at a time of changes and emerging CC and CBS in the research site and country at large (See Section 1.3). During the first half, the researcher was internal to the institution, hence, spent twenty weeks at the research site, allowing in-person, but formal (Hanson, 2013), interactions with the participants and various departments (Savin-Baden & Tombs, 2017). During the second half, the researcher joined her home institution for full-time work but continued to work with the participants using online research methods.

The overarching design considered the case of single research site and several embedded cross-sectional cases of teaching academics (Yin, 2018; Merriam, 2009; Scholz & Tietj, 2002) to develop in-depth narratives and analysis (Creswell & Poth, 2018). The data gathering began with content analysis (Silverman, 2013) of the institutions’ official documents provided an overview of all potential participants boundary system (Silverman, 2020). The use of online participant screener enabled inviting all academics across faculties. Their responses were analysed using content analysis and ‘criterion-based purposeful selection’ (Schensul & LeCompte, 2012; Emmel, 2013) that recruited nine academics who met the inclusion criteria (Yin, 2018). A qualitative narrative (Moen, 2006; Coulter & Smith, 2009; McAlpine, 2016) matched the philosophical underpinning.

Initially, the participants were invited to two one-hour individual interviews that enabled accessing their conceptions of CC and CBS. These were followed by three paired depth interviews (Wilson, Onwuegbuzie, & Manning, 2016) that took place online. The paired depth was decided to understand the participating academics’ social dynamics with their peer academics and line managers or course coordinator. To stimulate the participants’ perspectives, externalise their views, help them think aloud boundary crossing (Akkerman & Bakker, 2011) and boundary objects (Corsaro, 2018) were conducted. These helped them fill their memory lapses and focus on ‘something to do. Although boundary crossing (Akkerman & Bakker, 2011) has been used in sociotechnical research, implementing it in an online and educational setting using the TPACK model (Mishra & Koehler, 2006) is considered a novel and contemporary methodological contribution to the field. The data gathering concluded with a focus group of all the participants to construct a collective view of their conceptions and experiences from their discussion. Figure 7 sspresents the study’s research questions, and data gathering methods and study time frame.

Research Question	Data Collection Method	Study Time Frame
How do academics' technology-orientations influence their pedagogic experiences?	Participant Screener Information Session Researcher's Notes	Participant Screener AY 2018 – Week 11 – 12 Information Session AY 2018 – Week 16 – 20 Interview 1 AY 2018 – Week 20 – 24
How do technology-oriented academics experience cloud computing and cloud-based services in their pedagogic practices?	Information Session Individual Interviews 1,2 Researcher's Notes	Information Session AY 2018 – Week 16 – 20 Interview 1 AY 2018 – Week 20 – 24 Interview 2 AY 2019 Week 1 – 4 Paired Depth AY 2019 – Week 24 -28
How do technology-oriented academics conceive autonomy in their cloud-based pedagogic experiences?	Participant Screener Individual Interviews 1,2 Paired Depth Focus Group Researcher's Notes Institutional Documents	Information Session AY 2018 – Week 16 – 20 Interview 1 AY 2018 – Week 20 – 24 Interview 2 AY 2019 Week 1 – 4 Paired Depth AY 2019 – Week 24 -28
How do academics' autonomies become constructed by these experiences?	Participant Screener Individual Interviews 1,2 Paired Depth Focus Group Researcher's Notes Institutional Documents	Information Session AY 2018 – Week 16 – 20 Interview 1 AY 2018 – Week 20 – 24 Interview 2 AY 2019 Week 1 – 4 Paired Depth AY 2019 – Week 24 -28 Focus Group AY 2019 – Week 26 -40

Figure 7. Study's research questions and data collection methods and time frame

Figure 8 depicts an overview of the whole study's conceptual framework of methodology and theoretical underpinning addressing the research questions—data gathering process with multiple stages and iterative design (Yin, 2018). The methodology design was reinforced by employing a pilot for every used method. The iterative design was useful in ensuring the fitness of the methods as informed by the nuances of the case (Yin, 2018). The pilots were intended to confirm the validity of the employed methods (Yin, 2018). Besides, data familiarisation throughout the study guided the following stages (Clarke & Braun, 2018). The overall process guided understanding the studied issues and validation for each of the stage (Yin, 2018). The documentary analysis was used as a reference throughout the methodology (Silverman, 2020, p. 72). Constant comparative to the participants' responses provided understanding to changes in academics orientation, practices and conceptions over time.

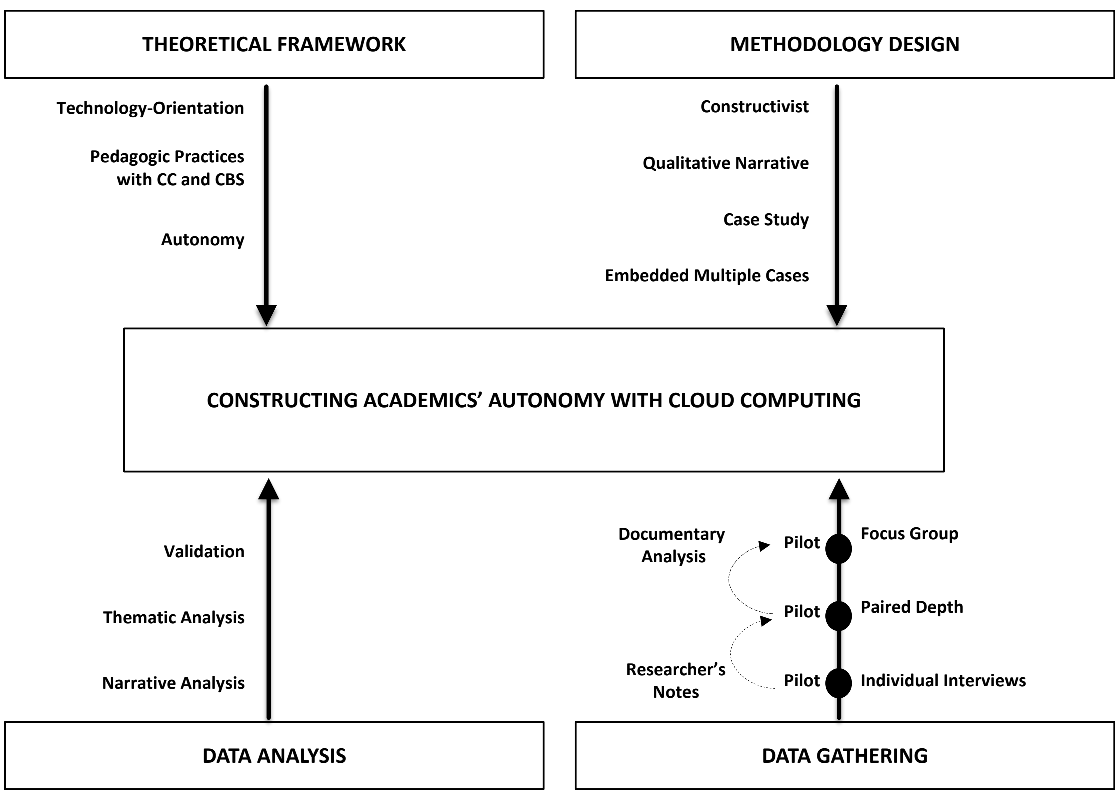

Figure 8. An overview of the study's conceptual framework

3.2. Philosophical Underpinning

Research on academics' professional autonomy examined its nature within various frames of pedagogic practices (Wermke & Salokangas, 2015). Autonomy has been considered a collective concept (associated with substantial aims and procedural activities) Individual academics are either afforded or deprived of their freedom (Berdahl, 2010; Cotelnic, et al., 2015; Casson, 2019; EUA, 2020). While academic freedom has a universal meaning, denoting the right to pursue truth without external influence (Dworkin, 2015), academic autonomy has been examined as perceptual (Dworkin, 2015), relational (Skewes, et al., 2018), collective (Berdahl, 2010), multi-dimensional (professional, faculty and organisational) (Frostenson, 2015), thus, nuanced and complex concept (Wermke & Salokangas, 2015). This ontological nature has been gathered from the philosophical narrative on personal autonomy that described it as a constitutive ethical and moral ideal (Shell, 2009), normative value (Young, 1986), essential utility (Haworth, 1986) and capacity to make decisions and reflect critically on and direct actions actively (Dworkin, 1988). Hence, personal autonomy has been considered *a sine qua non*; however, problematic due to its manifold meanings and impacts (Wermke & Salokangas, 2015). However, a wide consensus regards the constituents of personal autonomy (independence, competence and self-reflection) indispensable to be considered autonomous (Haworth, 1986; Young, 1986; Dworkin, 2015).

Drawing on this philosophy, some scholars adopted an objectivist[7] stances to understand autonomy in educational contexts using factor analyses, independent and self-rated measures, aiming to develop grand theories (Charters W. W., 1976; Chauvin & Ellett, 1993; Friedman, 1999). Charters (1976) examined teachers' sense of work autonomy (SAS) using a scale of 24 measures. Similarly, Chauvin and Ellett (1993) validated teachers' attitudes of autonomy (APA) as a proxy to their professional orientation and role perceptions based on a framework that examined their conceptualisations as an indicator to their orientation using 22 measures. In comparison, Friedman (1999) based his work on Charters to examine teachers' work autonomy (TWA) using a scale of 48 measures. While seminal to frame the boundaries of autonomous academics, setting predetermined measures, inadequately assumes that professional autonomy can be standardised, definitive and linear (Silverman, 2017; Bryman, 2016) which has been confounded by recent studies.

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7 Objectivism emanated from research into natural sciences. It deals with a social phenomenon as an external event that has rules and procedures that are distant from its contexts and social actors; therefore, tend to examine its reality (Bryman, 2016, p. 29). ,

This account discounts the complexity, nuances and conditions that concern the pedagogic experience (Knight, 2002). Besides, the nature of personal autonomy rests upon the subjectivity and complexity of human capacities, cognitions and behaviours within social and structural contexts (Dworkin, 2015). Hence, it is difficult to encapsulate in a set of criteria (Silverman, 2017; Bryman, 2016). However, the ontological narrative suggests that autonomy can be relative, perceptual, contextual and changing, demanding a constructionist stance that ascends to its subjectivity (Silverman, 2017). Therefore, an objectivist stance is inadequate to answer this study question which concerns the intersection of autonomy and pedagogic practices. Recent research on academics' practice and its connections with institutions' and learners' autonomy, has curated this limitation by adopting a constructionist[8] stance. In examining academics' autonomy, some scholars (For example, Ginsberg, 2011; Turcan, Reilly, & Bugaian, 2016; Hall R., 2018; Tight M., 2018) (Ginsberg, 2011; Turcan, Reilly, & Bugaian, 2016; Hall R. , 2018) constructed critical reflections based in the broader frame of structural and contextual issues that influence academics' autonomy, professionalism and well-being. In contrast, others (For example, Hamilton, 2014, Xhaferri, Waldispühl, Hotz, & Xhaferri, 2015; Duchatelet & Donche, 2019; Liu & Liu, 2018) accentuated the role of autonomy in promoting students' autonomous, independent, self-organised and regulated learning (SoL) with a skew towards schools and computer-assisted language learning.

Indeed, analysing the nuances in academics' autonomy and their impact on their pedagogic practices within the structural in HE contexts has been discounted (Hall R. , 2018). This can be drawn from the lack of research due to the sensitivity of the autonomy concept. Broadly, autonomy is based on socio-political contexts that entail justice, compliance and control (Hall R. , 2018). While precisely because academics' competence affects their reputation, personal and professional conduct. These inferences indicate that academics might have lower chances to open up to qualitative approaches. Few studies evidently examined academics' autonomy using qualitative approaches. For example, Henkel (2000) contested the influence of knowledge society on academics' professional identity within the biological sciences' policy. Similarly, Carvalho and Videira (2018) examined the impact of institutional autonomy on academics' decision-making.

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8 Constructionism twins the emergence of qualitative approaches in social sciences and educational research (Hammersley, 2013; Braun & Clarke, 2013; Bryman, 2016; Silverman, Doing Qualitative Research, 2017).

Opposed to objectivism, it emphasises the role of individuals in constructing their specific theories about a certain social phenomenon (Bryman, 2016, p. 29).

Both scholars focused on policy changes which provided limited guidance to examine academics' autonomy through their pedagogic practices, particularly within the emergence and prevalence of EdTech and various learning technologies in HE (Turcan, Reilly, & Bugaian, 2016).

In line with the field of EdTech, academics' pedagogic experiences with CC can be situated within their pedagogic practices and professional development within the emerging technology (Willis, 2008; Tight, 2009). Academics' practices have been differentiated based on their perceptions, contexts, disciplines, gender, experiences, roles and responses to formal training (Tight, 2004; Norton, Hartley, Newstead, & Mayes, 2005; Martin, Prosser, Trigwell, Ramsden, & Benjamin, 2000). This dispersity has created nuanced deployments and applications of EdTech (Bodily, Leary, & West, 2019) that seem to amplify with CC and CBSs (Baldassarre, Caivano, Dimauro, Gentile, & Visaggio, 2018; Al-Samarraie & Saeed, 2018; Qasem, Rusli Abdullah, Atan, & Asadi, 2019). Within the philosophical inquiry on adoption and effective deployments of the cloud, it is unclear what constructs or theories count as undermining or supporting academics' autonomy. Hence, this gap suggests that profoundly understanding the nuances of academics' experiences with CC in HE and links with autonomy would benefit from a qualitative approach.

3.3. The Researcher’s Role

My professional experience as an ICT academic, educator, and programme manager, informs my stance in this study. By taking different roles at HE institutions, I sometimes exercised autonomy to develop my practice and manage my work and pedagogical activities, while in other times, I realised that other factors might hinder this autonomy, particularly using technology. In this study, I expand my knowledge and experience through an in-depth understanding of my peer academics’ perspectives within and beyond my discipline (Hanson, 2013). My primary aim is to encourage critical and ethical reflections on academics’ pedagogic experiences as a means to understand and improve pedagogic practices in the context of technology in HE (Selwyn, 2007).

My role as an ICT academic and educator undertaking insider research (Humphrey, 2012) has enabled me to evaluate the proximity of the relationships within the study site. I was an insider in the sense that the research site is my institution (Hanson, 2013; Hockey, 1993). Further, I was an insider academics with assumptions about technology and participants challenges; however, an outsider to their nuanced experiences. My proximity and understanding of the institutional work practices privileged me the amenity of accessing the participants’ work-life (Humphrey, 2012; Hanson, 2013). Developing a social constructionist stance led me to believe that academics’ pedagogic practices are not only constructed by their role, capacities and social interactions but also evolving over time and within different contexts (Ramsden, 2003; Tight, 2004; Knight, 2002).

I draw this philosophy on the challenges that beset academics’ use of technology in meaningful and efficient approaches over time and medium and, within that, the emerging confluence on their autonomy particularly with the emergence of CC and CBS and the global structural HE changes. This study originates from my direct involvement in facilitating ICT resources for courses and capstone projects’ supervision that I was responsible for as part of my role. My responsibilities paralleled with the global shift towards CC and the enactment of ‘Cloud-first’ policies at a government’ level that entailed the need to prioritise the use of cloud over any other technology (MENA Cloud, 2019). These contexts triggered my interest in understanding the pedagogic experiences of specific technology-oriented academics within the emerging CC and CBS within the specific and temporal context and case (Merriam, 2009; Yin, 2018) in my institution.

3.4. A Qualitative Narrative Approach

Throughout this study, a qualitative narrative approach has been adopted. Epistemologically, examining academics' autonomy through their tech-enabled pedagogic experiences in the context of CC in HE must align to the subjective natures of autonomy and pedagogy. Silverman (2017, p. 18) reasoned that understanding human experience is best suited to qualitative approaches since the focus is on the details of 'what' and 'how' events happen within a social phenomenon. These inquiries are expected to provide nuances and contingencies that could challenge structured and rigid approaches of utilising technology and its features. Similarly, Selwyn (2019, p. 93) accentuated constructing knowledge about human stories of their experience with technology in a meaningful way and from a sociological perspective. Although, Bryman (2016, p. 21) fairly explained that structured approaches might also render a grand theory about a certain experience; however, stand when the aim of the research is delimiting constructs and conditions into measures and hypotheses. Hence, adopting a qualitative approach in this study allows constructing accounts of the participants' personal experiences.

Dealing with the participants' subjective experiences requires a social inquiry that adopts a flexible design and employs semi-structured or relatively unstructured approaches (Hammersley, 2013; Silverman, 2017). Hitherto, research on HE academics' work practices examined their professional development, work activities, role perceptions and changing teaching strategies (Tight, 2018). Employed methods in academics' practice ranged from simple observations to meaning-making that involved the nature of their perceptions and practices (Tight, 2018). Constructing an understanding based on participants' synthesis and interpretations of their experience with technology requires utilising its practical pedagogic experience (Willis, 2008; Neuman, 2014; McCune, 2018; Cilesiz, 2011). Research methods must focus on their 'voices' and expressed views and perceptions (Hammersley, 2013). Specific mediation of experience with technology has been differentiated from traditional practice (Cilesiz, 2011).

As inherent in their practice, academics recount their experiences in told stories (Ramsden, 2003; Tight, 2009). Academics' articulations of interacting with other social actors and ecological elements to facilitate their practices can be used to construct their 'accounts' (Ramsden, 2003; Tight, 2009). Within the recent turn in HE, research towards performative neoliberalism (Tight, 2019), there is evidence of employing qualitative, perceptual and interpretive approaches to examine HE academics' autonomy which forms the basis of this study.

Henkel (2000), for example, examined the influence of academics' autonomy on their identity within the knowledge society while Carvalho and Videira (2018) examined academics' participation in institutional decision-making. Both studies used qualitative approached to examine academics experiences in light of policy changes. Therefore, this study builds on this evidence of the feasibility and validity of using qualitative approaches, and the confluence on academics' autonomy with the aim of examining the impact of mediating their experiences with CC using qualitative, in-depth, interpretive and narrative approaches.

An interpretive narrative (McAlpine, 2016; Moen, 2006) was selected as an overarching approach to examine academics told stories and accounts of their experiences within their structural and social contexts (Yin, 2018; Merriam, 2009; Creswell & Poth, 2018). Creswell (2018) stipulates the narrative approach as one of five research strategies in addition to phenomenology, ethnography, grounded theory and case study. Although it hasn't been used to examine the technology, it has been recently prevalent in exploring teachers' and students' experiences. Whether it is a genre (Moen, 2006), framework (Willis, 2008), method or methodology (McAlpine, 2016), ontologically, the narrative research fits well with the adopted constructionist stance, interpretivism epistemology and qualitative strategy in this study. This is because narrative construction aligns with the hermeneutic representations of the participants' reality and diversity of their pedagogic experiences with technology (Neuman, 2014; Savin-Baden & Tombs, 2017; McCune, 2018).

Employing an interpretive narrative approach across all the study phases (Moen, 2006) has been beneficial for several reasons. First, the narrative inquiry embedded in semi-structured, in-depth, peer interviews and focus group has supported explicating the study aims and questions to the participants (McAlpine, 2016). This has been essential since questions related to emerging deployments and services is borne with complexity and diversity (Mell & Grance, 2011). Second, gathering academics' experiences through their narratives and told stories gave a widely opened window to their past, current and future pedagogic and personal perceptions, practices, conditions and the changes they encounter (Moen, 2006; Coulter & Smith, 2009; McAlpine, 2016). Finally, thematic analyses of the gathered data were aimed at co-constructing academics' nuanced accounts from their perspectives and within their contexts (Kvale, 2007). Narrative responses targeted unexpected meanings (McAlpine, 2016) of academics' pedagogic practices with cloud-based technologies. They are aimed at constructing an in-depth understanding of their practices and autonomy nuances with the cloud in line with the study objectives.

Academics' experiences with the cloud did not merely focus on its technical features and affordances that are common in usability research (Nielsen, 1994), but also on the personal interpretations such as the aims, meanings, justifications and value that merit their experiences (Norman, 1986). This study could have safely landed on a set of standards (Nielsen, 1994) in a comparative sense to assess academics' experiences of the cloud and its impact on their practice. However, and principally, the aim of this study is developing an in-depth understanding of technology-oriented academics' autonomy intersections with their pedagogic practices with cloud computing and cloud-based services within higher education. Although, the narrative inquiry was carefully handled due to the earlier criticism of its unstructured, partial, relative and subjective nature (Silverman, 2013). Hence, although academics' narratives were essential for the co-construction of their accounts (McAlpine, 2016), other data sources including paired depth, documentary analysis and focus group were also embedded in the design to match and construct credible accounts of their experiences and autonomy.

3.5. Research Design in Practice

Academics, like all professionals, need to be autonomous to pursue their work responsibilities and make informed decisions related to their practices (Ginsberg, 2011; Gibbs, 2018; Hall R. , 2018). They need to demonstrate their ability to proactively and effectively teach, research and interact with students, peers and superiors within the domain of their work ethics and institutional regulations and policies (Knight, 2002; Macfarlane, 2004). Whilst some values can be implicit, autonomy manifests in personal expressed conceptions and behaviours that contribute to their being (Young, 1986; Haworth, 1986; Dworkin, 1988; Shell, 2009). Besides, autonomy might intervene with individuals’ emotions and behaviours towards themselves and their social contexts (Young, 1986). Therefore, it is possible to perceive academics’ autonomy as a personal value, capacity, responsibility and right that nurtures academics’ self-esteem, satisfaction (Gibbs, 2018) and practice (Knight, 2002; Gibbs, 2018; Duchatelet & Donche, 2019).

It is equally possible to perceive autonomy as negligence, passivity, disinterest, and rebellion against standard practices and regulations (Macfarlane, 2004; Riley, 2011; Cummins, 2014). However, it can be global or temporal and contextual, as Haworth (1986) noted, to be autonomous, individuals need to the capacity and right environment to nurture their autonomy. Therefore, and as demonstrated in my theoretical framework, academics’ autonomy with technology can be situated within their capacities, orientations and practices in institutional contexts.

Due to these issues, examining academics’ autonomy is a complex route. Besides, examining academics’ autonomy is subject to limited disclosure. The reviewed literature showed that personal autonomy is entwined with ethics, values (Young, 1986), competencies, critical reflections (Haworth, 1986) and motivations (Niemiec & Ryan, 2009). This means that investigating academics’ autonomy in HE contexts is problematic since it exposes their competence and commitment to teaching practice which might affect their reputation and futures (Knight, 2002). As Davis (1996) noted, autonomy is used to distinguish professionals from non-professionals.

Autonomy has been established as a socio-political concept concerned with justice and prejudice (2015). This means that academics’ disclosure of the limitations that beset their autonomy might affect their reputations, jobs and futures. Despite these potential adversaries, Walker-Gleaves (2010) alluded to the need for ‘entangling’ approaches when dealing with sensitive and complex issues. Nevertheless, these means might level with the practical and rigid nature of utilising technology (Willis, 2008).

Academics' autonomy and pedagogic practices with emerging CC and CBS can be considered perceptual and behavioural. This means that autonomy can be examined based on academics' perspectives or practices (Cilesiz, 2011). Autonomy can also be global and contextual; indicating that it can be examined at a specific duration and settings (Yin, 2018; Merriam, 2009). Therefore, a single qualitative case study was considered suitable for this research (Yin, 2018; Merriam, 2009; Silverman, 2020). Examining the participants' contexts, conceptions and practices of CC, was ideal to answer the research questions and meet the objectives (Yin, 2018, p. 28).

Before this study, I conducted an exposition of the CC uses in HE (Zahran, Walker-Gleaves, & Walker-Gleaves, 2017). The exposition clarified the complexity of academics' pedagogic experiences with CC and unpacked external issues related to control and accountability, and personal issues related to beliefs, values and competencies. Hence, the methodology in this study accounts for this logic by considering multiple approaches that manifest the boundaries of academics' pedagogic experiences with technology (Silverman, 2017).

Besides, the theoretical framework that emerged from a wider literature review carried for this thesis (Silverman, 2017) showed that academics' pedagogic experiences in the context of CC intersect with their autonomy. As much as academics' uses of threatens their pedagogical autonomy (Silverman, 2017). The research questions and the methodological considerations were directly influenced by my background as an educator and insider researcher (Hanson, 2013) and my stance (Savin-Baden & Tombs, 2017) towards the pedagogical utility of autonomy with emerging technology. The study site (offices, classrooms and computer laboratories, organisational and social structures) is the participants' natural setting and bounded system (Yin, 2018) where they work as academics. Undertaking the data gathering within this natural setting was intended to support academics to relate, recall and recount their pedagogic experiences (Merriam, 2009).

An iterative approach of literature review, methodology design, data gathering, analysis and reporting was adopted (Savin-Baden & Tombs, 2017). The data gathering took place over three academic semesters (48 weeks April 2018 – May 2019) to capture changes in academics' practices since these require at least one academic semester to process and approve (See Section 3.6.1). The selected design was a single case (the institution) with a small number of participants (embedded cross-sectional cases) who experienced the emergence of CC in their pedagogic practices (the social phenomenon) (Yin, 2018; Merriam, 2009). Hence, a cross-sectional design was employed to examine the academics in parallel within the same time (Yin, 2018; Merriam, 2009). This approach has been found essential to understand academics' multiple views at a similar stage of introducing the cloud into their practice.

3.6. Selection Procedures

3.6.1. The Case

The case in this study is an HEI9 established in 2009 within a country in the GCC. The objective of examining this case was to develop an in-depth understanding of the context and bounded system of the participants (Yin, 2018; Merriam, 2009). The aim was to examine how CC and CBS influence and influenced by their pedagogic experiences and autonomy the structural influences of their institution. The whole study took place from Jan 2017 to June 2020, whilst data gathering took place over three academic semesters (48 weeks April 2018 – May 2019). My experience and the study objectives informed the selection of this specific site as it observed the emergence of CC the enactment of cloud policy and prevalence across all sectors.

Akin to other HEIs within the GCC (Hvidt, 2011; Vardhan, 2015), establishing the study site was a government initiative to prepare the local youth a skillset that enables them to engage in their society and develop diversified economies (Wiseman & Anderson, 2012; Vardhan, 2015; Azzi, 2018) At the time of conducting this study, this institution was focused on meeting social and economic demands. This was emphasised in the vision, mission and strategic plans. Innovation and excellence are stipulated as imperative values that support the institutions' mission to produce enterprising graduates with 21st-century skills who meet the market demands. An industry liaison team and academics were missioned to support this direction. It was also mandated and monitored by two regulatory bodies that represent a national quality authority and a HE council.

A business-like model dominated the hierarchy and levels of authority of the study site (Visvizi, Lytras, & Sarirete, 2019). A chief executive officer led a senior management team that comprised directors of functional departments (For example, finance, marketing, legal, human resource) and deans of two faculties (Dean of Engineering, Design and ICT and Dean of Business) who were in charge of the academic operations. Academic programmes were organised in six schools (business, logistics, engineering technology, ICT, visual design and Web Media). The management model was expanded with the head of schools, programme managers and course coordinators who channelled academic decision-making and day-to-day operations. The teaching staff were responsible for administrative activities related in addition to their teaching role.

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9 I will refer to the case as the research institution and study site interchangeably.

All the academic staff, including (deans, head of schools and programme managers) were expected to teach beside their managerial responsibilities. This accentuated teaching as a primary function for academics. Courses and modules (units of teaching within courses) were structured within programmes and managed at the faculty levels. Academics enjoyed the freedom to debate any changes related to their courses and practice (i.e., content, instructional design, assessment, etc.).

New development of academic programmes and courses was channelled through academic affairs and approved by the executive management team. These two aspects are particularly relevant to the case that examines a change in resources that might entail new or change in curriculum. The last decision boundary at academics was at faculties levels. Academics’ practice involved interactions with administrative staff such as organising academic operations (For example, students’ registration, results reporting, etc.). This indicated that academics were allowed autonomy to design and implement their courses, teaching activities and assessment. Certain functions such as facilitating pedagogic environments (For example, facilities management, ICT and technical support) and managing academics’ human resource matters (recruitment, induction, professional development, performance evaluation) were reliant on administrative services.

The institution and programmes have undergone quality evaluations at different times and levels enacted by national and regional (Hvidt, 2011; Abouammoh, 2009) movements to promote quality assurance and standards at the institutional and department levels. Quality standards were adapted from international qualification frameworks following the trend of internationalisation in the GCC (Hvidt, 2011; GMrabet, 2010). The administrative staff and academic staff were required to report their practices verbally through interviews and in writing in self-evaluation reports. The curriculum and teaching strategies were adapted from an international institution; however, contextualised to the local demands. Academic staff were multinational; however, a small number of academics and the majority of students were local citizens. This diversity reflected a cross-cultural environment becoming common in the GCC (Sawalha, Kathawala, & Magableh, 2019). This trend was ascribed favouring exposure to international education due to engagements in trade activities within the GCC (Hvidt, 2011; GMrabet, 2010). Although some scholars (Costandi, Hamdan, Alareeni, & Hassan, 2019) contended the challenges that beset HEIs in the GCC to create local knowledge, there was an emphasis on maintaining cultural norms, which was salient in preserving the dress code, celebrating national and religious occasions, conforming to conservative and religious guidelines. Essentially, international exposure was levelled by cultural boundaries.

Internal quality programs coincided within faculties and established internal procedures to evaluate courses and programmes for meeting the national criteria. An institution-wide project was undertaken to evaluate whether the courses implement institutionally recommended pedagogic strategies. These were focused on social constructionist pedagogic strategies (Aubrey & Riley, 2018). However, a degree of flexibility was allowed to assimilate and justify any deviation from these strategies. For example, while PBL that emphasise working on unstructured problems (Aubrey & Riley, 2018) was recommended, PjBL was salient in courses that comprise capstone projects, industry work-placement. This was accepted as long as it was justified as fit for purpose. Student’s engagement, work-readiness, enterprising were central concepts that directed the pedagogic activities.

This institution pioneered in adopting CC and CBS for organisational and educational purposes. This was commensurate with the institutions’ strategy to stand national educational budget downsizes across the GCC (Sultan, 2010; Alharthi, Alassafia, Alzahrani, Walters, & Wills, 2017). Directions to offer CC services as the first choice of technology infrastructure across all industries. This followed the need to upgrade the technology infrastructure and educational demands for resources. A virtual private cloud platform and cloud services were deployed to support the organisational and academic operation (For example, student registration system, student email and document management system and eLearning system, etc.). However, these services soon aggregated and required ongoing maintenance and upgrade of local physical equipment. Therefore, the ICT service department and management, determined to adopt a public cloud based on enterprise-wide service level agreement with a cloud provider. As a result, several operational systems (registration, document management, students and staff emails, productivity tools on all computers) were migrated to a public CC platform. Academics were invited to utilise the cloud platform and virtual services as for pedagogy, particularly projects’ development and assessment that demanded ongoing upgrade and high-level capacity computing as an alternative to physical equipment. However, it was unclear how academics experienced this migration. This motivated my interests in understanding how academics’ respond to, and experience, the emergence of CC and CBS in general and within their institution.

3.6.2. Potential Participants

The potential participants in this study included a hundred and eighty academics located within the seven academic programmes in one institution. The reason for including all programmes was to widen participation. At the time of the study, the programmes included (1) Foundation, (2) Business, (3) Logistics, (4) Engineering Technology, (5) Information and Communication Technologies (ICT), (6) Visual Design and (7) Web Media. Six of which (Business, Logistics, Engineering Technology, ICT, Visual Design and Web Media) offered four-year bachelor’s degrees primarily to local secondary school leavers. The Foundation programme was to bridge the gap between high schools and degree programmes based on entry assessment results. Academic staff were allocated to these programmes distributed over separate buildings across the institution campus. However, they were expected to teach courses in any programme based on course offerings and their expertise.

An Academic Development department was responsible for training and supporting academics’ practice. All academics were expected to receive a formal teacher induction training over two consecutive semesters upon commencing their work. The first part focused on institutional supported teaching strategies. Within a group, academics were guided to engage in discussions and activities and take turns to design and demonstrate selected lessons within their field of expertise. The second part included hands-on activities on technology-enhanced course design and pedagogy using an institutional eLearning system and various teaching, learning and assessment technologies. Academics were encouraged to employ learner-centred, EXL, PBL and PjBL as the recommended pedagogic strategies for their courses. In line with the institution’s objectives, academics were also encouraged to teach and assess students’ employability skills as priority outcomes of learning. These skills were situated in an internally developed employability framework that included transferable skills, namely, communication, teamwork, problem-solving, planning and organisation, learning, initiative and enterprise, self-management and technology. Although one course might emphasise one or more employability skill, all programmes were required to assess the eight skills collectively. The aim was to ensure that students were prepared for the job market.

The eLearning system was offered to help academics and students engaged in BL. The system was mostly used to manage course material. Smartboards were also deployed in all classrooms to present material. All academics were encouraged to use various EdTech and subject-specific technologies commensurate with the industry practices to promote students as employable and equipped with the required skills. Using EdTech inside and outside the classroom was encouraged and varied across programmes and courses.

Therefore, all experienced academics within this institution received formal training to employ technology in their pedagogic strategies, hands-on practices, critical reflections and pedagogies. However, I was not aware of the academics’ pedagogic practices beyond my programme. Therefore, I considered all the academic staff across the institution as potential participants for this study.

The Participants’ Selection Process

Nine technology-oriented academics, from the pool of a hundred and eighty academics, were selected using ‘criterion-based purposeful selection’ (Emmel, 2013; Schensul & LeCompte, 2012) that considered their technology-orientation as an inclusion criterion. Unlike quantitative research that aims to generalise results, the aim of this study to understand the nuanced, socially constructed, interpreted and shared experiences of technology-oriented academics (Hammersley, 2013; Bryman, 2016). Hence, a small number of academics (8-12) was considered suitable to allow quality and in-depth examination of academics’ pedagogic experiences (Hammersley, 2013).

Academics’ technology-orientation was decided as the selection frame that includes their tendencies towards using new technologies in their pedagogic practices. Several studies used its characteristics as criteria for selecting academics who effectively used technology in their pedagogic practices (Ertmer P. A., 2006; Ertmer P. A., Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Martin, Ritzhaupt, Kumar, & Budhrani, 2019). These criteria were expected to locate academics who could provide narratives and reflective accounts of their pedagogic experiences with emerging technology (Neuman, 2014; Savin-Baden & Tombs, 2017) as suitable key informants. Marshall (1996b) defined key informants as expert sources of data based on their role within their community, personal skills and experience of the research phenomenon. Therefore, technology-oriented teaching academics’ who were affiliated with the case and hold experiences with emerging technology were considered suitable for this study. Cilesiz (2011) described the experience as *conceptions* and *active* participation in events that lead to developing knowledge and skills. This notion is in line with Aristotle’s theory of understanding inherent truth and episteme (knowledge) of a phenomenon through *techne* (experience and process) and constructs *phronesis* (practical action) (Willis, 2008) and Dewey’s (1938) EXL through practical experiences.

Refining the selection criteria benefited from studies that examined teachers and academics technology-orientation. Gilmore et al. (2014) used four factors (mentor involvement, teaching experience, research experience, ongoing training as criteria) to understand teachers' orientation. However, at the time of this study, mentorship was not institutionally implemented in this case, although some academics applied it in as a personal initiative. Therefore, a more relevant technology-focused criterion (For example, teaching experience, technology experience, continuing professional and technical skills development) were initially considered.

Shelton (2017) and McCune (2018) and found an association between academics' continual technical skills development and exemplary and sustainable use in their pedagogic practices. Therefore, academics who continually undertook technology training were considered potential participants in this study. Moreover, according to Martin et al. (2019), academics who demonstrated notable online practices that provided a sense of successful pedagogic experiences shared willingness to learn and experiment with new technologies continually. Similarly, Gilmore et al. (2014) noted that academics' willingness to exploit new knowledge and share their experiences indicate their orientation to that specific knowledge. Hence, motivation for learning and active engagement map to Marshall's key informant's definition (1996b).

Academics who self-reported and demonstrated their technology-orientation through the following set of characteristics were selected as key informants for this study. Evidenced characteristics of technology-orientation (For example, Students' centred pedagogic approaches, passion for technology, problem-solving mentality, asking support from others) (Ertmer P. A., Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012) were also considered in the coding process.

The Participants' Selection Criteria

The theoretical and practical considerations (Willis, 2008) along my proximity as an insider researcher helped me understand the dominant context and culture of the research community (Hanson, 2013), hence, influenced my constructionist stance (Savin-Baden & Tombs, 2017). These enabled me to adapt the measures, in theory, to correspond with the specificity of the context. For example, I took into consideration that research was not a priority in this specific study site, primarily since it is focused on teaching and hands-on. However, motivation and interest in this study were essential to select the key informants (Marshall, 1996a). The key informants were also selected based on their experience. However, there is still controversy about whether experience influences the use of technology.

The research site required all academics to undertake professional and technical skills development for one year; therefore, two years was decided a sufficient period to allow academics' deployment of skills they acquire. The technology-orientation selection criteria included academics who are oriented towards emerging technology.

Their orientation can be understood from:

1. Experienced academic (2+ years)
2. Experienced in using technology in their pedagogic practices (2+ years)
3. Motivated to experiment with emerging technologies
4. Engage in continuing technical skills development
5. Hold positive self-theories about their ability to use technology

Institutionally common EdTech and subject-specific technologies considered in this study include:

- Learning management systems (LMS) (For example, Moodle)
- Collaborative software and social networking (For example, Padlet)
- Productivity software packages (For example, MS Office or Google Docs)
- Multimedia authoring and design (For example, Adobe Suite)
- Data mining and analytics (For example, SAS, SPSS)
- Design tools (For example, CAD)
- Software development suites (MS Visual Studio, NetBeans, Oracle)

CC and the cloud refer to the provision model, private and public platforms and services that fit with the NIST definition. Examples of cloud technologies considered in this study include:

- Cloud-based web and mobile applications (Office 365 Suite, Google Cloud Suite)
- Cloud computing platforms (Azure, Amazon Web Services (aws), Google Cloud)
- Cloud-based intelligent systems (Ai, Cognitive Services, Data Mining, Big Data)
- Cloud-based services (Internet of Things (IoT), Wearable Devices, Machine to Machine Systems)

3.6.3. Participant Screener

To reach a maximum number of potential participants within the case (Yin, 2018; Gentles, Charles, Ploeg, & McKibbon, 2015) and to ensure that respondents meet the selection criteria an online screener was employed (See Appendix A). Participant screening is standard in healthcare sciences, technology design and usability studies; however, hardly used in educational research (Neuman, 2014). It was considered ideal for reaching a large pool of academics in the selected institution (Yin, 2018). Structural aspects such as the variance in academics' EdTech practices, their availability and willingness to allocate time within their work schedules to engage in the research were also considered. Using this technique was useful to gather a collective view of potential participants characteristics and pedagogic practices (Gentles, Charles, Ploeg, & McKibbon, 2015). These characteristics also shaped the methods design, questions and language used to encounter the variances in academics characteristics across faculties.

The screener included four sections of semi-structured questions that academics to (a) report their background, (b) self-rate their technology utilisation, (c) self-rate their digital competence and (d), and I provide any desired input on their general perceptions of using EdTech for teaching and learning. This open-ended question was also used as an early 'skip logic' to disqualify respondents who do not fit with the main criteria (See Appendix A). Three responses were designed to disqualify respondents (not consenting the screener, not teaching, not using technology for teaching and learning). Questions related to academics' technology experience were tailored to specific institutional technologies. This was decided to help the respondents relate to their actual practices and to reinforce the precision of their responses (Yin, 2018). The screener was designed to get a sense of respondents' motivation and enable them to express their interest in participating in the study (Marshall, 1996a). Therefore, the final section was optional asked whether they are interested in participating on a voluntary basis according to the research ethics (TCPS2, 2018).

It's worth to note here that the screener was focused on academics' self-rating. Questions around their background were centred on their teaching experience and affiliation. Questions related to cultural and demographic aspects were not relevant. Although at the time of conducting this study most academics were from different nationalities; however, in this study I did not focus on the cultural differences; instead, I collectively treated the respondents whether they were local or not to the country and region of the institution.

The screener questions were validated by two expert researchers. To increase the efficiency of collecting and reviewing the responses, I created the screener using a web-based form builder that offered security and adequate features for customisation and analysis. A pilot was run by sending a link to the online screener to ten researchers from the supervising institution (See Figure 8). Piloting the screener helped in identifying any technical issues or variances in language acceptances (Yin, 2018). Recommendations were reviewed, and changes applied to the screener before distributing the final version formally to the potential participants. Gatekeepers (study site ERB and senior management) approvals were secured to run the screener.

To promote understanding of the screener questions, particularly the meaning of technologies and terminologies used in this study (Neuman, 2014), I conducted introductory sessions about the cloud (Yin, 2018). These were integrated into the teacher and learning week. The aim was to allow discussions on what is referred to as EdTech, subject-specific technology, cloud and cloud services used as terms in the survey. The first sessions were open to all academics. Two other academics helped in logistical preparations (For example, creating accounts and preparing a template of virtual services to speed up deployment) and conducting the tutorials. The organisation of these sessions was possible due to my awareness of the institution’s facilities and proximity from staff (Hanson, 2013). The sessions concluded with an announcement about the screener, aim and duration. This approach served as an introductory to the screener distributed subsequently.

Due to the limited capacity of these sessions, the material was made public in the teaching and learning site. Efforts were made to provide an opportunity for all academics who could meet the selection criteria (Yin, 2018; Gentles, Charles, Ploeg, & McKibbon, 2015). To increase the response rate the screener was active for a limited period and was sent amidst the teaching and learning week at the beginning of the second semester in 2018. This was decided to spare academics the time to respond since they were dedicated to professional development and research activities. An email was sent to all academic staff via a distribution list and included the objectives of the screener and accentuated its brevity (See Appendix A). All academic staff (tutors, course coordinators, program managers, head of schools, deans and teachers’ academics) affiliated with the study site received the screener by email. This concluded with 55 responses. Given the lack of emphasis on research in this site, (55, 30% response rate) is considered acceptable for this study. I gathered this assumption from working with academics in previous studies within the institution.

The respondents were located in Foundation, Humanities, Business, Engineering, Visual Design and Web Media and ICT. All respondents who qualified to take all questions have teaching experience, with the majority taught more than five years. Only one respondent with no teaching experience was disqualified and led to the skip logic question. Most academics who reported using technology were located in the Faculty EDICT where technology is inherently core in their teaching practice. More than half of the respondents provided their contact details, indicating their interest to participate in the following stages of this study, indicating motivation towards the topic. A multi-step approach was employed to validate the selection of the participants (Schensul & LeCompte, 2012). Based on common content analyses, the responses of academics who provided their contacts were analysed against the inclusion criteria (Emmel, 2013). Eight respondents were excluded due to basic to none use of technology in teaching. A list of twenty-two respondents was reviewed with the teaching and learning unit who observed and academics' pedagogic practices. Following discussions and review of the observation reports, nine academics who met the technology-orientation selection criteria were selected (Emmel, 2013).

3.6.4. The Participants in this Study

Nine academics were selected amongst the hundred and eighty potential participants, fifty-five screener respondents and twenty-two who showed interest to participate. This followed 'criterion-based purposeful selection' (Schensul & LeCompte, Essential Ethnographic Methods: A mixed-methods approach, 2012; Emmel, 2013) approach that considered their orientations towards adopting emerging technology. At the time of commencing this study, all participants (embedded cross-sectional cases) were affiliated with the same HEI (the case). The selected participants spanned four programmes (ICT, Engineering, Web Media and Business) within two faculties, Business and EDICT. The selection process included academics who reported (1) interest and motivation education and technology, the topics of this study (2) having teaching experience, (3) deploying current and emerging technology in their pedagogic practices and (4) maintaining professional development. Validation was carried against a report developed by the study site academic department which included teaching observations and the analysis of the gathered data (Yin, 2018; Gentles, Charles, Ploeg, & McKibbon, 2015). The nine academics who were recruited. To begin with, an overview of the study participants' demographics, roles and gathered from the screener responses, e-portfolios, as presented in Table 2.

Table 2.

This study participants' characteristics

Alias	Gender	Background	Department(s)	Role(s) in the Institution
Iris	Female	Academic and business professional	Business	Educator, Course Coordinator and Academic Manager
Jim	Male	Academic and ICT professional	ICT	Educator and Course Coordinator
Dan	Male	Academic	ICT	Educator, Course Coordinator and Academic Manager
Adam	Male	Academic and ICT professional	ICT	Educator and Course Coordinator
Alex	Male	Academic and ICT professional	ICT	Educator and Course Coordinator
Alice	Female	Academic and Web Media professional	Web Media	Educator and Course Coordinator
Aristi	Male	Academic	ICT	Educator, Course Coordinator and Academic Manager
Athena	Female	Academic and engineering professional	Engineering	Educator, Course Coordinator and Academic Manager
Sam	Male	Academic and ICT professional	ICT	Educator and Course Coordinator

3.6.5. Gaining Access

Being an internal academic provided me with the amenity of access (Humphrey, 2012; Hanson, 2013) to the study site (the case) and participants (embedded cross-sectional cases). All gatekeepers at the study site (Senior Management Team, Chairman of the Research Committee, and Faculty Deans) welcomed this study. The first gatekeeper was the Chairman of the Research Committee described this study:

> *It aligns with our strategic goal number one, which calls for the provision of state-of-the-art campus facilities that adopt leading technological concepts. It also aligns with the institution's Research Plan, which is committed to pedagogical research that leads to increased effectiveness of teaching and learning processes and the further development of innovative courses and programmes.* Chairman of the Research Committee at the Study site

Building rapport with the gatekeeper was critical for gaining access and collecting deep and hidden data (Hanson, 2013). This is particularly true since the study was designed to take place in the natural setting of their work-life and during their work hours, which means that it intervened with their workload. Therefore, the gatekeepers' approval is required to allow these activities to take place (Hanson, 2013). This has been achieved through my position and my years of experience in HE as I established a record of commitment to supporting academics and students and engaged in projects above and beyond my duties. This maintained a reasonable level of trustworthiness in conducting this study. My engagement in the research activities within the institution also allowed me familiarity with the procedures and standards of initiating and conducting an internal study. Therefore, in a previous semester to study start, and after gaining ethics approval from the supervising institution, I organised formal meetings with the Chairman of the Research Committee and discussed the study objectives, methods, procedures and timeframes. A proposal supported by institutional forms was submitted to the institution's Research Committee and gained their support and approval. This study received all required approvals from the supervising institution and the study site as essentials to commence (Yin, 2018).

3.6.6. Informed Consent and Permission

Obtaining participants' informed consent is the most critical step in the ethical conduct of qualitative research and a requirement by the above ethic committees (Silverman, 2017, p. 58; TCPS2, 2018; Cohen, Manion, & Morrison, 2018; BERA, 2018). Respecting the participants' autonomy in this study bestow them free will to deliberate their engagements and allowed me the confidence to access their experiences (TCPS2, 2018). In compliance with the research ethics (BERA, 2018), Amidst the recruitment process, the participants received an information sheet and a consent form (See Appendix B) (Silverman, 2017). Adequate information (study title, aims, contacts, procedures, expected forms and durations of participation, assurance of voluntary participation and withdrawal at any point in time) was included. Each of the selected participants was invited to an individual information session (See Appendix C). Electronic copies of the information sheet and a consent form were sent via email to each participant before the information session. This was intended to give them enough time to decide. During the session, the participants were introduced to high-level details about the study to caution against influencing their future responses (Silverman, 2013; Yin, 2018) and were reassured that their participation is voluntary and that they can refuse to respond to any question or withdraw from the study at any time without any consequences (TCPS2, 2018).

3.6.7. Assurance of Confidentiality

Protecting the participants' privacy and confidentiality is crucial for this research and the duty of the researcher (TCPS2, 2018); hence, a great deal of care has been taken to protect the identity of the participants. The participants were invited to reflect on their conceptions, aspirations and practices (Cilesiz, 2011). This was aimed to develop an in-depth understanding of their experiences and in turn enhance exposure to issues that concerns their competence, independence and perceptions of their context that could expose them as sources of information and risk their reputation (Macfarlane, Zhang, & Pun, 2014). As Macfarlane (2014) notes, a key challenge in researching ethical issues connected with academics is the 'negative framing' and referring to unethical conduct. Although autonomy as a concept was not mentioned until the end of the study, and despite their voluntary participation, some of the participants in this study were concerned about the destination of their responses: "where is this data going, is it for the institution?". Alice Hence, the participants were recurrently assured confidentiality and anonymity and invited to review their portrayal in addition to securing the data (Savin-Baden & Tombs, 2017).

All data that link to the participant identity was securely stored at my home office. To disguise the participants’ information, physical files that lead to their uniqueness and include their responses have been kept in a key-locked at my home office cabinet. Digital and multimedia files (For example, notes, documents, emails, voice recordings, video recordings and pictures) were stored and backed up a password-protected physical and online drives (also see Section 3.9.4). Data and narratives that attribute the participants and link to their identity and specific names of events and projects that are personal were obscured. Their specific demographics were reported in aggregate form. As a further measure, pseudonyms were used to replace the participants’ names in all the study documents (TCPS2, 2018). A coding manual linked the pseudonyms to their identity details and stored separately from the collected data. The name of the host institution and exact location were also concealed and referred to as an “HEI in the GCC”.

3.7. Data Collection Procedures

3.7.1. Documentary Analysis

Documentary analysis was used as a source of data concerning the case under examination as the participants' bounded context (Yin, 2018) and a window to their 'context-dependent' practices (Silverman, 2020, p. 72; Bowen, 2009). Silverman (2013) suggested examining relevant documents should precede any other source of information since salient data could provide initial grounding. Similarly, Yin (2018, p. 113) suggested that documents are an invaluable source of information in case studies. However, Silverman (2020, p. 290) discerned documents from other sources on the basis of not being collected by the researcher or merely for the study on hand, that he believes it an added value and suggested using them as background, not primary, data in empirical social research. At the same time, Yin (2018, p. 114) cautioned that extracted evidence from documents could be often levelled by a lack of accuracy or 'reporting biases'[10] . Augmenting multiple types of documents, treating them as clues rather than definitive answers to examine complementary or contradictory information support triangulating the data (Bowen, 2009).

Internal course reviews, and institutional and programme reports were considered a rich source of information. My proximity from the institution informed my understanding (Hanson, 2013) that these documents would provide an overview of the participants' 'social reality' (Silverman, 2020) and 'bounded context' (Yin, 2018, p. 114). The course reviews were a summary of reflective statements on courses offered during one academic year (2018 - 2019) within the four programmes where the participants were located. Also, the quality reports were a result of a mandate that included discussions, classroom observations, interviews with academics, management and students and responses on self-evaluation reviews (SER) submitted by the institutions and programmes. The SER was a result of collaborative work amongst faculty, academic management and faculty quality managers. Since these documents were not produced solely for this study, they were considered stable and conclusive sources (Silverman, 2020) that covered a range of pedagogic and that concerned the contextual aspects (Yin, 2018, p. 114).

Content analysis, coding and narrative interpretations were employed to link excerpts and critical data related to the study focus (Silverman, 2020). The aim was to construct a concise view of how academics report their practices with emerging technology works in this specific institution. It entailed examining the content for what it includes and what it does not (Silverman, 2020).

10 Reporting bias has been described as selective revealing or concealing information.

Relevant documents concerning the participants such as peer observation reports, produced by the academic department, and e-portfolios, which they have constructed themselves and publicly published, were also drawn upon (Yin, 2018, p. 114). The aim was to complement and incorporate the data (Silverman, 2020). However, these were treated as complementary to the produced by the participants specifically for this study, such as written communication and personal reflections on pedagogic practices. The aim was to construct the participants' pen portraits, accounts and common themes regarding the study framework (orientation, perceptions, training and autonomy).

3.7.2. Interviews

Semi-structured, in-depth, peer interviews have been employed to engage with the participants in a narrative inquiry and collect their responses (Kvale, 2007; Silverman, 2017; Yin, 2018). Interviews have been an evident method in case social study in general (Yin, 2018) academics' autonomy study (Henkel, 2007; Carvalho & Videira, 2019) that form the basis of this study. However, interviews have been criticised for their limitation in rendering the reality of a social phenomenon (Silverman, 2013). Caveats that interview data could be superficial when they merely yield the participants' responses, known facts, and when the participants lack sufficient knowledge or motivation to provide details of their experiences (Silverman, 2013). Hence, without rigours design, results would be invalid (Kvale, 2007; Silverman, 2013).

Compared to structured surveys, semi-structured interviews support narrative inquiry which has been used to explicate specific aims and meaning of interview questions to avoid any confusions (Cilesiz, 2011; Moen, 2006; McAlpine, 2016). This approach also supports in-depth access to the participants' conceptions, beliefs and experiences through their verbal and non-verbal narratives and interpretations that form the primary data in this study (Kvale, 2007; McAlpine, 2016). Digital recording has been employed with the participants' permission parallel to researcher's notetaking to avoid missing any important details. This 'concurrent recording' approach has proven useful during the transcription and analysis as it not only ensured capturing verbal responses but also highlighted specific, critical and nonverbal points. The caveat to peer interviews is the departure from the informal conversations between my peers and me into purposeful and formal discussions (Kvale, 2007, p. 15). This inherent asymmetry in my role has aroused from the need to steer the interview set up and flow (Hanson, 2013). Designing the interviews to be an enriching epistemological experience for the participants was beneficial (Kvale, 2007, p. 15), and also, by stressing my interest in their specific practices (Hanson, 2013).

A series of four to five 60-90 minutes interviews for each participant took place over three academic semesters. This duration was recommended as suitable for an in-depth understanding of experiences (Cilesiz, 2011; Yin, 2018; Hammersley, 2013). This was also intended to allow the participants time to deliver their courses and gather any change in their practices within the classroom, projects' supervision and contexts. This decision was based on my professional experience (Hanson, 2013) as I was aware that most courses in this institution were offered once a year to encounter a small number of students. Besides, any request for a change in course assessment or content required a minimum of one semester to process and another to implement. To keep the interviews focused (Kvale, 2007, p. 12), they were designed in three frames that centred on the developed framework of this study. The first concerned academics' pedagogic conceptions of CC and CBS. The second concerned the pedagogic overall experiences conceptions and uses (Cilesiz, 2011)of CC and CBS. The third concerned the participants' autonomy in the context of these pedagogic experiences with CC and CBS. These are presented in the following sections.

3.7.3. In-depth Interviews

The first interview theme focused on academics' experiences and meaning-making of emerging technology in general and CC and CBS in particular (See Appendix D) (Willis, 2008; Cilesiz, 2011; Neuman, 2014). According to Laurillard (2002), academics develop their stances towards and through technologies by framing their conception. Her conversational framework demonstrates a practical strategy for exchanging ideas between academics and students of the meaning and value of technology as a product or a medium (Laurillard, 2002). Communicating conceptions through explicit narratives, reflections and interactions, was expected to provide access to the participants' stances (Moen, 2006) and understandings of teaching and learning with and about emerging technology (Laurillard, 2002; Cilesiz, 2011).

Academics' conceptions of the value of CC were expected to afford access to key informants' perspective (Marshall, 1996a). Although the interview questions were directed to participants in the first interviews, I remained vigilant of their understanding of the cloud in their narratives throughout the study (Yin, 2018) as it was expected that the participants reason their practices based on the value (Cilesiz, 2011) of CC and CBS. This provided an in-depth understanding of their discipline-focused and perspectives.

3.7.4. Paired Depth

The second method involved examining academics' pedagogic practices (Cilesiz, 2011) with CC and CBS (See Appendix E). In general, academics' use of EdTech fall within the constructionist nature of their experiences (Willis, 2008; Cilesiz, 2011). Several scholars (For example, Marshall, 1996b; Cilesiz, 2011; Neuman, 2014) agreed that the participants' shared experience could give an in-depth understanding of their nuances. Hence, constant comparative analysis in the participants' profiles and responses in the individual interviews was employed (Yin, 2018; Wilson, Onwuegbuzie, & Manning, 2016). This led to identifying a subset of six participants who used similar CC platforms and services in their teaching practice, worked within the same department (School of ICT), but in different specialisations. The practical experiences of the other three participants relied on their responses in the individual interview.

Paired Depth interviews (Wilson, Onwuegbuzie, & Manning, 2016) was determined suitable to stimulate the participants' responses, reflections and interactions (Hammersley, 2013) about past and current experiences and future aspirations (Price & Oliver, 2007; Willis, 2008; Neuman, 2014; Cilesiz, 2011). This method was aimed to understand their social and structural interactions which were expected to influence their decision-making (Cilesiz, 2011) and role changes (Jaipal-Jamani, et al., 2018). Despite the participants' shared uses of CC and shared department and discipline, their specialisations and roles expected to yield nuanced perspectives (Cilesiz, 2011; Yin, 2018). The sameness of their discipline, the differences in their roles defined their boundaries.

Engaging participants from similar disciplines and the same department in paired depth was not only expected to enhance understanding their subjectivity, but also filling memory lapses in their responses (Wilson, Onwuegbuzie, & Manning, 2016). Akkerman and Bakker (2011) noted that 'Boundary-crossing' was successfully used to examine the differences in students' learning experience when they stepped into teachers' roles. Hence, the paired depth was an opportunity to explore the nuances of academics' pedagogies with CC and CBS. Table 3 depicts the distribution of the six participants in pairs according to their disciplines. Each pair comprised two participants within similar specialisation and different assignment or responsibilities besides their teaching roles. This distribution was intended to provide an understanding of the boundaries between academics in various roles.

Table 3.

Mapping participants to discipline in paired depth

Interview Reference	Discipline	Participants (pseudo)	Role(s)
Pair 1	Programming	Aristi	Educator, Course Coordinator and Academic Manager
		Sam	Educator and Course Coordinator
Pair 2	System Administration	Dan	Educator, Course Coordinator and Academic Manager
		Alex	Educator and Course Coordinator, Cloud Platform Specialist
Pair 3	Networking	Adam	Educator and Course Coordinator, Cloud Platform Specialist
		Jim	Educator and Course Coordinator

The paired depth method was an opportunity to help the participants externalise their reflections through the use of 'Boundary-crossing'. This technique aimed to encourage them to step out of their nuanced views into their peers' perspectives of pedagogic practices with CC (Akkerman & Bakker, 2011). Adopting this approach 'made the familiar strange' and stimulated the discussion and interaction (Hanson, 2013). Boundary-crossing (Akkerman & Bakker, 2011) was put into a design-based approach using boundary objects as envisaged by Corsaro (2018), to cross the participants' technological (CC and CBS) and physical contexts (pedagogic practices). It also aimed to give the participants 'something relevant to work with' and shift their focus to the objects in hand. This approach was drawn from Bowyer et al.'s (2019) work on understanding the participating family's conceptions of their data usage and control by local authorities. Bowyer adapted Brandt and Messeter's (2004) use of game design to streamline the ideation process between cross-disciplinary groups. It was also guided by Savin-Baden's (2017) recommendation to adopt new approaches that are more suited to educational research in the digital age.

The boundary objects in this study comprised textual and visual artefacts in the form of valuation model and an ideation grid (Sample results in Appendix E). The grid follows Mishra and Koehler's (2006) TPACK model for designing an ideal lesson plan that combines pedagogy, technology and subject content. It was decided as a suitable tool for examining academics' realism and idealism of their practices and role changes using CC and CBS (Rienties, Brouwer, & Lygo-Baker, 2013). The selection of TPACK follows Jaipal-Jamani (2018) who examined the influence of role changes on academics' experiences of teaching with EdTech. I was interested in academics' perspectives and the essence of their experiences rather than evaluating the reality of what they do. Therefore, the use of this approach was suitable. According to Cilesiz (2011), the essence of experience combines the real and ideal elements. Cilesiz (2011), alluded that these elements support understanding the participants' 'intentionality' towards a specific action (Cilesiz, 2011). Savin-Baden (2017) reasoned that the benefit of 'envisioning technology' is converging action and human-centred research. These notions indicate that the ideal lesson plans would help in filling the gap between the participants' current and future uses of CC and CBS.

At the time of conducting this interview, it was not possible for me to be physically available at the study site; therefore, 'online paired depth' using video conferencing (Wilson, Onwuegbuzie, & Manning, 2016) and 'digital boundary objects' were employed (Corsaro, 2018). However, the participants gathered face-to-face while I was facilitating their interactions from another location. This enabled me to gather the participants' responses at a distance from their immersion in the cloud platforms (Savin-Baden & Tombs, 2017; Cilesiz, 2011). It also helped me access their conscious conceptions, practices and interrelated dimensions of their experiences (Cilesiz, 2011).

However, a caveat to this technique is discounting my physical interaction with the participants, efficiency in managing the activities and observation of the complete picture (Savin-Baden & Tombs, 2017). As a general guide, the participants were asked to interact with artefacts, discuss and 'think-aloud' (Charters E. , 2003) to access their spoken narratives (Moen, 2006), conceptions and rationalisations of their interactions (Charters E. , 2003). The paired depth in this study included three activities, CC Features Valuation, CBS Features Valuation and Cloud-Based Pedagogic Practices Ideation.

The CC Features Valuation activity was aimed at gathering the participants' conceptions of CC features based on their practical experiences using a 'Valuation Model' (See Figure 9). This model was based on the literature that examined the affordances and challenges of EdTech. Osterwalder et al. (2014) value model has been used to address the issues and objectives of interacting with objects within individuals' contexts. In this activity, it was intended to stimulate the participants' responses on their gains, pains and experiences (Cilesiz, 2011) with CC and CBS to understand the variances in their conceptions of the cloud.

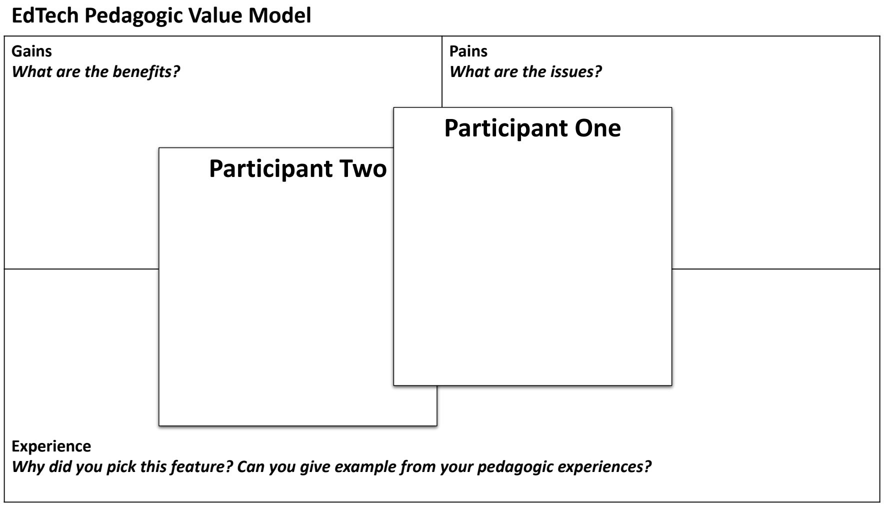

Figure 9. CBS valuation model in paired depth

The participants were requested to select the most important CC feature (See Figure 10) and place it in one of the valuation sections, justify their selections and give examples based on their experiences. The features were adopted from the NIST definition of CC, as these were standardised and well-known in CC literature (Mell & Grance, 2011). However, it was unclear whether the participants are aware of the specific meanings of the features. Therefore, a description was included on each prompt. An additional prompt was left open to the participants' discretion. This was decided to reinforce the semi-structured nature of this interview (Kvale, 2007).

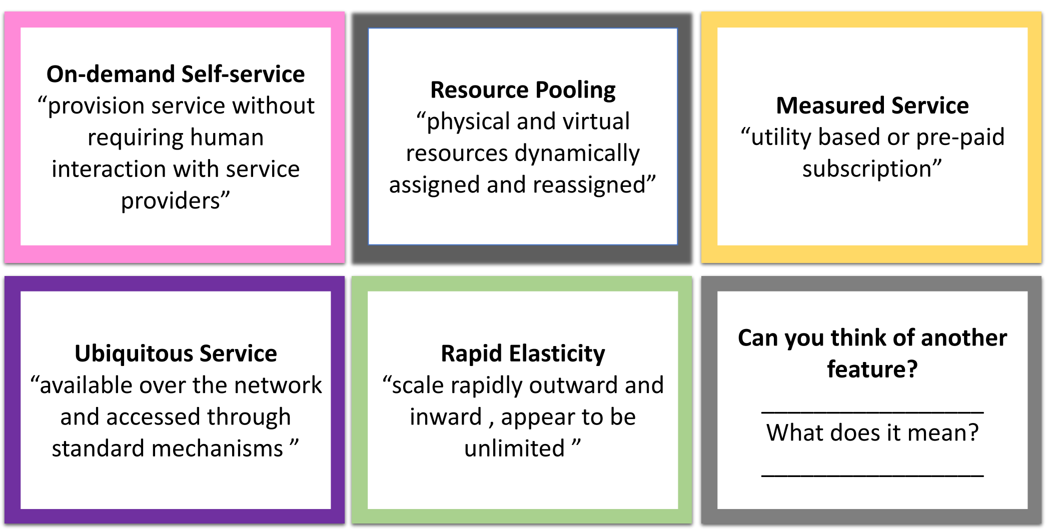

Figure 10. CC model five main features used as boundary objects

The same technique was used in the CBS Features Valuation activity (See Figure 11). CBS are functional features and applications based hosted on CC platforms (Mell & Grance, 2011). Examples of CBS from three prevalent platforms (MS Azure, AWS, and Google Cloud) were selected and classified. However, it was unclear whether the participants were familiar with these services. Therefore, a definition was included for each of the services, so this could also be a useful learning experience for some of the participants (Cilesiz, 2011). CBS prompts were colour coded and double-sided with category names, examples and descriptions on the back. The pedagogic valuation model was also used, and participants were given similar instructions to the first activity. Replicating the activity was expected to increase the quality and efficiency of the participants’ responses and encourage them to reflect and think aloud (Charters E. , 2003).

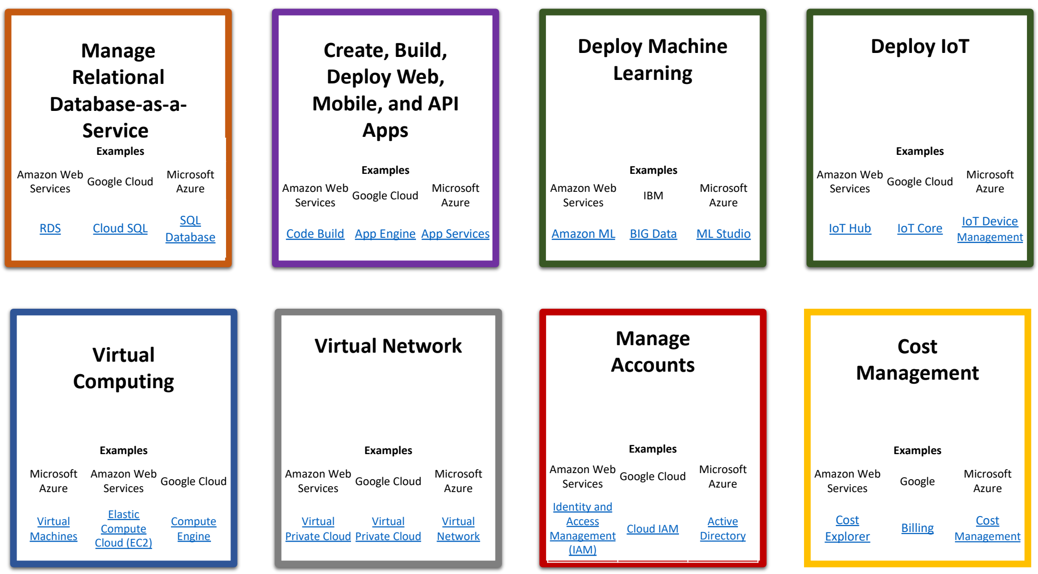

Figure 11. Sample prompts of CBS categories and examples

Examining academics’ Cloud-Based Pedagogic Practices Ideation entailed two parts. The first was using ideation approach to stimulate academics reflexive narrative on possible ideal scenarios (Cilesiz, 2011) of utilising CC and CBS in their pedagogic practices (See Figure 12). Much of the literature indicates that academics tendencies and conceptions indicate their practices (Bhat & Beri, 2016). Following TPACK (Mishra & Koehler, 2006), the participants were requested to think of three different topics within their discipline, select a suitable CBS and CC and pedagogic strategy. The participants were advised to discuss and propose a full set and agree on the third one. This approach helped to examine the participants’ boundary-crossing (Wenger-Trayner, 2015) and observe how they negotiate their ideas and decisions (Wenger, 2000)

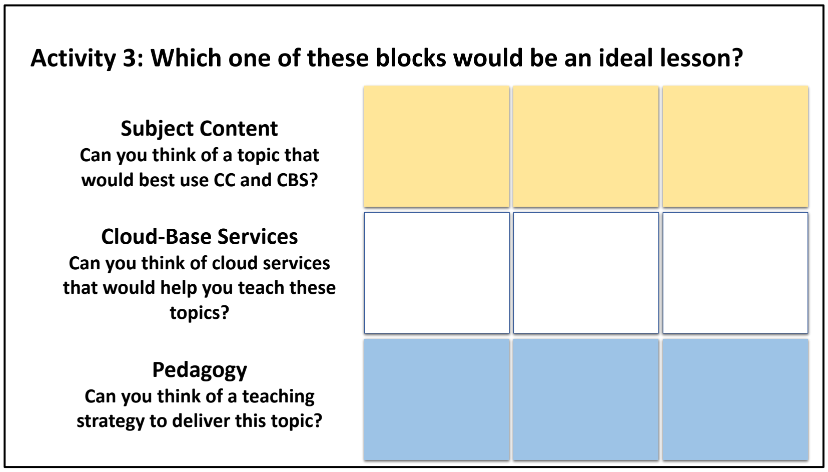

Figure 12. Ideation of ideal lesson plan with CBS

The second entailed asking academics to choose one lesson and think aloud (Charters E. , 2003) of what they need, how they would measure implementation and how using CC and CBS affect their role (See Figure 13). This was decided to examine whether using the cloud incurred any changes to their pedagogic practices.

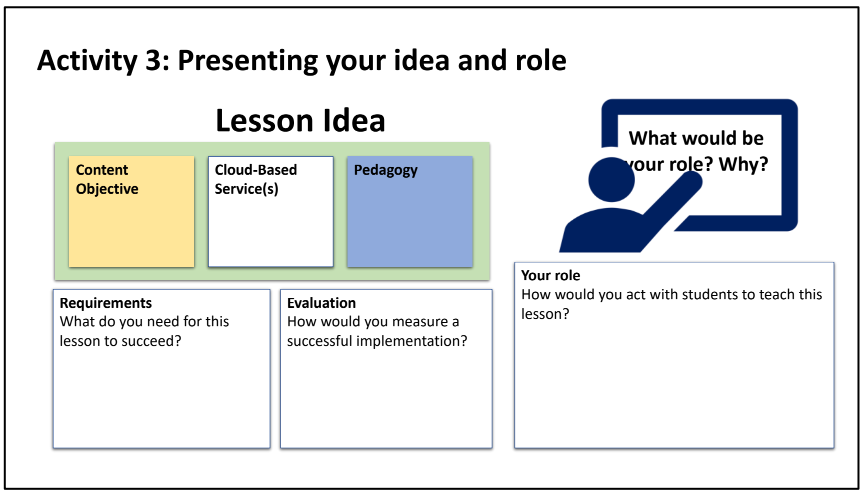

Figure 13. Ideal lesson and role changes presentation

Interviewing academics within the same discipline in paired depth, and the use of boundary-crossing and boundary objects, was a useful method for this study. The participants showed interest in handling the objects and constructing strategies of agreement or divergence with their peers. It also kept me attentive to their interactions and interested in their 'spoken narratives'. It differed from Bowyer et al.'s (2019) boundary-crossing, objects and ideation approach in adapting these tools in an EdTech setting and by employing TPACK to generate lesson plan ideas and observe role changes. The use of online video conferencing and e-boundary objects in a paired depth approach added a convenient alternative to fit research at a distance.

3.7.5. Focus Group

All participants were invited to participate in a focus group discussion in using CC in HE (See Appendix G). The focus group was aimed to triangulate the data and methods and stimulate discussions (Silverman, 2020). It also aimed to ascend boundary-crossings within the participants in different roles and provide access to their social and nuanced perspectives (Akkerman & Bakker, 2011). Silverman (2020) described the focus group method as a group interview in which the participants interact with each other and with the researcher. Hence, while the in-depth interviews employed a naturalist approach that focused on the participants’ experiences (McAlpine, 2016), the paired depth and group discussion examined the collective views and socio-cultural influences on these experiences. Although Silverman (2020) cautioned that the group dynamics might suppress participants; the relationships and established rapport within the participants were expected to brush out this concern (Braun & Clarke, 2013). Besides, combining individual and group interviews were intended to enhance the quality of the gathered data by examining the participants’ socio-cultural perceptions and collecting data from several lenses (Lambert & Loiselle, 2008; Caillaud & Flick, 2017) and their different perspectives (Yin, 2018, p. 245).

Given that academics experiences manifest in their conceptions, aspirations and practices, constant comparative analysis between the participants’ realism (what they experience) and idealism (what they wish to experience) was employed (Cilesiz, 2011). This allowed examining the gaps between their realities and aspirations (Cilesiz, 2011). Electronic and printed boundary objects (Akkerman & Bakker, 2011; Corsaro, 2018) comprising ‘ideal situation’ prompts were adopted. Five statements (See Appendix G) of an ideal situation, based on the reviewed literature, followed by questions on what support autonomous pedagogic practices with CC and CBS. The aim was to stimulate their distinct discourses (Yin, 2018). Reusing boundary objects technique was beneficial as the participants were already familiar with this approach having used it in the paired depth. The questions were underpinned by theory and open-ended to allow critical and variant responses (Yin, 2018). The design, questions and statements were validated by the study supervisors, and the whole method was piloted with experienced EdTech postgraduates from the researcher’s home institution (See Figure 8). The participants’ responses and interactions were audio-recorded and transcribed into +700 lines of transcripts. Their agreements and debates provided access to their role boundaries and their decision-making processes, challenges, aspirations and practices.

3.7.6. Researcher's Notes

Researcher's notes are integral to the qualitative researcher who acts as the primary instrument in narrative research (Neuman, 2014). Throughout this study, I was committed to maintaining extended notes, recording academics' narrative responses, verbal and non-verbal clues, contextual aspects, interpretations and reflections. My notes were methodological, conceptual, observational and reflective recordings impressions and provisional findings. Neuman (2014). and Silverman (2013) accentuated that the use of critical reflections on the gathered data is an essential analysis method that enhances the credibility of qualitative research. The most useful practice was to maintain multimodal notes that included text, visual impressions and diagrams as an integral element to my reflections and interpretations (Kara, 2015). Artefacts and graphs have evolved from recording the participants' past and current experiences and plans, conceptualising theories and practices (Kara, 2015). The most useful notes I recorded was on 16th March 2020, when the COVID-19 outbreak led universities and schools switch abruptly to online learning. These unprecedented circumstances occurred at the time of writing this thesis asserting to me that while CC and CBS were imperative to maintain education sustainability, many academics were taken by the switch and were left to their devices regardless of provided support.

3.8. Data Quality Procedures

Before commencing data gathering, this study received ethics approvals on the aim, objectives, questions, design and implementation procedures from the supervising institution research ethics committee (REC) and the study site institutional review board (IRB). While both institutions required this step, it was essential to ensure rigour and quality by providing a brief of the research aim and design (TCPS2, 2018). This was particularly imperative being an internal academic and educator to formalise discussions and interactions with my peer participants (Hanson, 2013). According to Lincoln and Guba (1990) discerned the quality of the process, that aims to emphasise the research authenticity and trustworthiness, and the product that ensures the validity of the presented narrative (1990). The following section explains how quality measures and ethics dimensions were integral to this study. The quality measures in this study follow the British Educational Research Association's (BERA) 'close-to-practice' guidance; that recommends critically considering established methods for educational research (BERA, 2018).

3.8.1. Credibility

Silverman (2020) described credibility as the 'trustworthiness' of data, processes and interpretations (products) as an alternative to reliability in quantitative analysis. Credibility has been reinforced in this study through member checking (Silverman, 2013) triangulation, design validation, piloting iterative data analysis, construct validity, participant validation (Sullivan & Sargeant, 2011; Yin, 2018) and peer debriefing. A firm grasp of the issues being studied (Yin, 2018) was sought by conducting two studies before commencing this research. The first explored the emergence of CC in HE (Zahran, Walker-Gleaves, & Walker-Gleaves, 2017) and the second analysed the utilisations of CC and CBS in educational settings using a mixed-methods systematic literature review (Unpublished). Analysis of documents not collected specifically for this study supported contextual of the participants and cross-check with the responses of the participants. My proximity as an internal researcher that enabled me to continually contact the participants has been a privilege (Humphrey, 2012; Hanson, 2013). This enabled conducting member checking through iterative dialogue and invitations to validate their responses and portrayals. This was intended to give the participant a voice and opportunities to correct any misinterpretations (Neuman, 2014; Savin-Baden & Tombs, 2017). Means of online communication such as Skype, WhatsApp and email safeguarded our communication whenever it was not possible to maintain in person. Methods triangulation entailed using documents, interviews (individual, paired depth, group) written reflections, researcher's notes and all relevant material (Yin, 2018).

Combining individual and group interviews, according to Lambert and Loiselle (2008), was expected to yield richness and parameters between the participants' individual and social aspects. This aimed to develop an in-depth understanding of the phenomenon from different angles (Yin, 2018). Data triangulation was also employed by examining evidence of academics' experiences from multiple sources. This approach supported exploring the nuances of individual participants' experience in comparison to other participants and also a collective understanding of the common issues. The analysis and interpretations were influenced by data with consideration to the theoretical underpinning. Construct validity was also sought by identifying the correct measures of academics' experiences with CC (Yin, 2018). This was suitable for this study since the literature offered indicators and dimensions. Priori codes were developed based on these dimensions (Saldana, 2009; Cohen, Manion, & Morrison, 2018). Cohen et al. defined a code as a label that describes data (Cohen, Manion, & Morrison, 2018, p. 668). However, as guided by Clarke & Braun (Clarke & Braun, 2018), the codes and theory were revised before they were used in the analysis. Throughout this study, all the employed methods were validated by and piloted with expert researchers from the supervising institution to avoid any 'leading questions' or ambiguous procedures (Sullivan & Sargeant, 2011; Savin-Baden & Tombs, 2017; Yin, 2018).

3.8.2. Transferability

Transferability was reinforced in this study through transparency, coherence of methods and validation. Reporting included detailed descriptions of the selected case, potential participants, employed research design, methods, approaches, analysis, interpretation and participants' portrayal structure. Contributions and limitations of this study were equally discussed. A challenge was to maintain a balance between transparency and confidentiality, mainly due to my proximity from the participants (Humphrey, 2012). Therefore, general rule-based (Savin-Baden & Tombs, 2017, p. 123) and reductionist approaches (Savin-Baden & Tombs, 2017, p. 127) were adopted. To protect the privacy of the participants, as explained in the assurance of confidentiality (See Sections 3.6.6 and 3.6.7), private data irrelevant to the aim of this study was omitted while relevant data was interpreted into representation (Savin-Baden & Tombs, 2017). However, the employed approaches, methods, and nuances of the case and participants, my analysis, interpretations and reflections remain open for future reference. Experienced researchers were invited to validate the research design to promote transferability, which in effect promoted dependability (Savin-Baden & Tombs, 2017, p. 123).

3.8.3. Dependability

Qualitative research has been criticised being anecdotal and partial (Silverman, 2013; Neuman, 2014). Such weaknesses threaten the trustworthiness of qualitative studies and confound transferability. Therefore, dependability (i.e. trustworthiness of findings) was reinforced in this study using three techniques. The first was maintaining the integrity of the gathered data (Sullivan & Sargeant, 2011). This was ensured through rigours data management (See Section 3.8.2). The second was promoting the quality of the gathered data (Sullivan & Sargeant, 2011). A key concern was to this study was socially desirable responding (SDR). Macfarlane (2014) cautioned that respondents in ethics studies tend to exaggerate a positive image of themselves or report what is socially acceptable, specifically in internal research (Hanson, 2013). Likewise, Silverman (2013) questioned the validity of gathered data from participants and suggested researchers' interpretation and critical analysis. Control methods such as emphasising anonymity and confidentiality in the informed consent (See Sections 3.6.6 and 3.6.7) to enhance access to the participants' experiences, triangulation (See Figure 8), member checking through inviting the participants to validate transcripts and can review their portrayals in this thesis contributed to promoting the dependability (Sullivan & Sargeant, 2011; Savin-Baden & Tombs, 2017). The third was enhancing the validity of the research design and implementation (Sullivan & Sargeant, 2011). The study, methods (reviewed literature, design, data gathering, analysis, interpretation) were systematised and validated. The research design is comparable and based on peer-reviewed studies. The selected methods for qualitative research were validated by experienced researchers and study supervisors for suitability for this study. Iterative piloting with external researchers, from the supervising institution, helped ease formality pressures and systematise and validate the adopted tools and techniques (Yin, 2018). An iterative revision of the design and piloting were implemented throughout to promote the research rigour.

3.8.4. Data Management

Managing the documents and data was critical for this qualitative study (Neuman, 2014). This was particularly critical since the data is semi-structured and gathered considerably (three semesters). The process is equivalent to what my line manager described "*a roller coaster experience*" due to its recursive and iterative nature as I was continually going back and forth to find the connections between the literature, methods, data and analysis, that interrelate and appraise one another.

A document management plan was developed upon the study's commencement to create and maintain files and information on a password protected online drive provided by the supervising institution. This was beneficial since the online archive provides ubiquitous access, security, sufficient capacity, and back up services, that also support protecting the confidentiality and integrity of research data (TCPS2, 2018). Three methods supported the data management and analysis, (1) extended field notes, (2) annotating and bracketing and (3) indexing by category and source of information. The regular practices were to write extended reflections in field notes (See Section 3.7.6) on observations and interactions with the participants, record meeting in agenda and minutes in writing and voice notes, transcribing and annotating interviews and meetings minutes (For example, digital notes, voice notes and videos). Archiving this data, emails, digital communication, and transcripts in proper document index supported data retrieval. Annotating and bracketing data were beneficial to separate the content received from the participants from my reflections (Neuman, 2014). This was crucial to maintain the data's integrity verbatim to its sources (TCPS2, 2018). Indexing guided the separation amongst gathered information, reflection and meaning-making out of this data and marking sources and forms of knowledge which informed the analysis (Neuman, 2014).

3.9. Data Analysis

There were four data sets within this study, data from (1) relevant institutional documents of the four programmes where the participants were located, (2) individual, paired depth and group interviews, (3) participants written reflections and (4) researcher's notes. Analysing data in qualitative research requires adopting a flexible and iterative approach (Yin, 2018). Therefore, throughout the analysis process, there was a continuous comparison with the theory to understand the essence of academics' experiences with CC and CBS (Cilesiz, 2011).

Comparison between academics' perspectives of their reality and ideal situation (Cilesiz, 2011) and theories of pedagogic conceptions and practices have been imperative to make informed interpretations of the temporal changes in these experiences and gaps between their reality and aspirations. A comparative 'content analysis' (Silverman, 2020) of formal quality and course reviews reports developed by academic staff was undertaken. The analysis aimed at developing a contextual overview of the general patterns (Silverman, 2020) concerning academics' practice with emerging technology. The result is a narrative description of the main issues that academics' experience in each of the four programmes where the participants were located. The analysis moved from the participants' broad contexts to their nuanced, shared experiences (Cilesiz, 2011). The primary source of data was the transcripts of individual interviews, paired-depth interviews and a focus group (See Appendix D and F respectively). A total of twenty-five audio recordings were personally transcribed, saved in three themes. The files were given sequence numbers and identifying name. The transcripts were analysed rigorously using procedures developed for qualitative narrative research (McAlpine, 2016; Moen, 2006; Silverman, 2020; Clarke & Braun, 2018). Braun and Clark's (2013) six-phase thematic analysis (TA) was selected as a suitable approach since it allows progressive, flexible, iterative, and intuitive construction of themes across narrative data (Braun & Clarke, 2013) that entailed:

1. Familiarising self with the data
2. Generating initial codes
3. Searching for themes
4. Reviewing potential themes
5. Defining and naming themes
6. Producing the report

The first step 'familiarising self with the data' (Braun & Clarke, 2013) began with verbatim (Cilesiz, 2011) transcription of audio-visual recording and exchanged digital and written responses. Although there was an option to use a digital transcriber, I decided to do this manually to familiarise myself with the data (Braun & Clarke, 2013). Employing bracketing [ ] and annotations (Cilesiz, 2011) helped recount any immediate thoughts, assumptions, exceptions and non-verbal responses such as variances in the participants' voice tone and body language (Cilesiz, 2011).

The study files were carefully named, sequenced and stored according to their sources described in Section 3.8. A collective view of the gathered data and findings from the literature contributed to the second step 'generating the initial codes (Braun & Clarke, 2013). The theoretical frame developed in the literature review was considered an input to generating, or more precisely developing, these initial codes (Saldana, 2009; Neuman, 2014; Braun & Clarke, 2013; Clarke & Braun, 2018). Therefore, the codes included four main categories that constituted the participants' technology-orientation, pedagogic conceptions, pedagogic practices and autonomy. The underpinning antecedents and elements of each of these concepts led to developing subcategories. The coding considered Hinrichsen and Coomb's (2014) models of ICT implementations (decoding, meaning-making, analysing, using, persona). The priori coding (Saldana, 2009) allowed a degree of intuition, flexibility and openness for new codes and themes developed based the data sources (Braun & Clarke, 2013) used in the analysis of data as listed in Figure 13.

A computer-assisted qualitative data analysis software (CAQDAS) entitled Dedoose was used to analyse the transcripts. It featured indexing and linking textual and visual files to sources that were useful for handling multiple sources of data from the same sources. Equivalent to emerging CAQDAS, the data summaries provided various visual representations beneficial in examining the nuances in participants' responses (Savin-Baden & Tombs, 2017). Matching data with codes entailed linking excerpts (sentences, paragraphs, specific words) to the priori codes (Saldana, 2009). The whole process required persistence and determination (Clarke & Braun, 2018) to produce evident themes of academics' experiences.

The analysis and discussion of the findings are framed within the developed conceptual framework of academics' experiences with emerging technology (orientation, experiences, autonomy). Theories around the academic' orientation towards technology concluded that it rests on their conceptions and influences their pedagogic practices. Based on the literature, academics' conceptions and practices have been considered indicators of their overall experiences with CC and CBS. These experiences are expected to shape and be shaped by academics' autonomy. The following interrelated concepts will be used as priori coding list for data analysis:

Priori Codes

1. Technology Orientation
2. Pedagogic Conceptions
   2.1. Perceived Affordances
   2.2. Perceived Challenges
3. Pedagogic Practices
4. Pedagogical and Professional Autonomy

Throughout this process, additional codes were added, summing up to more than a hundred and fifty-five codes. During the coding, I was 'searching for themes' by looking for the similarity and differences across the data (Braun & Clarke, 2013). This technique was aligned to what Cilesiz (2011) described 'imaginative variation' linking the variations and similarities to my understanding and concepts, aiming to extract the essence of the participants' experiences. These were revised with expert researchers in the member checking process, regrouped, classified into the coding structure (Saldana, 2009). The analysis also benefited from constructing 'individual narrative description' of each participant (Cilesiz, 2011); however, these were structured in pen portraits. The pen portraits technique as described as fragmented constructions of life stories and informal description of study participants' characteristics, value and demographics (Giordano, 2018). The informality, as opposed to a structured format, supports an ongoing generative and subjective description of the participants (Sheard & Marsh, 2019; Giordano, 2018).

Philosophically, studies that drew links amongst professional autonomy, identity (Henkel, 2000) capacity (Parker, 2015) and practice (Carvalho & Diogo, 2018), suggested that autonomy is situated in individuals' experiences. Therefore, the portraits technique seemed most suited to examine academics' practical experiences (Giordano, 2018). It also suited the 'orality' of data gathering methods. The choice between autobiographies and portraits was guided by the need to capture informal fragments and snapshots of the pedagogic experiences (conceptions and uses of CC and CBS), opposed to covering their complete life history (Giordano, 2018).

Therefore, in this study, the participants' portrayals focused on their characteristics, technology orientation, backgrounds, conceptions, practices (Sheard & Marsh, 2019). Opposed to using portraits as an end result, in this study, I used a precursor to the data analysis. The aim was to concentrate the participants' profiles and experiences into meaningful accounts (Sheard & Marsh, 2019). However, informal and incomplete were considered acceptable and purposely useful (Giordano, 2018). Although demographics and backgrounds were inexorably embedded in these experiences (Sheard & Marsh, 2019). A distinction between the two was apparent in the collective representation of nuances in the participants' personas (Sheard & Marsh, 2019). The analyses of the pen portrait concluded with 'reviewing potential themes' (Braun & Clarke, 2013) recorded for reflective narrative analysis in the Findings Findings (Moen, 2006; Willis, 2008; McAlpine, 2016). The whole process helped in an integrative and iterative review of the collected data from the documents, written reflections, interviews, and focus group transcripts cumulated thirty media files.

3.10. Concluding Thoughts

The described methodology in this chapter is informed by the primary research question that asks: How do technology-oriented academics' pedagogic experiences with CC and CBS intersect with their autonomy in the contexts of HE? This question evolved throughout the study duration and based on the research activities (Braun & Clarke, 2013, p. 44) and operationalised into four sub-questions (Kvale, 2007; Silverman, 2020). The methodology builds on Carvalho's and Videira's (2019) qualitative approach and case study design. However, it departs from their general inquiry of academics' participation in decision-making, into the influence of their autonomy on their pedagogic practices. Therefore, the research strategy and approaches consider constructionist ontology and interpretive approach that compels an overarching qualitative approach (Hammersley, 2013; Silverman, 2017).

The narrative approach was not only aimed to gather deep, detailed and thick responses but also to examine the generative and subjective aspects and nuances of academics' autonomy and practice through semi-structured interviews individually, in pair and within a group. This is aimed to construct narrative accounts based on both the participant academics and my, the research, interpretations (Silverman, 2013). Therefore, and to warrant the flexibility of this study, the main instrument for the narrative inquiry, data gathering, analysis and reporting is the interpretations and reflections of this researcher herself, who is internal to the participants and the study site as an employee, an academic and educator.

Nine technology-oriented academics have been selected using multi-step criterion-based selection (Emmel, 2013) and key informant (Marshall, 1996b). The selection approaches and process have been chosen with the best intention of providing an equal chance for all potential participants (TCPS2, 2018) who could provide evidence to answer the research question (Silverman, 2017; TCPS2, 2018). Academics' technology-orientation was chosen as the main selection criteria and based on their active, proactive and ongoing engagement in technical and pedagogic professional development and their tendency to effectively adopt and deploy emerging technology and various learning technologies in their practices (McCune, 2018). Although all participants have been identified being technology-oriented, the trajectories of their technology-orientation varied in its degree and tones. The selection procedures included staging (Kvale, 2007), screener, multi-step validation of self-reported pedagogic and technical experiences. The screener has been developed using the supervising institution online form builder tool which has been useful to efficiently yield visual results. The validation has been based on peer observation reports compiled by the institution teaching and learning unit as part of a pedagogic development project, and the face value in one-to-one meetings.

Data gathering included documentary analysis, semi-structured, in-depth and narrative peer interviews, focus group and Researcher's Notes. It's worth mentioning that the screener and semi-structured interviews included self-reporting element; however, these are often criticised for being partial (Wilson, Onwuegbuzie, & Manning, 2016). Therefore, triangulation was considered essential to complement the gathered data and reinforce the quality of the results. The documentary analysis used published institutional-quality reports and course reviews and reflections to construct a collective overview of the participants' context (Silverman, 2020, p. 72). This helped in defining and designing the schedules of the Interviews.

Several semi-structured, in-depth (Kvale, 2007) and narrative (Moen, 2006; McAlpine, 2016) interviews have been conducted. Interview questions have been centred on two themes, namely (1) CC conceptualisation, (2) CC pedagogy and instructional design and (3) academics' autonomy. Parallel to all employed methods, this researcher has maintained field notes throughout the study duration. The interviews and researchers' notes have undergone several iterations of intuitive and intense thematic analysis (Braun & Clarke, 2013). The first iteration employed priori coding catalogue using Dedoose, a cloud based CAQDAS. Based on the results, focus group for the same cohort of participants was employed and focused on 'academics' autonomy and CC'. The focus group was employed in-person to stimulate discussions amongst participants on their perceptions and beliefs. Data from the focus group together, with the semi-structured interviews and researcher's notes, were analysed similarly to the first iteration. The thematic analysis aim was to construct in-depth interpretations of the participants' responses and develop accounts of their experiences and autonomy (Braun & Clarke, 2013). The process of conducting the research approaches was iterative to ensure evidence coherence (Neuman, 2014; Braun & Clarke, 2013).

Designing rigorous and ethical methodology has been critical to this empirical study since there has been, and still, a degree of uncertainty about potential theories and concepts. Also, this is an internal study in which I, the researcher, co-constructed my peers' accounts based on their pedagogic practices within our institution. Although internal research was a blessing in understanding the proximal relationships and processes, it was equally challenging due to the assumption that there is consensus and shared experience between me, the researcher, and the participants and due to the proximal relationships and rising from informal to formal interactions. However, maintaining ethical stance and behaviour throughout the methodology design and data gathering have been critically important to ensure the welfare of the participants and confidence in the study and the researcher. All methods employed in this study have been codesigned, constructed, validated and piloted with an expert eye that helped in assessing the feasibility and informing the design and implementation (TCPS2, 2018). Formal data gathering took place over three academic semesters with a generous and active contribution from the participants and fellow researchers who were open for deliberations and discussions. The results of the data-gathering and findings will be presented in the next chapter.

Chapter 4. Findings

4.1. Introduction

This chapter presents the findings based on the analysis of empirical data that address the study purposes and research questions (See Appendix H).

The first purpose was to gain an in-depth understanding of how technology-oriented academics conceptualise and utilise cloud computing platforms and services in their pedagogic practices.
The research questions guiding this objective were:

1. How do academics' technology-orientations influence their pedagogic experiences?
2. How do technology-oriented academics experience cloud computing and cloud-based services in their pedagogic practices?

The second purpose was to explore how these experiences, intersect with their autonomy within higher education from their perspectives.
The research questions guiding this objective were:

3. How do technology-oriented academics conceive autonomy in their cloud-based pedagogic experiences?
4. How does academics' autonomy become constructed and rise out of these experiences?

Narrative analysis is used to conceive the data by means of naturalist and socio-cultural approaches (McAlpine, 2016) and thematic analysis across cases (Clarke & Braun, 2018), and use thick descriptions, portraits and themes. This approach helped in understanding the structural, individual and social aspects of the participants' experiences with CC and CBS since these are expected to influence their decision-making and autonomy. Hence, the findings are presented in three main sections. The first section presents the documentary analysis of published quality reports that give an overview of the participants' boundary system (Silverman, 2020, p. 72). The second section introduces an idiosyncratic view of participants pen portraits that sketch fragments of their characteristics, backgrounds and orientations (Sheard & Marsh, 2019; Giordano, 2018). The third section is a thematic analysis of the participants' experiences within the triad of their orientations, conceptions and practices (Cilesiz, 2011; McAlpine, 2016).

4.2. A Gateway to the Study Participants' Contextual Settings

In this section, I present findings from the documents' analysis of institutional programme quality reports and course reviews of the four programmes where the participants were located. The aim is to understand the participants' contextual settings. The quality reports were conducted and published by a national quality authority between 2014 and 2015 as part of national educational quality reforms at a time of change in the GCC (Altbach, 2011; Azzi, 2018). These reports were an evaluative commentary on the academic processes of these programmes, concluded from interviews and observations of primary stakeholders (students, academics, administrators, managers, deans and selected industry partners) and self-evaluation reports compiled by the head of programmes and quality managers. As such, they are considered a gateway to academics' work contexts. These documents, as Silverman (2020, p. 290) suggests, are considered (1) comprehensive, (2) accessible and (3) trustworthy and (4) representatives of the four programmes where the participants were located and collected impartial to this study. Although they stipulate accrediting the four programmes where the participants were located for meeting learning, efficiency, academic and quality standard, they included recommendations on professional development, curriculum, assessment, resources for this study's analysis that raise critical issues concerning academics' work condition.

4.2.1. Readiness for Teaching

The analysis showed that the most highlighted issue of the programmes' fitness for learning was academics' readiness for teaching. There seemed an absence of formal policies for budget, and procedures to support the promotion, specialist training, mentoring and research. A persistent recommendation for all programmes was to establish formal support strategies: "*develop a formal policy for academic promotion to ensure that qualified academics are motivated, available and trained, improve qualification and conduct applied research*" which remains valid until the time of writing this thesis. Although these imperatives existed in the early years of the institution's establishment, they dissipated in the following years due to budget limitations. Informal and unclear processes were controlled by administrative staff and limited to academics in 'permanent' contracts, similar to 'tenure track', awarded to few local academics. Since most academic staff were expatriates, these strategies lacked the directions to home-grow their development.

4.2.2. *Alignment to Contextual Demands*

The second most highlighted issue was enhancing quality standards by alignment to industry demands for graduates' skills. This accentuates the directions of the institution as most HEIs in the GCC to prepare the youth for the job market. This appeared in recommendations such as:

> *Introduce a formal mechanism for the continuous scoping of the labour market needs.*
>
> *Expedite the implementation of the alumni and employers' surveys to strengthen the programme and ensure that it caters for the market needs.*

This issue was also highlighted under learning measures:

> *Contextualisation the curriculum and its syllabus through direct feedback from the industry.*
>
> *Develop a formal mechanism with proper local input to ensure that the contextualisation of the curriculum is continuous and systematic in order to meet the needs of the local market.*

The reports addressed the need for considering feedback on assessments from non-academic stakeholders:

> *implement a formal mechanism that takes into account the views of the workplace mentor.*

Facilitating learning resources weighed on back-office information systems that help academics in their administrative duties regarding curriculum development, staff management, students' registration and grading systems, etc. Managing educational resources that concerns the teaching and learning were highlighted, particularly for ICT, Web Media and Engineering programmes. Absence of policy to maintain the currency of resources seemed directed towards students learning:

> *Implement a strict policy on the replacement of IT computer and networking equipment, with explicit acceptable limits on the age of such equipment.*
>
> *Develop a loan procedure for students for off campus use of equipment.*

4.2.3. Teaching Demands

Course reviews, on the other hand, are developed by the coordinators and academics who taught during the academic year 2018 across the four programmes. A noteworthy aspect is that these reports were current and comprehensive (Silverman, 2020, p. 290); however, access to academics’ personal reflections on their practices was not possible. Instead, a summary of the pedagogical plans and requirements were examined. Content development and access to resources, associated with the need to enhance teaching and learning, were the subject of this analysis. This analysis offered an overview of some pressing issues academics protested.

The ICT course reviews evidenced academics ‘emphasis’ on accessing appropriate computer hardware. Comments such as *“when budget allows, upgrade the PCs in this lab”, “hardware replacement in labs” and “purchase software once published”* demonstrated their understanding of the budget constraints that beset affording the right resources. Although the ICT quality report commended the modernity and readiness of the computer labs and teaching infrastructure; indicating a necessary upgrade was not sustained. Reference to software resources was absent from the course reviews since most courses used either open-source software with no fee or licenses that incurred nominal value under academic alliances that indicates that the ICT courses devised a workaround the budget confinement. However, few courses required proprietary software that entailed payments, regardless of the amounts, necessitated following a purchasing process. All exams were practical, which means that if software versions were different or missing, this would be an exam issue.

Web Media academics reported comparable reflections. However, they showed concerns about the availability of software licences and installations, content development and eLearning enhancements in comments: *“Upgrade to latest [X software] to the latest version”, “Install the latest version of [X software] in the classroom” and “Redesign some of the material to update to the latest release of [X software]”* that are related to two aspects gathered from the quality report. First, Web Media courses focus on design, presentation and communication. A variety of software is being used during the first three years includes design, multimedia and game development (For example, Dreamweaver, Adobe Creative Suite, Muse, Wix, Stencyl, Blender, Unity). Some of these applications were offered on the cloud, which means that academics are given a chance to use the same software via a web browser.

However, academics justified software installations by the need for intense graphics and efficient processing and due to their experience in using certain software interfaces. This misconception indicates their lack of understanding of how CC could support their practices. Second, Web Media endeavoured to employ commercial tools to align with the industry; therefore, emphasis on upgrading software versions, incorporate new ones and renew licenses was salient as noted in the quality report, adopting such tools evidence that students' access to commercial resources could be determined by their socio-economic status.

Engineering academics' demands, on the other hand, focused on the need for specialised equipment, consumables, commissioning new labs and acquiring more space for class dynamics. These issues appeared in comments such as *"Timely receiving of Lab equipment and consumables should be ensured"*, *"Establishment of a dedicated lab including all equipment and apparatus"*. Such demands indicate that academics are squarely focused on engineering content. However, the use of technology for the design and production of solutions and models for real problems is emphasised in the curriculum and learning outcomes. Issues related to the use of technology, nevertheless, were scant except for few comments on the need to develop programming content:

Distinctly, business course reviews stressed the lack of funding and staffing. This was due to a large number of students as business attracts a large number of students. Access to ICT resources for teaching such as enterprise resource planning (ERP), accounting management and social media tools such as Hootsuite, was confined by budget constraints. Emphasis on technology was highlighted as 'aspirations' to develop semi-industrial projects such as FinTech and creative marketing integrated labs using commercial software.

It is worth to mention, that although academics in all programmes plan to develop course content and assessment: *"Introduce additional software exercises"*, *"Introduce additional programming exercises"*, *"develop new course labs and content"*, *"develop a new strategy to evaluate double marking"*, *"develop a new [title] course*", indicate that despite the lack of resources, academics maintained their intentions to develop their courses. However, limited comments on developing pedagogical activities and changing supervision strategies indicate that although there are plans to vary their content; their current practices will remain unvaried unless these are not formally stipulated in their course reviews.

4.2.4. Projects' Supervision Demands

All four programmes employed PjBL in the final year capstone and work placement courses. The quality reports indicate that projects are a flexible pedagogic approach as they allow students to create products or conduct research for a given problem. The courses that offer this approach have unstructured nature as students, academics and clients, if any, deliberate on suitable problems that need to be solved in scientific approaches. A supervisor is assigned to each project to direct it in relevance to the students' major. Academics and students are allowed the freedom to choose resources that fit with given requirements in each of the projects.

The motivation behind these projects is providing students with real-world and learning experiences similar to the industry, such as the one highlighted by a business academic *"Need to incorporate more teaching activities"*. However, students work with real clients seem to necessitate cautious measurements: *"Assessment timings and dates to move to accommodate Trainee Marketers workload and to allow enough time at the end of the semester to work on creating their client presentations"*.

The analysis unfolded variances in the design, implementation and assessment of these courses across all programmes due to absence of a benchmark. This led to a demand for tailored processes to train supervisors: *"provide training to supervisors to set standards of thesis and demo to better supervision and evaluation"*. The flexibility in these courses entailed a lack of clarity about the assessment levels. This prevailed in need for grading mechanisms guidance and ongoing evaluation of adopted approaches: *"Review grading level on thesis and demo"* and *"Develop a new strategy to evaluate double marking*". Resources that students select were difficult to predict. In reflection, my proximity from the research site and these courses informed me that this was a major issue for these courses; although a separate budget was allocated to help the students and supervisors acquire new resources, the prolong purchasing cycle does not match the timeframe; therefore, academics and students reverted such route. Also, selecting emerging technologies not covered in their courses seem to impede students to completion of their projects. As noted for Web Media, academics are not trained in emerging areas of science and technology that pose a digital gap if students did not access sufficient resources and managed to develop independent learning.

4.2.5. Gateway Conclusion

To summarise, this documents analysis helped understanding the context that surrounded the participants. It showed that academics in all four programmes lack access to support strategies and resources that could facilitate their technical skills development and pedagogic practices such as mentoring, specialised training, research and promotion strategies. This means that academics' practices rely on their initiatives and socio-economic and intellectual capacities. Although the main professional development activity was the formal teaching and learning training offered during the induction period, it is broad and lacks relevance to academics' disciplines. It focuses on generic strategies and specific EdTech. Besides, its effect is most likely to dissipate in the continuum of academics' experience. Despite these challenges, academics showed commitment to develop content and assessment and utilise the available EdTech resources. Their course reviews showed that their intentions to use CC and CBS in their courses. A prime venue for this utilisation was the capstone projects and industry work placement. These courses allow the students the freedom to choose their selected resources and supervisors to recommend resources. Although this seems supportive of autonomous teaching and learning, it comes with manifold problems. Details of such issues were not recorded in the quality reports and course reviews. Therefore, empirical research using individual and group interviews and observations of the nine participants in this study focussed on filling these gaps and developing an in-depth understanding.

4.3. Introducing the Participants

In this section, I present the analysis of nine participants' pen portraits that step beyond their idiosyncratic input into reflecting on, and meaning making of, their responses, work activities and stories. During the last three years, I carefully examined the participants' self-portrayals, characteristics, role(s), duties, background and orientations towards emerging technology; paying attention to their discourses and notable events with technology within their institution. The analysis yielded that their intrinsic motives and determination prevail as catalysts to their practices with emerging technology; however, several constraints level these motivations.

4.3.1. Iris: "It is close to aligning to the needs of the business"

Defining Characteristics

Iris defines herself as a business consultant, project manager and an educator. Before teaching, she worked in research, business consultancy and education. In the study site, her work involved teaching, course coordination and management. At the time of conducting this study, Iris was teaching enterprise strategic planning and human resource management undergraduate courses, final year projects and industry work-placements supervision and mentoring students. Her courses incorporate digital strategies and the impact of emerging technology on the society and economy.

Background

I have worked with Iris on a collaboration with a technology provider to enrol students in work-placements within the GCC. Together we facilitated a national group discussion with industry that centred on the utility of emerging technology and skills gap in the industry. Iris is an active researcher and consultant to the institution's management, government and industry. She initiates students' engagements with industry and ICT providers and applies her expertise to research projects at a national level. She exemplifies a long-life learning female academic and business consultant through self and instructor-led professional developments, research activities and ongoing engagements in institutional and national projects.

Nuanced Technology Orientation

Iris is motivated towards emerging technology, but notably cautious, attentive and critically reflective on her self-identity. Emerging technology to Iris keeps her *"current"* and able *"to speak the language"*. When informed about being identified as technology-oriented, Iris discerned her identity as a business professional and educator. He orientation differs as she vests her technical development to her business discipline and real-life applications.

Self-Directed Technical Skills Development

Iris recounted her self-directed training on several emerging technologies during her personal time, as it was not possible for her to fit learning in her work schedule. The latest training was on an externally hosted block-chain development platform that entailed interactive tutorials, online instructor-led sessions, video self-recording and think-aloud reflections on her usability experience with a group of international specialists and educators who were taking the same course. She critically reflected on this experience and notably employed agentic projection by demarcating her capabilities and identity from other ICT specialists; that reinforced her self-confidence.

4.3.2. Jim: “I have more control”

Defining Characteristics

Jim defines himself as a technology specialist. Before teaching, he worked in senior roles directing and operating various technology projects. In the study site, his work involved teaching and ICT administration roles. At the time of this study, Jim was teaching networking, system administration, computer and network security courses, supervising capstone projects and industry work-placements and mentoring students. His courses involve ICT deployment and configuration for given requirements. Besides his teaching, he was assigned managing a private cloud platform and provisioning virtual ICT resources and users’ accounts for pedagogy, assessment and projects across all ICT courses.

Background

Jim developed a private cloud infrastructure for my capstone projects course and several other courses under my responsibility. We collaborated on acquiring a private cloud infrastructure and services as part of an academic alliance. We worked on upskilling ourselves on using a public cloud platform and deliberated on deployment scenarios, issues and affordances and on teaching a systems administration course. Jim transitioned from a long record of a professional career in industry to teaching and supporting other academics with their courses.

Nuanced Technology Orientation

Jim holds a track record of professional certifications and academic qualifications and actively engages in self- and instructor-led technology training. A tech-specialist, guide and consultant. Jim’s orientation differed through his passion for learning in its’ own right. His nuanced orientation manifests in equipping himself with specialist expertise and maintaining technical certifications that helped him construct his identity as a specialist in his field.

Self-Directed Technical Skills Development

Jim undertook self-directed training on private and public CC platforms. He was systematic in allocating time on-the-job and between his classes to complete online tutorials on a public cloud environment and implementing real-life scenarios in a private cloud environment. He continually reflects and shares his implementations with other academics who showed him interests in the cloud. Jim developed an interest in AI a new area that differs from his specialisation. His ambitions led him to explore it as a new area that could demarcate him as an ‘expert in his area’.

4.3.3. Aristi: "I have to drop one to use another"

Defining Characteristics

Aristi defines himself as an ICT educator, programmer and researcher. Before teaching, he worked in development positions in research labs. In the study site, her work involved teaching, course coordination and management. At the time of conducting this study, Aristi was teaching programming and maths for ICT courses, supervising capstone projects and industry work-placements and mentoring students. He also took on several responsibilities as a coordinator of the department research strategy and academic advisor.

Background

I collaborated with Aristi on the design, development and delivery of capstone courses. Since he started his work at the institution, he established himself as research-active; although he stated that it was challenging to attend to research activities during work hours. This particularly amplified when he took on administrative roles that occupied him in internal and external engagements. Despite his technical expertise, which he acquired from his academic qualifications and professional experience, he is committed to developing his technical skills and staying current in his field of expertise. He was not easily driven, particularly in ensuing routine practices, and continually sought new venues.

Nuanced Technology Orientation

Aristi is research active and advanced emerging technologies' (AI, ML, IoT and cognitive services) specialist. He is driven by innovation and new ideas and engages with learners from within and outside the institution. He led several engagements with the community and industry to develop interests in his domain. He is a conscious technology evangelist and a self-critique, particularly regarding his digital competence. His nuanced orientation emanates framing the development and practices of his technical skills towards his research interests.

Self-Directed Technical Skills Development

Aristi's self-development entailed experimenting the services in various scenarios, completing online tutorials and technical courses provisioned by leading technology providers and high-rank universities. His informal training left him unsure about his cloud skills and whether he can apply them in his courses as he accentuated being overwhelmed by the wide-ranging services. Hence, he showed confidence in a hands-on training delivered by expert trainers and initiated by ICT academics that seemed to him tailored to their interests, courses and teaching demands.

4.3.4. Dan: "I felt very much that it was shallow learning"

Defining Characteristics

Dan defines himself as a technology educator. He holds teaching and research experience. In the study site, his work involved teaching, course coordination and management. At the time of conducting this study, Dan was teaching system administration, programming, networking, security, math's for computing courses, supervising capstone projects and industry work-placements and mentoring students. His courses ranged ICT products development and deployment.

Background

Jim and I collaborated on developing academic programmes and courses and engagement in internal and external projects. He went an extra milestone in facilitating resources and commissioning lab equipment for several ICT courses and projects. Throughout these years, Dan was intrigued by students' motivation and the ability to utilise technology in meaningful applications. But he applied himself actively to motivate his students. He had interests in multiple ICT fields, Networking Security, Programming, CC and IoT; that ascended to teaching most of the ICT courses within the degree and supervising a diverse range of capstone projects.

Nuanced Technology Orientation

His skills span over several ICT specialisations. He continually experiments new technologies and applies them to his courses. Dan's selection of new technologies goes beyond the boundaries of his ICT experiences and qualifications. He actively engages with technology providers, industry and government entities. He initiates technology competitions within the institution, facilitates students' participation in national contests and engages with colleagues within and outside his department and institution. His orientation differed by being confident to unfold possibilities.

Self-Directed Technical Skills Development

Dan' self-directed learning exemplifies in training himself to CC and CBS 'on the job' and while developing courses and supervising projects. He initially believed that the cloud is neutral and that using it will yield superficial learning. However, he applied it to support a gap in students' learning. To educate himself, Dan attended several vendor-led sessions organised by members of his staff. Besides educating himself, he was motivated to share this learning and lead discussions with academic staff on the integration of CC in the curriculum.

4.3.5. Alice: "Practical and works for me"

Defining Characteristics

Alice defines herself as a digital learning technologist, multimedia developer and educator. She holds research and teaching experience. She worked in applied research, web development, e-learning resources design and management. In the study site, her work involved teaching and course coordination. At the time of conducting this study, Alice was teaching web development and web communication and mentoring students. Her courses require the design and development of digital content and communication media products.

Background

Before teaching Web Media courses, Alice taught language and communication and supported an eLearning group of academics. She was critical of employing PBL for teaching languages caused some since, in her view, it imposed a lot of uncertainties for the teachers who act as facilitators and advise students to search for resources over the internet. This often resulted in prolong and ineffective processes.

Nuanced Technology Orientation

Alice actively promotes current and emerging technology through her pedagogic practices. She employs participatory and collaborative content design with students as designers and developers by being herself an instructional designer, promoter but a vigilant user. When informed about being technology-oriented drew boundaries about her teaching:

"I am not tech-oriented I am a teacher and a practitioner who uses technology to enhance my courses". Alice

Her technology orientation differs by transforming herself from being a technology user into pedagogy and content designer and developer who seek meaningful and relevant application of technology in teaching.

Self-Directed Technical Skills Development

Alice's pursued her graduate studies by taking unpaid leave from her job. She transformed her qualification by specialising in using EdTech. She recounted images of this successful learning experience that shaped her pedagogic practices with her students. I have not worked with Alice directly, but I have noticed her motivation to improve her technical skills by engaging in cloud training I have organised and seamlessly applying her skills.

4.3.6. Alex: "I just don't have visibility"

Defining Characteristics

Alex defines himself as an ICT architect and educator. Before teaching, he worked in the ICT industry as an architect, developer and team leader. In the study site, his work involved teaching and course coordination. At the time of conducting this study, Alex was teaching and coordinating system architecture and administration courses, supervising capstone projects and work placements and mentoring students. He was also assigned managing a public cloud platform to provision virtual ICT resources and accounts management for pedagogy, projects and assessment.

Background

Alex and I taught, developed courses and supervised projects together. We also worked on delivering training courses on CC and CBS for academics within several programmes and organising competitions for students. I accompanied him in his shift from the industry to academia. He boarded seamlessly due to his technical tenacity, experience and approachable personality. He was able to create an atmosphere of trust with his students by being reciprocal, flexible and proactive. He actively supports his colleagues in facilitating a public cloud environment and provisioning resources for pedagogy, assessment and projects.

Nuanced Technology Orientation

Alex developed his technical skills from working in real-life projects, and his experience manifests his abilities. Although he brought the necessary foundation that fits courses, he teaches. Alex demonstrated a keen interest in utilising new technologies in his teaching practice. He is a veteran professional, DevOp, forefront and au courant. On being technology-oriented Alex commented: *"This applies to anyone who has an appropriate level of knowledge, experience"*. His orientation differed in bringing long years of experience in utilising technology in real-world projects. Not only he considered the educational potentials of the cloud but also the strategic directions and implications for the economy and businesses.

Self-Directed Technical Skills Development

Alex directed developing his technical skills to match his teaching practice. He recounted images from his professional experience in large scale ICT projects. He weighed with upgrading his cloud skills which he used to transform a course and develop a new one. His learning was self-driven and, on the job, through teaching courses and supervising projects.

4.3.7. Adam: "A change of mindset is everything"

Defining Characteristics

Adam defines himself as an ICT professional and educator. He holds professional and teaching experiences. In the study site, his work involved teaching and course coordination. At the time of conducting this study, Adam was teaching networking and system administration and architecture courses and supervising capstone projects and industry work placements and mentoring students. He was also assigned managing a public cloud platform to provision virtual ICT resources for pedagogy, projects and assessment for other courses.

Background

Adam and I designed and developed of a new course and supervising capstone projects. He had a seamless transition from industry to academia as his teaching practice entailed hands-on skills and engagement with industry. He exemplified an image of a young ICT specialist that made him popular amongst his students. His quest is to simplify teaching complex ICT concepts and make it not only manageable but also meaningful to students.

Nuanced Technology Orientation

Adam holds diverse experience in the technology industry as an engineer, analyst and project manager. He is motivated by students' learning, innovation and engagement with industry. He compares his identity, practices and roles in academia and industry. He commented on being technology orientated by saying: *"I was looking at the cloud from an industry point of view". Adam*. The nuance in his orientation is that he associated his motivations practices and technical skills developments with his professional experience.

Self-Directed Technical Skills Development

Adam self-learning practices with CC and CBS entailed online courses while the instructor-led were organised within the department. He normalised the use of CC with the internet as he believed that students should not be learning CC as a separate topic. However, he experienced a shift in perspectives towards the utility of emerging technology with role changes. His views emanated from his professional experiences. His orientation differed in weighing his motives and objectives between his two identities, the ICT professional and educator.

4.3.8. Athena: "I will do it myself"

Defining Characteristics

Athena defines herself as an engineer, academic and researcher. She holds research, engineering and teaching experience. In the study site, her work involved teaching, course coordination and management. At the time of conducting this study, Athena was teaching engineering courses and supervising capstone projects and industry work-placements.

Background

I worked with Athena on research activities and several projects within the institution and with industry. She exemplified motivation towards students' learning, confidence in their abilities and sensitivity to their cultural nuances. As part of her managerial role, she actively facilitates resources for the engineering faculty and supports curriculum and instructional design. She undertakes applied research and institutional training; however, develops on the job through her teaching to maintain currency within her field. Throughout our relationship, I noticed her tenacity as a goal-getter; she actively engages with students in constructionist learning opportunities, academics on projects and research activities and the industry as a consultant through students' capstone projects.

Nuanced Technology Orientation

Athena describes herself as a dynamo, an inquirer, and a goal-getter. Athena employs technology to teach the design and development of engineering products. She coordinates several engineering courses and maintains a track record of supervising engineering capstone projects and industry work-placements. Athena is acknowledged within and outside the institution for her being an active researcher and an expert supervisor. An initiator of several tech-enabled projects and external engagements with industry and technology providers. Her orientation is differentiated through empathising students' learning and motivating their interest in Engineering.

Self-Directed Technical Skills Development

Athena maintains her professional development through her teaching practice. Therefore, much of her focus on technology was directed towards engineering tools through online tutorials and research activities. But she spends much of her time researching topic that supports students in their capstone projects' development that parallel with educating herself on the latest developments in her field.

4.3.9. Sam: "I could see changes vividly"

Defining Characteristics

Sam defines self as an ICT educator and researcher. He brings long years of teaching experience at different international institutions and educational levels. At the time of conducting this study, Sam was teaching and coordinating programming, system analysis and design courses, supervising capstone projects and industry work placements and mentoring students.

Background

I collaborated with Sam on developing a module for capstone projects and authoring several projects' ideas. Throughout my experience with him, he showed academic tenacity, compassion, empathy and motivation to support students' learning. He continually introduced new approaches to teaching ICT concepts and experimenting with emerging technologies. He supervised several award-winning projects nationally which he contributed to contextual ideas that solve pressing problems.

Nuanced Technology Orientation

A world explorer who holds a portfolio of international teaching experience. A lifelong learner engages in professional development and research activities and keeps a track record of ICT certifications. A students' motivator who supervised several award-winning ICT projects. A technology explorer, instructional designer, pioneer adopter. His orientation differs in terms of converging his teaching experience with a broad range of ICT skill.

Self-Directed Technical Skills Development

Sam educates himself on using two prevalent cloud-based collaborative and social networking tools and CC platforms through vendor-led training, online virtual labs and courses, conference attendance and on the job through final year projects' authorship and supervision. The broadness of his technical experience and demand of his teaching role, being capstone projects course coordinator and supervisor, reinforced his development and CC integration in his practices.

Pen Portraits Conclusion

Overall, the pen portraits provided an overview of participants' defining academic characteristics, backgrounds, technology orientations, and how they maintained their knowledge and skills through ongoing technology development. These were beneficial in drawing boundaries around academics' professional identities that facilitated access to their practices and conceptions with emerging technology, specifically CC and CBS and pedagogic accounts.

4.4. The Participants’ Cloud-Based Pedagogic Experiences

This section presents the analysis of aggregate narratives of the nine participants. It addresses the primary research question and four sub-questions regarding academics’ experiences; that entails identifying them as technology-oriented, their pedagogic practices and conceptions and autonomy. Technology-orientation (i.e., ongoing EdTech skills development, EdTech motivations, pedagogic practices with emerging technology) was decided as the defining characteristic of the nine participants. Their pedagogy was classified into the current, emerging and visionary practices (Cilesiz, 2011). Their ICT conceptions were classified into affordances and challenges (Kirkwood & Price, 2013), and their autonomy was examined through their decision-making and practices.

Based on the pen portraits, a distinction amongst the participants’ backgrounds, those who held professional experiences before, or along, teaching and those who are purely academic, was beneficial in understanding their experiences. Another distinction between the participants’ added responsibilities and roles besides teaching the understanding of managers and teachers was helpful in understanding the influence of boundaries on academics’ decision-making. The individual interviews provided nuances of their practices and conceptions; while the group interviews (paired depth and focus group) provided an opportunity to explore the influence of boundaries between academics in different roles on making decisions with their peer academics and other social layers. The gathered data from all sources were aggregated and analysed individually and collectively.

Figure 14 depicts the themes that are defined in this study based on the participants’ experiences with CC and CBS. The data analysis yielded 155 themes condensed to eleven subthemes and three primary themes concerning academics’ technology orientations, pedagogic practices, conceptions and autonomy. These themes are specific to the participants’ experiences with CC and CBS; hence, there was not enough literature; thus, I use intersecting studies and theories that could offer reasonable explanations.

Research Question	Domain	Theme	Outcome
How does academics' technology-orientation influence their pedagogic experiences?	Technology Orientation	Stimulating Critical Perspectives Revitalising Pedagogic Practice	*Technology orientations enhance academics' pedagogic practices.*
How do technology-oriented academics experience cloud computing and cloud-based services in their pedagogic practices?	Emerging Pedagogies Pedagogical Conceptions	Redefining Pedagogy Expanding the Curriculum Cautious Pedagogy Visionary Pedagogy Matching Pedagogic Requirements with Contextual Demands Risk Aversions Against Control	*Academics' cloud-based pedagogic practices are constrained.*
How do technology-oriented academics conceive autonomy in their cloud-based pedagogic experiences? How do academics' autonomies become constructed by these experiences?	Academics' Autonomy	Constrained Autonomy Guided Autonomy Self-directed Autonomy	*Academics' autonomy is bounded in the context of cloud-based pedagogy.*

Figure 14. The defined themes of the participants' pedagogic experiences with CC and CBS

4.4.1. Technology Orientations

In this study, I examined the influence of academics’ technology orientations on their pedagogic experiences. Technology orientation has been decided as the selection criteria of HE academics who can provide ‘key informant perspective’ (Marshall, 1996b) on the emergence of CC and CBS. The participants’ selection was based on the dimensions of technology orientation that emerged from the literature that involved motivation towards using emerging technology, engagement in continuing professional and technical skills’ development and positive self-theories regarding the use of technology in teaching practice. The participants’ orientations towards adopting emerging technology in their pedagogic practices were identified from the selection process, participant screener and endorsed by the gathered data across all methods. This section presents the influence of academics’ technology orientations on their pedagogic practices.

Stimulating Critical Perspectives

Although all the participants have shown self-confidence and experience in utilising technology in their pedagogic practices, they were critically reflecting on their experiences as learners and academics with emerging technology. They based their reflections on their personal, peers, and students’ perspectives. They were also critiquing their peers’ pedagogic experiences, the design of technology and their institution’s policies and procedure, indicating deep conceptualising.

Critiquing Self Learning

Most participants were critical of their digital efficacy with emerging technology. Some critiqued challenges in pursuing professional development and maintaining their currency that could help them meet their ‘ideal’ level of digital efficacy and integrate emerging technology efficiently and effectively in their practices. Their reflections exemplified assumptions and feelings of guilt, concern about being left behind, lack of efficacy (and equally confidence). They associated the challenges with the demands of their discipline, a lack of support structures that could provide opportunities for formal and informal training, institutional direction, self-motivation to prioritise skills development and integration, the design of technology and ongoing and rapid technological development.

Aristi's critical perspective differed as he exemplifies 'agentic self' and internalises his self-motivation and willingness to dedicate efforts and time to direct developing his technical skills, and makes explicit that learning should be self-directed:

> *I am trying to learn, but I can do better, learning never stops it's challenging. I would need to perform a great amount of self-study before I can engage in using emerging technology, I am trying to learn, but I think I can do better.* Aristi

Dan too critiques his CC expertise; however, he was able to overcome his negative beliefs about the fitness of CC for deep learning by self-directing his skills' development, engagements and pedagogic deployments; exploring the possibilities and levelling with the contextual demands:

> *I am not a cloud expert in any shape; I am just doing an architect course, it's sort of mix of several ICT areas, I just know a little bit about CC, I am interested in knowing how it can be used to learn and create something new.* Dan

Situating self in subject discipline and relevance to 'a community of practice' also prevailed in Athena's emphasis on her engineering identity. Athena externalised the challenges in developing technical skills to the engineering academics and culture collectively. She was critical of her ability, akin to any engineer, to develop skills across multiple disciplines. Hence, her critical perspective was influenced by the social norms amongst her peers:

> *I need to keep up with the rapid changes, and I have to follow my updates plus the internet plus online applications, so there is a challenge. Especially the engineering needs that align with emerging technology. We think that we know all the aspects, but we don't.* Athena

Likewise, iris was critical of her digital skills in general. Still, she reflected on her skills’ development experience within an ‘external community’ who she engaged with on learning a cloud-based development platform. Her reflections enable her to understand that the challenges in using technology were common even to skilled professionals that increased confidence and motivated her further development. It also helped her define her motivations towards technology and digital identity. Iris’s reflections were entrenched in the requirements of her business discipline that bestowed her to comprehend the level of technical skills she needed to acquire.

> *That [training to develop mobile apps] was completely foreign to me[...] it was a huge learning curve to me [pause and contemplate] I cannot say that I understand everything, but I understand it a lot better.* Iris

Within Institutional Support Structures - Sam's critically reflected on the external frame of his learning. Although he was able to integrate several emerging technologies in his courses, believed that strategic support and vision are critical for academics’ context awareness, development and for radical changes to happen:

> *On the scale of 5 to 10, and honestly, I feel that I need training and support. However, I will not wait I will move forward and equip myself, although struggling in the first stage itself, there must be a radical time allocation industry affiliation and to be sent to workshops at industry; however, I will not wait; I will move forward and equip myself.* Sam

Critiquing Prior Experiences

All the participants who held specialist experiences in using technology before teaching (Alex, Adam, and Jim) expressed their ability to develop their technical skills continually. This was evident in assigning them as Cloud Platform Specialists to provide services for students and colleagues which ushered an opportunity to up their skills through hands-on experiences, various ICT resources requirement of their peers, students and managers. However, despite their technology orientations and capacities, they were critical of meeting students' and teaching demands; given the dominance of their prior experiences as technology specialists. Their accounts were shared in terms of critically reflecting on the changes in their perspectives and multiple identities as specialists and academics.

Adam, for example, was critiquing his ability to switch his perspectives and match technology with students' learning demands and expectations. He is centred on the need for a flexible view of the utility of emerging technology:

> *It was a different approach to come to see also in an educational institution, and in an academic and educator perspective in the corporate side all you need to know is customer requirements can technology do x, y, z for me so I can offer to the customer, I was looking at the cloud and technology from an industry point of view. But here, I come with a mindset of what is the best way to deliver this to students who are here to learn.* Adam

Likewise, Alex internalised challenges in his first use of CC, , indicating his motivations towards developing his skills and pedagogic practices. He was centred on the need to consider the change in ideolog of technology:

> *You might find it's a bit of challenge when you teach; I think in my first semester I needed to get used to the environment and been cut out by students who know more about it, students have been using it before.* Alex

While Jim was mostly concerned about his ability to simplify his knowledge and tune it to the students' level in ways that would not overload their thinking and adversely discourage them, this indicated his endeavours to empathise:

> *It's not just about deploying these complex configurations because it can be easily done with tutorials, what matters is to encourage them to think critically beyond what is given and what if I changed the design or scenario? Although I feel they may not accept what I do.* Jim

Critically Reflecting on Pedagogic Practices

Few participants were critically reflective of their pedagogic practices and their impact on students' learning, regardless of the variances in reflection modes. Dan was critical of his learning but critically reflected on employing, in his words, '*superficial activities'* that entail students' interactions with interfaces to complete tutorials that emanated from benchmarking against his 'ideal' experiences and assumptions of the need to teach concepts that entail deep thinking and problem-solving. His account was dispersed between his ethical commitments to giving students justice through meaningful learning and obligation to equal with the dominant rhetoric and external demands concerning emerging technology:

> *The students are gaining skills; they can use it and apply in different ways not just let's say to [xx cc vendor] interfaces; sometimes it just felt, when they were creating a virtual server instance and two types of database, that we need activities to support students' learning something useful. There is a lot there that can be done with the cloud, but you know, as an IT professional, it just felt that there wasn't any problem-solving, they weren't learning new skills. I felt very much that it was shallow learning; what we did with the students was a high level of monkey see monkey do; these are introductory exercises.* Dan

Alice's reflection differed as she externalised her pedagogic practices through her peers' online practices that seem to enable her to formulate her teaching 'ideal' and challenge traditional pedagogic practices with technology:

I think some teachers I have seen the practice where they are putting all files in one zip file, and they claim that this is a better way of utilising rather than click. With [...] students can download everything. You have it discrete. What is your model? The titles you choose for each link should be more meaningful. I think that they learn and perform according to what they read not just by putting everything you know how it is, in fact, I will show you that I threw out a lot of files, I thought they weren't relevant, and they have to be based on your lesson structure. For this week, I am going to give them [students] access to research resources if you have enough skills, you don't need more content. Alice

Self-Directed Learning

The participants' orientations and critical perspectives of about their digital efficacy, learning conditions and teaching practices could justify their ongoing self-development. Much of the participants' reflections focused on their self-directed modes of learning as they recounted undertaking activities during their weekends, holidays, summer breaks, sabbatical leaves and on-the-job during their formal duties. These practices were perhaps a result of their orientation and context-awareness of formal professional development limitations. As previously stated, all of the participants expressed their lack of complacency about meeting their habitual potentials. Their reflections were borne with tensions against the lack of resources and support structures:

Mainly through my teaching[...]through the courses I develop [interrupted by another staff member], I keep myself updated through my research and through developing the course[...]I can say that the new tech for me in order to learn it I have done it 90% by myself each time to do some practice to understand new tech it is difficult because the tech is rapid and I feel that I am back if I look at myself ten years I can see that my professional and personal life has changed because of tech. If we create the courses, we are obliged to teach them and to follow this progress. Athena

I mean the life of the academic is not a 9:00 to 5:00. I early realised that you have to work sometimes afternoons, weekends, holidays, to maintain your professional currency. Aristi

Experimenting with New Technologies

The participants’ technical skills developments bestowed their capacity to depart from their normative practices and experiment with new technologies. However, some of them were more efficient in applying their skills in practice. They all evidenced experimenting with new technologies related to their courses, capstone projects, supervision or external engagements. Their experimentations and skills development afforded them volition and expanded their choices:

> *I am doing courses on information technology, there is no content so far, [XX Specialisation] straight forward for me, but I am also teaching advanced* programming *using [XX language] and systems analysis and design, new areas for me. Dan*

> *I see my students all the time they are with their mobile phone, so I decided to use social media, and we will finally manage to communicate.* Athena

> *I ended building a mobile app myself using this new development tool.* Iris

Images of Prior Learning and Experience

The participants learning seem to be situated within their current and past experiences. Some participants recounted positive and negative images from their learning and professional experiences. They were replicating good practice, departing from bad practices or identifying new practices. This indicates that their past experiences influence their pedagogic decision:

> *having a good lecturer instilled these practices on me, she always opened our files while discussing concepts.* Alice

> *I wish I had these services at the time when I was studying, for many reasons, one of which the technology made hands-on exercises possible and affordable.* Jim

Motivation

When asked about their motivations to developing their digital efficacy and exploiting technology in their practice, the participants anchored their responses with extrinsic and intrinsic motivations. A recurring theme was their commitment to students' learning. Interestingly, they associated this commitment with their development:

> *I am motivated to learn technology and share my knowledge with others; this is what keeps me going; I would like to be an ML and artificial intelligence expert. The most important thing is that students learn something new and what I plan is effective and useful. I feel that it is only ethical to teach them with emerging technology. I am already employed and can be passive to these changes, but I do feel it is essential for me to help them.* Jim

> *I am revamping my obsolete research interests; my research interest is focused on AI; cloud computing supports my interests; it is becoming essential, and the students can do novel things with AI and cognitive services. Aristi*

Distinctly, participants who showed interests in social internal and external engagements projects and contextual awareness beyond their institution more than pure teacher academics. This could also be influenced by their managerial roles or job demands of their as shown highlighted in the quality reports, academics were expected to consider industry requirements or due to their professional background:

> *I would like to stay current and speak the language; also, students' hands-on technology enables them to speak the language; it will give them great opportunities.*
> Iris

Despite their critical perspectives of their digital efficacy, limited time, packed workloads or absence of institutional support strategies, the participants' intrinsic motivations seem to sustain the momentum of their orientations, technical development and practices with emerging technology. Despite that, the participating academic are all technology orientated, and regardless of the obstacles they faced to develop their technical skills, some of them were able to efficiently apply their learning to practical implementation more than others. Such approaches seem to afford them to integrate emerging technology in their courses and projects' supervision. Hence, their development reinforces their competencies and self-confidence.

Revitalising Pedagogic Practices

The participants' responses indicate that their technology-orientation enable them to revitalise their teaching practices with emerging technologies. Most participants employed student-centred approaches, in self-organised learning activities, and social constructionism and collaborative learning using PBL and PjBL. Their uses of emerging technology in their pedagogic practices ranged information and document management, communication, collaboration and practical demonstrations to stimulate the students' engagement and motivation for learning:

> *Most of the time I use either [XX collaborative tools] I have got some examples so its application that I taught them I set up some of the boxes active to begin with as the class they all access and fill in the bits by the end of the class they complete the full exercise some of them have alternative views we discuss this person said that and compare them and come to a conclusion which one was true and why and sometimes about there are little questions have them consider while they are working. I [kinda] of like it, when they discuss, they could have [an] argument about stuff.* Alice

Most participants’ employ new approaches such as autonomy-supportive learning by giving their students the freedom and responsibility to make decisions regarding evaluating, selecting and acquiring emerging technology to support their learning. Their orientations allowed them to depart from the grammar of their curriculum and pave how for their students’ explorations:

> *Students can use anything they want, but if they want, for example, to produce the piping system design, they need to use CAD software.* Athena

> *My students are always reminded that there are alternative platforms; they are not limited to one; however, they need to make sure that they are aware of the limitations.* Alex

> *Using tutorials is becoming outdated, so I guide them where to find resources, and I give them the autonomy to develop critical thinking to be more independent and do things themselves.* Adam

Although the constructionist approaches characterise their institution (See Section 3.6.1), which means that most of the academics are expected to employ them in their practices, the participants’ approaches in this study differed. They were continually and actively updating their practices with emerging technologies, engage in activities that enable them to enhance these practices and employing new pedagogies. Their orientations towards experimenting with these technologies regardless of critiquing themselves, support them in not only meeting their teaching requirements but also in revitalising their teaching practices. Some participants like Dan stressed that developing new courses and programmes with emerging technologies would reflect a fresh look of the curriculum for all stakeholders:

> *“The motivation to refreshing the degrees the structures are very important like you know how you motivate the staff to get out and work with companies and to stay current like that’s one of the big things in the [XX this institution], there is no motivation, the staff now just teach certain hours that’s all you needed no rewards it’s an easy straight we weren’t doing new courses so”.* Dan

4.4.2. The Participants' Cloud-Based Pedagogic Practices

In light of the participants' orientations towards technology, a significant feature in this study is the limited extent to which they practically employed CC and CBS in the classroom or computer labs. Only four participants (Jim, Dan, Alex, Adam) utilised CC platforms (For example, VMWare, MS Azure, and AWS) and two (Sam and Alice) utilised CBS (For example, Google Docs, Padlet, etc.) in collaborative and participatory pedagogies. Only two of the nine (Dan and Alice) reflected critically on their pedagogical practices with CC. However, most participants supervised capstone projects that utilised a range of CC and CBS for impact evaluation, planning, design and development. Distinct to the ICT academics was Expanding the Curriculum with CC, while disciplines varied in Redefining Pedagogy. Distinctly, Cautious Pedagogy and Visionary Pedagogy are the most specific pedagogies to CC and CBS. Table 4 lists the most common participants' pedagogic utilisations of CC and CBS per discipline.

Table 4.

This study participants' utilisations of CC and CBS

Utilisation	**Discipline**
Expanding the Curriculum	ICT
Redefining Pedagogy	ICT and Web Media
Cautious Pedagogy	All
Visionary Pedagogy	All

Expanding the Curriculum

Some academics expanded their curriculum and subject-specific content with CC and CBS. The utilisation of CC and CBS enabled them to offer courses in new areas and new topics such as systems administration, new programming languages, security, AI projects. These expansions supported the participants' projected curriculum development and enhancements that surfaced from their planning to align with the national qualification framework. Pre-cloud development was challenged due to budget and process constraints and limitations of the available technologies. Utilising the cloud was considered a viable approach. Although, there were conflicting views about the utility of using CC as some participants recounted that the cloud was necessary to design activities and add content not possible otherwise. In contrast, others considered it an opportunity reinforced by other factors that can be replaced by pre-cloud technologies.

Dan developed a new system architect course that combined multiple ICT specialisations (programming, networking, systems administration, database and security) using a CC platform and CBS. His technology versatility helped him link these topics in lab activities, term projects and practical assessment. Dan accentuated that the design and developing these activities were influenced by industry and government demands and the prevalence of CC. However, internalised these motives with his commitment to students' learning. His vision of the new course was to fill the gap in the students' skillset missing from their curriculum:

> *I was motivated by what is happening in the industry, not from infrastructure but development, big data, AI, scripting and autonomation point of view, I want the students to utilise the cloud services so they can deploy applications[...]the reason why I put that in a new course is that I wanted students to develop their critical thinking, programming skills, autonomation that was missing and they were not feeling confident about, I wanted it for different areas than what was expected; the [XX course] was about building an environment I felt that the students with the cloud-first policy in [country] needed to have these critical skills.* Dan

Likewise, Alex developed a new system administration course that utilises CC platforms and CBS. His technology background helped him mimic real-world scenarios. Hence, similar to Dan, his teaching strategies involve case studies, classroom activities, discussions, exercises and project development that aim to provide students with a conceptual and practical understanding. Although the course can be delivered using the modelling and theoretical strategies, Alex exploited CC to enable students to develop hands-on learning experiences based on real-life scenarios:

> *In the [XX course] using cloud resources wasn't the main aim, it wasn't to make the students learn the cloud but to build the [XX service] which in this case happens to be on the cloud how they would go about the[XX course]tasks would be no difference if we built a local server they weren't in the mindset of learning a lot of cloud functionalities.* Alex

The participants recounted an increasing use of CC and CBS in new capstone projects and work placements and seemed satisfied with the students' utilisation. Some of the participants were involved in supporting several capstone and industry projects:

> *For the capstone projects, most students are using cloud platforms or services for their projects. The two major platforms students using are [X] and [Y]. Management Information and Networking students are using are [X] for their infrastructure development. Programming and Database students are using [Y] for their AI services.* Sam

> *The overall introduction of [X] offerings and capabilities went really well and its widely used by all final year students working on industry/in-house projects.* Adam

Aristi emphasised that despite the growing trend in utilising these technologies; students had to develop new learning independently. He stressed that this is a risky undertaking since academics and students are learning these services at the same time. Nevertheless, He found the autonomy in himself to learn CC and CBS since he had the core knowledge from previous professional, teaching and research experience. He stressed that this was imperative to give students adequate support and supervision. Besides, he engaged himself in locating resources for development and troubleshooting to direct his students.

Despite his expertise, Aristi weighed more on the students' choices in ways that align with autonomy-supportive learning. This was partly due to his lack of cloud-efficacy and enough resources:

> *From supervising students' projects what I noticed is that it gets a little bit tricky in advanced steps so after you finish deploying a service consuming it. It's not simple [grin] as it seems to be. There aren't enough online tutorials that can guide you for this; it's easy to say here is how you start a service but then the service needs maintenance and retraining; these tutorials leave students and teachers to their devices to determine how to do the advanced deployments. [x, y, z providers] need to do a little of upgrading to their tutorials.* Aristi

Supervising students' work placement seems to open exciting collaborations and engagements with industry partners despite the challenges of having to deal with additional requirements that may not map to academic objectives. Iris was clear that the use of emerging technology gives a new perspective to industry projects. How the capstone projects and work placements are designed to support academics to think beyond their practices and possibilities of using technology in real scenarios. Her practice was within the norms and priorities of her discipline:

> *Business students analyse they can not only think but make. To get them to interact with technology and use it more than we normally do—getting students to develop a website in a course is not a normal practice for business students. But it gives them a chance to use these platforms in projects. That would give our students and us an edge. It's not a teaching tool, it's for students to solve problems case studies [gave specific example] but also for anybody they could be thinking how I can develop an app to help me solve an issue, or they could have an informed conversation with a developer because I learned quite a bit about coding.* Iris

Redefining Pedagogic Practices

Some participants recounted using CC and CBS to transform pedagogic practices with new strategies and tools. While they were required to maintain the core content, since their courses are stipulated in the curriculum and programme structure, they devised new ways for teaching with CC and CBS to enhance their students' learning and experience. Redefining academics' practice seems to transform their courses and improve their students learning experiences; however, it created new challenges. All the participants who redefined their practices with CC regardless of the variances of their deployment aimed to enhance their pedagogic practices:

Alice reidentified a Web Media course by employing 'collaborative and participatory design and development' approaches and engaged students in co-developing the course content using cloud-based productivity tools, video editors, online discussion boards for brainstorming and real-time group thinking. This required her to prepare templates and content and use previous course material. Her approach aimed to stimulate students' inquisition and interest by critiquing content and design and providing students with tools that keep them motivated and engaged and give them a sense of ownership, leading to redefining the classroom social structure. These activities allowed her students time to work on their own in self-organised, pair and group thinking, discussion, learning and co-constructing design while Alice observes their collaboration and signpost their narratives and products for reflections and discussions. Alice exemplified pragmatic use of cloud-based 'just-in-time' technologies:

> *Everything is there, links to articles, the exercise provides explanations, and I update it as I go, [...] I teach the course three times, and sometimes, I have different ideas, so I update the content every week, technology makes this very practical and efficient[...]the challenge is to motivate the students, with cloud-based slides they can download the files any way they want, they can add multimedia and images on their design, these visuals get them to connect to the content". This also shaped her assessment as she adopted product development using accessible tools which she described 'useful'. This helped her combat students' excuses for not having the right resources "If you don't' have software go online and use any software at least for a month, you can choose anything and stick to it.* Alice

Sam integrated cloud-based collaborative tools in courses that employ tutorial-based programming and ICT solution development. He employed these tools as a means to motivate students' critical thinking and collaboration. In line with Alice's perspective, Sam also introduced a new cloud-based collaborative programming tool into his teaching. Sharing his experience with colleagues from different programmes during formal teaching and learning training weeks indicates his sense of achievement:

> *It enables access and user friendly and collaboration; I employ them for my four cs: collaboration, creativity, communication, and critical thinking. Face-to-face communication may not be useful for students who are shy; it requires a convenient environment. It offers various options, that we can measure their engagement and begin to collate data on their behaviour, as cohort and individuals. The collation of this data and the analysis of it come under the educational data mining and learning analytics.* Sam

Jim's security and system administration courses were scoped on theoretical and practical skills development. Pre-cloud, these processes were constrained by the institution's strict security policies and limited software and physical resources that enforced constrained deployments. Jim redefined the pedagogic practices in these courses by using IaaS (on a private cloud) that offers individualised work environments, facilitate concurrent assessment and control on submissions. Jim's preparation entailed designing unstructured problems, scenarios and case studies, configuring access privileges and testing the work environments similar to the normative practices in his department. However, utilising the cloud not only improved the efficiencies of the work processes but also redefined the social structures by giving academics and students more control.

> *I used to teach this topic by lecturing then tutorials. To build a platform, they were forced together in groups and pairs. But now, by allocating two virtual machines each student has a scenario of attacking a victim machine in a secure and separate environment, students are given problems and projects, and work in group and individually. We used to assess them in batches, and now I assess them all at once, which allows me time to focus on supporting them.* Jim

Cautious Pedagogies

Conversely to aspirations that the cloud would facilitate ICT ease of use, the participants' narratives yielded cautioned practices as a result of their perceived challenges of utilising it in their academic practice. The lack of certainty, control and authority and lack of cloud efficacy and competence, instigated fears of failure, lack of availability, cost overrun and unethical behaviours. Table 5 depicts the participants' cautious pedagogies as a means to mitigate salient risks:

Table 5.

This study participants' cautious pedagogies to mitigate cloud computing risks

To Mitigate	Cautious Pedagogies
Lack of cloud efficacy	Avoidance, theoretical or abstract applications
Access interruptions	Backups and traditional pedagogies
Associated cost and cost overrun	Informal, open-source or private cloud
Unethical practices and misuse	Control privileges and pre-configure services

Avoidance, Theoretical or Abstract Applications

Some participants eschewed the use of CC in classroom pedagogy, projects and assessment. They exemplify academics' risk aversion against practical deployments. This was primarily due to their lack of adequate digital efficacy. Iris designed her classroom activities around critical evaluation, analysis and meaning making in capstone projects. She employed theoretical but critical discussions on the utility and implications of using CC and CBS in her business courses. Her technology-orientation reinforced her use of CC and CBS. Although her pedagogy might be perceived 'abstract' or 'theoretical', she employed 'critical dialogue', 'conceptualising' and 'meaning-making' which students examine in her words the *"ethical implications of CC on the vitality of human performances"*, *"regulated cloud"*, *"implications on work practice"*. Practical implementation did not seem a priority for her discipline as she recounted, that deployments and developments *"were not normal practices for business students"*. However, Iris supervised capstone projects and work-placements that involve analysing and proposing emerging technologies and cloud-based services in *"real work environments"* and *"small businesses towards economic development". Iris*, as a lesser risk avenue.

One the other hand, Alex taught technical, legal, ethical, social and professional implications of using CC and CBS for infrastructure, storage and computing. Contrary to Iris, his course involves theoretical and practical implementations in which students use CC and CBS as tools for deployment and development of ICT solutions. His cloud-efficacy and discipline demand reinforced practical application.

Backups and Traditional Pedagogies

To mitigate complications associated with institutional cloud and pre-cloud applications, some participants, employed SaaS applications or private cloud platforms, that are not supported by the institution's ICT department. This yielded notable challenges such as limited access to 'specialist' and 'peer support' that could guide the instructional design, resolve encountered issues or support in management. This reinforces the participants' responsibilities and cautious approaches.

Alice's participatory approach renders issues concerning data integrity and authenticity. She found it challenging to manage her students' work. Hence, she devised a cautioned 'temporal privileges' approach by allowing students 'edit right' to plan and design and 'read right' to view the final product. She also uses backups and pre-cloud approaches to manage technical failures:

> *I have to overcome some of the challenges; one is being overwhelmed by doing content, and technology to learn the network and why you are using it[...] I'm not too fond of the eLearning system used in the institution for managing content uploading and updating files frequently. I put option to view, that's for the ones up for class, during the development then I set up a template and make them develop them, I download all files to my computer at the end of each week and save them on a flash.* Alice

Informal, Open-Source or Private Cloud

Most participants were cautious about associated cost limitation as it could lead to interrupting the pedagogic process. Payment models offered by the cloud vendors are designed for commercial use while in HEIs are relies on experimenting, learning and maximum exploitation. The participants weighed alternative models such as private cloud and open-source resources for better control that demand higher levels of expertise and responsibility:

> *With the private cloud, I can set up and wipe off services when I don't need them and use the same environment for other courses. With this, I save a lot of efforts and avoid these extra costs.* Jim

> *I set up my machines to shut down at a certain limit, and I see that students have left their machines running over the weekend and lost dollars, when they have not paid for it it's not a big issue. I think we can give them more credit. You can make a simple mistake, so I think the method of giving students an allocation of 30-40 % of what they can get. Then if they have a couple of days downtime that would teach them a lesson.* Dan

Control Privileges and Pre-configure Services

Some participants recounted cautious practices against students' unwitting and inadvertent misuse or unethical practices such as plagiarism. Jim, for example, reported preparing pre-configured services, testing deployments before the lab work and limiting students' privileges to eschew possible failures and students' misuse. Jim felt that these practices were necessary to mitigate unexpected issues and misuses of CC resources since changes can be easily applied. Negative personal (and peer) experiences in classroom pedagogies and assessment due to students' lack of cloud efficacy resulted in their misuse that amplified his workload and challenged students to finish their work:

> *The problem with public and private clouds is the lack of control on what the students do, ubiquity and uncontrolled access encouraged them to plagiarise; they told me themselves that this was open and possible, and it would be stupid not to try, students don't take this seriously as they should, we need to make sure they understand the implications of these actions.* Jim

Alex reported that doing cloud-based assessments entailed preparing a pre-configured CBS to eschew any issues of cheating and plagiarism. His cautious practices included deploying new services. As for the term project, Alex delegated students' administrative privileges to develop their environments and services according to given requirements that raised issues of authenticity:

> *During exams, students were supplied with a preinstalled database on brand-new servers they had to do various hands-on activities [...] an issue that I came across was that in [XX cloud platform] how we have it set up here in the [XX institution] I was given delegated authority to create subscriptions for class and create resources myself. The only disadvantage I see is getting access to the billing information. I just don't have visibility, so somebody says have left a machine for a two-week break and forgot to put it down it built costs.* Alex

Visionary Pedagogy

Another recurring theme is the participants' visionary pedagogy that reveals their aspirations and current limitations to their pedagogic practices with CC and CBS. Their assumptions about the novelty of the cloud promote their visions of pedagogic approaches above and beyond their current practices. Such pedagogies were salient amongst participants who felt constrained to utilise CC and CBS in their classroom practices, and even the ones who used it under certain limitations.

Iris and Athena were entrenched in their non-ICT related disciplines; however, their technology orientations reinforced their aspirations to practically employ CBS at introductory levels that could renovate their current practices. However, the limitation of the predefined business courses and learning outcomes within led Iris to envision integrating CC and CBS in meaningful uses in capstone projects.

> *I would like to use the cloud to create websites; business strategy is about growth and about customers base, which is obvious. Each group [of students] can develop a website as part of their projects [...] it's close to aligning to the needs of businesses[...] If you can get a small business to develop technology, it's going to be suitable for meeting their demands. So, the idea behind this is that I would make [XX app development] an elective in the business school to solve business problems. Still, for anybody can have a conversation with developers, so they would know what developers have to do. Cause I learned quite a bit about coding.* Iris

Athena demonstrated a similar approach, as she envisioned collaborating with ICT academics to overcome the limitation of the Engineering discipline priority. Also, Athena envisaged employing interdisciplinary specialist holding education, engineering and ICT. This revealed her aspiration to innovate in her practice:

> *I think we need new courses which will provide the combination of engineering and the IoT otherwise it's not possible you know to follow this progress if we create the courses, we will also be obliged to teach those courses, so we will be obliged to follow this progress.* Athena

While academics who teach ICT related courses, and practically utilise CC platforms in various deployments more than academics in other disciplines, expressed their visions to exploit the cloud and beyond their current practices. However, their visions were based on their educated assumptions of potential uses and solutions to current limitations:

> *So teachers should be the same way and delivering information should be the same manner cause the bunch of information that we are required to deliver to the students is ‘too much’ unlike the old days you cannot summarize in a booklet, and if you do so you would be limiting the amount of information so what I would say Integrating what we currently have into the emerging technology, although it is different, how it is delivered to students should match up the relevancy to the speed, to the amount and to the capabilities.* Adam

> *I expect the students to design an infrastructure on the cloud that will require knowing how to do four or five different elements instead of me designing material for these four or five elements.* Alex

The paired depth interviews revealed academics’ visionary pedagogy above and beyond their current practices. The participants were requested to propose ideal lesson plans in the frame of TPACK elements (pedagogy, technology, content). They seamlessly selected topics within their area; however, trending topics and implementations that are outside their curriculum; indicating their aspirations to change their practice to novel approaches:

> *Maybe I can switch it to autonomous vehicles overall, and I would like same as Sam I would expand to have various case studies and pick a simple one, then work on the requirements and have the students develop features and develop in groups something possible in a semester or depending on the length of the course.* Aristi

Selecting teaching strategies was aligned with the participants’ experiences and tested pedagogies that allowed them informed decisions and rationalisation:

> *I would say definitely its group work because it’s a complicated task it has a lot of components you need a lot of skills; I would have a multidisciplinary group of students to better tackle this project.* Aristi

> *Regarding dynamic decision-making, I may go for a case study I will give a case study what went well and what did not go well and the reasons so all it depends on the quality of data.* Sam

Conversely, the majority found it challenging to select a specific CC and CBS service. This indicates that the numerosity and interconnection of services challenge integration in pedagogy:

> *Some projects related to autonomous systems we can give guidance for them to make aware about the cloud services like AI feature, since they [students] may not have the background, we would expose them to [X] programming to complement each other.* Sam

> *Particularly regarding AI, we would definitely focus on computer vision which is important to autonomous cars. But only this AI has a lot of tools and models that can be. They also need to calculate predictions and classifications.* Aristi

4.4.3. The Participants' Pedagogic Conceptions of Cloud Computing

The participants' conceptions of CC and CBS were gathered from all the employed methods and throughout the case study. Although the first interview was dedicated to gathering the participants' conceptions of the meaning-making, affordances and challenges of CC, throughout the data gathering, they were continually justifying their practices. The analysis of their responses yielded two salient pedagogical affordances and five pedagogical challenges.

Pedagogic Affordances

Although academics' narratives weighed more on the challenges, they all (academics and managers across the four disciplines) expressed overall positive views of the CC and CBS educational potentials. Often these perceptions are anchored in their experiences and assumptions about potential changes with emerging technology:

> *With CC, the abilities and the capabilities of the technology are endless. Athena*

> *The cloud is not used as a solution of its own; it is a tool that facilitates and eases the implementations of innovative ideas and projects[...] it is becoming an integral part of any educational environment with minimum expenditure/investment on infrastructure and labs equipment that have a short life span.* Adam

> *It's amazing how quickly you can do things launch the environment; AI maybe big areas that are going to be a success.* Dan

> *We started seeing the emergence of other resources on the cloud such as ML and IoT those simply wouldn't be available here.* Alex

Supporting Learning

The most salient CC and CBS affordance the participants highlighted was supporting students. The participants positively consider CC and CBS affordance to reinforce constructionist, collaborative and autonomous learning. Their conceptions were drawn from enabling the specific features of cloud that comprises interactive interfaces, an abundance of tools that facilitate choices, selection and decision-making and the ubiquity of services will allow access and collaboration.

> *CC enables students the liberty to choose the most relevant and suitable services needed for their projects. Teachers exploit the various cloud collaboration servers that offer innovative teaching methods that can be accessed by the students from anywhere via tablets, mobile devices and mobility. Students extensively use their mobile devices to access data. Cloud-based classroom applications are the best way to facilitate this exchange between student and faculty. CC allows new forms of material that encourages interaction and allows flexible setting of assessment and monitoring students' work.* Sam

Often the participants conceive it as an enabler for learning that would not have been possible otherwise and disruptive to their practices with pre-cloud technologies:

> *It is becoming a tool that facilitates and eases the implementations of innovative ideas and projects. Without the cloud, it would have been almost impossible to execute and implement projects due to lack of dedicated equipment".* Adam

Alice recounted that using CBS to teach her courses was beneficial for her practice and her students' learning. She stated that online and on-demand technologies motivate students, keep them focused, deepen their learning. Alice equated this with the ubiquitous and flexible access to learning resources that facilitates pedagogic practicality and efficiency. She empathised that using online resources for learning helped her students stay focused on the subject content rather than the medium. Overall, she felt that online services afforded her to maintain content currency and her students' flexible access, motivation and autonomy:

> *It [online technologies] has more easy things because it's about getting them all to engage and participate in meaningful learning activities that related to their subject".* Alice

Athena expressed motivations towards the use of CC and CBS to attract the students' interests and gain their confidence. Her motivation reflected her commitment to students' learning. She felt that academics are responsible to finds ways to motivate students' engagement:

> *I think that the students are ahead of us in social media and games but not in specialised software and advanced technology applications; we have to motivate and teach them so they can engage themselves with the real developments. We need to know the new software that is coming".* Athena

Athena's pedagogic practices with emerging technologies align with her CSL and EXL teaching strategies which reinforces her tendencies towards emerging technologies. Her selections of emerging technology are influenced by her personal and peers' experiences and students' preferences:

> *Engineering teachers don't like technology progress; it's difficult for them to follow. There is a difference in generation. Students cannot understand the 2D since they were born; they understand 3D objects while we continue to teach in our old ways.* Athena

Relevance Discipline and Orientation

The participants' disciplines were often highlighted as a barrier and equally as a motive for the participants interested in developing their skills and utilising the cloud in their practice. Participants who were entrenched on non-ICT disciplines expressed priority of subject-specific content; some participants in ICT felt that the cloud was more relevant to specific specialisation than others.

Athena, for example, highlighted that the difference in discipline between engineering and ICT is a barrier to learning and utilising emerging technology. While she emphasised the need to use the latest technologies that interest students, she felt that engineering content and discipline are more important to her, her engineering colleagues and students. This resulted in a lack of awareness and digital efficacy. Besides, she accentuated that time and workload were significant issues that impede expanding her skills beyond her specialisation:

> *I believe that academic management should support the teachers in utilising emerging technology, particularly specialised software that could help them develop content-specific skills. It is not easy to convince a professor to use the cloud and introduce it in his teaching approach, especially in engineering, while they prefer to cover engineering content. I think that the teachers need full support for this process in order to manage quickly and effectively.* Athena

Her academic management role amplified her sense of responsibility towards other academics within her department.

> *Technology and the cloud are rapidly changing. Although we are focused on teaching engineering content, all our courses, projects and research depend on using technology.* Athena

Likewise, Iris was entrenched in her business discipline:

> *I have an active interest in digital but in the context of how it is developing society, and mainly around HR because that's what's related to my job, I am Interested ethic side of things sociological side of things.* Iris

Meeting External Demands

The second recurring affordance of using CC and CBS in pedagogic practices is meeting industry demands. The participants associated their motivations and practices toward the cloud with preparing their students with relevant cloud skills that match with the prevalence of the cloud and external demands.

Iris associated her practices to learn, experiment and employ and research emerging technology with her motivation for renovation, staying current that also indicated her aspirations. Her motivation to learn is directed towards passing her knowledge to students and enabling them to use it in future endeavours. This seems to emanate from Iris’s belief that utilising technology would enable societal engagements and developments. In this respect, Iris’s conceptions of emerging technology were framed by her past experiences. Her autonomy to develop her technical skills and directed towards external engagement beyond her institution:

> *I would like to be able to speak the language and stay current” to support her developing and engagement. Students’ hands-on technology enables them to speak the language; it will give them great opportunities.* Iris

Athena also felt obliged to provide students with specialised tools across the curriculum (in her course and other courses she supports) that are mostly used and required by industry. Although she allowed the students to use other tools that would provide similar features, she expressed her belief that CC and CBS could afford access to ICT mediated collaboration, data management, but mostly innovation critical for engineering:

> *They can use any software they want, but if they want to produce the [XX] system design[...] they have to use this software[...]it is the same version and requirements as the industry, we emphasise it because the industry uses it. Besides, alternative software cannot produce the same accuracy and calculations.* Athena

Likewise, Dan was compelled that CC automated features could provide a lot of capabilities that can be applied to help students develop new solutions and skills that would be attractive to industry. However, Dan views the cloud as not only in how it is promoted to HEIs but by exploiting its deeper capabilities and localising its affordances to the students' requirements:

> *It does so many things to automates a lot of processes, so I used this to design activities to help students learn new skills. I was definitely driven by the industry and feedback in this like they were saying, I think they've been driven more by the type of servers on the cloud, not from an infrastructure point of view to AI to big data analysis, the capabilities that there is there I feel, a lot of articles I've been reading in just in five of 10 years' time every single application can be utilising these tools that are there on the cloud for customers.* Dan

Particular emphasis on the participants' professional experiences appears in Alex's reflection that it would challenging not to use CC and CBS since there is a strong influence and, in his words, a "*pull factor*" from industry and cloud providers to limit the options of using on-premise technologies, as he based this understanding from his background:

> *Companies themselves are approaching cloud very heavily. They are pulling all the work towards themselves, killing off on-premise and making it harder for people to work on-premise systems. With my background makes me pay attention to the wider and why things are happening how they are, it makes me more aware of the outside world. My idea is not to look from only an academic point of view but to map to the market leaders' criteria not only academics if you prepare work-ready students to the market the relevance of their skills to the market is of high important the most relevant skills are on demand in the market are defined by vendors.* Alex

However, few participants considered meeting market demands as intrusions on their practices. Adam expressed his concerns about the expectations to maintain currency in such rapid technological development. His account in such expectation was balancing between considering it a challenge and a motivation for change:

> *Whenever there is a new demand for new technology, new skills there is an eye whether that we have it implemented it in our courses or not or whether our courses are relevant to the industry or not. And whenever there is something out, we would like to see that in our courses, the management would want to see that in our courses. So, we do have that support of something new is in the market the cloud is in the market, a certain aspect of the cloud is in the market there is the push to embed that into our courses.* Adam

Pedagogic Challenges

Several challenges were identified from the participants' narratives. These challenges can be aggregated into intrinsic (cloud-efficacy and discipline orientations) extrinsic (control and strategic direction). Often, these challenges seem a trade-off in with the CC and CBS affordances.

Lack of Cloud Efficacy

As noted in the orientation section, most academics find it challenging to develop their technical skills. These challenges are personal, social and contextual. The participants' responses were in the continuum of challenges to self-directed learning and institutional support strategies. Aristi internalised problems and aptitude to develop CC knowledge and skills. However, he exemplified academic management concerns which strategically consider staff development. He accentuated that the overwhelming teaching workloads entwined with a lack of institutional support (human resources and funds) contributed to academics' lack of continuing development:

> *I don't find adapting the cloud services more difficult than learning any new programming language which I already did, on the contrary, the cloud requires using these skills on a new platform, interfaces and terminologies. This goes beyond professional training and is down to a personal level; a professional understands that using emerging tech would benefit them in their career. But this is a challenge. It doesn't mean it's an easy thing specifically now that the technology appears like mushrooms. I learned this, but I have to drop it and use another one.* Aristi

Likewise, Athena finds it challenging to remain current with the rapid changes and demands of her disciplines and staff aversions against acquiring new knowledge from a different subject-discipline:

> *It's difficult for us to follow the changes all the priority for us is to follow our discipline. I have to follow the safety what's happening in [XX specialisation]. Besides, it is not easy to convince a professor to use emerging technology in a new teaching approach.* Athena

Iris highlighted these two perspectives beside accentuating that influence of socially and contextually constructing knowledge and skills, comparing her skills with expert and non-expert ICT users:

> *If I can pop more time to it, I think I would feel more confident to be able to teach it to others, but at the moment it is becoming a bit sporadic as I got swamped; so [yeah] my goal to be able to beat it but I am not there yet. I heard that other people who were more tech-savvy than me were having the same problems when we had group meetings on Zoom. This gives me more confidence that I progressed quite well.* Iris

Sam's asserted these issues as expanded developing his cloud skills was challenging mostly due to the lack of strategic planning that could facilitate time to learn and partly due to the vastness of the services and features that are increasingly and rapidly developing:

> *There must be a radical time allocation for the staff to train, update and experiment these tools to develop sustainable growth.* Sam

Authority and Reliance

For most participants, their aversions from CC and CBS originated from their concerns of reliance on the cloud vendors from multiple dimensions, costs, security, lock-in, lock-out and packaging that pose threats on their certainty, credibility and accountability. Jim and Dan emphasised their concerns about cost-overrun, access limitations, and cloud vendors control. Their security specialisation promoted his awareness of the risks of lack of availability and unauthorised access to teaching content and students’ work, particularly with this data being located in different regions [at the time of the study public cloud providers offered services located outside the GCC] and their configuration to prepare lab work and projects. Several participants reiterated their concerns about students’ lock-out of resources, challenged by vendor ongoing changes and evolvement of commercial provision strategies that are not feasible for an educational setting. These changes pause risks, particularly when used in courses:

> *I had a student doing a project using API, he was given 200 as free credit but reached his quota, and he had to pay money to continue his project so we couldn’t give credit for this student to allow him to continue, we should really make sure we have a solid agreement with these providers to ensure that students can continue these projects and not running out of credit in the last weeks.* Dan

Issues related to security were not particularly prominent in the participants' perspectives. There is a general consensus amongst them that security is less important in educational contexts due to the lack of sensitivity of the pedagogic data and institution and service provider responsibility. Resources availability and data integrity were more salient in their responses. However, some participants’ awareness of security risks reinforced their cautions responses against students intentional and nonintentional misuse and vendor lock-in and control.

Jim's use of a private cloud was intended to enhance his certainty, flexibility and control:

> *Security is a major concern since data is located in a different region, what if there is an issue. Performance, security and availability are major concerns for universities; you need to think about how the students understand the cloud. When using a private cloud platform, I feel I have more control over what to give to students, and I am aware of what is going on, while on public cloud, students have more control which means more responsibilities to monitor what they do.* Jim

All academics who manage CC platforms (Alex, Dan, Adam) reasoned that administrative challenges such as limited budget, cost, privileges and use time exacerbate in educational settings due to the consumption size. They accentuated that academics' awareness of the best uses of CC and CBS would support their pedagogical applications, evaluation, cost control and operating free from external influences and vendor lock. Alex suggested that Ethical challenges such as plagiarism, violations to copyrights and intellectual property are unavoidable but managing these issues rest collectively on the academics and student attentiveness and cautious measures:

> *One of the important things is cost management. A match to a large number of students is training tutors to hold the responsibility of estimating costs, managing privileges, and timely operating the given resources, particularly for assessment content should be generic and not vendor-specific what you do on one cloud should be transferrable, you need to know the most common features and uses whether you are using a CC platform or services. Education concerns the reputation of the users' integrity; you cannot guarantee that students are not plagiarising; you can prepare a brand-new environment and schedule shut down after assessments.* Alex

Packaging and Shallow Learning

Part of academic aversion against control is their recurring contentions on 'packaging' and 'black-boxing'. These features refer to rendering virtual software, hardware and interactions in defined user interfaces. The participants' responses indicate that although packaging enhances efficiency and aligns with emerging trends, it delimits certainty, control and deep learning:

Dan's manifesto was the limitation of CC in supporting meaningful learning. He stated that the cloud would not replace pre-cloud technologies. Therefore, he refrained from teaching courses focused on cloud interfaces on the premise that these are procedural and provide limited to no value to students' skills:

> *I felt very much that it was shallow learning, not deep and I just felt you know what we did with the students was a high level of (a kind of monkey see monkey do) now these are introductory exercises as well [...] what we [teaching team] did with the students was very high level to what they can do. I very much prefer the activities that help them develop tangible skills such as implementing Python [programming language] to automate small and large projects.* Dan

Alex also stated that packaging could limit certainty and fundamental understanding. On balance, facilitating the efficiency of utilising ICT services is a trade of these limitations:

> *It's important for students to do the fundamental things first before using the virtual world where a lot is pre-done you won't be doing a lot of low-level work yourself. Otherwise, they won't understand what and how any of the services work as they are and when things go wrong how to fix it. But why would you build an environment if it's there? We are using more and more abstracted level, but we are using much more tools for developing solutions, it's much more components that you join together the architecture is changing from building everything yourself to well-defined interfaces you assemble the solutions.* Alex

4.4.4. Bounded Autonomy

The paired depth and focus group yielded findings related to social praxis. This section presents examples of the participants' critical discourses on the social dynamics within and outside their programmes (See Appendices E and F).

Academics' Affinity

Findings from the paired depth (Appendix E) and focus group (Appendix F) yield affinity amongst the participants. Despite the nuances in their views about the educational value of CC and CBS, affordances and challenges and applications in pedagogic practices, their interactions entailed complementing each other's responses and listening deeply and thoughtfully to each other. Although the use of boundary-crossing and boundary objects was expected to stimulate discussion, it yielded harmonic, yet nuanced ideas. This indicates that they were interested in and influenced by each other's responses. Often, their responses were within the sameness of their disciplines; however, tailored to their specific courses and areas of expertise. Primarily, most participants expressed their views regardless of their role:

> *I agree with [X], but when looking around, I think it's difficult to pick one of the cloud services or features.* Aristi

> *As [X] said, we need to continue learning and developing our skills, but there is no clear vision.* Sam

Their conflicts were directly linked to their roles. The participants who were in management roles focus on the resources that support the integration of CC in curriculum and pedagogy, while participants in teaching and course coordination roles focus on the practical applications and procedures of using the cloud for teaching and learning, detailed tactics and prerequisites of students' learning, acceptance and ability to utilise the available resources in specific scenarios. Nevertheless, the affinity amongst the participants in different roles seems to enhance their independent decision-making and opinions as they felt not only free but also safe to reason their ideas. For example, Aristi explained how ML was complex and required advanced tutorials:

I found many tutorials around how to set up an experiment and how to do a different type of ML such as regression classification and pattern recognition etc. The introductory levels are straightforward, but then when I read the tutorial on how to update a recommender system, I couldn't understand it! [exclamation and pause] it was difficult; I didn't really try to spend a couple of days to read more, but I realised how difficult to my students to articulate and use these services in their work. Aristi

While Sam recounted a successful students' experience in implementing CBS in projects:

Our students know, but still many students did projects using [x programming language] which they already covered in previous courses; but [CC platform] places very user-friendly and easy for the students since they are good at using [a development environment], integrating the APIs and deploying an application. Sam

When asked about the most beneficial features, most participants' responses seem to agree on services access, ubiquity and elasticity, that would enable them to expand their pedagogic activities and enable their students to not only meet assessments and projects' implementation requirements but also innovate. However, there were conflicting views about the easiness and complexity of utilising the cloud. As some considered it was overloading while others equated it with the internet:

Our physical infrastructure hasn't changed hasn't upgraded [although new equipment arrived] the students' desire to do more advanced projects and use more superior resources increased which also raised the question what kind of resources we can give the students. Therefore, the cloud makes this possible. Adam

Institutional Support Structures

The focus group discussion yielded participants' views of their autonomy within their institution. When they were presented with a statement about the level of support, they receive to integrate CC and CBS in their courses (S1, Appendix F), they agreed that to some extent, they line managers offer them support. However, it lacks institutional strategies and direction towards CC:

> *The level of integration of CC at the operational level is proportional to the level of integration happens at the strategic. Currently, there is a huge gap at this level. I could see vividly no such drastic changes are happening at the tactical level of my ICT School. The faculties were given brief training on the [XX and XX CC platforms]. There is a big gap in the training, support and services of the student. Students are dependent on the faculty for checking on the availability of services and technical issues. Faculties are not that much enlightened on the available services and resolving technical issues due to lack of adequate training.* Sam

Administrative processes such as making changes to predefined and standardised learning outcomes that shape the curriculum prolong approvals that are initiated and pursued by academic managers and course coordinators. Besides, the lack of development, these structural imperatives seem to constrain changes to academics' practices:

> *I feel encouraged and supported by my peers and line managers; but from my personal experience If I want to include something in my courses, I need to push for it to happen[...], but this year I have added and included new content without having to go through any red tapes or any changes and yet still have to get support from my manager. I was supervising a student in industry, and he was giving me feedback on requirements which I felt necessary to add to my course without having to make changes.* Adam

Most participants agreed that receiving encouragements from their managers to continually develop their cloud skills was driven by the need to maintain their currency, match the curriculum with market demands and teach the relevant curriculum. However, professional development is often constrained by a lack of formal strategies, out of their control and managed by administrative staff, particularly with CC and CBS since they require economic intelligence and attentiveness. The diversity and ongoing development of technology enforce academics to step into short learning cycles to update their skills; that challenge in developing their expertise, activating, evaluating and guiding their professional development and practice:

> *Faculty management encourages us to stay current; however, it is difficult for me to do so if I don't get support to attend a training or complete professional certification; you only get sufficient learning resources if you enrol in such programs.* Jim

> *I feel supported to a certain extent, but the [institution] could be more committed to making resources available. This year there has been uncertainty about budget availability to support [X CC platform]. There is also a desire to support [Y CC platform] in the [institution], but there have not been any resources put into this program to date.* Alex

There were nuances in the managers' expectations. These nuances are situated within their disciplines, motivations and experiences. Although they asserted that awareness and development are absent; however, required to improve efficiencies in adoption and effectiveness in use. Their responses indicate that while non-ICT academics could receive technical support, ICT academics are expected to adopt self-regulated technical skills developments since it is within their discipline:

Aristi emphasised that academic staff should take agentic responsibility for their learning, although he conceded the limitations:

> *A professional academic should exhibit autonomous learning; If I do not receive enough financial support if I really care about my personal development and unless I am financially in a difficult situation, I should invest in my own training.* Aristi

Athena asserted that formal support is required and proposed a visionary model of implementation in which a specialist with interdisciplinary skills that combine engineering and ICT would support her staff. The need or technical specialist support was associated with academics from other disciplines critical views of having to learn and use new technology:

> *If we know how to use emerging technologies, we can utilise it immediately because we understand what is happening there and we can be more flexible and updated. It's not our expertise. Nobody knows why this [cloud platform] is important for us; we need a consultant because it's so rapid the technological progress, it's not possible to follow it so well. Maybe my students don't like [XX engineering] subject and can be motivated by emerging technologies; it would be great if I can create something that they enjoy and learn.* Athena

Implications on Decision-making

When the participants were asked to what extent they were able to integrate CC or CBS in their practices (S2, Appendix F), there were conflicting responses. It is not surprising that academic managers focused on integration challenges and the need for resources:

> *We need a consultant because it's so rapid the technological progress, it's not possible to follow it so well.* Athena

> *Well, it's difficult I think it's a combination of events let's say towards this situation, one situation is of course what Athena said earlier, people might feel overwhelmed with other duties. We expect people to do that this is not easy just because we say we should do it. It doesn't mean it's an easy thing specifically now that the technology appears like mushrooms.* Aristi

While the teaching academics recounted successful integrations of CC platforms in ICT-specific courses and capstone projects and the use of informal SaaS that within and outside institutional supported policies, their practices were scoped on the classroom and capstone projects; however, it is worth noting that their reflections did not include assessment practices:

> *I've supervised four projects in this area, and I am attending some ML training this week, so this is very much released from [cloud vendor]. It's free to use, and it's something I can look into integrating it into future projects and into courses as new approaches as well that are on the cloud like DevOp.* Dan

> *I was able to use [a cloud platform] in two courses, CC and System Admin. The usage of [a cloud platform] is integral to the CC course, as it is used for lab exercises around deployment and configuration. The System administration uses infrastructure-as-a-service for installing and configuring database instances.* Alex

> *I use a private cloud platform in teaching security courses; without it, it's impossible to practically give the students some sense of the scenarios, it would be all abstract.* Jim

The teaching academics reiterated the challenges that beset their pedagogic practices with CC such as the absence of institutional strategies for utilising CC and CBS, lacking clear direction and technical support. It was also apparent that the participants did not base their CC utilisation decisions on the institutional e-policies and strategies as a reference to these was absent from their discussion. Besides, some also stressed the growing size of services and continuous evolvement of CC and CBS as barriers to their competence:

> *Currently, there is a huge gap at the strategic level and the tactical level, without a successful transition and transformation at the top-level management as a faculty at the operational level we cannot expect a successful integration at the teaching and learning platform.* Sam

> *One thing I noticed is that a change of mindset in the teachers and institute is all we need and the main customer of the institute, which is the students.* Adam

Changes with Cloud-Based Pedagogies

When the participants were asked to what extent they feel that using CC and CBS changes their teaching strategies and practice, the most narrated change was enabling independent learning. This was associated with the abundance of cloud services and individualised workspaces pre-cloud constrained by time and access limitations. Such as learning approach reinforces academics' role as consultants:

> *The project going to be technical we were looking at it from a technical point of view it's brilliant. Is it viable as a business model for the client where the students are based? And the student was delivering in more details the project was delivering web hosting infrastructures for one of [company] client. The idea is from building a website into infrastructure and make it a shared multi-tenant infrastructure for X number of users.* Adam

> *The advantage of using [CC] for this class is that new servers can be created quickly by students, with no additional help. Then they can be run at low cost for the duration of the assignment, and then deleted. Provisioning resources for exams and assessments can also be done easily and at low cost.* Dan

> *Now, I can dedicate one pod containing all devices to one student, and in this case, students have a chance to do things alone.* Jim

> *Delivering technology changes across courses at the school-level or institution-level that can bring along all members of staff.* Alex

Gaps Between Idealism and Realism

When the participants were asked what the ideal scenario is required for effectively exploiting CC and CBS or in their courses, classroom activities and projects' supervision, most of them reiterated their aspirations. Their idealism emanated from their assumptions about pedagogical, technological and structural challenges that confine their autonomy with CC and CBS. Ideal integration in pedagogy comprised maintaining the core content that present academics' expertise, undertaking a collective change across all four programmes and maximising integration in capstone projects. These notions indicate the need for a systematic change. This is not surprising given how in which HE is structured and portrayed in academics' memory:

> *Any technology should support and not replace, work on the things that we already know, we have been working very hard to learn these tools and these things.* Athena

A scarcity in managing current processes that allow flexible access prevailed in the participants' aspirations for relevant resources, specifications, and data. However, these seemed undefined due to the lack of cloud-efficacy and competence in combining content with appropriate services.

> *Lots of data that I don't have [...] more knowledge for myself and my students on how to use artificial intelligence and machine learning services.* Aristi

Their perception of the limitations within their ecology seem to motivate their aspirations for organisational direction, that would facilitate specialist support and professional development and contextualising skills development. Sam and Alex suggested that for the change to happen requires structural organisation.

> *A complete revamp needed at the organisational level from the top to bottom levels of management. For a successful transition and transformation towards the cloud needs a well-defined strategy.* Sam

4.5. Concluding Thoughts

Chapter 4 Findings focuses on the influence of academics' orientation on their pedagogic experiences and the importance of these experiences on their autonomy. Findings from the participants' orientation (self-directed learning, critical reflection, motivation independent adjustment of pedagogies) indicate alignment with autonomous practices. The findings show that the participants could be classified into one technology-oriented academics' group. To some extent, all the participants in this study have shown technology orientation and autonomy in making decisions their pedagogic practices with CC and CBS. Therefore, they were all considered one group. However, their technology-orientation and pedagogical autonomies differed based on their professional backgrounds and motivations Competencies and roles.

Consequently, they could be classified into four subgroups. First, a distinction between those who held professional or purely academic experiences differed in defining their identities and technology orientations. Second, those who developed their knowledge and those who enhanced their cloud-efficacy. Third, those who were able to utilise the cloud in hands-on activities and those who decided to use it theoretically in impact evaluation. Fourth, the differences in the participants' responses based on their roles, indicated influences on engagements in institutional decision-making. A distinction between academics in purely teaching positions and academics in management roles emerged. The narratives show a difference in the participants' perceptions of their autonomy. Some teaching academics demanded strategic support to allow more autonomy in using CC; whereas the managers emphasised the availability of some mechanisms that would enable autonomous practices. The managers' responses also indicated more autonomy in engaging in internal and external activities that involved CC and CBS.

Chapter 5. Discussion

5.1. Introduction

This chapter expounds the study findings presented in Chapter 4. The theoretical framework built for this study was developed based on separate but interrelated bodies of research in the fields of HE and EdTech exploring:

- The influence of academics' orientations on their pedagogic practices
- Academics' pedagogic experiences with emerging technology such as CC and CBS
- The implications of cloud pedagogic experiences on academics' autonomy within the changing contexts

This discussion addresses the following research question that asks:

How do technology-oriented academics' pedagogic experiences with cloud computing and cloud-based services intersect with their autonomy in the contexts of HE?

This discussion interweaves academics' conceptions of their orientations, practices and autonomies into the literature on these areas with a complex articulation of academics' experiences with technology. The analysis advances from the naturalist approach of reporting thick descriptions of the participants' experiences in Chapter 4 Findings to the personal, social, structural and technological features that shape these experiences (McAlpine, 2016). This approach allows understanding articulating a collective view of the shared and nuanced social aspects that construct academics' experiences (Silverman, 2020). In doing so, I have been mindful that the academics' narratives do not reflect their complete experiences; instead, they reflect a limited portrayal of these experiences amidst the emergence of CC and CBS and the structural HE changes.

This chapter is divided into two sections:

The first, represents the influence of the participants' technology orientations on their pedagogic experiences in the context of CC and CBS. Hence, this section is a discussion of the mode of connection between academics' technology orientations and pedagogic practices addressing the first two research questions:

1. How do academics' technology-orientations influence their pedagogic experiences?
2. How do technology-oriented academics experience cloud computing and cloud-based services in their pedagogic practices?

The second, constructing academics' autonomy out of their experiences with CC and CBS, represents a discussion of the findings concerning the participants' accounts of their autonomy, addressing the last two research questions:

3. How do technology-oriented academics conceive autonomy in their pedagogic practices?
4. How do academics' autonomies become constructed by these experiences?

5.2. The Influence of Technology Orientations on Pedagogic Experience

5.2.1. Academics' Technology-Orientations Enhance Their Pedagogic Practices

Several studies have shown that academics' experiences with technology are predicated on their conceptions that formulate their perceptions, beliefs, motivations, attitudes, intentions and aspirations of its educational utility (Bhat & Beri, 2016; Rijst, Baggen, & Sjoer, 2019). Academics' conceptions have been considered indicators of their technology orientations (Bhat & Beri, 2016; Bhat & Bashir, 2018) Heidegger believes that given the externality of technology, individuals' awareness and deep meaning-making of its value are key to understanding the essence of their experiences (Beira & Feenberg, 2018). This ideology indicates links between orientations and backgrounds with technology. Hooper and Rieber (1995) extended this idea by suggesting that teaching with technology requires (re)orientation of how teachers conceptualise the meaning of integrating it in their practice. This means that academics' orientations, stemming from their perceptions and belief systems, could vary according to their experiences. Rijst et al. (2019) found that academics' conceptions of technology mediate their meaning-making of its educational value and their epistemological and learning approaches using it as a medium or content. Therefore, these theories indicate that academics' technology orientations are interconnected with their experiences as learners and teachers.

The first question in this study sought to explore how academics' technology-orientations shape their pedagogic experiences. Hence, this section offers a discussion on 'Stimulating Critical Perspectives' and 'Revitalising Pedagogic Practices' as two salient effects that yielded from the influence of academics' orientations on their practice.

Overall, the participants' reflections show that their orientations have enhanced their pedagogic practices with technology. This finding accords with several scholars' (For example, Martin, Ritzhaupt, Kumar, & Budhrani, 2019, Bhat and Bashir, 2018) arguments that suggested academics' orientations towards technology positively influence their practices. However, in this study, such a proposition is based on two findings, namely, 'Stimulating their Critical Perspective' and 'Revitalising Pedagogic Experiences'.

5.2.2. *Stimulating Critical Perspectives*

There is a consensus that critical thinking and reflection are imperative to scrutinising deep episteme, action and change in educational settings (Van Manen, 1995; Brookfield, 2017). Equally, there have been debates between the overstated rhetoric about the benefits of technology that spread determinism and neutralism cultures (Convery, 2009; Selwyn, 2017) and the influence of technology on stimulating (re)conceptualisation of the meaning of employing it in teaching and learning (Hooper & Rieber, 1995; Hansen, 1995).

All the participants’ responses in this study, irrespective of their disciplines, motivations, capacities and digital efficacies, indicate that their technology orientation stimulates their critical perspectives. They were all critical of their experiences with technology in terms of skills development and pedagogic practices. They all anchored their perspectives in their assumptions and desires to develop their digital efficacy and apply it in their pedagogic practices. The participants’ critical perspectives accord with Brookfield’s (2017) idea that teachers’ critical thinking is often based on their assumptions of ideal pedagogic practices, theories and work conditions. Their experiences, ongoing skills development and tendencies to experiment with technology seem to afford them to construct their assumptions and rationalise their practices with technology in various manifestations.

One group of participants were critical of their digital efficacy with emerging technology in the form of causal reasoning to pursuing developing their technical skills. They levelled their challenges to learn with their colleagues’ negative experiences, technology design, lack of access to institutional support strategies, intrinsic motivation and sense of agency, particularly in the absence of job or disciplines demands. Such influences have been highlighted by teachers and academics across all education levels (Ottenbreit-Leftwich, Anne, Liao, Sadik, & Ertmer, 2018).

However, this study's participants were explicitly critical of the lack of institutional support and problems in available institutional training being irrelevant, rudimentary and fragmented; hence, they associated their criticism with improvement suggestions. Their suggestions align with Brookfield’s (2017) ‘anticipating’ reflections that present academics desires and vision of their ideal practices. The absence of consistent professional development programmes also yielded from the documentary analysis; resonating Jaipal-Jamani (2018) and Mishra’s (2019) views that teachers’ technical skills development is essential for their effective practices.

Interestingly, academics’ critical perspectives seem to ascend with the emergence of technologies that entail new learning, acquisition and deployment; echoing Brookfield’s (2017) notion that teachers’ knowledge stimulates their critical reflection on the difficulties and challenges condition and process. In this sense, critiquing the intrinsic and extrinsic barriers to developing the participants’ technical skills indicates not only Mishra’s (2019) ‘context-awareness’ but also their dispersed accounts. Some participants stressed the need for ‘agency’ to direct development iteratively and consistently while others contended the need for support strategies. This perhaps was centred on the need to focus on skills specialisation and choosing a certain technology over the other, supporting their learning. However, they all agreed that their practical integrations of emerging technology in their pedagogic practices were less lucid, straightforward and efficient than what they have anticipated that made them critical of reaching their habitual potentials.

Another group of participants who held specialist experiences before joining academia were critical of their professional and educational experiences with technology. Their technology orientations afford them the capacity to discern the objectives of using technology in different settings. Their accounts concern transitioning from non-academic to academic perspectives, that accord with Martin’s (2019) and notions that academics’ ‘willingness to experiment and learn’ and ‘Carol Dweck’s (Aubrey & Riley, 2018) flexible mindset’. Their flexibility seems to derive their use of technology in their practice. Adam, for example, exemplified Brookfield’s (2017) ‘ideology critique’ by alluding to changing the culture of ownership in using CC and CBS:

> *It was a different approach to come to see also in an educational institution and in an academic and educator perspective in the corporate side all you need to know is the customer’s requirements; can a technology do x, y, z so I can offer to the customer, what solve their problem, I was looking at the cloud and technology from an industry point of view. But now, in an academic institution, I come with a mindset of what is the best way to deliver it to students who are here to learn. I had the knowledge and exposure my mind was not saying how to pass it but how to make it meaningful.* Adam

While Alex was critical of how, vendors push technology towards the users to standardise business processes in line with McOmber's (1999) sense of technology-as-instrumentality and a means for systemising processes. Hence, this group was explicitly critical of the shift in habitual practices that entailed, as Hooper and Rieber's (1995) pointed, reorientation and switching focus towards student-centred approaches. Their abilities to develop their skills in using emerging technologies efficiently and actively perhaps also link with assigning them coordination roles. They were 'in charge' of provisioning CC platforms and CBS to their academics' colleagues and students. The influence of their roles and responsibilities echoes Jaipal-Jamani et al. (2018) finding that academics in technology leadership are more motivated to develop their digital efficacy and meet their peers and superiors' expectations.

Regardless of the nuances of the participants' critical perspectives in these two groups, there is evidence that their technology orientations enhance their ability to conceptualise their experiences within technology. However, their critical perspectives link with Hansen's (1995) and Hooper and Rieber's (1995) notions that technology stimulates thinking, conceptualisation, choice and decision-making since they weigh and anticipate their actions with technology. However, they were not critical of the influence of their pedagogic practices on their students' learning in Brookfield (2017) and Giroux's (2020) sense.

Distinctly, two participants' critical perspectives were more functional (Hinrichsen & Coombs, 2014) and reflective on the influence of their pedagogic practices (Brookfield, 2017) with technology's fitness on their students' learning. Their narratives exemplify Brookfield's (2017) critical reflection from self, peers and students' lenses. For example, Dan's reflection emanates from his beliefs and past practices that critique, similar to Laurillard (2002), 'superficial' and 'shallow' learning with packaged interfaces and procedural activities. Surprisingly, Dan did not align his beliefs with his practices, how Ertmer (2006) suggested; instead, his technology orientation (and expertise) afforded him to experiment with emerging technologies, regardless of his adverse beliefs. His stance exemplifies resistance to the overstated rhetoric about the instrumentality and novelty of technology (Convery, 2009) by employing it in more meaningful and effective ways:

> *There is a lot there that can be done with the cloud, but you know, as an IT professional, it just felt that there wasn't any problem-solving, they weren't learning a new skill. I felt very much that it was shallow learning; what we did with the students was a high level of monkey see monkey do; these are introductory exercises.*
>
> Dan

Alice's narrative is also critically reflective of her practice (Brookfield, 2017). However, her reflections on her past practices and her peers' approaches were intended to restrict her new teaching methods with technology. Essentially, Dan and Alice's critical reflections assert Selwyn's (2019) argument that fostering critical perspectives of the utility of technology entails applying it in practice. Hence, their reflections on pedagogic practices indicate deeper conceptualisations of the impact of their teaching with technology on students' learning and their ability to apply their skills more critically and efficiently than most participants.

Overall, the participants' orientation towards technology stimulates their critical perspectives regarding their self-efficacy and learning conditions rather than critically reflecting on their practices. They accentuated the challenges that forbid them from reaching their potentials such as their disciplines, teaching demands, lack of institutional support structures, workload, engagement in networking and social activities, clarity about their institution strategic direction and self-motivation. Brookfield's (2017) indicated that despite the benefit of self-reflection academics could be reluctant to critically reflect on their practices due to the associated risks such as imposter syndrome, cultural suicide, lost innocence and road running. Most participants distance from reflecting on their pedagogic practices, links with these risks and culture within their context.

Although encouraged in academics' induction and onboarding programme, the research site's lack of critical reflection culture reflects on academics' practice. However, critical reflection is not epistemologically or morally laudable in the GCC. This notion links with Romanowski and Nasser (2010), who concluded that achievement and performativity cultures are dominant in the GCC; hence, academics, particularly expatriates, are expected to exhibit the highest level of expertise. To some extent, the participants' critical accounts bring into focus Brookfield's (2017) lack of 'critical reflection culture' and Giroux's (2020) discourse that technocratic and objective ideologies undermine social and critical perspectives; in the sense that most participants' did not critically reflect on their current or past practices. Instead, they were mostly focused on the mechanics of pursuing professional development, transitioning between their identities as professionals and academics and the utility of emerging technology. Most participants were swaying away from critiquing their feelings and empathic considerations of the negative influence of their students' or colleagues learning experiences that Brookfield (2017) emphasised would be a form of academics' critical reflections.

5.2.3. Revitalising Pedagogic Practices

Academics are required to make sense of the educational and real uses of technology and implication on pedagogy and living in general with such prevalence of these technologies (Kirkwood & Price, 2016; Selwyn, 2017; Martin, Ritzhaupt, Kumar, & Budhrani, 2019). To some extent, the participants' responses in this study reveal their motivations to assert their role with their technical skills and practices. However, their challenges in developing their skills led them to undertake informal and self-directed professional development to experiment with emerging technologies in their practices. Nevertheless, their capacity to direct their development entails 'self-efficacy' (Bandura, 2019) and 'self-confidences' (Martin, Ritzhaupt, Kumar, & Budhrani, 2019) portray them as competent learners and afford their practices.

The participants' technical skills' development approaches accord with Rijst et al.'s (2019) 'learning paths' that manifest in experimentation with new technologies, on-the-job practices and reflections on learning. Rijst et al.'s (2019) argued that academics' self-directed learning paths are often motivated by enhancing or transforming their pedagogic practices, engagements and their students' learning and the degree academics can apply their technical skills in innovative practices relies on their conceptions of and motivations towards technology (Rijst, Baggen, & Sjoer, 2019). The participants' responses explicitly resonate all of these motivations. Besides, their critical perspectives revealed their motivations and their determinations to pursue their objectives and emancipate from their constraining circumstances. Their determination to pursue their technical skills' development can be understood from Ryan and Deci's (2020) SDT that implies intrinsic and extrinsic influences can be internalised to support the individuals' decisions and actions. Ryan and Deci's (2020) defined intrinsic motivation as activities done for their sake and self-satisfaction, such as contentment from college achievement exclusive; while they defined extrinsic motivations influenced by reasons other than satisfaction such as a need for job and income.

These tenets link profoundly with this study participants' motivations. Although the participants' narratives in this study indicate that they were motivated by multiple influences (personal, students or degree currency, or the social norms), there are cues of a tip towards their intrinsic motivations (commitment and satisfaction). Echoing Ryan and Deci's (2020) ideas on the efficacy and sustainability of intrinsic motivation, most participants in this study, explicitly, internalised their students' and degree's currency with their development.

For example, Aristi and Jim combined developing their AI skills and supervising projects with their research interests and career progression and Iris associated maintaining her students’ currency with her own, so they can all speak the language within the business community:

> *They need something that would give them a competitive edge as graduates must have the language and at least some understanding; some of them do it naturally because they are into social networking, but many would be like me aim to be able to speak the language[...] for them, because of where the world is heading in ten years from now, they will be able to say in my business course I developed a block-chain app on a decentralised platform, and I used it as a case study. For me, I would like to stay current, and up to date, I wasn’t born with these technologies around.*
> Iris

No matter how the participants differ in their approaches and motivations, their ongoing technology orientation and ongoing development seem to bestow them ‘self-confidences’ (Martin, Ritzhaupt, Kumar, & Budhrani, 2019) to experiment with emerging technologies and ‘self-efficacy’ (Bandura, 2019). They all recounted using experiential and constructivist and autonomy-supportive learning approaches. This finding pulls threads with Mumtaz (2000), Ertmer (2006) and Rijst et al. (2019) who found that academics’ tendencies to experiment with technology sustain their deployment and use in various teaching and learning activities.

An interesting finding regarding the participants’ motivations towards orientation (learning and using technology) is their aims to revitalise their pedagogic by demonstrating their capacities to use contemporary technologies and maintain their curriculum's currency. This finding extends the current narrative on academics’ motivations towards the use of emerging technology. Extant literature has examined the antecedents of academics’ use and continuance to use technology from instrumental perspectives, discounting the importance of the social and educational order. Hence, this finding extends the field.

All the participants in this studying in one way or another associated their technology orientations with promoting their, students and degree currency. There are several possible explanations for this finding. According to Shelton (2017), academics often adopt new technologies to upgrade their pedagogic deployments and explore innovative possibilities. Hence, the participants' tendencies to exploit emerging technology could be merely directed towards their pedagogy. A causal understanding of the underpinning reasons for changing their practices could offer another explanation. This can be drawn from links with Selwyn's (2019) pleas to re-emphasise academics' role and Johnson's (2013) contentions on devaluating academics' practices in the context of emerging technology. Selwyn (2016) concluded that the adverse effects of technology (For example, distracting, disrupting, the increasing difficulty of learning and detriment teaching practices) accentuate the need for academics' effective practices.

Selwyn (2019) also maintained that the rising educational benefits (and complexities) of emerging technologies reassert the need for academics' knowledge, expertise, social intelligence, informed decisions and ethical conduct. Selwyn (2019) suggested that emerging technologies such as autonomous systems, AI, IoT, and ML afford precision, clarity and efficiency and equally remain limited to the given instructions algorithms and scenarios, subject to failure and lack an ethical sense. These aspects led him to accentuate that academics' role is importance increases with the use of technology.

However, the participants' responses in this study differ from Selwyn's (2019) perspective in that they do not ascend to their expected role in directing the social and ethical implications of utilising emerging technology. Instead, they stress on the vitality of successfully achieving technology utilisation, producing students with current skills and adjusting their practices from conventional to autonomy-supportive learning perspective that suite the ongoing and rapid technology evolvement.

A possible explanation for this might be the increasing emphasis on the utility of emerging technology. As noted by several scholars, the shift in paradigm towards exploiting the affordances of emerging technology in and for teaching and learning and to prepare students across all HE activities, globally (Kirkwood & Price, 2013; Tamim, Bernard, Borokhovski, Abranmi, & Schmid, 2011) and specifically in the GCC (GMrabet, 2010; Vardhan, 2015; Altbach, 2011) indicates that conventional teaching is no longer viable or acceptable and holding to it would be swimming against the tide. Convery's (2009) cautions against the 'pedagogy of the impressed' might indicate that the general rhetoric merely influences the participants in this study, and what Selwyn (2016) described 'dominant discourse', about technology.

To some extent, these concerns are justifiable. However, what indicates that the participants aim to revitalise their pedagogic practices with technology is how they explicitly internalise their students' and degree's currency with their development affording them what Ryan and Deci describe 'relative autonomy'.

Another explanation is the lack of evidence of the impact of technology on teaching and learning (Tamim, Bernard, Borokhovski, Abranmi, & Schmid, 2011; Kirkwood & Price, 2014) that has been fusing doubts in academics' ability to exploit technology in effective and meaningful practices. The participants' technology utilisations in contemporary approaches of constructionist learning (autonomy-supportive, independent, project-based, real-world projects) with technology promote their sense of the vitality of their role within their institution and by their industry partners.

Hence, the participants' accounts towards upgrading their practices with emerging technologies agree with Selwyn's (2019) perspectives on the vitality of their role; however, they differ as they indicate their role in maintaining currency with technology. While Selwyn (2019) links their vitality in holding critical perspectives and pedagogic intelligence, nevertheless, all of the participants, without exception, accentuated their aim to promote students' learning and increase their engagement. These aims link with many researchers' findings, akin to that of Macfarlane (2007) that the social orientations of academics turn their focus towards the impact of their practices on their main mission, students' learning. While some participants were concerned about refreshing their degrees with new content and outlook to attract students and employers. These stances also line up with Macfarlane's (2007) views that some academics manifest a sense of awareness and commitment to instil in their students meaningful and relevant learning. This finding can be answered by further scrutinising the participants' motivations to utilise CC and CBS.

Academics’ Cloud-Based Pedagogic Practices Are Constrained

This section presents a more specific view of the participants’ pedagogic experiences and focuses on their practices and conceptions of CC and CBS. This focus is influenced by the increasing CC and enactment of cloud-first policies globally (BSA, 2018) and in the GCC (MENA Cloud, 2019). The participants in this study were located at the time of gathering data. Prior studies show emphases on utilising technology in HE to support digital economy and society (World Economic Forum, 2016); within this motivation, rising interests in exploiting the educational and economic potentials of CC and CBS (Sultan, 2010; Alharthi, Alassafia, Alzahrani, Walters, & Wills, 2017; Mircea & Andreescu, 2011; Woods, 2018; Ercan, 2011). The literature also shows increasing demands for matching skills in light of developing cloud-based intelligent and transformational technologies such as AI, IoT, ML, etc. (BCS, 2018; World Economic Forum, 2018; MENA Cloud, 2019); however, changes rest on institutions and academics’ responses.

The second question in this study sought to explore academics’ pedagogic experiences in the context of CC and CBS; hence, this subsection offers a discussion on the findings developed from the participants’ responses.

Overall, all the participants in one way or another experienced utilising CC and CBS. Nuances in their experiences accord with the demands of their disciplines, competencies and orientations. This section presents four emerging pedagogies, namely, Expanding the Curriculum, Redefining Pedagogy, Cautious Pedagogy, and Visionary Pedagogy charted in this study. It also offers two main conceptions, Risk Aversions Against Control and Matching Pedagogic Requirements and Contextual Demands. These pedagogies and conceptions are specific to academics’ experiences with CC and CBS; hence, they contribute to the field with new structures for cloud-based pedagogies.

5.2.4. Expanding the Curriculum

In this study, some participants utilised CC platforms and CBS as pedagogical and specialist technologies to expand their curriculum by developing new courses and new content, pedagogic activities, assignments and capstones and industry projects. It indicates that the participants use CC and CBS as an avenue for creating new content that could inform different teaching and learning approaches. The literature on CC in HE offers limited explorations of the influence of CC on curriculum development; hence, this finding contributes to the field.

Biggs and Tang (2011) proposed alignment between the curriculum pedagogic practices. They described the curriculum as a means for operationalising the intended teaching and learning outcomes. Hence, changes to the curriculum and pedagogic practices could inform one another. Developing the curriculum with CC could be linked with studies that explored introducing CC as a new topic in ICT-related disciplines (Murah, 2012; Sommerville, 2013; Sobel, 2016; Woods, 2018). Despite these studies’ narrow focus, they were seminal to understanding issues related to expanding the curriculum using CC and CBS. Much of these issues were ascribed to academics’ lack of expertise or motivation. Likewise, Parker (2017) suggested that teachers’ ability to develop the curriculum is contingent on their capacities. However, academics’ digital efficacy and Competencies might not warrant their motivation to develop new courses. Academics’ incentive to innovate in their pedagogic practices remains confined by the lack of association between their pedagogic efforts and institutional rewards systems (Flavin, 2017). Foster et al. (2018) collected that the gaps in utilising CC in the curriculum development link with the lack of academics’ expertise, rigidness of learning outcomes due to the prolonged validation process, reliance on CC vendors, and the lack of alignment between academics’ objectives and industry demands.

The participants’ responses reiterate these issues as they portray the curriculum expansion as a labour-intensive process. Although there is a research site strategy to allocate time for curriculum development, reducing development with new learning seems obscure. Besides the prolong change processes and lack of reward system seem to reinforce academics’ resistance to change as Jim voiced:

> *We have to teach with the physical equipment just because they are already there; we cannot just forget what we have, it is difficult to apply cloud services in a current course or assessment no matter how ready we are; no one wants to make new changes to what we do, change is not easy.* Jim

However, some participants were able to exploit CC and CBS in new content or courses that either require specific resources or inspired by their novel affordances. Dan and Alex’s deployments of CC in new system architect and system administration courses using different CC platforms and CBS denote their ability to tolerate the issues protested by other participants. Both assert Parker’s (2017) ideas of ‘curriculum development capacities’ since they exemplify expertise in utilising emerging technologies in their practices. They also exemplify self-confidence in their digital efficacy highlighted as essential for academics’ practices with technology (Mishra & Koehler, 2006; Martin, Ritzhaupt, Kumar, & Budhrani, 2019). Distinctly, Dan's diverse usage of a cloud platform for teaching system architect and programming indicate his critical perspective of the versatility of the cloud. His practice accords with Flavin’s (2012) view of disruptive technology being used differently to its design. It also backs González-Martínez et al. (2015) collection of the multiple uses of cloud services in various teaching deployments. While Alex's development of a system administration course differs since he was exploiting CC affordances based the knowledge and experience, that he developed through teaching a CC course and from his coordination of a cloud platform. His development of a system admin course was already stipulated in the programme plan, but he independently exploited CC in teaching topics based on his experiences.

Overall, academics’ course development with CC in this study was activated by the participants’ content expertise, while learning the cloud seemed secondary to their objectives of teaching new topics. Drawing on Mishra and Koehler(2006), academics require TPACK to devise effective teaching and learning with technology. However, Mishra and Koehler (2006) emphasised on the precedence of choosing the learning objective and activities before deciding appropriate technologies that support these objectives. However, in this study, although the new courses were stipulated in the programme development plan, choosing CC informed the topics and type of activities academics could deploy in their pedagogic practice. Both participants’ constructionist activities were in line with their previous pedagogic practices with pre-cloud activities. This means that the use of CC as a resource to teach content might not be associated with functional changes to academics’ pedagogic practices. Besides, the participants’ pedagogic practices in the new courses fall between Gupta et al.’s (2013) ‘purely’ and ‘partially’ technical teaching modes since they were developed in the ICT discipline and by ICT academics. This, in turn, indicates a need for further research across other disciplines to understand the implications of utilising CC for curriculum development.

While creating new courses was limited to ICT, employing CC in new capstone projects extended across the four disciplines. Most participants recounted supervising capstone and industry projects that expand to new areas as Jim stated, *"the students need to develop new knowledge beyond their curriculum, it is an opportunity to innovate and use contemporary technologies"*. This finding is somewhat unsurprising, given that all the participants naturally supervise projects as part of their workload. According to Fincher et al. (2001), the increasing interest in employing project-based learning in HE ascribes to the demands for developing students practically. The increasing demands for cloud skills globally (BSA, 2018) and in the GCC (MENA Cloud, 2019) assert this notion. Fincher et al. (2001) also suggested that projects are a flexible and safe avenue for expanding content tailored to the students and supervisors' interests. These reasons might explain the participants' tendencies to exploit CC in projects since courses are often constrained by the rigidness of learning outcomes (Foster, et al., 2018).

However, selecting the projects' resources could be influenced by many reasons besides academics' choices, Fincher et al. (2001) suggested that projects are a function of negotiation between academics, students or external customers who could be involved, nevertheless, and regardless of the associated motivations and logistics, using CC and CBS across the curriculum indicates that the participants are keen on supporting students' utilisation of CC. However, academics' handling this expansion with students seems to be a complex process since there would be no structures to support them or their students when needed. This is particularly salient when academics are developing their cloud skills on the job and their students' supervision which triggers their ethical concerns and sense of responsibility to provide the right level of support to their students as Aristi commented:

> *Anyone proposes projects can use all sort of emerging technology for supervision such as [XX CC vendor] and [XX CC vendor] using IoT and AI regardless of the cost they are not restricted on these platforms. Still, when it comes to 'support', we are facing obstacles in terms of resources. But you can try out something with the students with what is offered by the institution such as facial recognition using [XX CC vendor], there are a good few students doing projects on block-chain from those projects you see good success and feedback you can develop courses based on these ideas, staff members can propose new topics and start developing new modules that may become core courses.* Aristi

5.2.5. Redefining Pedagogic Practice

Other pedagogic practices that yielded based on the participants' narratives are redefining their pedagogic practices with CC and CBS in current courses. As Puentedura (2014) noted, redefining pedagogic practices denote that academics utilise technology in new ways that cannot be done otherwise. In this sense, the participants in this study utilise CC as a utility to transform their typical pedagogic practices that can be classified according to, Gupta et al. 's (2013), partly technical and partly pedagogical. Such finding accords with much of the extant literature that explored the influence of utilising CC and CBS to enhance the teaching and learning practices.

Most of the studies (For example, Ghoulam, Bouikhalene, Harmouch, & Mouncif, 2016; Pike, Pittman, & Hwang, 2017; Ramírez-Donoso, Rojas-Riethmuller, Pérez-Sanagustín, Neyem, & Alario-Hoyos, 2017; Huang R., 2018) showed little evidence of functional changes from academics' pedagogic practices with pre-cloud technologies. Evidence shows that academics and students mostly use CC and CBS in CSL and constructionist learning approaches (Olanrewaju, et al., 2017; Al-Samarraie & Saeed, 2018) that enabled them to create, edit, discuss, access, synchronise, retrieve and share curriculum and document design and development. Although the uses of the cloud seem to enhance these uses, there were no functional changes to pedagogic practices. Besides, these uses were already possible using pre-cloud technologies such as collaborative tools, eLearning systems and laboratory computers. Similar to developing new curriculum, transforming pedagogic practices can be associated with several barriers. On the one hand, academics' lack of Mishra and Koehler's (2006) TPACK, particularly in science and technology courses, academics might not be and pedagogically intelligent or critically savvy, and much of their practices can be dictated by procedural approaches (Laurillard, 2002) On the other hand, unless academics have intrinsic motives, they are reluctant to change their practice in light of the lack of incentives and award system (Flavin, 2012).

Denton's (2012) study explicated several constructionist project-based and problem-based pedagogies that could redefine how teachers organise students' work activities. However, some studies showed practices similar to that of Denton's (For example, Wang & Huang, 2016; Huang, 2017; Mehlenbacher, Kelly, Kampe, & Kittle Autry, 2018; Çakiroğlu & Erdemir, 2018; Barak, 2017) that explored students' concurrent collaborations on developing content inside and outside the classroom. Some participants showed similar practices to those of the second group of studies.

The participants recounted redefining their pedagogic practics with CC and CBS in new approaches. This aligns with Puentedura’s (2014) ‘pedagogy transformation; in which academics use technology to either modify or redefine their practices. Alice's 'participatory and collaborative design' approach, for example, transformed her practice from simply informing and transmitting to jointly designing content. Her practice differs from most studies on using CC in collaborative learning as she invited her students to co-design her course material in a way that could enhance their ownership and critical thinking of the learning content. Alice's motivation to redefine her practices can be understood from González-Martínez et al. 's (2015) and Flavin’s (2017) conclusions that academics are motivated to utilise CC and CBS to create new learning scenarios and innovative developments with complex and contemporary resources. This means that Alice could be motivated by her curiosity to innovate. Her critical reflection on her own and colleagues' practices indicates her interest to discern her current practices that could also be understood from on her identity as an online learning specialist which she has constructed through her formal self-development. Thus, Alice’s responses indicate her intrinsical motivation to transform her practices.

Redefining Adams' pedagogic practices with CC, on the other hand, exemplified in shifting his practice to supporting autonomous learning. Flavin’s (2017) also alluded to students’ tendencies to use emerging technologies in ways that differ from their HEI. His justification the evolving and rapidly growing services of CC ushered the changes his practice towards guiding the students to the right resources instead of guiding their learning of all aspects how followed within his department with pre-cloud technologies. According to Adam, his practices were intrinsically influenced by his commitment to students learning and extrinsically motivated by the nature of CC and CBS. Likewise, Sam integrated a collaborative tool in most of his courses to encourage the students to engage and critically think that transformed from assigning them individual or small group tasks to work on technical development. His applications also assert Flavin’s (2017) and Laurillard’s (2002) calls for using emerging technology in deep learning.

5.2.6. Cautious Cloud-Based Pedagogies

The most dominant theme in the participants' responses is their cautious cloud-based pedagogic practices. Their cautious pedagogy denotes employing various approaches against the sociotechnical challenges associated with their use of CC and CBS. This finding is consistent with the general discourse on the risks associated with CC such as security, cost overrun and vendor lock-in (Odeh, Garcia-Perez, & Warwick, 2017). However, the reviewed literature in this study shows not only a dearth in the analysis of the impact of these issues on pedagogic practice, but also positivist and deterministic stances of CC and CBS affordances (Baldassarre, Caivano, Dimauro, Gentile, & Visaggio, 2018). It weighs more on applauding the benefits of utilising CC and CBS in and for teaching and learning; leading to a lack of critical perspectives of its implications (McOmber, 1999; Selwyn, Education and Technology: Key Issues and Debates, 2017; Beira & Feenberg, 2018). This study differs as it analyses the participants’ critical narratives that lead them to employ cautions pedagogies. Hence, this study extends the field with an emerging pedagogy that the participants espouse in response to issues they encounter with CC and CBS. Their approaches can be classified into technical, socio-political and managerial. Distinctly, Iris cautious pedagogy exemplified in limiting her use of CC and CBS to what Hinrichsen and Coombs’ (2014) described as ‘meaning-making’ and ‘analysis’. Although these uses might be appropriate for business courses, Iris expressed her ambitions to employ CC and CBS in practical deployment had she felt ready to introduce them in her courses:

> *I show them sample dashboards, and how a business might use that, showing and critically discussing, you know we’ve never used technology how we wanted to, it would be really helpful to demonstrate what it looks like and to have a simple activity.*
> Iris

Such as a cautious approach was influenced by various factors including digital efficacy, the lack of learning resources for the rapidly evolving services, course priorities, and variability of students’ digital skills. Besides, ***Iris*** peers’ negative experiences and institutions’ support structures. Hinrichsen and Coombs’ (2014) highlighted most of these factors as limitations. Likewise, Aristi, who holds expertise in using technology, followed a similar approach while supervising ICT students who hold higher digital skills. His cautions against recommending CC and CBS in students projects are also influenced by the lack of teaching and learning resources, self and peer expertise; however, at deep and complex levels or across multiple platforms.

Both of their cautious pedagogies link with Howard's (2013) 'risk aversions' due to the uncertainty that limits academics' full exploitation of technology. Except Iris's orientation warranted skills' transformation, positive beliefs and conceptions but not to the extent that would usher her to practically employ them in their courses. On balance, both exploited CC it in critical discussions and evaluations with their students.

Some of the participants' utilisations of cloud-based applications accord with studies that reported the deployment of CC in collaborative learning approaches (Olanrewaju, et al., 2017; Al-Samarraie & Saeed, 2018). Despite the of cloud-based applications ease-of-use, efficiency and rich functionality, they offer limited configurations and control that shaped academics' practices (Hogan, Liu, Sokol, & Annie, 2011). Alice's backup practices, in which she stores her work in multiple places to safeguard against the loss of course content and students work, were influenced by the use of cloud-based productivity, design and development technologies. Her practices adversely resulted in further issues with synchronisation and document version control.

She employed critical pedagogy with her students aiming to stimulate their critical thinking and questioning of the available learning material and empower them (Giroux, 2020) that led her to carefully control their access privileges on the final versions of the course content were published in their eLearning system. Sam's practices differed by using cloud-based collaborative with a backup plan that comprises switching to local computers and traditional document processing software or even pen and paper to collaborate on design ideas when required. Sam's belief that using a cloud-based collaboration is necessary for students' critical thinking, skills and knowledge development did not safeguard against his cautious pedagogy in case of CC service interruption. It is worth to note that Sam and Alice's use of informal cloud-based applications not adopted by the institution led to a lack of specialist support and benchmark practices to follow when needed. These implications raise the level of their responsibility to manage issues they might encounter and provoked their caution pedagogies.

Overall, most participants' cautious practices were instigated by their perceptions of the limitations of packaging, black boxing and user interfaces that constrain their instructional, content and process design – lacking customisation - and enforces shallow and partial learning. Their cautious pedagogies with CC and CBS were primarily associated with their sense of responsibility and accountability that escort their pedagogic practices in general.

5.2.7. Visionary Cloud-Based Pedagogies

Another salient theme that yielded from analysing the participants' narratives is their visionary cloud-based pedagogies as they imagine ideal teaching and learning scenarios with CC and CBS. This finding is consistent with the initial studies that envisaged implementing CC and CBS for collaboration on knowledge and research development across disciplines and institutions, and CSL and EXL approaches. For example, Stevenson and Hedberg (2011) envisaged the use of CC to exchange resources, and González-Martínez et al. (2015) suggested that CC and CBS will override conventional VLEs and enable the use of intelligent technologies. The participants' responses in this study align with these aspirations in terms of advancing their educational activities with CC and CBS and departing from their normative practices and intrinsic and extrinsic limitations.

Iris envisioned deploying the block-chain development environment in projects that could inspire business students to engage in useful implementations that would yield economic benefits on the broader context of their society. Her vision emanates from the limitations of using technology in the business degree and manifests her recently developed technical skills and tendencies to advance her students' (and her own) external engagements. Likewise, Athena envisioned deploying highest computing specifications in engineering courses, research projects, collaborating across disciplines, particularly with ICT, and acquiring technology expert to support advancing engineering teaching practices. Her vision emanates from her challenges in acquiring resources and expertise. Iris and Athena's visionary pedagogies back to Cilesiz's (2011) ideas that the gap between idealism and realism reveals individuals' aspirations of the presuppositions about their experiences.

Brookfield (2017) and Giroux (2020) also supported that academics' critical perspective is contingent on their assumptions of ideal scenarios. Their theories resonate in, Dan, Aristi and Sam's visions about developing a high level of expertise and implement CC, CBS and AI in courses and projects to engage students in collaboration on intelligent developments. Particularly, Alex, Adam and Jim, who were assigned to coordinate their students and peers' access to CC platforms and CBS, expressed their vision to offer CC and CBS with better clarity and institutional strategic support and planning. Their narratives are more of 'visionary management' rather than pedagogies; however, they are situated within the frame of teaching and learning and concerns the limitations that beset their responsibilities towards their students and peers.

Overall, despite the participants' nuanced responses, their visionary pedagogy seems to expand their current practices to useful, meaningful, contemporary and imaginary pedagogic approaches. To some extent, their visions, exemplify what McOmber (1999) termed as 'technology-as-novelty'.

McOmber contended the instrumental (or deterministic) view of technology as a source for innovation; discounting the importance of forms of uses. In a similar vein, Latchem and Hanna (2010) and Flavin (2012) suggested that imagining modes of technology deployment is imperative for innovative teaching and learning. The participants' responses in this study back these ideas and weigh more on the strategies and deployments rather than CC in itself. However, unique to the cloud, the affordance of expanding non-ICT students' skills to produce, rather than use, solutions and also expanding the ICT and Web Media activities and students' skills in creative deployments.

What is interesting is that most of these visionary pedagogical deployments are directed to social utilisations beyond the instrumentality of CC and CBS. Although all the participants' visions are all within their areas of expertise, they are above and beyond their current practices and work conditions. Likewise, Flavin (2012) alluded to the Disruptive Innovation Theory that endorses the use of technology in implementation beyond its design intentions. In complement with the participants' cautious pedagogy, their visions could represent their indirect critical perspectives of the limitations and gaps in their current practices (For example, lack of cloud expertise, lack of institutional vision and directions, vendor-lock in, limitations of CC and CBS). While they envisaged developing their pedagogy, their current context seems to constrain their visionary autonomy.

The need for imaginative, visionary and anticipative pedagogic approaches, as (Giroux, 2020) and Brookfield (2017) noted, are necessary for devising critical reflection and assumptions about implementing better approaches to teaching and learning. As part of the learning process, Yoosomboon and Piriyasurawong (2017) suggested that 'imagination' is essential to inspire engineering students to think creatively and innovatively while utilising CC. Their model pondered imagination as a key element in design thinking and product development within the teaching and learning process. However, their utilisation of the cloud was limited to communication and collaboration amongst academics and students, which does not show its influence beyond normative functional practices. Xiong et al. (2020) work that practically applies Stevenson and Hedberg's (2011) vision in exploring the use of CC in experiential learning across multiple HEIs shows that some pedagogical visions outlast and transform from mere idealism into realism practices. Indeed, technology has been entwined with innovation and transforming education (U.S. Department of Education, 2017; UK Department of Education, 2017). However, one of the limitations of the participants' visionary pedagogy is a lack of objectives which might hinder future implementation.

5.2.8. Matching Learning and Contextual Demands

As mentioned in the literature review, there is little known about academics' conceptions of CC and CBS as extant studies have been focused on their implications on students learning. However, (For example, Laurillard, 2002; Kirkwood & Price 2016; Bhat & Beri 2016; Bhat and Bashir 2018) suggested a direct link between academics' conceptions and practices. Hence, this section will discuss the findings in relevance to the studies on emerging pedagogic practices.

Research on the educational potentials of CC and CBS emphasised its alignment with the key learning theories. Several scholars' (For example, Denton, 2012; Bellman & Pupedis, 2016; Olanrewaju et al., 2017; Al-Samarraie & Saeed, 2018) conceived the ubiquitous and concurrent access to learning material with CBS and CC enablers for CSL and the applications of processes a great potential for cooperative and hands-on learning. As Denton (2012) suggested, CC and CBS support multiple profound learning theories that promote students' learning. His practical experience with CBS in PjBL led him to propose that it expands academics' and students' volition and decision-making. Likewise, Bellman and Pupedis's (2016) suggested that CC enables academics to provide their students with more choices and control on learning through provisioning safe and flexible space to experiment and make choices. The participants' responses in this study resonate these positive conceptions. Whether they used CC and CBS intensively, or figuratively they all conceived them affording to students' learning based on several dimensions including, enabling ubiquitous and flexible access to (and different choices) of ICT recourses and reinforcing experiential and CSL.

The reviewed literature showed a general positivist stance towards utilising CC and CBS in pedagogic practice. Several studies (For example, Sun & Shu, 2016; Arpaci, 2017; Min, Wang, & Liu, 2018; Wang, 2017; Barak, 2017; Musungwini, Mugoniwa, Furusa, Simbarashe, & Rebanowako, 2016; Zhao, Yang, & Ma, 2017; Al-Samarraie & Saeed, 2018) have shown increasing use of CC and CBS for CSL by accentuating the benefit of reinforcing situated communication and collaboration. Zhao et al. (2017) found that cloud-based pedagogy facilitates students' active engagements. The responses of most participants agree with this notion as they expressed their positive conceptions of CC and CBS to promote CSL approaches through classroom activities, PBL and PjBL. Most of them accentuated that CC and CBS enhance students' engagement in learning. Their conceptions differ from Selwyn' (2016) study, which suggested that technology leads to adverse effects (distracting, disrupting and complicating) on students' learning.

Specifically, Sam and Athena positively conceived CBS potentials to enhance collaborative learning. Alice considered the cloud a utility for enabling students' critical thinking and participatory design to the course content. Her approach, in Gupta et al. 's (2013) sense, redefined the pedagogic and technical utility of CBS:

> *I think this has more options because it's about getting them all to engage as they have different ideas, I want them to participate and not be submissive; I know some of them can involve more than the others, but everyone feels that they can do something. It's about the content they choose what you choose how you arrange content and activities, and the final thing is they do more work.* Alice

Few studies (For example, Wang & Huang, 2016; Huang, 2017; Suwannakhun & Tanitteerapan, 2017; Chang, Chen, Yu, Chu, & Chien, 2017; Ding & Cao, 2017; Barak, 2017; Mehlenbacher, Kelly, Kampe, & Kittle Autry, 2018; Çakiroğlu & Erdemir, 2018) an emerging trend in using CC to support students to design and develop subject-specific products including reports, models, websites, embedded and customised gadgets in existing and new systems using ICT services. Much of these studies reported academics and students' satisfaction that entwine their enhanced pedagogic experiences, active engagement and improved academic attainment. Besides developing students' soft skills (teamwork, critical thinking, decision-making) (Çakiroğlu & Erdemir, 2018), these studies accentuated the fitness of cloud-based pedagogy for developing students' specialist (co-design and co-production) and CC and CBS technical skillset (Mehlenbacher, Kelly, Kampe, & Kittle Autry, 2018), that are increasingly demanded by industry and society. Barak (2017) framed the learning potentials of CC in a quadrant of enabling adaptation, collaboration, data generation and exploration. The participants' responses accord with these ideas.

While they conceive CC and CBS as utilities for affording students' experiential, hands-on and CSL, they reasoned that developing the students' cloud skills enable them and their students match with the contextual demands. This finding is somewhat unsurprising given that their institution is centred on producing work-ready graduates. The quality reports analysis also yielded emphasis on meeting external requirements; indicating a dominant direction to align the curriculum, pedagogy and learning outcomes. The dominant discourse on the increasing adoption of CC and CBS shows a growing demand for cloud-skills in the GCC and globally (BSA, 2018; MENA Cloud, 2019).

However, interestingly the participants internalise these demands with their ethical commitment to their students learning and their interests and professional development. This finding can be understood from their orientations with technology and Ryan and Deci's (2020) theory of autonomous individuals' 'integrated motivations' in which they mediate, assimilate and integrate extrinsic motivations. These capacities could explain the participants' tendencies to associate CC external demands with their technology orientations:

Some scholars alluded that CC is shaping the classroom social structures and giving students authority, control and independence in designing and developing their learning content (Ding & Cao, 2017; Ramírez-Donoso, Pérez-Sanagustín, & Neyem, 2018). While others noted that academics' control over the configuration and setup of the working environment, although distracts academics from teaching, promotes their authority (Mehlenbacher, Kelly, Kampe, & Kittle Autry, 2018). The participants' narratives in this study agree with the first notion and indicate that they conceive cloud-based pedagogy affording students independent and SoL through classroom activities and a capstone project. Autonomy-supportive learning has been identified as critical for students self-confidence, competence, sense of responsibility and ownership that enhance their well-being and effective learning (Duchatelet & Donche, 2019; Vansteenkiste, et al., 2012).

The participants recounted that the flexibility, ubiquity, rapid evolvement and services numerosity of CC (Mell & Grance, 2011; Hogan, Liu, Sokol, & Annie, 2011) reinforcing their students' ability to explore and test services from various resources, evaluated and their make decisions. Their understanding of their students' learning challenges in developing their cloud skills and encourage their SoL learning. In Brookfield's sense (2017), academics are often able to understand students' learning challenges when they themselves undertake new learning.

These practices and Duchatelet and Donche (2019) note are forms of autonomy-supportive learning. Hence, the participants' conceptions that CC and CBS reinforce their students' independence and SoL align with these ideas. Overall the findings in this study indicate that academics positively conceive CC and CBS as a utility for enhancing students' learning through co-design and co-development, CSL and SoL approaches. Indeed, cloud-based pedagogy supports key teaching and learning theories (For example, SoL, CSL, PjBL, PBL, EXP, flexible learning) (Denton, 2012); indicating potentials for enhancing or transforming teaching and learning. It also matches with the contextual demands for specialist and relevant skills; indicating that university students could have more opportunities for engaging.

5.2.9. Risk Aversions Against Control

All of the nine participants’ responses strongly imply their aversions against the risks of control associated with the adoption and use of CC and CBS. Their dislikes seem to inform their cautious and visionary pedagogic practices. Hence, the conceptions of the participants in this study differ from the dominant positivist stances as they weigh more on the challenges, risks and negative implications. Three issues cut to the heart of their conceptions:

First, the participants view the cloud as an unstable platform for teaching and learning due to the possibility of being locked out of ICT resources, particularly during pedagogical activities, assessments and projects’ implementation. This finding extends links with Filippi and McCarthy’s (2012) exposition on the increased control and shift from open and democratic access to ICT offered by the internet to vendors’ authority, sovereignty and lock. Academics and students’ access to resources, ongoing upgrade and management manifested in the quality reports as critical barriers to the educational practices and curriculum development and learning.

Second, most participants alluded to the lack of visibility, control, certainty and confusion over institutionally provisioned CC and CBS. As Johnson (2013) and Habib and Johannesen (2020) found, such impressions could be a result of the absence of policies, academics’ participation in the design and acquisition of EdTech or coordination between academics and administration. They ascribed this to what Noble (1998) contended, HEIs motivations towards technology for non-educational reasons. Even with the existence and exposure to these policies, the cloud seems to require reconfiguration of the use, management terms, conditions and responsibilities. By design CC and CBS packaging seem to increasingly stifle academics’ control over what the technology offers. Such an issue in Filippi’s (2013) sense resonates as a barrier for academics’ customisations.

Third, the design and development of the cloud seem to be targeted for commercial, business and universal use which could fit in what Selwyn described ‘public pedagogy’. Calvo et al. (2020) argued that these models are designed with no consideration fo human autonomy. Pike et al. (2017) cautioned against the challenges in using public cloud in the classroom due to the overhead setup, reliance on connection, risks of cost overrun that hinder students from seamless experimentation on a specific topic within a limited time. Broadly, Shiau and Chau (2016) suggested that focus on efficiency significantly influence academics and students’ tendencies to use CC and CBS. These notions suggest contradictions with academics’ pedagogic requirements and that the use of CC and CBS might not fit with the educational lessons or assessment structures.

5.3. Academics' Autonomy with CC and CBS

The westerns experiences have shown that in light of the shift to institutional autonomy and emerging cloud-based technologies, academics' autonomy is at jeopardy. Broadly, many scholars cautioned against the ideological turn in western HEIs towards institutional autonomy that aims to decrease external governance and increase operational efficiency(Berdahl, 2010; Enders, Boer, & Weyer, 2013; Nokkala & Bladh, 2014; Wermke & Salokangas, 2015; Berdahl, 2010). Critical issues in HE (For example, massification, marketisation, internationalisation) and the structural changes that surfaced corporate style HEIs (Ginsberg, 2011) led to this turn. The documentary analysis in this study shows that akin to most HEIs in the GCC and the Middle East (Altbach, 2011; Azzi, 2018), the research site's academic standards are informed by a national quality authority, and funds are managed by a central government authority. However, its operations and structural organisations are 'corporatised' with expanded administration and confined academics' influence.

Ostensibly, these structural changes rely chiefly and adversely on the emergence of EdTech and various learning technologies (Coffield & Williamson, 1997; Turcan, Reilly, & Bugaian, 2016). Although the research site is a small local institution, it follows the global trend of emphasising technology as an identifying characteristic and a catalyst for its organisational and academic operations. Akin to most HEIs in the GCC (Altbach, 2011; Azzi, 2018), the research site aims to produce enterprising and work-ready graduates prepared with relevant skillset encapsulated by the use of technology. Hence, and to some extent, the dominant discourse on the influence of technology on the structural HE changes reflects the case of the research site in this study. Based on the literature, academics' autonomy in the context of emerging technology has been understood as their self-governance, competencies, critical reflections, informed decisions, motivations, and ethical conduct that manifest in their capacity to develop a positive self-identity, effective pedagogic practices and engage in institutional decision-making, ongoing skills development relevant to their expertise and interests in the context of emerging technologies. Several scholars suggested that while utilising EdTech in HE pedagogy is expected to support academics' practices; it has been undermining their autonomy in multiple axes.

The first is their lack of participation in decisions related to the design and acquisition of EdTech, and exposure to technology strategies and e-policies (Noble, 1998; Henkel, 2005; Habib & Johannesen, 2014). Most participants' contentions against the lack of exposure to, or participation in, institutional strategies and policies regarding technology acquisition and developing their technical skills echo this notion.

This led to impeding their lack of access to the institutional resources that, as Rijst et al. (2019) noted, are necessary for their self-directed learning, professionalism and competence. Several studies suggested that academics' participation in institutional decision-making gives them a sense of ownership, relatedness and reassurance of their competence (Ginsberg, 2011; Hall R. , 2018; Carvalho & Videira, Losing Autonomy? Restructuring Higher Education Institutions Governance and Relations Between Teaching and Non-Teaching Staff, 2019). These imperatives prevail in some participants' responses more than others, indicating nuances and in their engagements based on multiple influences including their roles, capacities and disciplines.

The second is the rising threat on academics' professionalism, competence and ability to devise and incur change using EdTech (Turcan, Reilly, & Bugaian, 2016; Aberbach & Christensen, 2018). Some scholars (For example, Convery, 2009; Tamim et al. 2011; Kirkwood & Price, 2013; Johnson, 2013; Selwyn, 2011, 2017, 2020) cautioned against the dominant discourse on the educational value of technology on the premise that it remains questionable. Covery (2009) and Selwyn (2019) argued that the dominant discourse about technology stifles academics' critical perspective. Covery (2009) explained how academics become victims of these discourses, which coerce them to perform 'pedagogy of the impressed' in which they portray themselves and their students as tech-savvy. Likewise, Henkle (2007) suggested that are continually required to expand their pedagogic practices due to the permeated boundaries with the knowledge society.

These notions can be examined with academics' technology-orientation and their endeavours to revitalise their practices, expand their curriculum and develop new topics and courses. However, their reluctance to speedily use emerging technology might raise questions around the authenticity of their orientations, motivations and conceptions and whether they direct their self-development based on their preferences or external influences. These notions bring back the debate on influenced decision-making. Some scholars (For example, Davis M., 1996; Ryan & Deci, 2020) argued that some individuals are unable to mediate and internalise extrinsic influences and treat them as their own. While others (For example, Hogan R. a., 1983) suggested that the authenticity of decisions is determined by the level of ownership, and those (For example, Skinner, 2003) who rejected the feasibility of autonomy on the premise that social contexts continually influence individuals' experiences and choices. This study's findings back with the former view as most participants encapsulate extrinsic with intrinsic influence; hence, in Ryan and Deci's (2020) sense, internalise and mediate extraneous influences and demonstrate autonomy. Besides, their autonomy can be understood from their critical, perspectives.

As Selwyn (2019) argued, academics’ critical perspectives of technology are often situated in a continuum between neutrality and determinism. The findings in this study are contrary to this notion since most participants’ orientations shared their critical perspectives of the confining conditions that forbid them from achieving their maximum potential in using technology in their practice. This could be due to, as Brookfield (2017) noted, their assumptions about appropriate conditions to support their practices. However, the participants’ lack of critical reflection on their practices with technology is rather contextual and cultural, as most of them could tacitly and privately critique their conditions (Brookfield, 2017). The third axis is that a change in HEI ideology towards corporate models and performative cultures adversely influence academics’ identity (Henkel, Can Academic Autonomy Survive in the Knowledge Society? A Perspective from Britain, 2007; Ginsberg, 2011; Hall R. , 2018; Carvalho & Videira, Losing Autonomy? Restructuring Higher Education Institutions Governance and Relations Between Teaching and Non-Teaching Staff, 2019). Individuals’ awareness and self-definition of their identity are crucial for their understanding of their social position, value, self-satisfaction and autonomous actions (Young, 1986) and so do academics whose self-awareness of their interests and responsibilities are key to their pedagogic practices (Henkel, 2000).

Covery (2009), Henkel (2007) and Johnson (2013) suggested that academics’ autonomy has been confined due to the expectation that HEIs could contribute to advancing the societal and economic advancements with technology. Covery (2009) and Johnson (2013) suggested that the technological changes control academics’ engagement in decision-making, workload and teaching practices. While Henkel (2007) emphasised that these changes are due to the permeated boundaries between the market, HEIs borne with technological aspirations that repress academics’ identity. These notions could offer an explanation of the influence of the participants’ experiences with emerging technology on their autonomy.

Most participants define their multiple identities. Walker-Gleaves (2010) expounded that academics’ multiple selves as academics, teachers and scholars emanate from their life stories and biographies. The participants’ responses support this notion; however, their multiple identities espouse the new ideals of engagement (Henkel, 2007) by defining themselves as academics and subject specialists. This indicates what MacFarlane (2007) suggested that academics define their ‘dual identity’ to seek social acceptance and relatedness. Nonetheless, all the participants naturally play multiple roles (academic managers, course coordinators, technology specialists, mentors and advisors) within their institution that requires, as Macfarlane (2007) noted, speaking multiple languages related to their academic and extra-academic roles.

Jaipal-Jamani et al. (2018) found that academics’ roles influence their responses to technology; indicating that professional identity manifests their autonomy. Likewise, the participants’ narratives show that their roles contributed to shaping their autonomous uses of emerging technology in their pedagogic practices.

5.3.1. Bounded Autonomy in The Context of Cloud-Based Pedagogy

Since the early 2010s, CC and CBS have been evolving and diffusing rapidly in HE and all sectors in the GCC and elsewhere (BSA, 2018; MENA Cloud, 2019); positing a new ideology of utilising technology as a service. Some studies (For example, Timmermans et al. 2010; Filippi & McCarthy, 2012, Filippi, 2013; Pourreau, 2017) suggested that the emergence of CC and CBS uniquely links with individuals’ autonomy due to various socio-technical aspects. However, most of the reviewed literature reported positivist stances, regarding the educational utility value of CC and CBS (Baldassarre, Caivano, Dimauro, Gentile, & Visaggio, 2018; Al-Samarraie & Saeed, 2018; Qasem, Rusli Abdullah, Atan, & Asadi, 2019), that indicates gaps in identifying their associated pedagogic risks.

This study shows that CC and CBS can equally foster and confine academics’ autonomy owing to various influences and at different levels. This section offers a discussion on academics’ conceptions of their autonomy and how their academics’ autonomy is constructed specifically regarding their cloud-based pedagogic experiences.

These levels are discussed with consideration to the indicators of academics’ autonomy:

- Develop awareness of self-identity in the context of emerging technology
- Proactively engage in institutional decision-making related to pedagogic resources
- Ethically develop pedagogic practices with emerging technologies
- Continually engage in professional and technical skills development
- Engage in activities relevant to their expertise and interests
- Ability to critically reflect on the impact of emerging technology

To some extent, all the participants demonstrate these capacities. However, their responses to CC and CBS have been influenced by specific features and conditions that challenge their autonomies at different levels according to their disciplines, roles, work conditions and capacities.

5.3.2. *Constrained Autonomy*

Some participants exemplified constrained autonomy rising out of their challenges to develop their CC and CBS skills and apply them in their educational practices. This finding links to Ryan and Deci (2020) who held a persistent view that individuals' decision-making and behaviour fall in a continuum between least autonomous or controlled depending on the level of influence of extrinsic motivations. Ryan and Deci (2020) show that individuals' internalisation (regulation, introjection, identification and integration) could determine the level of responses, resisting, partially adopting or deeply internalising extrinsic influences. Most participants' educational experiences in the context of CC and CBS in this study support this notion. Their responses indicate that they perceive themselves as constrained by intrinsic and extrinsic influences imposed upon them. This state suggests that exploiting the potentials of CC and CBS in educational contexts requires 'self-regulation' and 'external regulation' (Ryan & Deci, 2020).

Their habitual technology-orientation stimulated their critical perspectives and 'self-critique' of their cloud-efficacy and 'professional critique' of their work conditions (Brookfield, 2017). Their lack of cloud efficacy seems to adversely affect their confidence imperative for autonomous utilisation of CC in their pedagogic practices (Passey, et al., 2018). However, the absence of classroom application, and the uncritical culture where they work, seem to hinder their reflection on their pedagogic practices (Hinrichsen & Coombs, 2014) that could help them depart from their current practices (Brookfield, 2017). For several scholars (For example, Haworth, 1986; Van Manen, 1995; Brookfield, 2017; Selwyn, 2019; Giroux, 2020), a lack of critical reflection constraint changes from normative practices. In Selwyn's (2019) sense, developing a critical perspective of digital technology requires practical implementations to develop a sense of technology utilisation. On balance, the participants' orientations and intrinsic motivations towards utilising technology and the constraints that challenge their autonomy enhanced their visionary pedagogy. Some participants' visions centred on possible applications of CC and CBS in their specific subject disciplines. In contrast, other participants' visionary pedagogy focused on advancing their current practices with pre-cloud technology to new deployments.

Aristi's constrained autonomy arose out of his lack of 'intrinsic motivation' to prioritise developing his cloud skills and equally 'extrinsic motivation' in the absence of urgency and necessity to employ CC and CBS in his ICT courses. His stance links to Ryan et al. 's (1983) perspectives of individuals' cognitive evaluation individuals of the effect of extrinsic influences on their interest and needs.

However, his view that academics' development should emanate from their agentic-self and his self-interest led him to direct his cloud-based AI skills and apply them in capstone projects supervision links with Passey et al.'s (2018) view on the need for 'digital agency' in which individuals control over and adapt for the emergence of technology to engage as citizens in their data-driven digital society. However, he was constrained by his intrinsic motivation.

Sam, on the other hand, felt constrained by the lack of institutional structures and strategies that could support his technical skills development and direct his deployment of CC and CBS in his pedagogic practices. His stance links with Davis's (1996) notion that individual autonomy within organisational contexts requires a guiding frame that demarcates acceptable practices. However, it contradicts with Lester (2014) and Gibbs (2018) theories that contended regulating academics' practices with standards and guidance on the premise that they stifle academics' commitment and innovation. However, Sam was able to integrate a cloud-based collaborative tool and a debugging cloud-based application. However, he conceived his aspirations of deploying CC and CBS constrained by the lack of support strategies that several scholars, akin to Rijst et al. (2019), asserted imperative for academics' development and practices.

Aristi and Sam are constrained by structural and contextual conditions that seem to limit their cloud skills' development. However, they vary in terms of the level of internalisation. Their technical expertise in utilising pre-cloud technologies seem to bestow them confidence that they could develop their kills as appears in their visionary pedagogies.

The priority of non-ICT disciplines seems to constrain Athena's and Iris's autonomies. They weighed on the preference to develop their skills in their subject-disciplines, demarcating their digital orientation merely to support their practices. Their responses indicate constrained exploitation of CC and CBS affordances in their classroom practices. Both were constrained by the demands of their disciplines, social contexts and the norms within their communities of practice. Their stances agree with Beasley and Sutton's (1993) and Henkels' (2007) notions that HE academics' disciplines shape their practices and conceptions. Beasley and Sutton's (1993) suggested that academics' disciplines determine the required level of digital efficacy, while Henkel (2007) indicated that academics' disciplines indicate their orientations towards technology. However, the reviewed literature showed that technology spans across disciplines (Selwyn, 2019).

Iris's digital transforming in utilising a block-chain development platform reinforced her technology orientation and bestowed her self-confidence to deploy CC in critical discussions, and projects' supervision that, according to Hinrichsen & Coombs, 2014 (2014), match with her teaching demands.

This agrees with theories that emphasise self-confidence for their digital pedagogies (Howard, 2013; Bhat & Bashir, 2018; Martin, Ritzhaupt, Kumar, & Budhrani, 2019; Passey, et al., 2018). However, her risk aversion against failure, provoked by her peers' negative experiences and her students' varying digital skills, impeded her from practically applying her skills in her classroom. Athena's autonomy, on the other hand, is constrained by the influence of her engineering staff lack of flexible mindset and resistance to acquiring knowledge outside their area of expertise, although Athena's technology orientation reinforced her to lead technology deployment projects for her faculty, her lack of cloud efficacy, her discipline demands, and staff resistance inhibited her from practically exploiting the cloud in her classroom practices. Her motivation to engage students in learning and positive conceptions of technology, reinforce her orientation.

Often Athena's and Iris's definite conception of the cloud is matching with the contextual demands such as the need for digital skills, enhancing students' engagement, attracting industry. These extrinsic motives might constrain academics' authentic decision-making. However, to some extent, all these participants' responses indicate that they internalise these demands by equating and matching them with their interests and commitment to students' learning. This approach in Ryan and Deci's (2020) sense exemplifies 'relative autonomy'. Besides, the participants' negative conceptions of the cloud were centred on their lack of efficacy which some of them link with the absence of institutional support. This contention is compelling since their competencies link with their autonomy (Passey, et al., 2018; Ryan & Deci, 2020). Consequently, their cautious pedagogies illustrated in eschewing the utilisation of CC and CBS in classroom practices, except for Sam's basic integrating of collaborative cloud application in his pedagogic practices. Often, their CC and CBS deployments were in the form of capstone projects that seem flexible and safe (Fincher, Petre, & Clark, 2001) or abstract, critical analysis and meaning making (Hinrichsen & Coombs, 2014).

To sum, constrained autonomy in the context of CC and CBS for some participants in this study rises out of the confluence of intrinsic and extrinsic conditions on their pedagogic practices. This state indicates more profound confinement from multiple layers (self, social and structural) on their autonomy that could be described in Ryan and Deci's (2020) sense 'regulated autonomy'. As they conceive themselves constrained by these extrinsic regulations, their aversions to exploit the cloud in their practice (Howard, 2013), contrary to their beliefs of its educational utility, assert that their autonomies are constrained.

5.3.3. Guided Autonomy

Extrinsic and intrinsic influences also beset other participants’ practices; however, some participants’ work conditions and capacities seem to contribute to promoting their autonomy. According to Jaipal-Jamani et al. (2018) support structures and technology projects’ leadership increase academics’ tendencies and efficiencies in developing their digital competence and support their colleagues; indicating the critical role of structural order in shaping academics’ use of technology. Similarly, Habib and Johannesen (2020) suggested that academics’ participation in institutional decisions related to EdTech selection, acquisition and deployment increases their sense of ownership, relatedness and motivation to utilise it effectively in their practices.

In this study, these ideas are backed by the responses of the three participants’ who have been allocated CC platforms coordination which bestowed them administrative access, ongoing development and informed utilisations. Their roles comprised not only their utilisation but also supporting other colleagues and students in selecting and utilising the right CC services according to their requirements. These roles are similar to those of Jaipal-Jamani et al.’s (2018). Their responses indicate what Habib and Johannesen (2020) suggested regarding promoting their motivation. Those participants’ work conditions could inversely mean a high order of social expectancy imposed upon their practices (Convery, 2009). However, their backgrounds, as technology specialists, seem to enhance their autonomy. This inference is drawn from Passey et al.’s (2018) emphasis that digital competence and efficacy entwines autonomous and agentic use of technology. Hence, those participants’ autonomy is understood from their ability to weigh the socio-technical affordances, trade-offs and tolerance of possible risks of misuse and failure of CC and CBS. Although they seem to surrender to the idea that these risks are inevitable, their awareness and expertise seem to guide their cautious and visionary pedagogic approaches.

Jim’s and Alex’s services and privileges pre-configuration bestowed them control over the risks and uncertainties associated with CC and CBS. Filippi and McCarthy (2012) illustrated that such threats emanate from the increasing control over ICT resources and data and shift from the usual democratic internet. This led Jim to use private CC platform to ***“have more control over what to give the students”.*** As Filippi (2013) cautioned the growing comfort using CC and CBS interfaces and autonomous services pauses risks on the users’ autonomy. The essence of Jim’s experience is his intrinsic interest in the development and support students’ learning and self-confidence that his expertise helps him achieve his objective.

However, his emphasis on the need for institutional support for cloud development aligns with to Jaipal-Jamani et al.'s (2018) and Rijst et al.'s (2019) studies that exhibited the absence of institutions' structures, engagement and resources as barriers for effective technology utilisations. Alex's tolerance of CC and CBS risks increased his sense of responsibility to take cautious measures. However, his exemplar quote *"I just don't have visibility"* indicates a need for profound exposure to the technical and economic aspects that are often controlled by the institution. His stance emanates from the risks Filippi and McCarth (2012) highlighted and lack of exposure that Habib and Johannesen (2020) found even absent with academic managers who have authority. These social-technical risks also influenced Adam to emphasise that *"a change of mindset is everything"* in the pedagogic uses of CC and CBS. His stance backs Hooper and Rieber, (1995) and Martin et al.'s (2019) notions that willingness to learn and experiment is critical for conceptualising the utility of emerging technology. The lack of flexibility in the curriculum and change process seems to constrain Adam from making changes to his courses using CC. However, his expertise bestowed him some course adjusting without going through these processes.

Hence, the three participants cautious approaches, and their competence, indicate their guided autonomy. Although Gupta (2013) and González-Martínez et al. (2015) reasoned that such mitigation practices could be framed in different responsibilities that if handled by academics, would adversely distract them from their main duties. Hence, a role of 'technology or cloud specialist', that Gupta (2013) and González-Martínez et al. (2015) suggested, is essential particularly using CC and CBS since these put administration in the hands of the users. However, in this study, the participants' rationalisations of the risks and benefits of utilising CC and CBS by personal experience informed their practices. The participants' visionary pedagogy seems to emanate from the challenges that beset their practices in the context of CC and CBS.

However, they conceived themselves as autonomous due to their expertise that helps them transition seamlessly between emerging technologies. Besides, they were critically reflecting on their backgrounds, indicating links with their practices (Brookfield, 2017). However, their digital efficacy bestowed them the autonomy to make sound decisions in utilising and provisioning these services. This finding indicates that while academics could be excluded from the process of evaluation and acquisition (Habib & Johannesen, 2014), their capacities and efficacy afford them to make informed decisions.

Although Shelton (2017) suggested that academics' selection of EdTech is often guided by social and structural influences such as students' acceptance, fitness for teaching, compliance with institutional policies, in this sense, the participants' utilisation of CC in this study is often based on its fitness with their curriculum and acceptance by their colleague which means that their uses are, to some extent, guided by these influences.

To sum, guided autonomy in the context of CC and CBS for some participants in this study rises out of their roles as CC platforms specialist, past experiences, expertise, peers' and students' demands and institutional e-policies. To some extent, these social and structural influences in Ryan and Deci's (2020) sense exemplify 'introjections' into their autonomy. However, their digital efficacy guides their autonomous use of CC and CBS for themselves and their peers' practices.

5.3.4. Self-directed Autonomy

Several studies have shown that the level of autonomy is proportional to the degree of volition, decision-making and self-satisfaction. Ryan and Deci's (2020) taxonomy of self-determination posits that the highest degree of autonomy exemplifies in individuals' decision-making based on self-endorsed laws and intrinsic motivations. These ideas are like Young's theory of the need for autonomy to reach a state of self-satisfaction and self-ideal. However, in the case of academics, these theories must be considered and their responsibilities within institutional structures.

Broadly, Davis (1996), suggested that professionals are subject to organisational influences that might counteract their autonomy. This means that the complexity of academics' contexts indicates the levels of their autonomy. As Carvalho and Videira's (2019) empirical study showed, academics' autonomy manifests in the degree of their influence on decision-making and their ability to make their decisions within HEIs. The emphasis on individuals' capacities to determine their autonomy manifested in Ryan and Deci's (2020) levels of autonomy which suggest that autonomous actions rest on the individuals' ability to internalise their extrinsic influences and depart from regulation and introjection to identification, and integration. Passey et al. (2018) also proposed that individuals' agency rest on their inner sense of responsibility, accountability and ability to make their choices and decisions in the digital space and varying their use of technologies. Likewise, Parker (2017) found that teachers' capacities promote their autonomy. These theories seem to underpin the responses of two participants in this study. They indicated a higher order of autonomy using CC and CBS than the rest of the participants as they were able to pursue their self-directed development, apply their developed skills directly to their pedagogic practices and critically reflect on these practices.

These accounts evidence that critical reflection on pedagogic practices (Haworth, 1986; Van Manen, 1995; Brookfield, 2017) and cloud efficacy (Foster, et al., 2018; Rijst, Baggen, & Sjoer, 2019) are indispensable for academics' autonomous use of CC and CBS within digital ethics frames. In Passey et al.'s (2018) sense, their capacity to apply their digital competencies to their pedagogic practices and independently select CC and CBS that suit their teaching requirements manifest their competence and digital autonomy. Their responses to the emergence and utilisation of CC, as described by Ryan and Deci (2020), are 'identified' and 'integrated' as they anchored their technology-orientation in their identity and disciplines. Dan's confidence, as noted in his response: "*if you are an IT person you can adapt, its easy you have skills*" and Alice's self-critique: *"I am not tech-oriented I am a teacher and a practitioner who uses technology to enhance my courses"*, indicate their identity awareness and ability to internalise their extrinsic influences.

More importantly, their critical reflections seem to discount any social, structural or boundary barriers. Instead, they focused on their teaching objectives by either tolerating or mitigating the associated challenges with CC and CBS with cautious approaches. Their resilience to extrinsic and technology design challenges asserts Ertmer (2006), Kirkwood and Price (2016) and Martin et al. 's (2019) notions that overcoming technology integration barriers is associated with effective practices. Their cloud-based uses align with their pedagogical beliefs and based on their self-directed learning. Alice's redefinition of the pedagogic practices in her courses in which she integrated cloud-based collaborative tools in a participatory approach, self-directed technical skills development, and critical reflection was aimed at enhancing her students' deep and meaningful learning. Her use of a cloud-based collaborative tool, as she noted in her exemplary quote: "*practical and works for me*" signposts the authenticity of her pedagogic practices. Although positive images from her own learning experience influenced her autonomous practices (Brookfield, 2017), she devised her tailored approaches that fit with her discipline. Hence, her cautious pedagogy was drawn from her personal experience and best practices.

Dan's expansion of the curriculum with a new architect course that employs a CC platform exemplifies Self-directed Autonomy. he exhibited capacities to step out of his beliefs of the limitation of the cloud by independently developing his cloud-skills and positively reflecting on his learning experience. As Rijst et al. (2019) showed, these practices could reinforce academics competencies and autonomy. His cloud-efficacy bestowed him the confidence to employ the CBS in a new course; backing Foster et al. 's (2018) idea that competence is necessary for curriculum expansions with emerging technologies such as CC and CBS.

However, Dan's management role bestowed him knowledge and awareness of the process to develop his course. To a great deal and on several occasions, Dan internalisation of external demands and associating them with his commitment to his students' meaningful and relevant learning and readiness for the job market shifting to growing deployment of the cloud indicate a level 'identification'(Ryan & Deci, 2020).

Besides, Dan's convergence of a CC platform in multiple learning objectives and reflecting on his pedagogic practice: *"I felt very much that it was shallow learning"* indicates that his critical self-reflection on his pedagogic practices promotes the authenticity of his decisions. To level with these challenges, his responses show that he continually educates himself practically and theoretically. Hence, his visionary pedagogy seems to build on this development and target specific objectives; indicating his tendencies to deploy these visions. This finding extends links with theories of academics' positive practices with informed objectives and planning (Bhat & Bashir, 2018; Martin, Ritzhaupt, Kumar, & Budhrani, 2019). It differed from response of academics who showed constrained autonomy as their visionary pedagogies were rather centred on potential deployment of the cloud in their courses without adequate objectives that could guide practical implementations.

To sum, Self-directed Autonomy in the context in the context of CC and CBS for two participants in this study rises out of their self-directed technical skills development, application of acquired skills in effective pedagogic practices and critically reflecting on these practices. To some extent, their intrinsic motivation to enhance or transform their practices and the degree of internalising inherent motivations to the level of integration with these intrinsic motivations, in Ryan and Deci's (2020) sense, ranges between 'identified' and 'integrated' in the context of HEI.

5.4. Towards a Framework for Autonomous Cloud-Based Pedagogic Practices

To sum, this Discussion chapter aims to construct academics' autonomy from their pedagogic experiences in the context of CC and CBS. To some extent, all the participants seem to exercise autonomy in their pedagogic practices; however, at different levels. Their autonomy seems contingent on the conceptions of their technology orientations and context. The participating academics who are (1) intrinsically motivated, (2) critically reflective on their experiences, (3) independently apply their orientation to their practice and (4) mediate extrinsic influences exemplify stronger autonomy than their peers. Inversely, the ones who are (1) constrained by their contextual influences, (2) unable to practice their orientations or (3) critically reflect on their experiences, (4) express visionary and highly cautioned pedagogic practices and (5) rely on extrinsic motivations to sustain their practices exemplify lower levels of autonomy.

Overall, the participants' pedagogic experiences with CC and CBS two main conclusions. The first, considering the indicators mentioned earlier that their technology-orientation seem to align with their autonomous pedagogic practices in the sense that it promoted their self-directed professional development, conceptions, practices and critical reflection. Their pedagogic conceptions indicate their tendency and ability to apply emerging technology in their practices (Ertmer P. A., 2006; Bhat & Bashir, 2018; Martin, Ritzhaupt, Kumar, & Budhrani, 2019). Their competence and critical reflection indicate their ability to make their decisions (Passey, et al., 2018; Brookfield, 2017; Rijst, Baggen, & Sjoer, 2019). Second, the participants' emerging practices seem to indicate the level of their autonomy. The participants who exemplified constrained autonomy through their critique of the extrinsic or contextual barriers, their cloud efficacy and practices yielded ambitious visionary pedagogies that aim to either implement CC and CBS in their courses or expand capstone projects. According to Cilesiz (2011), such as gap indicate the variance between idealism and realism. Their focus on these barriers seems to inhibit their departure from experimenting to active integrations of CC in their pedagogic practices. Participants who showed guided autonomy were mostly focused on cautioned approaches as they were able to evaluate the use of the cloud in their (and their peers) practices. As Jaipal-Jamani et al. (2018) suggested, their roles bestowed them a reasonable autonomy and in Ryan and Deci's (2020) sense enable them to identify the relevance of these extrinsic work objectives to their goals. And finally, the participants who exemplify Self-directed Autonomy seem to be able to expand the curriculum, redefine their pedagogic practices and integrate their commitment to their students with their intrinsic satisfaction (Ryan & Deci, 2020).

This study proposes a threefold framework: academics' autonomy, technology-orientation and pedagogic practices with CC and CBS to warrant their informed, ethical, self-directed practices. Figure 15 depicts these permeable and contingent imperatives. In the current contexts, academics' autonomy might prevail as constrained, guided or self-directed. Academics' technology orientation could stimulate their critical reflection and revitalise their pedagogic practices. These autonomy levels could directly influence academics' pedagogic practices to devise visionary, cautious pedagogies, expanding the curriculum and redefining current practices. In this context, orientation and autonomy might be regarded as critical for academics' pedagogy practices with CC and CBS; hence, aligned and mutually dependent on each other.

These findings are unique to this study; however, they extend threads to established theories on the primacy of academics' digital competence and efficacy (Mishra & Koehler, 2006; Kirkwood & Price, 2016; Rijst, Baggen, & Sjoer, 2019; Passey, et al., 2018), conceptions (Bhat & Bashir, 2018), critical reflections (Brookfield, 2017; Rijst, Baggen, & Sjoer, 2019) and motivations (Ryan & Deci, 2020) for the enhancement transformation of their pedagogic practices. These capacities and practices prevail as constituents for academics' autonomy and technology-orientation. This asserts that the participants' responses in this study indicate that their technology-orientation is critical for their autonomous pedagogic practices. Equally, their autonomy is essential to foster their orientation towards effective pedagogic practices. Therefore, the association between these two imperatives seem intentional and directed based on academics' motivations, competencies, disciplines and work environments.

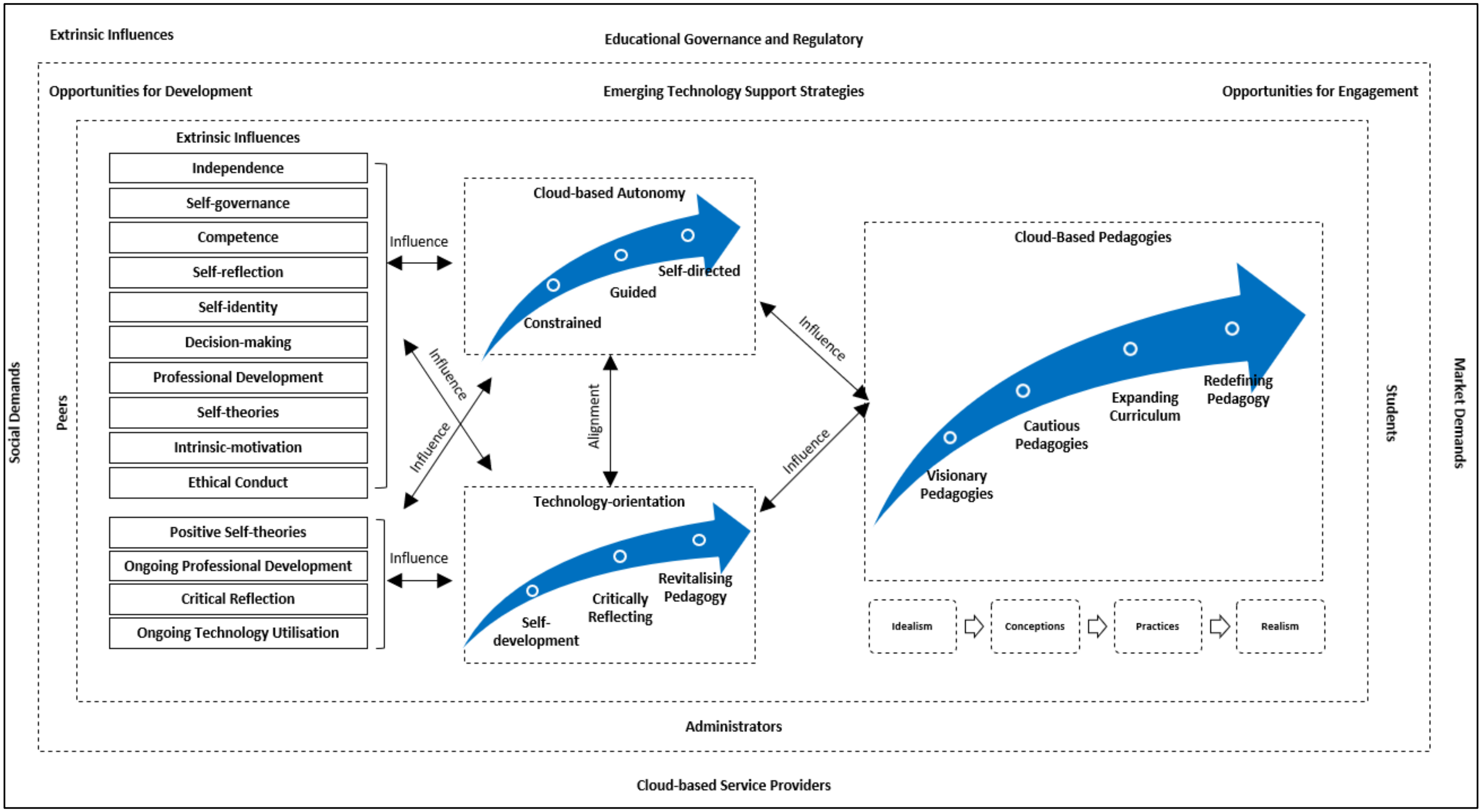

Figure 15. A framework for academics' orientation, autonomy, and cloud-based pedagogies

Chapter 6. Concluding Thoughts

6.1. Introduction

This Concluding Thoughts chapter presents a discussion of the outcomes, implications, recommendations, limitations and future work. This discussion draws on a threefold framework: the philosophical and practical basis of academics' autonomy in the context of contemporary HE changes, academics' technology-orientations that influence their pedagogic experiences with emerging technology, particularly cloud-based services, and how these experiences influence their autonomy.

This study aimed to develop an in-depth understanding of technology-orientated academics' experiences in the context of CC and CBS in a GCC HEI. It took place over three years at a time of CC, and CBS emergence and a national cloud policy were enacted in the country where the participants were located. The participants were selected from a pool of a hundred and eighty academics using 'criterion-based purposeful selection'. The inclusion criteria considered their technology orientations based on their self-reporting and observed practices by their institutions' academic services. Arising from the literature review and the participants' responses, an interest in the intersection between their pedagogic experiences and autonomy emerged. Hence, a qualitative narrative methodology addressed the primary research question that asks: How do technology-oriented academics' educational experiences with CC and CBS intersect with their autonomy in the contexts of HE? The employed qualitative narrative research using a single case study with multiple embedded cases enabled an in-depth understanding of the participants' experiences.

This thesis contributes to the field of intersectional studies between technology and HE contexts in two ways. The first is it offers to the existing research the types of emerging pedagogies with CC and CBS within the neoliberal HE changes. It contributes new knowledge to the sensitive and significantly under-researched area, academics' autonomy. As such, it proposes a new form of Kantian bounded autonomy within the data-driven era. The second is the original contribution in employing a contemporary approach that fits with the qualitative nature of this study. By incorporating participant screener, qualitative narrative, boundary-crossing, boundary objects in 'in-depth', 'paired depth' and 'focus group' interviews, in person and virtually, the study stimulated discussions that bridged the gap between academics' nuanced practices in physical and digital spaces. The employed methods as presented in Appendices A, F and G can be extended to academics' technology-oriented professional development programmes in similar contexts.

6.2. Outcomes

The main finding of this study is the claim that empirical evidence of academics' pedagogic practices with emerging technologies, such as CC and CBS that conceptually predicate upon their informed decisions and control, profoundly rest on their autonomy. Academics' autonomy seems to align with their orientations, institutional support structures and contextual demands. These imperatives enable academics to devise ethical and responsible pedagogic practices with technology; however, equally constrain their autonomous pedagogical practices. This conclusion builds upon the theoretical framework developed in this study in three trajectories:

6.2.1. Academics' Technology-Orientations Enhance Their Pedagogic Practices

At the time of commencing this study, all the participants self-reported and demonstrated their orientations towards emerging technology. Based on the screener, interviews and group discussion, their technology-orientations exemplified in their self-confidence, ongoing technical skills development, technology adoption and utilisation in their pedagogic practices. Their orientations embedded by their intrinsic motivations seem to foster their self-directed development to revitalise their practices and renew their pedagogic activities by converging appropriate emerging technologies with effective pedagogies. All of the participants reported and demonstrated constructionist teaching approaches that match with their institutions' directions which they seem to internalise with their commitment to their students learning and their development and progression. Their orientations seem to bestow them critical perspectives of the value of technology and the challenges that beset them in reaching their habitual ideal in utilising technology in their practice. Their intrinsic motivations, and their objectives and critical perspectives, seem to help them overcome these barriers. They all used this study to reflect on their identities as professionals and educators, indicating their awareness and intentional use of technology. Hence, in line with the reviewed literature, academics' technology-orientations seem to enhance their pedagogic practices.

6.2.2. Academics' Cloud-Based Pedagogical Practices Are Constrained

Throughout this study, academics' responses indicate their constrained pedagogic experiences in the context of CC and CBS. This finding draws on their reactions to the absence of institutional strategies that could support their learning and appropriate technology selection and deployments that are essential for their development (Rijst, Baggen, & Sjoer, 2019) and engagement (Habib & Johannesen, 2020). Akin to Filippi and McCarthy's (2012) and Filippi's (2013) findings, most participants' responses assert that the unique CC and CBS features impose control and limitation on their pedagogic practices.

The narrative, qualitative, paired depth and focus group, approaches offered access to the social dynamics between teaching academics, academic managers, and course coordinators; indicating affinity; however, akin to Jaipal-Jamani et al.’s (2018) findings, high expectancy. Social influences (administrative control, negative peer experiences and management expectancy) seem to privilege the confluence on the participating academics’ orientations; hence, stimulate their critical perspectives. Much of the participants’ responses on modes of their practices yielded visionary pedagogies that reveal gaps between their idealism and realism and abstract deployments such as discussions, analyses, reports writing and projects’ supervisions. These cautious utilisations imply a trade-off between the affordances and challenges of CC and CBS. Developing some of the participants’ cloud-skills indicates a nuanced perspective in their professional and educational uses; however, their responses showed a tip towards purely technical deployment. This was not surprising since most participants come from ICT related disciplines. The responses of only two participants indicate a balance between pedagogical and technological uses of CC and CBS. Hence, contrary to the reviewed literature, this study shows that the use of CC and CBS could enhance and equally constrain academics’ pedagogic practices.

6.2.3. Bounded Academics’ Autonomy in The Context of Cloud-Based Pedagogy

For all academics, autonomy is fundamental for their pedagogical practices, competencies, positive self-theories and motivations, ethical and informed decision-making (Knight, Being a Teacher in Higher Education, 2002; Kirkwood & Price, Technology Enabled Learning: Handbook, 2016; Gibbs, 2018; Hall R. , 2018). In the current focus on students’ learning, academics’ autonomy implies the type of their pedagogical practice and their ability to devise and facilitate autonomy-supportive learning (Niemiec & Ryan, 2009; Duchatelet & Donche, 2019; Yasué, Jeno, & Langdon, 2019). In this study, the participants’ pedagogic experiences in CC and CBS contexts and current HE changes indicate a dual impact on their autonomy. The visionary pedagogies of most participants signpost the challenges that limit their deployment of CC and CBS in their practices; characterising much of what the literature would suggest ‘controlled’ autonomy. The cautious pedagogic approaches when utilising CC and CBS indicate risks and negative implications that indicate that some of the participants’ autonomy, similar to what Ryan and Deci (2020)‘regulated’ or introjected’. Only two out of nine participating academics showed signs of Self-directed Autonomy; however, their responses indicate that they lack strategic and institutional support structures that could sustain, foster their current practices and introduce them to best practices.

Their responses indicate 'identification', 'integration' and alignment of their contextual influences with their motivations. The implications of these autonomies are discussed in the following section.

6.3. Implications

The participating academics' constrained autonomy signals that they might not be able to achieve their visionary pedagogies of utilising CC and CBS. Broadly, academics' confined autonomy negatively affects their motivation and engagement in institutional and contextual objectives. In the context of emerging technologies and associated security, privacy and social issues, academics' engagement, visions and practices are essential to ensure ethical and informed pedagogies. Hence, developing academics' cloud skills is expected to support their autonomous and agentic practices (Kirkwood & Price, 2016; Selwyn, 2017; Passey, et al., 2018).

With the emergence of digital learning professional roles, guided autonomy might best in the context of CC and CBS. However, this guidance, engagement opportunities and fostering environment need to align with academics' different areas of interest and expertise to warrant sustainability (Henkel, 2007; Selwyn, 2017; Passey, et al., 2018). The participating Academics' pedagogic practices and support structures in the context of CC and CBS must be devised based on negotiating well-defined access, control and responsibilities. Self-directed Autonomy also raises concerns against the imminent risks associated with CC and CBS. These risks exemplify in the academics' being left to their devices without reliable institutional and peer support or benchmarking that could guide them with an in-depth understanding of best practices or the impact of their employed practices.

Personal autonomy's positive and negative effects emanated from the subjectivity of human behaviour, their values and interactions with, and responses to, their social network or elements within their ecology (Young, 1986; Haworth, 1986; Dworkin, 2015). It is also evident in the participants' tolerance to social and technical implications of utilising the cloud. Academics' deployment of informal cloud-based applications that lack ethical frames that could give them and their students, safe experience (Macfarlane, 2007). This notion aligns with Passey et al.'s (2018), Rijst et al. (2019) and Jaipal-Jamani et al.'s (2018) theories on the need for the right conditions, technology and support structures to foster technology users' digital competence, autonomy and agency. Timmermans et al. (2010) and Filippi (2013) noted that digital accountability that entails a reasonable degree of traceability and monitoring is becoming feasible using CC and CBS. Such a measure contradicts with the users' security and privacy rights, particularly, in HE contexts where there are increasingly intensive use of technology and growing focus on privacy rights.

These ethical issues should be considered with the academics' and students' conceptual understanding and a deep sense of responsibility to support their autonomous and informed use of CC and CBS(Passey, et al., 2018). Hence, a collective and strategic high degree of competence must be considered in HE contexts.

6.4. Recommendations

The triad framework concluded in this study (orientation, autonomy, cloud-based pedagogies) and the reviewed literature suggest several courses of actions for academics, management and cloud services providers in the GCC and elsewhere.

Academics' technology orientation and competence for their ethical and informed cloud-based practices. While institutions work on preparing appropriate infrastructure, academics' CC and CBS competencies should precede any other step throughout the technology acquisition, deployment, utilisation and evaluation process. Their cloud skills will enable them to critically evaluate the usability of emerging services in their pedagogic practices. Hence, greater efforts are needed to ensure that academics have access to opportunities not only develop their content, technology, pedagogy knowledge and skills but also to converge these skills in meaningful pedagogies pertinent to their self and students' interests and contexts.

This alerts me that despite the fact that the HE changes during the last three decades, the increasing emergence of technology (Bodily, Leary, & West, 2019) and change to neoliberalism (Tight, 2019), academics' autonomous exploitation of CC and CBS is profoundly fundamental for fostering their digital ethics, motivations, engagements, well-being and autonomy-supportive pedagogy. Hence, HEI management should support academics with access, competence development, engagement and control over these technologies. Productive exploitation of CC and CBS is not possible without integrating academics' requirements in its design and development. Hence, collaborative, participatory and co-design of such resources with academics' input is expected to facilitate partnership in the diffusion and ethical and responsible utilisations of emerging technologies. Where there are no means to recruit cloud architects, HEIs should seek the support of specialists with technical expertise who can work side by side with academics in the design of CC and CBS (Habib & Johannesen, 2020).

With the contemporary global changes and the switch to online learning caused by Covid-19 pandemic, academics are expected to be producers rather than mere users of cloud-based pedagogies. Competent academics need to sustain their commitment to moral values and make ethical decisions while operating emerging technology. Such values should be the single track in applying technology in their teaching and practice to disseminate digital ethics culture across all sectors and in every aspect of our lives. Although we remain in need of a vision, real progress requires practical deployments of feasible and carefully designed cloud-based pedagogies with users' autonomy in mind. This vision requires enacting institutional-wide strategies to foster autonomous and responsible dissemination of emerging across all disciplines, support services, students and partners. Institutional policies should weigh more on EdTech and pedagogical requirements and form the domain of autonomous practices for all stakeholders. A strategic enactment of cross-disciplinary collaboration amongst academics and faculties could interweave a conceptual understanding of the affordances and challenges and support critical of innovative applications.

6.5. Limitations

Certain limitations in this study could be addressed in future research. For example, the focus on academics' experiences in the context of CC and CBS was drawn upon studies on academics' pedagogic practices, EdTech, and autonomy. Although these studies are intersecting and indicative of the current state of research, they are by no means exhaustive. The small number of participants, although suited the narrative, qualitative and in-depth approaches, yields nuanced experiences that can hardly be generalised to different contexts. Instead, a more extensive range of participants could yield more nuanced perspectives that could benefit specific communities of practice (Yin, 2018). Although all academics in the study site were invited to express their interest in participating, most of the selected participants were located in the school of ICT due to their default use of emerging technologies (Gupta & Goyal, 2013; Sobel, 2016; Woods, 2018).

On a personal level, being an insider researcher lined up as a life experience and equally entwined challenges with proximity from the participants being central (Hanson, 2013). My work relationships and engagement in various projects with the participants was beneficial in interpreting their narratives (Hockey, 1993; Hanson, 2013); however, it is entwined assumptions that we have shared perspective as salient in their narrative which prevailed in the recurrent use of 'you know' cliché which implied the need for a different approach to access the participants' stories.

Employing boundary-crossing, boundary objects, pair and focus group discussions was imperative in directing their attention and stimulating their narratives. Adopting a formal procedure to engage the participants in the research activities was also important to establish my position as a researcher (Hanson, 2013). Another issue is related to the scope is focusing on academics' orientations, pedagogic practices, excluding gathering data on students' perspective. Although the reviewed literature comprises studies on students' experiences with CC and CBS, this partially meets Cilesiz's (2011) suggestion to develop a comprehensive understanding of experience with technology by including different stakeholders' perspectives. Besides, the ongoing development of CC and CBS shows a steady rise in its prevalence (Mircea & Andreescu, 2011; McCusker & Dan, 2018); and evolvement of its features and services which means that some of the issues considered in this study might dissipate.

6.6. Future Work

This study shows that despite the participants' endeavours to develop their CC skills and experiment with cloud platforms and services to revitalise, expand and redefine their courses, most of their cloud-based pedagogies were visionary and cautious. I argued that their immense uncertainties linked with the emerging technology design and uses, and the absence of support structures that could afford their tolerance to the associated challenges. Such a finding paves how for future research in this area, particularly with the HE changes circumstances that imposed the use of CBS as the only route for effective online pedagogy as shown during the global outbreak in 2020. HEI interventions with emergency support services and ad-hoc resources mean that academics are required to deal with a just-in-time leap in their knowledge and skills. Hence, research that examines the influence of such a model of professional development and the implications of the collective and strategic switch to CBS and other emerging technologies could yield a greater understanding of academics' orientations and autonomies. Examining multiple institutional contexts that offer interdisciplinary programmes could also produce a greater understanding of possible applications of CC and CBS and emerging cloud-based technologies. The ongoing technology evolvement means that future research should continually take into account new contexts and implications. Despite the mentioned limitations, this study is a step forward towards promoting academics' cloud-based pedagogy. To sum, academics' autonomy with emerging technology is not a luxury; it is critically imperative for their effective deployment of CC and CBS in their pedagogic practices. I hope that this study will pave how for empirical research on academics' and students' ethical and practical utilisations of emerging CBS in HE.

Appendices

Appendix A. Participant Screener

A.1. Invitation sent to Academic Staff

Dear Colleague

As part of my EdD study, I am sending you a survey on academics' experiences of cloud computing and emerging technology.

This survey aims to develop a better understanding of your utilisations of emerging technology for teaching and learning activities. Your responses may assist you in reflecting on your practice.

You are kindly requested to consent your participation by completing the form in the following link: http://alturl.com/vskph
(The survey will be open from 22 April to 2 May 2018, the link will be disabled at the end of the duration)

There are no right or wrong answers; I would like you to answer as honestly as you can. This survey might take you from 10 to 15 minutes to complete depending on your answers. Required questions are indicated with an asterisk (*).

For any inquiries, please email me on r.m.s.zahran2@newcastle.ac.uk

Kind Regards, Raghda Zahran

A.2. Participant Screener Question

Section 1. Welcome

Introduction - This survey aims to develop a better understanding of your utilisations of emerging technology for teaching and learning activities. Your responses may assist you in reflecting on your practice. There are no right or wrong answers; I would like you to answer as honestly as you can. This survey might take you from 10 to 15 minutes to complete depending on your answers. Required questions are indicated with an asterisk (*).

Consent Statement - I agree to participate in this survey on a voluntary basis. I understand that I am free to withdraw at any time without any negative consequences. The records of this survey will be kept secure and private. No information should be included in any report that may be published that could make it possible to identify me individually. There should be no way to connect my name to my responses. My details will be anonymous and, if provided, will be used to contact me in further research stages with my consent. [skip logic question]

Yes No

Section 2. Please tell me about yourself

2.1 Department, School, Faculty*

[required]

A drop list of all programmes

2.2 How long have you been teaching? *

[Skip logic question, required, one option]

Less or equal to one year

From two to four years

More than five years

None of the above

Other

Section 3. Please tell me about your use of computer technology for teaching

3.1 How long have you been using computer technology in your teaching practice? *

[Skip logic question, required, one option]

Less or equal to one year

From two to four years

More than five years

None of the above

Other

3.2 Select your top three motivators for using computer technology for teaching? *

[required, 1-3 options]

Prevalence

Demand
Cost of use
Availability
Usefulness
Effectiveness
Data privacy
Technical support
Your digital efficacy
None of the above
Other

3.3 Which of the following best describes your preference for choosing computer technology in your teaching practice? *
[require, one option]
installed on the local machine
hosted externally
None of the above
Other

3.4 Which of the following best describes your computer technology needs? *
[required, one option]
Basic tools
Moderate specification
High Performance Computing
None of the above
Other

3.5 Which of the following best describes your approach(es) to develop your computer technical skills? *
[required, multiple options]
Instructor-led training
Self-paced training
Study Group
None of the above
Other

3.6 When was the last time you received training on using current or new computer technology? *
[required, one option]
This semester
Last semester
More than a year ago
None of the above
Other

Section 4. Please tell me about your digital skills

4.1 Select from the following list of computer technology which you the necessary skills: *
[required, multiple options]
Learning Management Systems (LMS) (For example, Moodle)
Social Networking and Collaborative tools (For example, Twitter, Facebook, Instagram)
Productivity Software Packages (For example, MS Office or Google Docs)
Multimedia Authoring and Visual Design (For example, Adobe)
Data Mining and Analytics (For example, SAS, SPSS)

Design Tools (For example, SolidWorks, Enterprise Architect)
Software Development Suites (MS Visual Studio, NetBeans, Oracle)
Cloud computing platforms (For example, Azure, AWS, Google Cloud Engine)
Cloud-based services
AI, Data Mining, Big Data
Internet of Things (IoT), Haptic Technologies, Machine to Machine Systems
None of the above

4.2 Select from the following list of computer technology which you have intermediate skills: *
[required, multiple options]
[The same set of technologies options]

4.3 Select from the following list of computer technology which you have advanced skills: *
[required, multiple options]
[The same set of technologies options]

4.4 Overall, how would you rate your computer technical skills? *
[required, one option]
Basic
Intermediate
Advanced
Unable to rate my skills

5. Expression of Interest
[optional, to qualify respondents]
In the next stage of this research, I will be running a qualitative study on the pedagogical uses of emerging computer technology, particularly cloud computing and cloud-based services. If you are interested in attending an information session about the study, please provide me with your contact details to send you an invite.
Name Email Address

6. Input
[skip logic question, disqualified respondents]
In general, what you think of using computing technology for teaching and learning in higher education.

7. Would you like to add any additional comments?

Thank you for taking the time to respond to this survey.

.

A.3. Participant Screener Map

The screener map Figure 16 shows four main sections in separate pages. These include semi-structured questions (See questions Appendix A.) with choice selection (multiple, single, required and optional, constrained and open) and a space for open-ended responses. A logical workflow is used to take the respondents through their background, technology use, self-rating, optional contact details and skip logic that uses custom route in three questions (consent, teaching experience, use of technology) that disqualify respondents (See questions marked with skip logic in the previous appendix).

Screener Form Builder Site https://admin.onlinesurveys.ac.uk/account/newcastle/home/
Access credentials (username and password) are stored in the study repository.

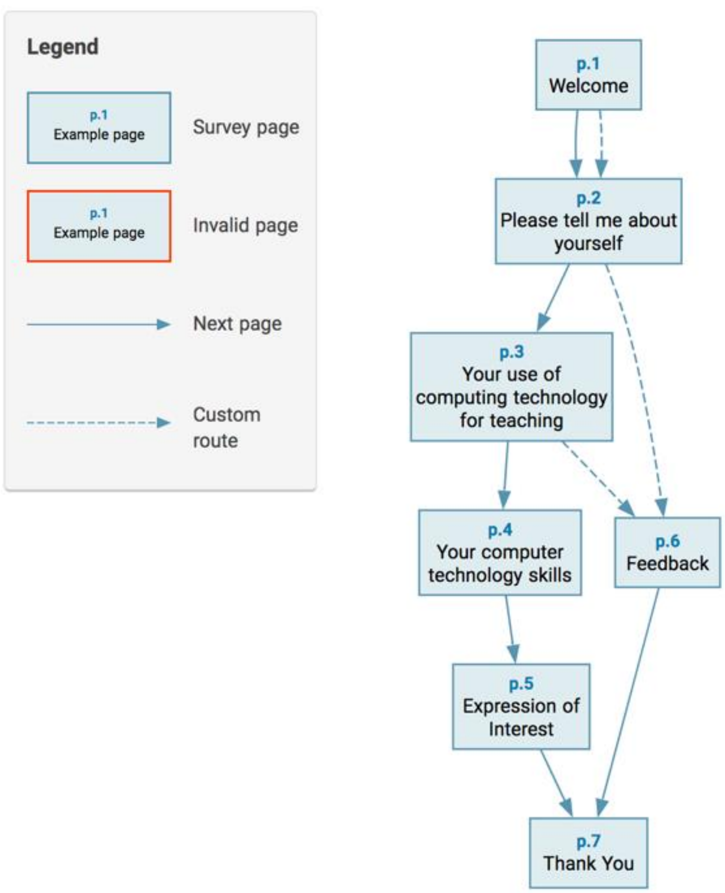

Figure 16. Participant screener question map showing the skip logic

Appendix B. Study Onboarding

B.1. Information Sheet

Study title: Academics' Experiences of Cloud Computing in Higher Education

You are invited to take part in a study. Before you decide whether you wish to take part, it is important you understand why this study is being conducted and what it involves. Please read this information and feel free to discuss it with others. Please do not hesitate to ask any questions if you require more information.

Contacts: This study is conducted by me, Raghda Marai Zahran, the primary researcher, as part of my postgraduate studies at Newcastle University. The research proposal has been reviewed and approved by the Ethics Review Boards (ERBs) at Newcastle University and your institution. Throughout the study duration, the research work will be supervised by Professor Caroline Walker-Gleaves, School of Education, Communication and Language Sciences and Dr Ahmed Kharrufa, School of Computing, at Newcastle University, in the United Kingdom. If you have any questions regarding the study or any concerns about the ethics procedures, please don't hesitate to contact me directly or the study supervisors.

The purpose of the study: The purpose of this study is to gain an in-depth understanding of higher education academics' experiences, conceptions of and practices with emerging technology such as cloud computing in their teaching practice and projects' supervision from their perspectives. Research shows that the adoption of cloud computing in higher education is necessary; however, problematic despite its educational potentials. This research is qualitative and interpretive and will be organised in a single case study and multiple cases of academics.

Why have you been chosen? Academics, volunteers, who are aware of the affordances and issues of using emerging education technology subject-specific technologies, and emerging technology such as cloud computing or any cloud-based services will be asked to take part in this study. You are being contacted because you have indicated your use of emerging technology in your teaching practice. In this study, I would like to understand your conceptions and applications of these technologies. There will be other selected participants within your institution who reported similar practices.

Do you have to take part? It is up to you to decide whether to take part. If you do choose to do so, you will be asked to sign a consent form. However, you will still be free to withdraw at any time and without giving a reason.

Your Role: If you agree to take part in this study, you will be asked to:

1. Sign the consent form
2. Participate in approximately three interviews, a focus group and informal meetings
3. Please share with me a reflective piece on your pedagogic practices with emerging technology
4. Please communicate with me via email about ideas you feel relevant to this study

Each of the above will last from 60 - 90 minutes. At maximum, a total of around six hours over the period of one academic year and a half. I will be recording your responses, using written notes and audio-visual recordings. However, you are free to decide whether to participate or withdraw at any point in time. Please don’t hesitate to inform me about your views on using any of the recording and data gathering forms. If you choose to participate, you may decline to answer any questions or withdraw from the study without penalty of any kind.

What are the possible benefits of taking part? This study will give you a chance to express your stances, engage with me, the researcher, and other participants in discussions around pedagogic practices and conceptions of emerging technology. The knowledge gained from this study will give you a chance to receive updates on the overall study results. It will allow other academics understand the implications of leveraging emerging technology in pedagogic practices through your nuanced experience and from your own point of view.

Study results: The overall results of the study may be presented at formal meetings, public forums, or published in academic journals. You will not be identified in any of these presentations or publications. I will be happy to share with you the results in writing for your validation when the study is complete and before publishing. This is essential to ensure the study rigour. I will let you know where you can obtain a copy of the published results.

Confidentiality: Your privacy and confidentiality are important to maintain the research rigour. The following procedures will be used to protect the confidentiality of your identity and records. I, the primary researcher, will keep all digital records in secure locations. All electronic files that are documented in digital forms (For example, word files, databases, spreadsheets, etc.) that might contain identifiable information will be stored in a password-protected digital drive. Any computer or device hosting these files will also be password protected. Hard copies will be store in a locked cabinet at my home office. Research records will be labelled with codes. I will use a pseudonym to refer to you for a specific reference. A master coding file that links your identity and pseudonym will be stored in a separate and secure location. The master file and audiotapes will be destroyed three years after the closing of this study. Only I, the researcher, will have access to the digital repositories, keys and passwords. At the conclusion of this study, I intend to publish the study findings. The study information will be presented in a summary format and portrayal of the participants' experiences; hence, you will not be identified in any publications. There will be no way to connect these portrayals to you or your responses at any time during or after the study.
The interviews will be in the form of one-to-one, pair and focus group. Please do not share other participants' identities or responses with individuals outside the pair interview and focus group. This is necessary to maintain the anonymity of all participants.

If you do decide to take part, you will be given a copy of this information sheet and a consent form for your signature and for your records. You can return the signed copy to me in a scanned format by email or by hand during our first interview. If you have any questions, requests or concerns regarding this study, please contact me via email at r.m.s.zahran2@newcastle.ac.uk or by mobile at +44 7403111303 (UK mobile number). You may also contact the study's primary supervisor Caroline Walker-Gleaves by email at caroline.walker-gleaves@newcastle.ac.uk.

Raghda M. Zahran

B.2. Declaration of Informed Consent

Study title: Academics' Experiences of Cloud Computing in Higher Education

- I agree to participate in this study, the purpose of which is to gain an in-depth understanding of the conceptualizations and utilisations of cloud computing in higher education from academics' perspectives
- I have read the participant information sheet and understand the information provided
- I have been informed that I may decline to answer any questions or withdraw from the study without penalty of any kind
- I have been informed that all my responses will be kept confidential and secure, and that I will not be identified in any report or other publication resulting from this research
- I have been informed that all interviews will be recorded in text, audio, and visual media
- I have been informed that this researcher will answer any questions regarding the study and its procedures
- I will be provided with a copy of this form in English for my records

Contacts

If you have any questions, requests or concerns regarding this study, please contact me via email at r.m.s.zahran2@newcastle.ac.uk or by mobile at +44 7403111303 (UK mobile number). You may also contact the study primary supervisor Caroline Walker-Gleaves by email at caroline.walker-gleaves@newcastle.ac.uk.

By signing this form, I acknowledge that I understand my rights as a research participant as outlined above. I acknowledge that my participation is fully voluntary.

Signatures

I certify that I have presented the above information to the participant and received his or her consent.

Researcher Name Raghda Zahran Signature Raghda Date 4th April 2018

Participant Name Signature Date

Appendix C. Initial Information Session

C.1. Invitation Information Session

Subject: Academics' Experiences of Cloud Computing in Higher Education

Dear XX

Many thanks for completing the survey; based on your responses you have expressed your interest and you have been selected as a potential participant in this study.

The primary aim of this study is to explore your experiences of utilising cloud computing and cloud-based applications in teaching and learning. Beside resonating your voice, your participation will contribute to studying the best strategies for integrating cloud computing and emerging technology in higher education (please see attached information sheet).

Should you accept to participate, please share suitable times for a meeting during this week and I will send you an outlook invite to schedule the meeting

I look forward to your kind response.

Kind Regards,

Raghda M. Zahran

C.2. Information Session Schedule

Study title: Academics' Experiences of Cloud Computing in Higher Education

Subject: Individual Information Session

Date:

Time:

Location:

Participant:

Many thanks for accepting to take part in this study and for providing me with an opportunity to research your practice; your input is of great value.

[main take away is how the participants conceive their orientations]

- Selection and Orientation
    - You have been identified as 'technology-oriented'. What do you think about this identification? Do you feel that it best describes you why/why not?
    - What motivated you to express your interest in this study?
    - You stated using technology in your courses, what motivates you to use technology in your courses?

[discuss the information sheet and consent form]

Thank you for taking the time to answer my questions.

Is there anything you would like to add?

Raghda M. Zahran

Appendix D. In-depth Interviews

D.1. Individual Interview 1 Schedule

Study title: Academics' Experiences of Cloud Computing in Higher Education
Subject: Interview schedule 1: academics' conceptions of technology/cloud computing
Date:
Time:
Location:
Participant:

Many thanks for accepting to take part in this study and for providing me with an opportunity to research your practice; your input is of great value.

[The main take away is how the participants conceive cloud computing and cloud-based services in and for teaching and learning]

In the screener, you have indicated that you have been using cloud computing or cloud-based services in your practice.
Today, I would like to learn more about your views of these services.

- How would you describe cloud computing?
- In general, do you feel confident to use cloud computing in your practice?
  - If yes, how do you think you have been able to achieve this?
  - If not, what has been keeping you?
- In your opinion, how do you think the cloud or cloud-based services are useful or not? Can you give me examples?
- What specific services are useful and why?

Thank you for taking the time to answer my questions.
Is there anything you would like to add?

Raghda M. Zahran

D.2. Individual Interview 2 Schedule

Study title: Academics' Experiences of Cloud Computing in Higher Education

Subject: Interview Schedule 2: Pedagogic Utilisation of Cloud Computing

Date:

Time:

Location:

Participant:

Many thanks for accepting to take part in this study and for providing me with an opportunity to research your practice; your input is of great value.

[The main take away is how the participants use emerging technology, specifically cloud computing and cloud-based services in their pedagogic practices and projects' supervision]

Today, I would like to learn about your practices with cloud computing or cloud-based services.

Can you tell me about your use of cloud computing or cloud-based services in your practice?

- In which courses you use these services?
- What type of services specifically you use in these courses?
- How do you use these services in your courses? In what activities?
- How do you think it's useful for your courses? Or not?
- How do you think these uses affect your teaching?
- How do you think these uses affect your students' learning?

Thank you for taking the time to answer my questions.

Is there anything you would like to add?

Raghda M. Zahran

Appendix E. Paired-Depth

E.1. Interview Schedule

Study title: Academics' Experiences of Cloud Computing in Higher Education

Subject: Paired Depth Schedule: Pedagogic Experiences of Cloud Computing

Date:

Time:

Location:

Participant:

Many thanks for accepting to take part in this study and for providing me with an opportunity to research your practice; your input is of great value. The objective of this interview is to understand your uses of cloud computing for teaching and learning. During this interview, I would like to understand how does cloud computing affect your practice?

[the main take away is how the participants use or aspire to use emerging technology, specifically cloud computing and cloud-based services in their pedagogic practices and projects' supervision]

- Activity1: What is your experience of utilising cloud computing in general?
    - You are presented with the main five features [NIST] of cloud computing.
    - In your opinion, what are the essential features of the cloud model for your teaching?
    - In your opinion, what benefits/gains did you experience from these features? Can you give me examples?
    - In your opinion, what challenges/issues did you endure from these features? Can you give me examples?
- Activity 2: What is your experience of utilising cloud-based services?
    - You are presented with the primary sample cloud-based feature from three providers.
    - In your opinion, what are the essential cloud-based services for your teaching practice?
    - What are the benefits/gains of using these services? Can you give me examples?
    - What are the challenges/issues of using these services? Can you give me examples?

- Activity 3: What is the ideal way of utilising cloud computing?
    - Can you think of three topics related to your courses or discipline?
    - Can you think of three teaching strategies that you need to employ to teach these topics?
    - Can you select the most useful cloud computing services for your lessons?
    - Which one of these combinations would be ideal for a lesson?
    - What do you need for this lesson to succeed?
    - How would you measure a successful implementation?
    - What would be your role? How would you act with students to teach this lesson?
- Is there anything you think I should have asked you about your use of cloud computing?

Thank you for taking the time to answer my questions.

Is there anything you would like to add?

Raghda M. Zahran

E.2. Activity 1 - CC Valuation

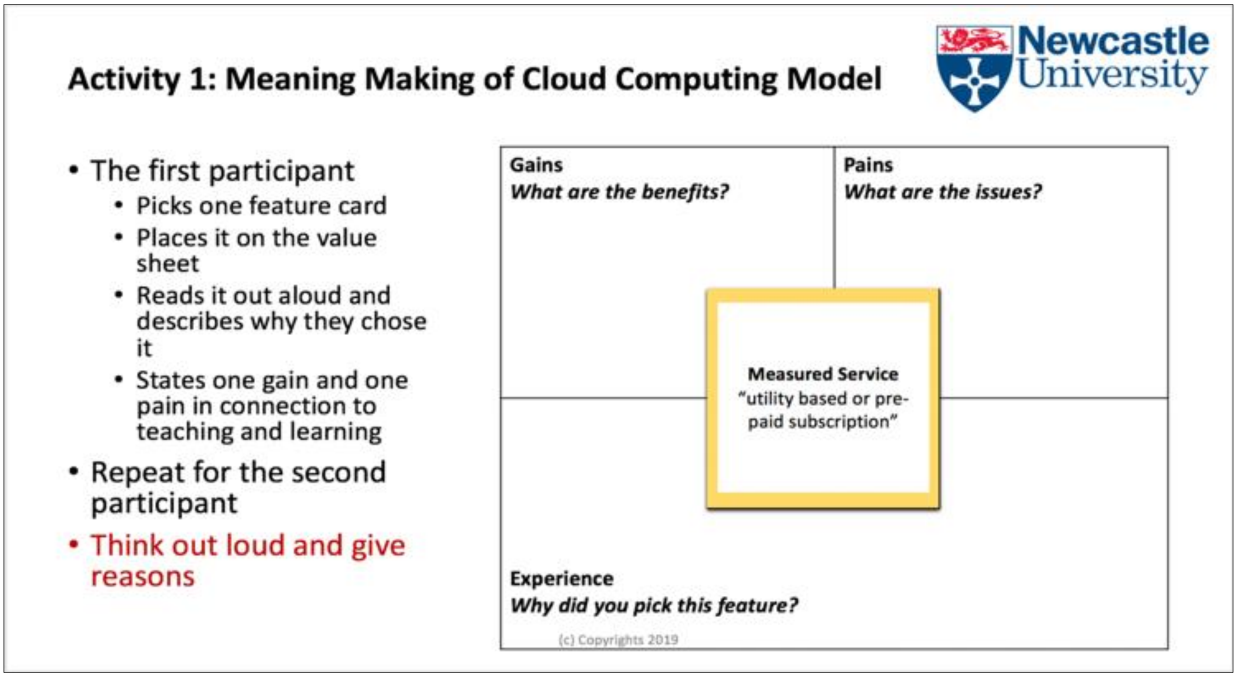

Figure 17. Activity 1 - guiding instructions to CC valuation model

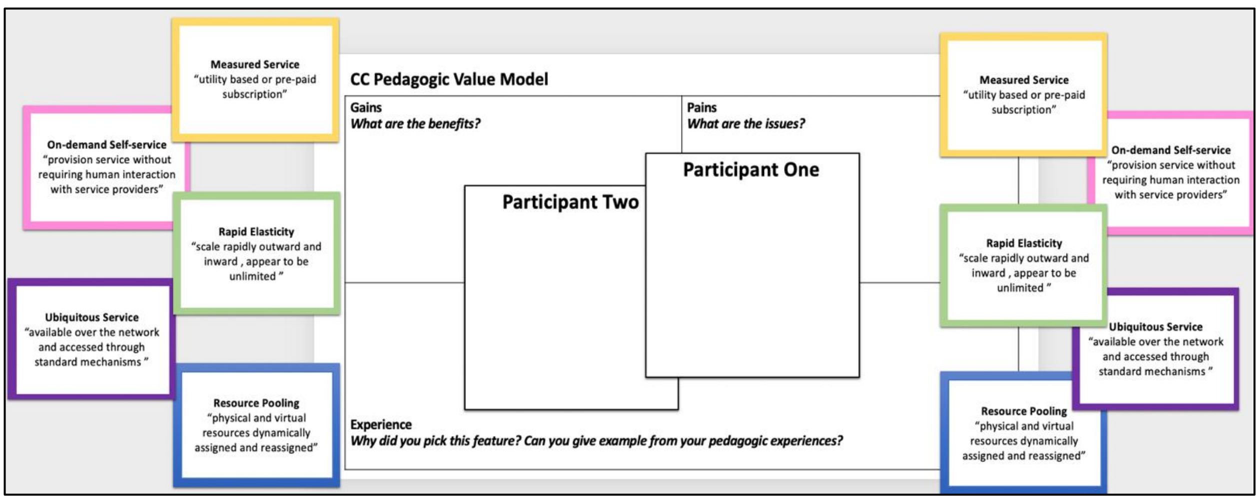

Figure 18. Activity 1 - academics' valuation of CC features

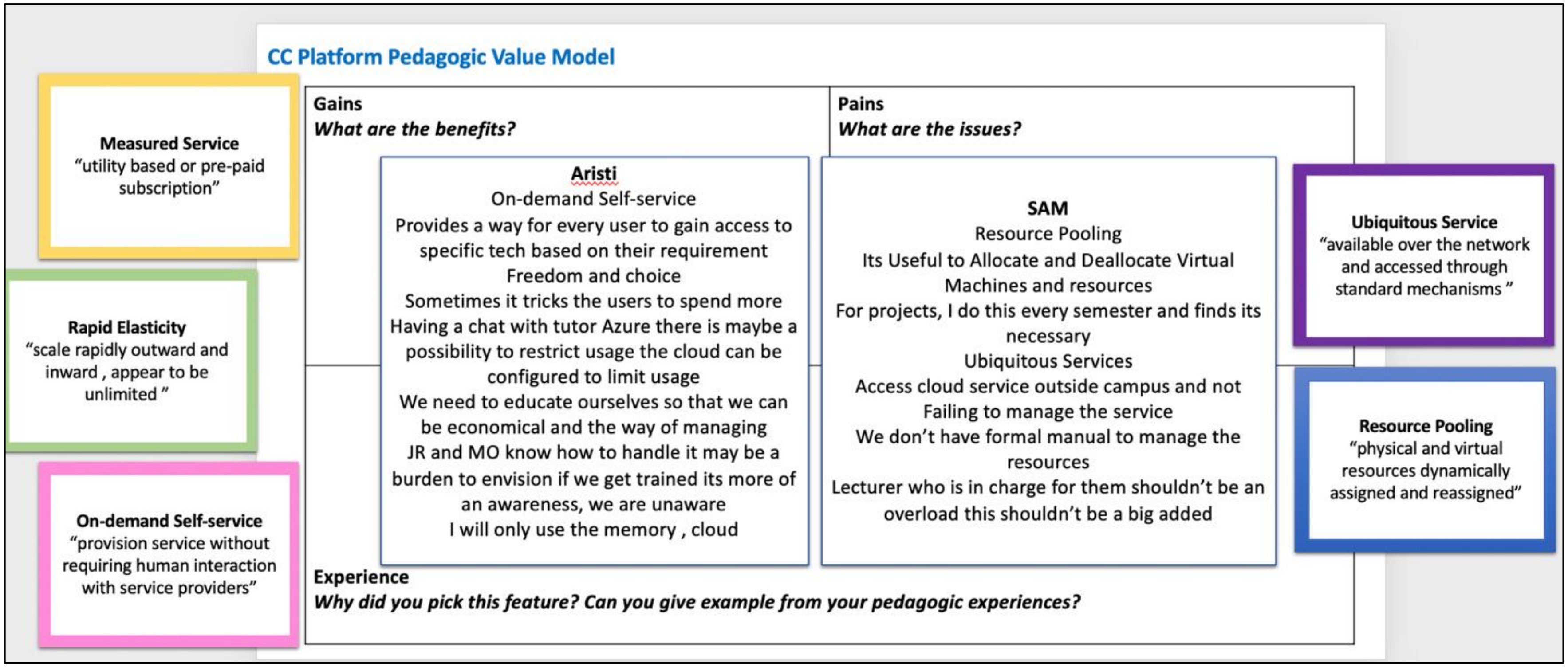

Figure 19. Activity 1 - sample result

E.3. Activity 2 - CBS Valuation

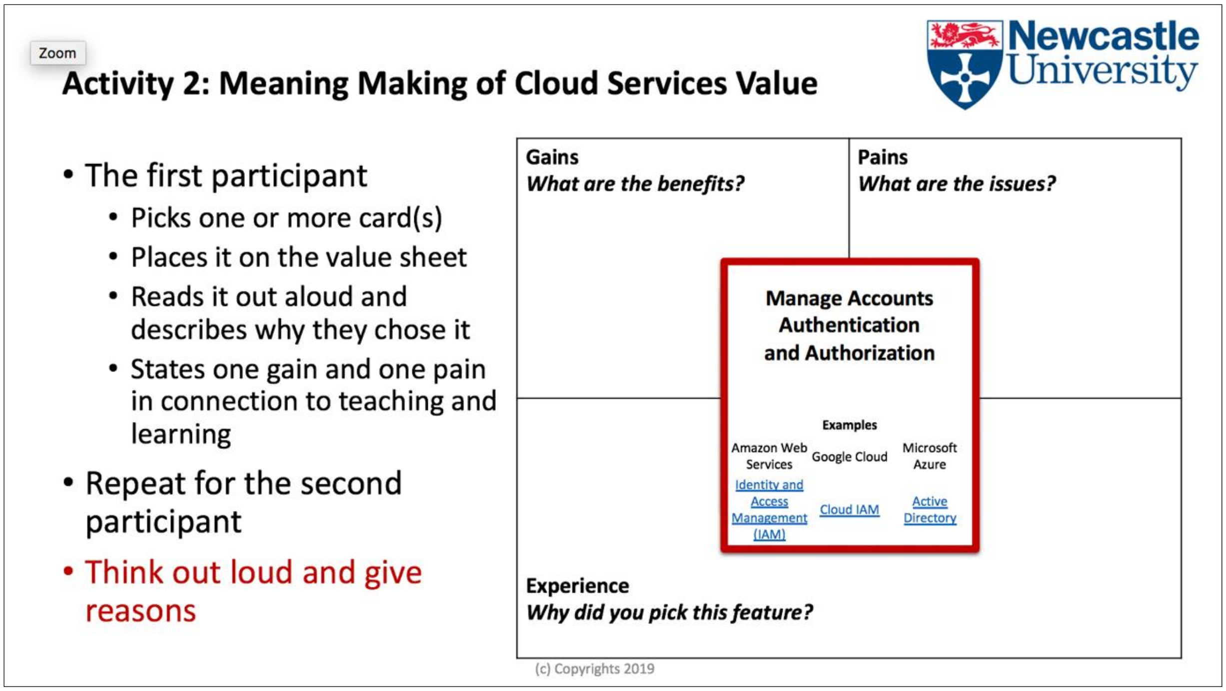

Figure 20. Activity 2 - guiding instructions to CBS valuation model

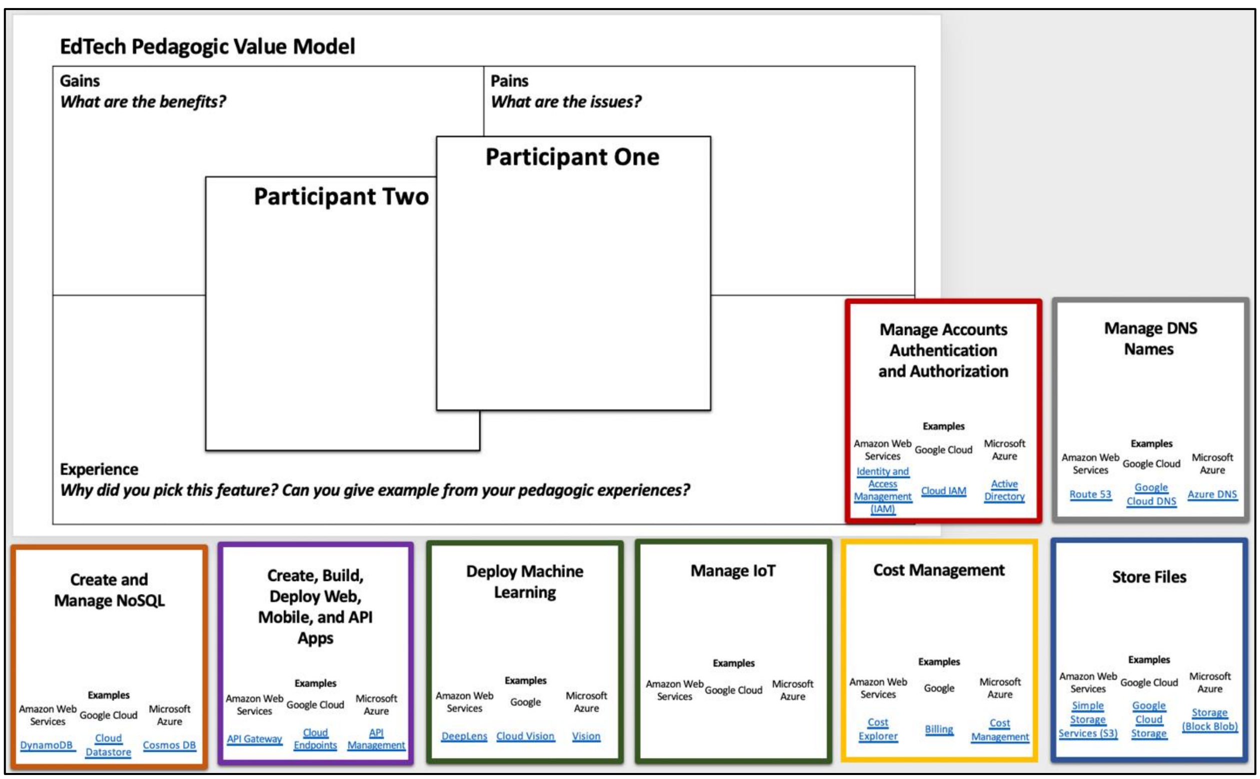

Figure 21. Activity 2 - academics' valuation of CBS

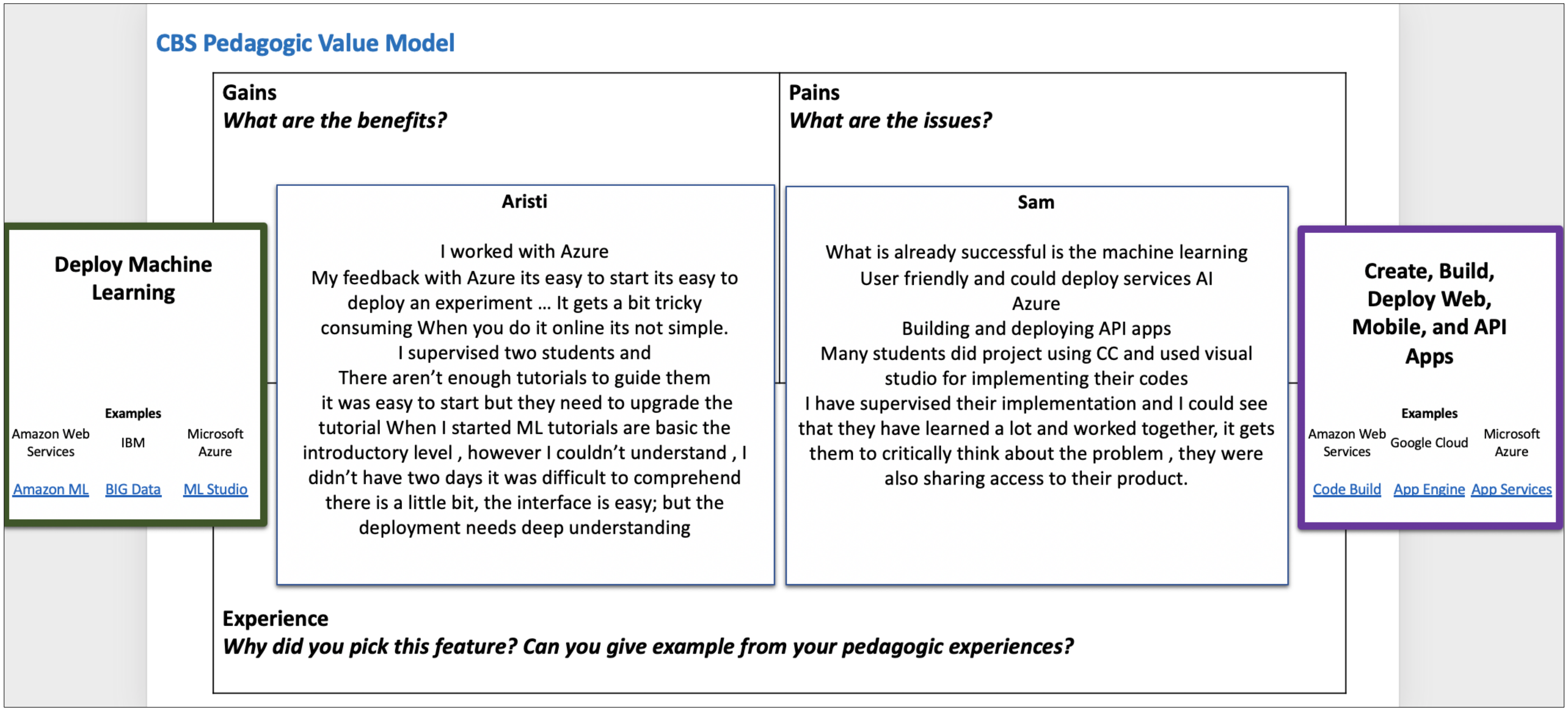

Figure 22. Activity 3 - sample result: selected CBS utility rationalisation

E.4. Activity 3 - CBS Pedagogic Practices Ideation

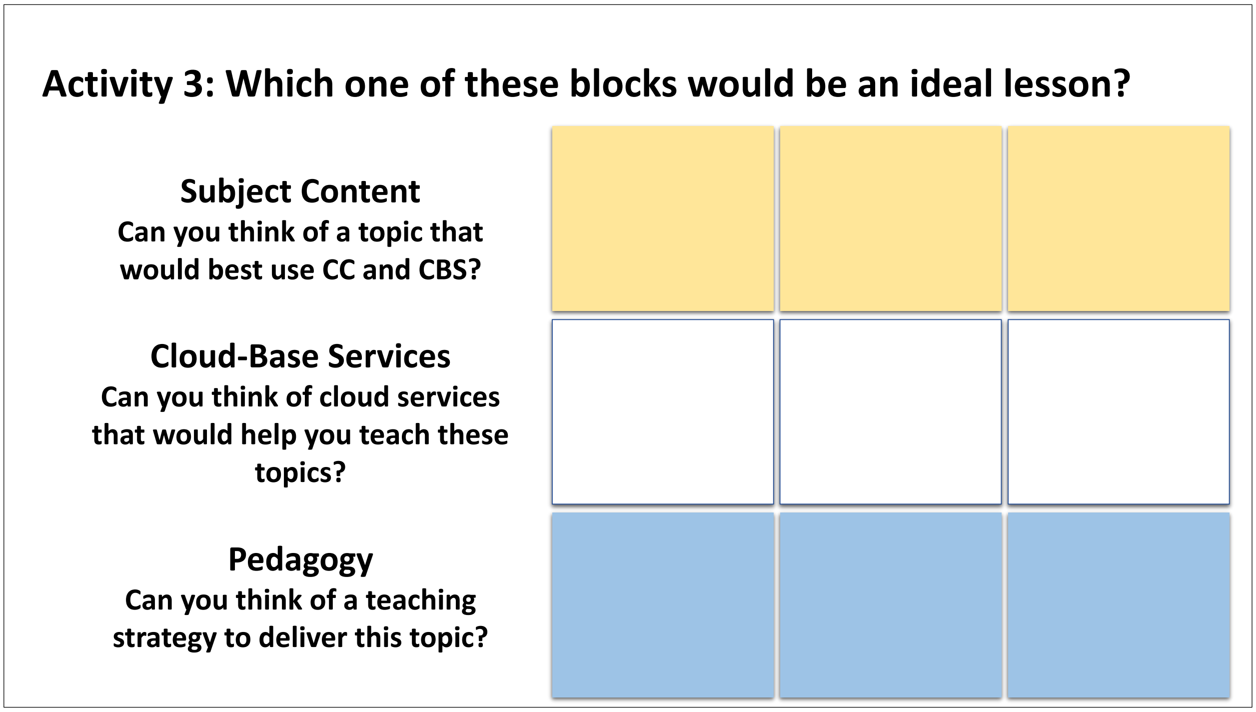

Figure 23. Activity 3 - a reflection on ideal pedagogic practices with CBS

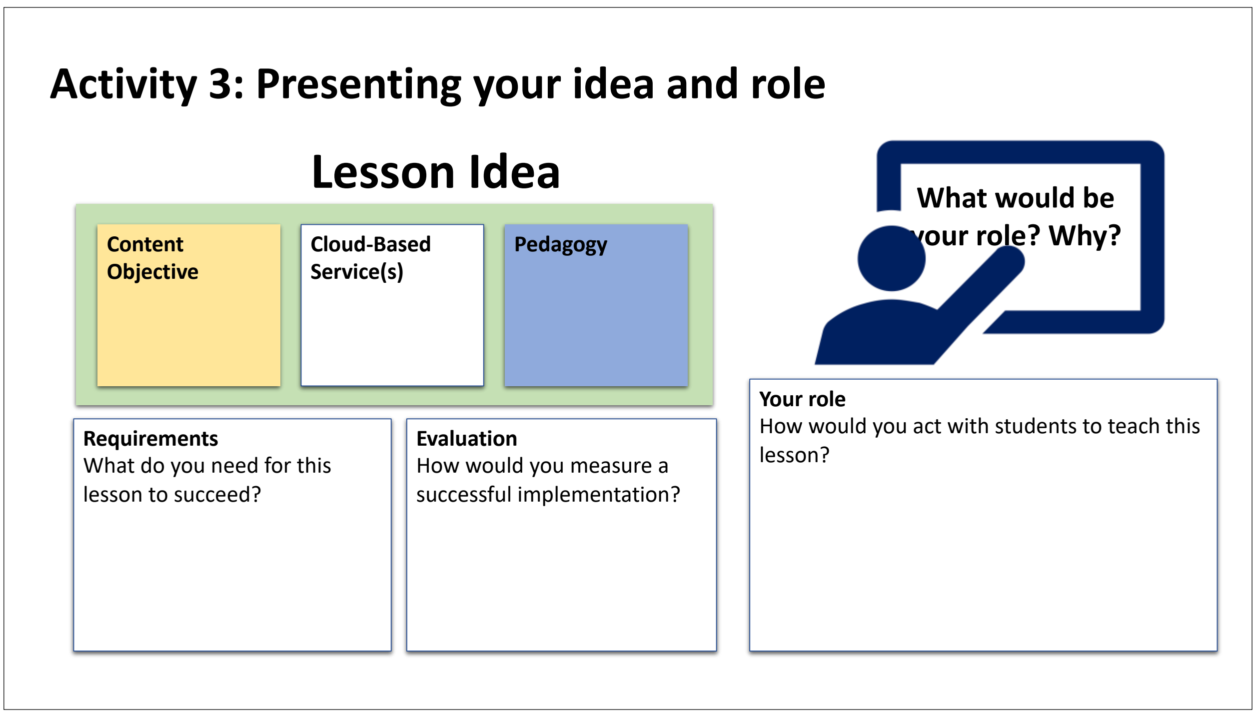

Figure 24. Activity 3 - ideal lesson plan and academics' role with CBS

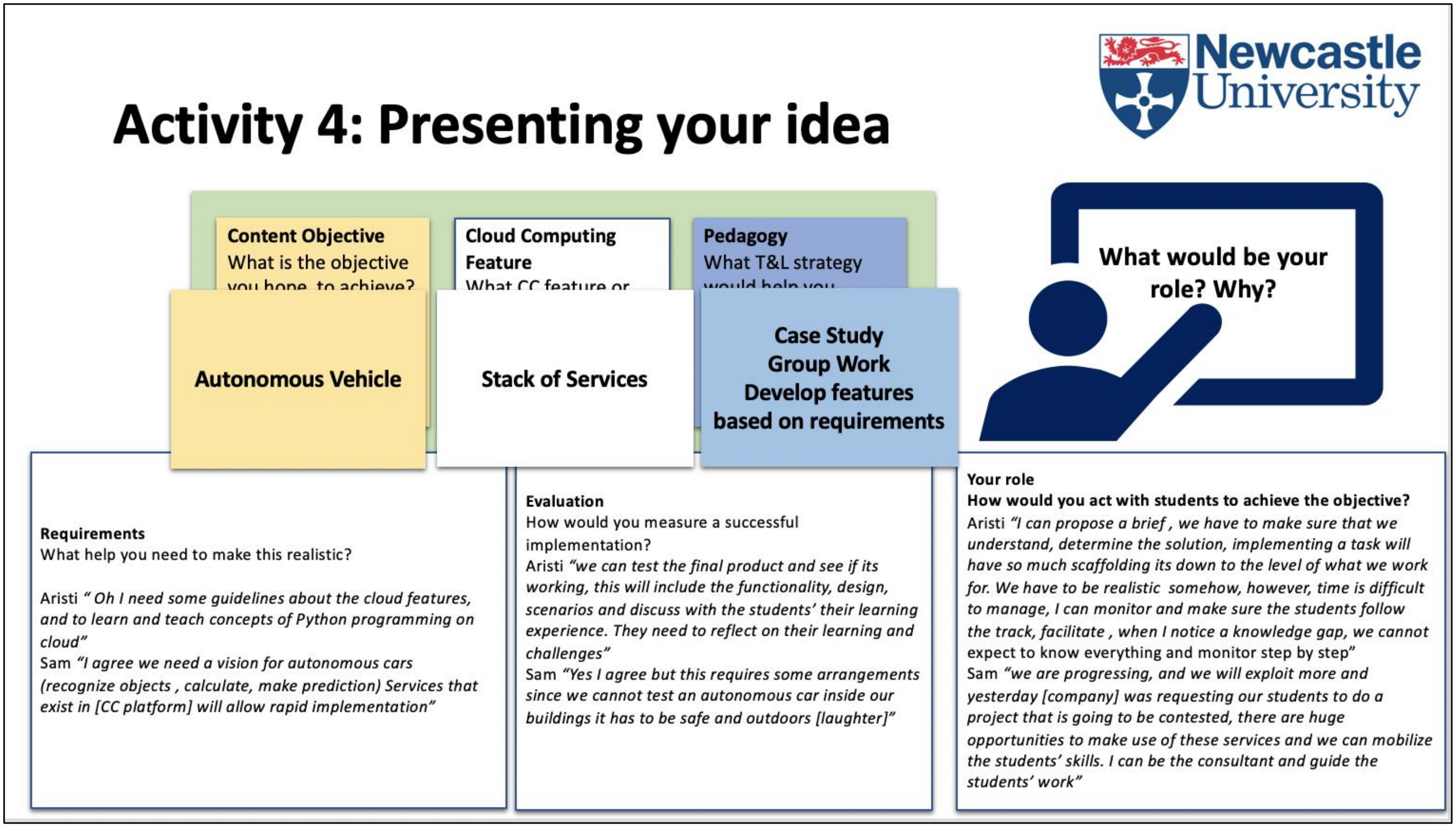

Figure 25. Activity 3 - sample result: selected ideal lesson plan with CBS

Appendix F. Focus Group

F.1. Focus Group Schedule

Study title: Academics' Experiences of Cloud Computing in Higher Education

Subject: Focus Group: Academics' Autonomy and Cloud Computing

Date:

Location:

[main take away is how the participants conceive their autonomy with the emergence and use of cloud computing and cloud-based services in their pedagogic practices and projects' supervision]

Welcome - The aim of today's discussion is to find out how do you conceive your autonomy in the context of utilising cloud computing and cloud-based services in your teaching and learning:

"You will be presented by statements of ideal situations regarding your use of cloud computing and cloud-based services in your pedagogic practices. The statements will be presented in prompts. You will be given time to discuss to what extent you feel that this statement is true or not, please".

Time	Topic	Details	Notes for Researcher
10 min	Welcome	• Researcher Goal • Debriefing • Participants' Role • Expected outcome • Audio Recoding	Confidentiality 'please do not share other people's identities or responses from the focus group with others to maintain the anonymity of the participants' Reemphasise 'ask any question, you do not have to answer all question, think out load' General Rules: There are no right or wrong answers Please think aloud and discuss
60 min	Ideal Scenarios	Using screen share and discussion • Present five prompts (See Figure 26) • invite participants to discuss	Give each participant a hard copy of the prompts present e-copy on screen
10 min	Reflection	Using reflection • individually reflect on the overall experience with CC and CBS	
10 min	Closing	• Any additional thoughts	Thank Participants

F.2. Focus Group Ideal Scenarios Map to Questions

No.	Objective	Question	Ideal Scenarios
S1	Institutional Support Strategies: To understand whether and how structural influences affect academics' autonomy about utilising emerging technology such as cloud computing in their pedagogy.	To what extent do you feel supported to integrate cloud computing in your courses? Please give examples.	Higher education academics in your institution are supported to integrate emerging technology in courses, classroom practice, and projects' supervision.
S2	Influence on Institutional Decisions: To understand whether and how academics' autonomy influences their utilisation of emerging tech/cloud computing in pedagogy.	To what extent you were able to integrate cloud computing or cloud-based technologies this academic year? Please give examples.	Changing the technology tools used in teaching, learning, and projects' supervision in your institution is achievable.
S3	Making Pedagogical Decisions: To understand whether and how emerging technology and cloud computing influence academics' pedagogic practices.	To what extent you feel that using cloud computing or cloud-based technologies changes your teaching strategies and practice? Please give examples.	Using emerging technology such as cloud computing in your institution promotes changing and adding new teaching strategies.
S4	Aspirations: To understand what influences academics' autonomous use of emerging technologies and cloud computing in their pedagogy and what is missing from current practices and contexts.	What is the ideal scenario of implementing cloud computing or in your courses, classroom activities, and projects' supervision? Please give examples.	The best possible scenario to use emerging technology and cloud computing in higher education teaching/supervision and learning is[...]
S5	Perception of CC influence on Autonomy: To understand whether and how emerging technology and cloud computing influences academics' autonomy.	To what extent you feel that using cloud computing affords or limits your academic autonomy? Please give examples.	Emerging technology cloud computing and cloud-based services afford academics' pedagogic autonomy.

Figure 26. Mapping focus group questions and objectives to an ideal situation prompt text

F.3. Focus Group Ideal Scenarios Prompts

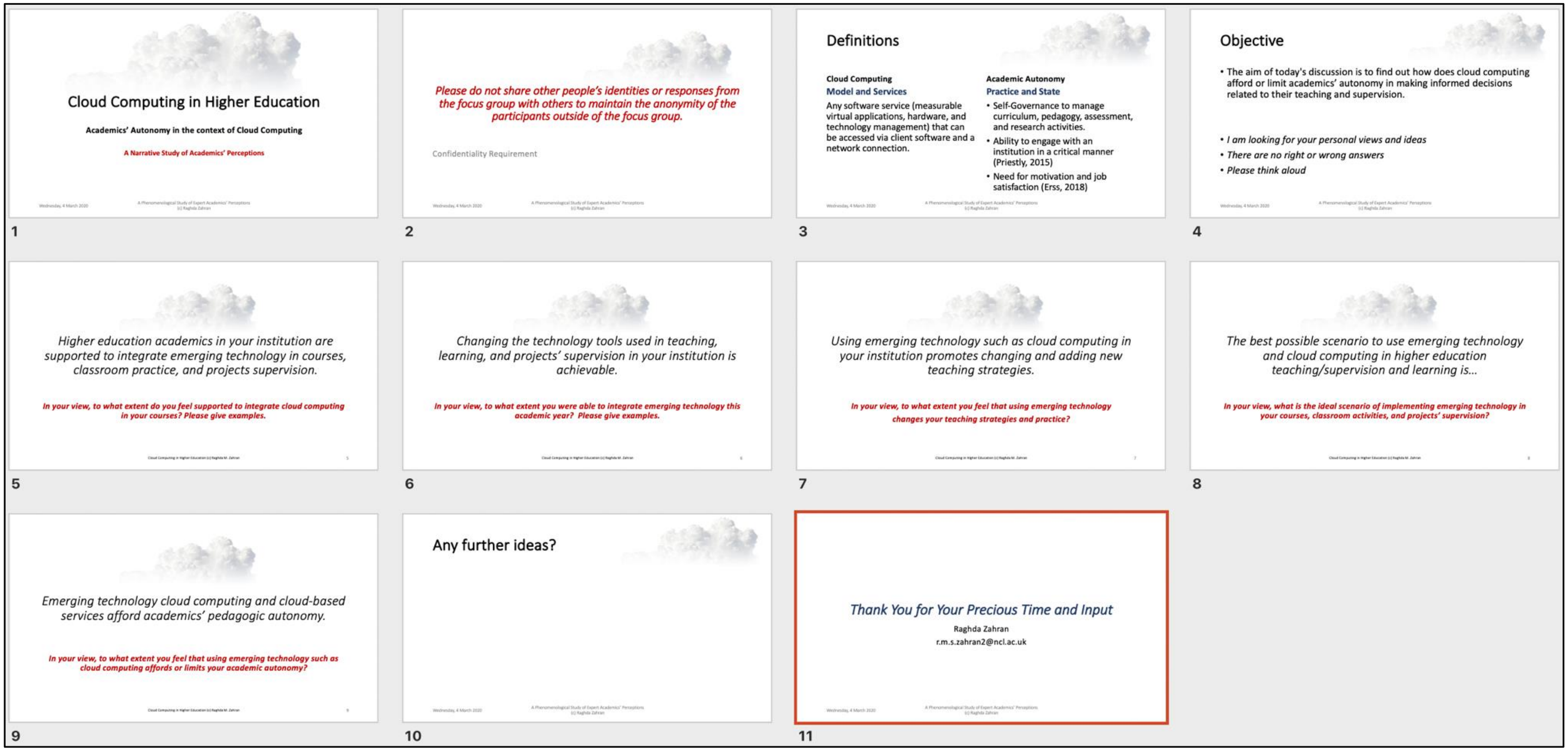

Figure 27. E-prompts including statements of ideal pedagogic scenarios

F.4. Focus Group Organisation and Layout

Figure 28. Focus group layout and printed prompts

Figure 29. Onscreen e-prompts

Sample Analyses of Gathered Data

F.5. The Institutions’ Official Quality Reports

The following graph depicts the clusters of quality reports’ recommendations for the four programmes where the participants were located (ICT, Web Media, Business and Engineering) where the participants were located. The analysis yielded emphasis on the need to align to contextual demands. This was based on the mission and vision of the institution that capitalises on preparing students for the job market. Equally, there has been an emphasis on the need for and enact professional development strategies.

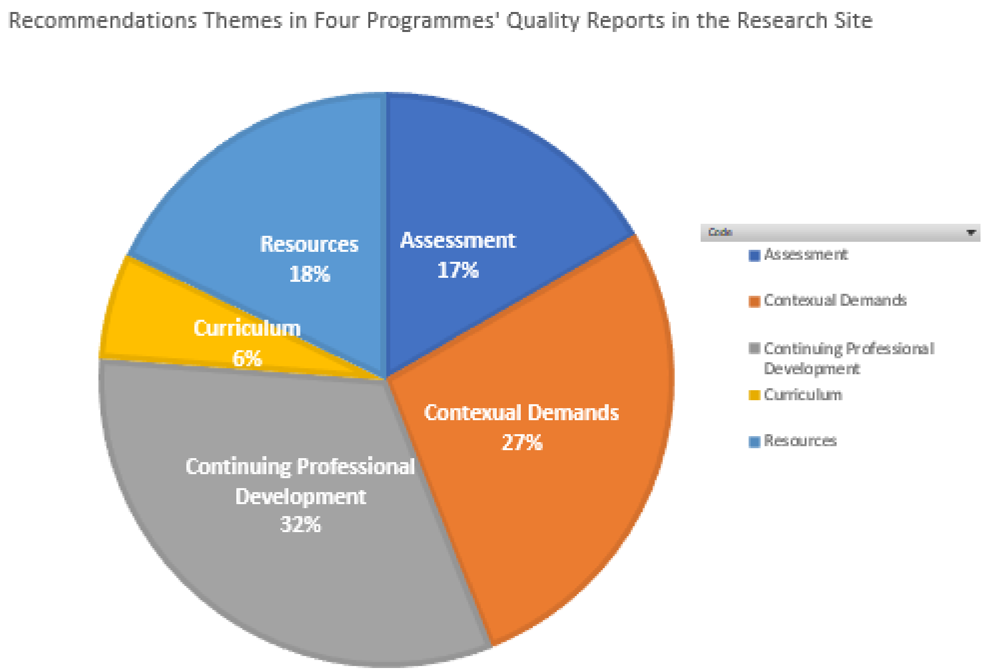

Figure 30. Themes of recommendations in the research site’s quality reports

F.6. The Institutions' Official Course Reviews

The following graph depicts clusters of themes that yielded from the analysis of course reviews of all academics (including the participants in this study) within the four programmes where the participants were located (ICT, Web Media, Business and Engineering) in the research site where academics are located. The graph shows academics' aspirations and plans to develop their courses and emphasis on the need for ICT resources. It also indicates plans for academics' professional development for their courses were limited. This situation could be owing to the existence of performance reviews where academic mostly plan their professional development or due to their understanding of the lack of support structures that they could be committed to undertaking.

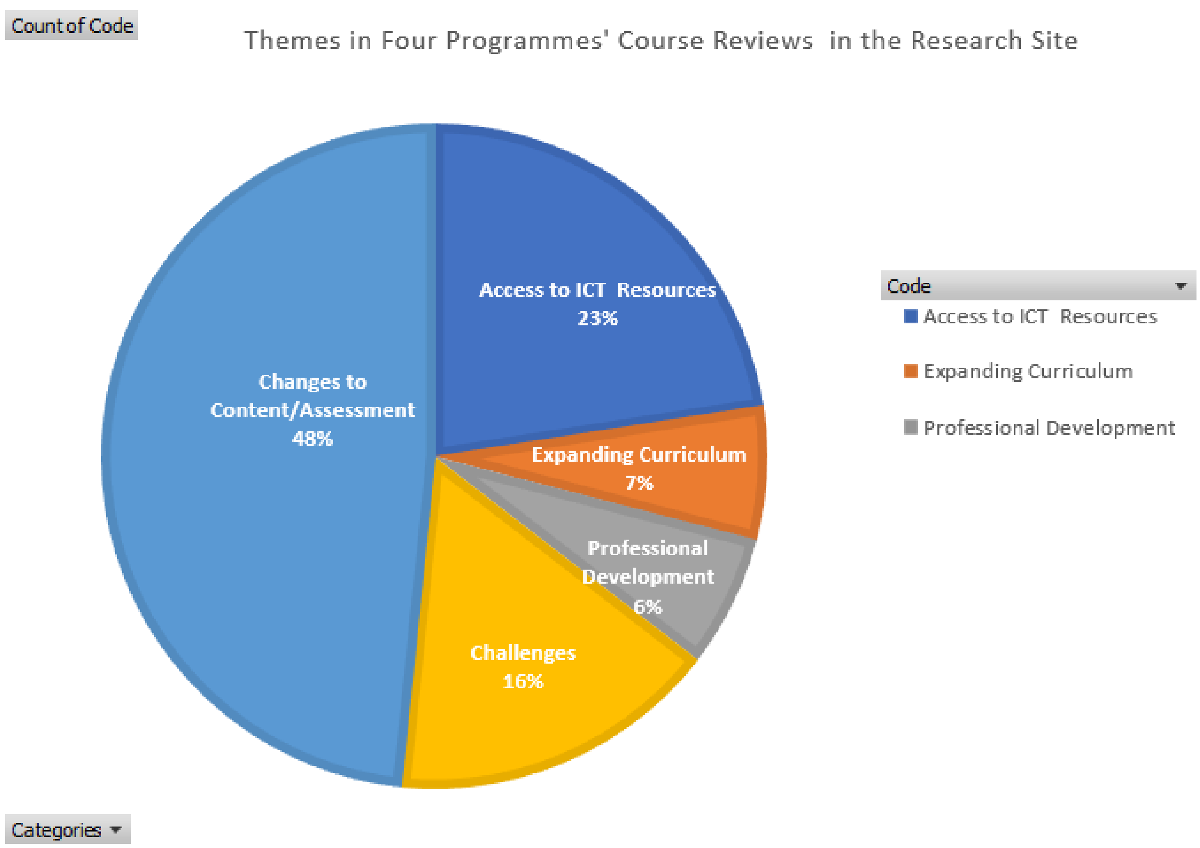

Figure 31. Themes of academics' teaching reflection in course reviews

Study Participants’ Aggregate Narratives

Figure 32 depicts clusters of the domains (Affordances, Challenges, Practices, Orientations) that yielded from the analysis of the participants’ narratives in this study. It might not be surprising, but I thought it is interesting to see clearly and evidently that most participants focused on challenges, particularly their cloud-skills development, under orientations that superseded their reflections on their practices. This could be due to CC and CBS's limited exploitations in their practices or the uncritical culture within their institution. What is surprising is that, although some participants were highly oriented and experimented with CC and CBS; they were reluctant to exploit them with their students. Their responses were mostly associated with their colleagues’ negative experiences, design of the technology or lack of access to support strategies, intrinsic motivation or a sense of agency in the absence of job or disciplines demands.

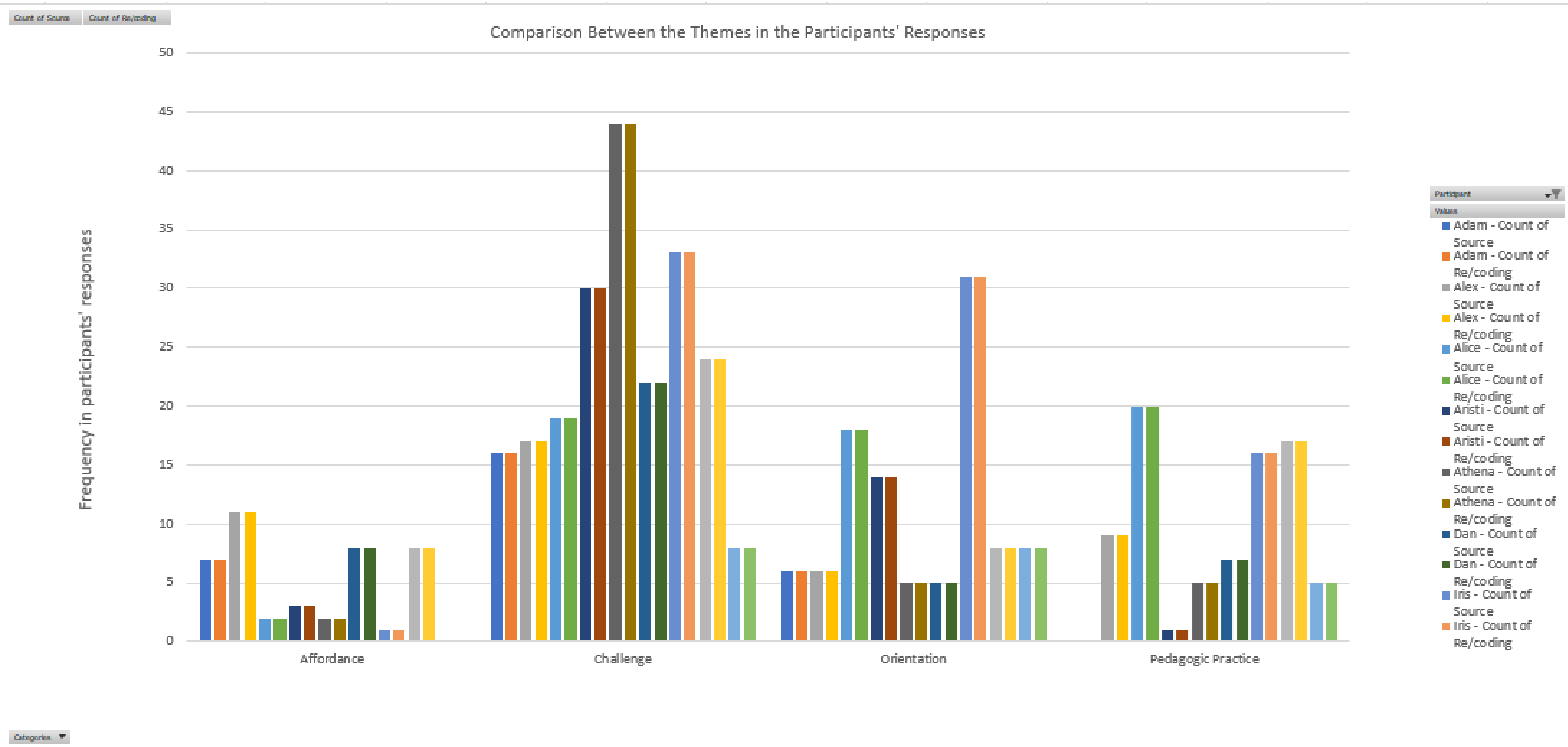

Figure 32. Themes of the participanting academics' responses on their pedagogic experiences with CC and CBS

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Thesis End