The Learning Technology Adoption Model (LTAM): A Critical Realist Grounded Theory Approach to Understanding Academics' Adoption and Use of Virtual Learning Environments in Higher Education

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Abstract

The increased adoption of Virtual Learning Environments (VLEs) in Higher Education (HE) has prompted an appreciable amount of research into their acceptance and use. Despite producing useful insights, existing studies present notable limitations: most focus on student opinions while those concerning academics often employ hypothetico-deductive approaches based on two generalised technology acceptance theories and their extensions. However, as neither of these theories were developed for learning technology, or VLE adoption, they fail to satisfactorily account for the complexities and dynamics of academics' VLE adoption, or their use behaviours. Specifically, these theories overlook the complexities of the diverse, nuanced characteristics of human behaviour and their perceptions of organisational systems and culture.

This study investigates academics' adoption and use of VLEs in HE to generate a new understanding of VLE adoption and use. It employs a Straussian Grounded Theory (SGT) methodology combined with an extension of Critical Realism (CR), namely the Morphogenetic Approach, to explore academics' practices, perceptions, and experiences. Data from 24 semi-structured interviews with different groups of academics, including three Learning Technologies support staff, are analysed. The outcomes, aligned with SGT and conducted within a CR framework and the Morphogenetic Approach, identify the key explanatory factors seen as influencing academics' adoption and use of VLEs in HE.

These findings, presented as a new explanatory model, the Learning Technology Adoption Model (LTAM), explains academics' VLE engagement, and overcomes limitations in the dominant theories of technology adoption. LTAM consists of six categories of influence which represent the key explanatory mechanisms and are mediated by the seventh, the academics' reflexivity. Reflexivity is central to LTAM by mediating the different entities and generating their temporal realisation. In alignment with CR, the six categories of influence are understood to be stratified

and consist of complex meso- and micro-level dimensions which act in concert to influence adoption.

This study makes three core contributions to the existing knowledge on the adoption and use of VLEs: the development of LTAM itself; the presentation of distinct methodological strengths of a novel CR-informed SGT approach that reflect the complexities of learning technology adoption; and the identification and reconceptualisation of seven key factors which influence and explain academics' adoption and use of VLEs in HE. Alongside these seven key factors, it also provides a conceptual clarification of two frequently discussed constructs which are frequently used in VLE adoption studies.

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3-TUM	Three-Tiered Use Model
ABC	Arena Blended Connected (Curriculum design model)
ANT	Actor-Network Theory
CET	Channel Expression Theory
CLT	Cognitive Load Theory
CMS	Course/Content Management System
CR	Critical Realism
CT	Constructivism Theory
DOI	Diffusion of Innovations
ETAM	Extended Technology Adoption Model
EVT	Expectancy-Value Theory
GDPR	General Data Protection Regulation
GGT	Glaserian Grounded Theory
GT	Grounded Theory
HCM	Hypothesised Conceptual Model
HE	Higher Education
HEI	Higher Education Institution
IDT	Innovation Diffusion Theory
ISCM	Information Systems Continuance Model
ISM	Interpretive Structural Modelling
ISSM	Information Systems Success Model
LMS	Learning Management System
LTAM	Learning Technology Adoption Model
MM	Motivation Model
MPCU	Model of PC Utilisation
MT	Motivation Theory
PEP	Personal Emergent Property
PEU	Perceived Ease of Use
PGCHE	Postgraduate Certificate in Higher Education
PSRB	Professional, Statutory and Regulatory Body

PU	Perceived Usefulness
QIS	Quality of Information System
QS	Quacquarelli Symonds (World University Rankings)
REF	Research Excellence Framework
SCT	Social Cognitive Theory
SDT	Self-Determination Theory
SE	Computer Self-Efficacy
SGT	Straussian Grounded Theory
SQEM	Service Quality Evaluation Model
SQM	Service Quality Model
STF	Stimulus Theoretical Framework
TAM	Technology Acceptance Model
TEF	Teaching Excellence Framework
TEL	Technology-Enhanced Learning
THB	Theory of Human Behaviour
TLC	Technology Life-Cycle
TLT	Transformative Learning Theory
TMSA	Transformational Model of Social Activity
TPACK	Technological Pedagogical and Content Knowledge
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
TRAM	Technology Readiness and Acceptance Model
TTF	Task-Technology Fit
UNESCO	United Nations Educational, Scientific and Cultural Organization
UTAUT	Unified Theory of Acceptance and Use of Technology
VLE	Virtual Learning Environment
VR	Virtual Reality

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Author's declaration: This thesis is entirely my own work and has not been submitted in substantially the same form for the award of a higher degree elsewhere.

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Chapter 1: Introduction

1.1 Background

Digital technologies have become deeply embedded in the higher education (HE) landscape and are actively reshaping teaching, learning, assessment, and student engagement with universities and tertiary education settings. Among these technologies, virtual learning environments (VLEs) have become one of the core infrastructures that support course delivery, communication, resource management, and provide opportunities for both synchronous and asynchronous learning. As universities expand their digital provision, VLEs are playing a central role in academics' practice. However, the extent to which academics engage with VLEs and integrate them into their teaching varies considerably. This variance raises important questions about academics' adoption and use of VLEs in HE.

In light of this variance, this study's objective is to determine the key underlying personal and institutional factors influencing academics' adoption and use of VLEs in HE. I contend that existing scholarship on academics' VLE adoption presents numerous weaknesses by predominantly utilising models and theories developed for the acceptance of technology for personal use, and do not adequately explain the adoption of education technologies. Specifically, these theories fail to adequately account for the multifaceted and dynamic nature of human behaviour and its complex interplay with educational systems, nor account for technologies adopted to benefit both adopters and others. Although many models use the term 'acceptance', this thesis uses 'adoption' to emphasize the academics' engagement rather than just acceptance. This distinction is important because it highlights academics' active and ongoing engagement and interactions with VLEs, whereas acceptance can be interpreted as passive tolerance or endorsement without implying active use.

Although the terms learning management system (LMS), course management system (CMS), learning content management system (LCMS), and VLE are often

used interchangeably in the literature and are often conflated, researchers do draw distinctions between systems and environments. Watson and Watson (2007) state that in North American contexts, an LMS typically refers to systems that support the delivery, administration, and management of face to face courses with a focus on enrolment, student tracking, and content distribution; a CMS is more closely associated with the management of online courses and includes auxiliary communication tools; while an LCMS is primarily concerned with curating and delivering e-learning content.

VLEs are described as flexible online environments designed to support teaching and learning. Drawing on Chetwynd (2017), Dillenbourg, Schneider, and Synteta (2002), and Maccoll (2001), a VLE typically refers to a platform that not only combines the features of an LMS, but also supports communication, interaction, and pedagogical engagement. This includes quizzes, polls, surveys, wikis, forums, and tools for both instant and deferred feedback. For accuracy, and the purposes of this thesis, the term VLE is used throughout and preferred over LMS, CMS, or LCMS despite synonymous use in many publications. Additionally, the term VLE also attracts wider use in UK HE policy and practice, while the use of the terms LMS, CMS, and LCMS has been declining. Popular VLEs include Moodle, Canvas, Blackboard, and Brightspace, which dominate the higher education institution (HEI) landscape (Mosley, 2022).

VLEs have become indispensable and ubiquitous. A sector-level survey of VLE adoption reported that by 2014, 99% of HEIs worldwide had operationalised a VLE (Educause, 2014) while more recently, a UK-based survey reported that 100% of responding universities had centrally supported VLEs (Voce, Walker, Barrand, Chatzigavriil, and Craik, 2022). Given such institutional investment, notable evaluation research has reported on institutional strategies designed to foster VLE adoption and use. For example, Walker, Voce, Swift, Ahmed, Jenkins, and Vincent, (2016) reported that over 91% of UK HEIs provided VLE staff development programs and training resources, while 68% had minimum usage policies. This institutional commitment indicates clear visions of technologically advanced

education environments where academics deliberately and seamlessly weave technology and technology-based instructional strategies throughout their practice. However, as Geertshuis and Liu (2016) suggest, HEIs maintain assumptions that VLE investment alongside mandates automatically result in their adoption and use.

Despite institutional efforts, literature (e.g., Al-Mubireek, Mahmoud, El-Deen, Moumene, and Younis, 2023; Amoush and Sandhu, 2019; Porter and Graham, 2016) consistently reports adoption hesitancy and VLE underutilisation. Disconnects between idealised use and reality reinforce the need for comprehensive understandings of the factors surrounding academics' VLE engagement. While investment in VLEs and training alongside mandates may engender some adoption, evidence suggests that such reductionist approaches overlook the deeper competing institutional tensions between research and teaching, the organisation's goals and individuals' motivations, or the individuals' perceptions of such factors. These complexities will be outlined to contextualise this investigation.

Further reflecting tensions between teaching and research, evidence exists that universities' promotion criteria consistently prioritise research activities over teaching excellence (Fagan and Teasdale, 2021). Additionally, academics are typically recruited based on research potential, and many expect to actively research. Even academics on teaching-focused contracts may need to quantify their scholarship and research (Smith and Walker, 2024). Research further demonstrates that academics' workload commitments often limit investments towards upskilling on technology enhanced learning (TEL), and often any TEL initiatives go unrecognised (Gregory and Lodge, 2015). Consequently, teaching activities are regularly perceived as less desirable than research, teaching standards are rarely embedded in institutional policies, and university teaching is perceived as lower status than research (Chalmers, 2018).

However, Evans (2024) notes that certain academics feel strongly about teaching, enjoy it, and expect teaching and research to be mutually beneficial. Similarly, Spurling (2015) reports that many academics invest significant time and effort pursuing teaching excellence. However, such commitment to teaching quality predominantly relies on individuals' personal motivation rather than institutional initiatives (European Commission, 2013, p.14). This emphasis on individuals' autonomy demonstrates that alongside contextual factors, agency is instrumental in driving the integration of VLEs into their teaching practice, highlighting the need for comprehensive understandings of individual agency within organisational contexts.

Given the complex interplay between academics' goals and orientations, organisational culture, research-focused metrics, accountability regarding learning technology investments, and various external factors, I argue that developing a new explanatory model of academics' VLE adoption and use behaviours is warranted. As existing models overlook this dynamic interplay, such a model must account for individual agency and academics' perceptions of contextual factors within a dynamic open system. Such a model can provide more nuanced and comprehensive explanations concerning academics' VLE engagement.

1.2 Personal motivation

My doctoral journey stems from a deliberate decision to pivot from an English language teaching career and pursue a second master's degree in education technology. This decision led to my employment as a Learning Technology Consultant at the institution where this study is conducted, a position which arose following the institution's lower-than-expected Teaching Education Framework (TEF) ratings. An overriding university objective became the need to increase academics' engagement with digital technologies, particularly the VLE.

One early initiative within a team of Learning Technology Consultants and academics was a curriculum redesign project employing the ABC Learning Design framework (Young and Perović, 2022), alongside Mishra and Koehler's (2006) TPACK (Technological, Pedagogical, and Content Knowledge) framework. Adopting the principles of TPACK and the ABC Learning Design framework, Learning Technology Consultants were to assist academics with integrating the VLE and its tools within their new curriculum. Although they acknowledged TPACK's benefits, most academics were reluctant to implement any technological-pedagogical approaches and remained rooted in convention. Consequently, despite a VLE mandate, training, and ABC workshops, VLE engagement remained suboptimal, and we were further instructed to identify new initiatives to increase academics' VLE use. Regardless of positive sentiments about digital technologies and the VLE, academics' training and drop-in sessions were poorly attended, as was a new and well-publicised digital learning community of practice. These experiences reinforced my beliefs that the principal factors in VLE adoption lay within the academics themselves.

Later, after conducting some desk-based research, I identified the dominant technology adoption models and realised they only partially accounted for the adoption and use behaviours I had observed while working as a Learning Technology Consultant. Based on the disconnect between theory and observed behaviour, I concluded that a new understanding of VLE adoption was essential. This conclusion later became instrumental when determining my study's topic.

I had deliberated pursuing a PhD for several years. My subsequent commitment to undertaking doctoral study stemmed from working in a university. However, I did not originally intend to investigate VLE adoption. During taught research methods courses on the Lancaster TEL PhD program, I conducted an exploratory study regarding automated feedback on VLEs. This theme was informed by a study undertaken during my English teaching master's degree combined with my TEL interests. I assumed automated feedback would constitute the main focus of investigation within my doctoral work.

Despite these plans, I became convinced that more generalised understandings of academics' VLE engagement was necessary before investigating automated feedback. This realisation rekindled my interest regarding why, despite having state-of-the-art infrastructure and initiatives pushing increased VLE adoption, academics' appetite for learning technologies remained limited. I therefore determined that developing a new understanding of VLE adoption was necessary before exploring pedagogical applications. This shift in focus ultimately provided the topic for my study.

1.3 Policy context

This section outlines the international and national policy contexts within which this study is situated. As education exists within an open social system, these contexts are important for understanding any global influences while also considering the domestic education landscape and potential effects on the adoption and use of VLEs in HE. This framing also contextualises how my study could inform policy.

Global and national high-level discussions and publications, while not specifically mentioning VLEs, consistently reinforce the importance and potential of digital learning throughout primary, secondary, tertiary, and lifelong education settings. Supra-national policy documents such as the *Qingdao Declaration* (UNESCO, 2015) are often aspirational documents related to TEL. Strengths of this high-level vision are commitments to quality, equality, open access, teacher training, and lifelong learning amongst others. However, such commitments often overlook the challenges and complexities of implementing digital learning in practice by reducing them to quantifiable interventions such as training programs and incentivising innovation, while neglecting deeper dispositional, cultural, and perceptual factors.

Similarly, the EU's publication, *The Future of Digital and Online Learning in Higher Education* (Humpl and Andersen, 2022) emphasises financial support, appropriate technologies, the need to master certain tools for specific subjects, and fostering a digital learning culture. However, it reduces digital learning culture to vague statements of participatory, student-oriented learning, and integrating digital technology into teaching, which "…pushes educators to adapt their teaching habits and methods" (p. 14). While illustrating laudable TEL visions, they similarly assume quantifiable interventions will automatically lead to use.

In the UK, the government's strategy, *Realising the Potential of Technology in Education* (Department for Education, 2019) similarly addresses key overarching aspects including digital infrastructure, skills development, online safety, and procurement. This strategy assumes that training, peer-to-peer networks, and showcasing best practice leads to adoption. The Department for Education's *Future Opportunities for Education Technology* (Vicentini, Day, Gill, Lillis, Komers, and Olausson, 2022) also promotes a broad, generalised TEL vision. While acknowledging barriers to learning technology adoption exist, it predominantly focuses on skills deficits, with training needed to support and engender adoption without addressing any underlying human and cultural dimensions.

Specifically in England, TEF is the primary national regulatory framework for evaluating teaching and learning quality. Drawing on data from the National Student Survey, it rates English HE providers on six criteria based on student experience and student outcomes (Office for Students, 2025). While VLE use is not directly surveyed, my institution is highly cognisant of National Student Survey and TEF criteria and, as noted in Section 1.2, promotes VLE engagement to increase student satisfaction.

These aspirations and broad visions overlook many complexities involved in engendering academics' TEL engagement. Without specifics, institutions must interpret such broad directives in alignment with their own strategic priorities without necessarily committing to changes in organisational culture or attending

to academics' individual perceptions, dispositions, or beliefs. As noted in Section 1.1, many institutions simply provide training and articulate minimum use policies. Combined, this situation presents further challenges for academics to understand and interpret the narratives in their educational settings and reconcile them with their drivers, concerns, and professional orientations.

Therefore, by addressing the dynamics of individual agency and organisational culture within an open social system, this study complements high-level policy work on TEL implementation. It can help institutions and support academics to bridge gaps between idealised visions of technology-enhanced learning and the realities of VLE adoption hesitancy and underutilisation. Furthermore, for supra-national and national policy makers, this study highlights the importance of human factors in TEL adoption and suggests their inclusion in any strategy.

1.4 Research context

This section on the research context establishes three core ideas. Firstly, it outlines the importance of VLE adoption research and why it remains a significant area of inquiry within the HE landscape. Secondly, it highlights the shortcomings of existing research, particularly the absence of indigenous theory. Thirdly, it explains the relevance of this study in addressing these shortcomings by offering a more theoretically grounded explanation of academics' adoption and use of VLEs in HE.

Since web-based VLEs emerged in the 1990s, VLE adoption research has become a distinct, multi-faceted, and evolving strand of technology adoption research. It has examined VLE use in different contexts and includes achievement of learning outcomes (e.g., Ademola, 2021; Lacka and Wong, 2019), potential barriers and enablers to use (e.g., Macharia, 2021; Otto and Raturi, 2024), and student satisfaction and perceptions amongst others (e.g., Baines, Barbosa Boucas, and

Otermamns, 2023). Within VLE adoption research, investigations (e.g., Lavidas, Komis, and Achriani, 2022; McGill and Hobbs, 2007; Mouakket and Bettayeb, 2015) note that research tends to address student perspectives, while generally neglecting academics' views. Alongside some research considering administrators' perspectives, investigations concerning academics typically focuses on perceptions of VLEs (Granić and Marangunić, 2019) and although some research into academics' VLE engagement exists, Flavin and Bhandari (2021) argue it is insufficient and, as noted in Chapter 3, it is fragmented and often inconclusive.

Despite growing interest in academics' VLE engagement, with no discipline-specific frameworks, research typically adopts general theories of technology adoption, psychological theories, or theories regarding characteristics of the technology or context (Omieno, 2022). As elaborated upon in Section 3.2, over 30 different models and theories were identified in these investigations with a prevalence of two generalized technology acceptance models and their extensions. These models, despite offering some explanatory powers, typically focus on technology adopted for personal use, while overlooking the complex interactions in educational systems. Through statistical conjunctions, they typically reduce complex personal dispositions and dynamic contexts to shallow factors and ambiguous variables.

Furthermore, many investigations either replicate existing investigations in new contexts and populations or simply append hypothesised variables to older models. This is elaborated upon in Section 6.2.4 where there is a comprehensive analysis of existing VLE adoption literature. This approach to VLE research often generates dissonant findings which complicates, rather than clarifies, the landscape. Finally, by being developed for personal technology adoption, these models fail to satisfactorily account for adoption and use behaviours concerning technologies designed to benefit others rather than for personal gain. As elaborated upon in Chapter 3, these shortcomings contribute to the rationale for this study.

1.5 Practice context

Describing the practice context is essential for interpreting the findings of this investigation and, as outlined in Section 4.7, for meeting the standards of rigor and trustworthiness. As a single-site study, the findings must be interpreted within their setting, especially to appreciate any institutional factors that may influence academics' decision-making. Furthermore, making the practice context explicit enables readers to consider any potential implications regarding both my insider status and to assess the transferability of the research design and insights into other higher education settings (see Chapter 4 for a description of the research design). To maintain commitments regarding anonymity, the name of the institution is withheld. However, this broad description provides sufficient contextual details without compromising anonymity.

This study was undertaken at a research-intensive Russell Group institution. The 24 Russell Group universities in the United Kingdom commit to substantial research activity and align themselves with the Research Excellence Framework (REF) quality ratings (Russell Group, 2025). This research commitment is further reinforced by the most influential university ranking system, the Quacquarelli Symonds (QS) World University Rankings, whose criteria significantly overlap with, and mutually reinforce, many aims of the Russell Group and REF. This university has a stated ambition of becoming a QS top 50 institution. It can also be described as a full-service university by offering degrees in engineering, humanities, social sciences, natural sciences, health sciences, and the arts. Consistent with many Russell Group universities, it must navigate the dual objectives of reinforcing and improving its research culture while promoting a student-centred educational environment.

Teaching at this institution is predominantly conducted face-to-face and on site with the university actively promoting its award-winning campuses, outstanding facilities, and a vibrant, student-friendly city environment. Bachelor's degrees are delivered on campus, and the mainstream teaching model is firmly campus

based. Outside of this on-campus model, a small number of online programs do exist including 14 part-time postgraduate courses, a single online PhD, and one professional certificate. The university also offers a short online summer English course for international students, which is delivered synchronously via Microsoft Teams. It has recently suspended its FutureLearn MOOC offerings. Every course has a Moodle module, and Moodle is promoted to students as contributing towards the provision of unparalleled opportunities for learning. Moodle is centrally supported and serves as the location of teaching and learning resources, lecture notes and slides, reading lists, and managing assignment submissions.

Therefore, this institution offers an excellent research setting. As a prominent campus-based institution, it has invested heavily in digital infrastructure. It has fully equipped digital learning spaces, interactive studios, and virtual reality (VR) suites. Reinforcing this narrative, internal and external marketing materials consistently highlight cutting-edge technology-enhanced learning and state-of-the-art teaching facilities, which are both embedded in and central to the educational experience. The teaching spaces have lecture capture facilities which upload recordings directly to Moodle as it serves as the location for teaching and learning resources.

Notably, an established characteristic of this university is the amount of autonomy afforded to faculty, particularly surrounding the use of the VLE as a teaching and learning resource. Outside of a minimum Moodle use policy and courses aligned with Professional, Statutory, and Regulatory Bodies (PSRB), such autonomy extends to curriculum decisions, assessment, quality and quantity of feedback, pedagogical approaches, and technology use. In practice, this autonomy contributes to Moodle being used as a functional tool and it serves primarily as a content repository and assessment-management system. More interactive features are used selectively and at the discretion of individual academics. This autonomy ostensibly recognises and reflects the professionalism of motivated academics being trusted to deliver an educational experience tailored to disciplinary perspectives and student needs.

Therefore, academics can employ Moodle passively as a content repository or actively as an interactive teaching and learning platform. They can elect to deliver some content via pre-recorded lectures hosted on Moodle instead of live lectures. They can determine assessment types, their distribution, management, and marking. Moreover, such discretion even extends to individual academics delivering co-taught courses within the same Moodle module. This practice often results in inconsistent VLE use between separate sections of the same module depending on instructor. Moodle use often reflects each academic's competing demands, professional priorities, technical and pedagogical knowledge, and aspects they regard as most central to their teaching.

Further complicating the institutional narrative is that, when compared to investments in visible cutting-edge hardware, investment in the outward-facing Learning Technologies team is comparatively small. With a manager, one Learning Technology Consultant per faculty, and a similar number of learning technologies support staff, the team's role is predominantly advisory. Further to the initial information presented in Section 1.2, I was essentially employed to deliver training, facilitate workshops, help operate a virtual help desk and in-person drop-in sessions, and advise academics interested in creating e-learning materials. Consequently, physical resource allocation meets expectations of a technologically advanced teaching environment and high-tech centre of excellence while serving as a marketing tool for prospective students. However, amongst academics, the Learning Technologies' advisory role can reinforce overarching narratives of a research culture and contribute to perceptions that TEL is largely peripheral to the university's core strategy.

My experience as a Learning Technology Consultant, combined with reflective personal observations, have afforded me unique insights into the disconnects between the idealised VLE use promoted by the Digital Learning Directors and actual use. While observing that motivated academics do become competent with the technologies and develop learning resources, they represent a minority. Again, this experience reinforces my view that, while the institutional narrative is

important, individual agency is more influential in the adoption and use of learning technologies.

Academic agency has numerous implications for my study. Specifically, VLE use beyond the mandate represents individual agency; these academics are making deliberate decisions and therefore underlying reasons explaining them must exist. Consequently, this context presents opportunities to elicit insights regarding the factors influencing academics' decision-making that an authoritarian institution cannot offer.

1.6 Locating the project

This study is located within, and contributes to, two areas of scholarship. The principal contribution is theoretical; it examines and extends the literature related to general theories of learning technology adoption and, more specifically, the literature on academics' adoption and use of VLEs in HE. In doing so, it presents the Learning Technology Adoption Model (LTAM), a new model of academics' adoption and use of VLEs in HE. LTAM is an explanatory framework that captures the underlying factors, including potential barriers, that influence academics' VLE adoption. The second significant area of contribution is methodological. This study employs a novel CR-informed Straussian Grounded Theory (SGT) methodology to investigate academics' VLE engagement and illustrates how such a methodology can develop new theoretical understandings of technology adoption.

As outlined in Section 1.4, general technology adoption literature outlines the prevailing theories, adoption landscape, and some broad conceptual categories. However, unlike these established theories, LTAM is neither an adaptation of a general technology adoption model, the application of a psychological theory, nor a theory derived from characteristics of the technology being adopted. Instead, it

is developed inductively from the context it seeks to explain and represents an indigenous model of learning technology adoption. Its development addresses several limitations of existing models and theories used in learning technology adoption, particularly as it differentiates between technologies used for the adopter's personal gain and technologies that also benefit others.

Despite being an innovative indigenous theory, LTAM reinforces numerous established insights from existing technology adoption scholarship. Furthermore, it also reconceptualises some other elements from existing technology adoption theory through the consistent and principled application of a CR-informed methodology. Alongside these theoretical contributions, it also introduces into the wider learning technology literature several conceptual imports from adjacent disciplines such as behavioural psychology and leadership studies. In essence, LTAM consists of six new and reconceptualised 'categories of influence' which together offer significant explanatory power regarding academics' adoption and use of VLEs in HE. All six categories are connected through a central concept of *reflexivity* which accounts for human agency and decision-making. Furthermore, through the application of CR, each category of influence is stratified, and is comprised of complex and layered influences that contribute to LTAM's explanatory value. This stratification organises the existing, reconceptualised, and imported elements into an ontologically principled framework which is consistent with CR's emphasis on the underlying causal powers that shape both systems and behaviours.

Further to the theoretical contributions of LTAM, the methodological contributions arise from the deliberate adoption of a CR-informed SGT approach. Grounded theory is a well-substantiated inductive research methodology for developing new theories and models from data (Belgrave and Seide, 2019) and SGT is an evolution of the original grounded theory (Corbin and Strauss, 2008). CR, as elaborated on in Chapter 2, foregrounds the complex causal powers of systems and individuals within open social systems, while the Morphogenetic Approach emphasises the decision-making characteristics of human agency (Archer, 1995). SGT is widely

recognised as particularly compatible with CR-informed research (Hoddy, 2019) because it supports the integration of contextual, structural, and agential factors into theory generation. The combination of CR and SGT enables this study to move beyond descriptive accounts of technology adoption by considering ontological depth, emergence, and generative structures, while also fostering the epistemic conditions to explore the interplay between context and agency, a key focus of this study.

Consequently, the objective of this study is therefore driven by the following question: *How do academics' personal motivations, dispositions, and situated perceptions shape their adoption and use of VLEs within a research-intensive university?* This question is aligned with the institutional contexts and addresses the tensions highlighted in this chapter. Specifically, it seeks to identify the key factors influencing academics' decisions to use a VLE beyond mandated requirements within an institution where the prevailing narrative is excellence in research alongside a focus on education and student experience.

1.7 Thesis overview

This section outlines the entire thesis by briefly summarising each chapter and clarifying how they contribute to this study. Notably, as elaborated on in Chapter 2, this thesis is structured in alignment with the principles of SGT which require two distinct literature reviews: a preliminary literature review that establishes foundational concepts and a substantial literature view that anchors the discussion and situates the findings within the wider discipline. The rest of this subsection provides a brief overview of each chapter.

Chapter 2 outlines the theoretical framework underpinning my study. I articulate my ontological and epistemological positions before introducing the key tenets of CR and its extension, the Morphogenetic Approach. I then present SGT as my

chosen research methodology and demonstrate its compatibility with CR. Chapter 2 therefore establishes a clear and principled foundation for my investigation.

Chapter 3 presents the preliminary literature review which establishes context. It identifies the prevailing theories used in previous research, highlights numerous limitations in existing models, and further justifies this study. It also serves to contextualise development of the interview protocol and preliminary analysis and illustrates how the initial research trajectories were informed by insights from the two dominant models of technology adoption: the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT).

Chapter 4 describes the research design. It explains its theoretical underpinnings and how the initial research questions were informed by the preliminary literature review. It then justifies qualitative methods and semi-structured interviews before detailing the research site, the participants, and interview design. It further explains the data analysis and theory generation processes before explaining ethical considerations, credibility, rigour, and trustworthiness.

Chapter 5 presents the main findings. It begins by presenting the six core, macro-level categories of influence, then the stratified nature of each category is explored through their separate, underlying, meso- and micro-level dimensions. After presenting these categories of influence, reflexivity, a key concept from the Morphogenetic Approach is introduced. It then details the Learning Technology Adoption Model (LTAM), the integrated outcome of this study, illustrating how reflexivity can transform or reinforce elements of each category of influence and how academics mediate these influences. This chapter also demonstrates how LTAM offers a more comprehensive explanation of academics' VLE engagement than existing models and frameworks.

Chapter 6 details the substantive literature review. This literature review provides a comprehensive and detailed analysis of existing research into academics'

adoption and use of VLEs in HE. A substantive literature review is conceptually different from the earlier preliminary literature review in Chapter 3. While the earlier review surveys the research landscape to contextualise this study, this substantive review identifies, analyses, and synthesises specific research papers through a CR lens to identify the relevant themes in the literature and to help locate LTAM's contributions to scholarship. Doing so is essential for anchoring the discussion in Chapter 7 and it provides a clear backdrop for comparing my findings with the existing canon.

Chapter 7 presents the discussion of the study's findings, showing how these findings are situated within, extend, and in places reconceptualise or challenge exiting literature, while also introducing adjacent theory into the learning technology adoption field. Further to introducing LTAM, it highlights two other broad contributions to the literature. The first concerns the new and reconceptualised key entities within LTAM which arose from this study. The second is the methodological insights gained by adopting a CR-informed SGT approach to learning technology adoption, including how it encourages deeper critical reasoning and can challenge existing orthodoxies and biases.

Chapter 8 concludes this thesis by summarising this study and presenting the limitations to LTAM before reflecting on my theoretical and methodological contributions to the literature, potential implications for policy, suggestions for future research, and my concluding thoughts.

Chapter 2: Theoretical framework

2.1 Overview

This chapter establishes how this study is underpinned by a sound theoretical framework and aligned with a principled research methodology. It also explains how the philosophical foundations and research aim shaped both my methodological decisions and, consequently, the research methods. Such elaboration is essential for substantiating this investigation's trustworthiness, the validity of the findings, and for framing the discussion and conclusions.

2.2 Philosophical foundations and researcher position

This study is conducted in alignment with the view that the nature of reality and knowledge in the social arena is congruous with the ontological and epistemological tenets of Critical Realism (CR), specifically Archer's (1995) Morphogenetic Approach, which extends CR's foundational principles. As this chapter elaborates upon, CR is considered both and ontology and epistemology. Ontologically, it posits a stratified reality operating within an open system, with the Morphogenetic Approach emphasising the separation and interplay between human agency and structure. Epistemologically, it recognises that knowledge can be generated through an active and critically engaged researcher role, and it encourages investigation beyond surface-level observations. Furthermore, as elaborated on in Section 2.4, CR is compatible with GT methodologies for developing new theories.

This philosophical perspective emerged from my experiences as a Learning Technology Consultant, as described in Section 1.2. During this time, Learning Technology Consultants were pressed to increase academics' VLE engagement. With the university's initiatives having minimal impact, I became interested in

academics' different VLE engagement behaviours. Through observation and reflection, I noted two broad underlying aspects: individuals' personal motivations, and the institution's underlying systems, processes, and culture. Subsequently, in investigating VLE adoption, I determined that the two dominant models, TAM and UTAUT, were inadequate in explaining my observations and realised other influential, but seemingly unacknowledged, factors must exist.

In investigating theoretical foundations for this study, I became aware that TEL lacks a coherent body of indigenous theory. It often relies on conceptual imports from other disciplines (Bligh, 2020) which was reinforced during the later preliminary literature review where over 30 separate models and theories were identified as being used in VLE adoption research, of which none were TEL theories. Needing a theoretical foundation, I initially considered Actor Network Theory (ANT) after being introduced to it in a compulsory research methods course. ANT posits that social and physical entities are dynamically related and that reality, however temporary, is a product of interconnected networks (Fenwick and Edwards, 2010; Latour, 1987; Law, 2007). I initially considered disaggregating VLE use into a logical network of actors and intermediaries to determine deeper understandings of the network. I had also hypothesised that there was an absence of certain actors or intermediaries within the university that research might identify. While ANT initially offered a plausible theoretical basis, further investigation revealed ANT's ontological stance of symmetry and treating all human and non-human actants as equal seemed incongruent with my own beliefs, observations, and experiences of academics' VLE engagement. Additionally, it lacks alignment with my epistemological belief that knowledge can be generated through critical reasoning rather than strict empirical observation.

Subsequent desk-based research and supervisor discussions led to CR. After extensive reading on CR's ontological and epistemological perspectives, specifically Archer's (1995) Morphogenetic Approach, I found that it resonated with my personal beliefs, observations, and this study's aims, especially as CR focuses on explanation rather than prediction (Danermark, Ekström, and

Karlsson, 2019). It should be noted that a detailed explanation of CR is beyond the scope of this thesis. However, as CR and the Morphogenetic Approach underpin this study, foundational explanations of key tenets are provided for context.

Formulated by Roy Bhaskar, with later extensions by other critical realists like Margaret Archer, CR is distinctive by being considered both an ontology and an epistemology (Danermark et al., 2019) and possesses numerous characteristics essential for this study. It recognises that events in social systems occur in *open systems* rather than closed ones, meaning that influences exist outside the system under investigation (Mingers, 2004). As elaborated upon in Section 2.2.1, CR also possesses ontological depth through its stratified reality of three domains and, as such, events and phenomena stem from the *real domain's* underlying *causal powers* and *generative mechanisms,* which can be complex and multi-layered (Bhaskar, 1975/2008). These *causal powers* and *generative mechanisms* are typically unobservable, meaning reality can exist independently of human observation and understanding, and, as described in Section 2.2.5, these mechanisms can combine to create new phenomena through a concept known as *emergence*. Danermark et al. (2019) emphasise that the identification of these mechanisms is achievable through critical reasoning using *abduction* and *retroduction,* processes presented in Section 2.2.4, which can be used to interpret observable events and to infer and explain the unobservable.

Significantly for this study, the Morphogenetic Approach adopts the principle of *analytical dualism* where both individuals and systems possess separate *causal powers* and *generative mechanisms* (Archer, 1995). Acknowledging this separation is an essential tenet of the Morphogenetic Approach and is needed for clarifying how structural conditions shape, but do not determine, individuals' reflexive deliberations and subsequent actions. For simplicity, throughout this thesis, the term *generative structures* collectively refers to both the *causal powers* and *generative mechanisms* that underpin emergent phenomena.

This chapter will now briefly elaborate on some significant tenets of CR and their relevance for this study. These concepts provide the philosophical grounding for the methodological and analytical choices made throughout this thesis and they help clarify how this study addresses questions of reality, causation, and agency. While these concepts are presented in a logical sequence, some cataphoric references to ideas later described were necessary for coherence. In such cases, relevant sections will be identified.

2.2.1 Ontological depth and domains

A fundamental ontological tenet of CR and key for this study, is CR's stratification of reality into three domains, as illustrated in Figure 2.1: the *real domain*, the *actual domain* and the *empirical domain* (Hoddy, 2019). The *real domain* is generally considered ontologically distinct from the *actual* and *empirical domains* (Danermark et al., 2019; Sayer, 1992). The *real domain* is the level of reality where the underlying *generative structures* are located. These underlying *generative structures* are the causal powers and mechanisms that produce various events, phenomena and outcomes. The *actual domain* and *empirical domain* both represent the manifestation or outcomes of these *generative structures*. Phenomena in the *actual domain* exist independently of perception but are still considered to exist, whereas the *empirical domain* represents the events that are experienced, observed, or measured (Wynn and Williams, 2012). Therefore, the main distinction between these two domains is primarily that of experience or perception. Because of their similarities, the *actual domain* and *empirical domain* will generally be termed the *actual/empirical domain* throughout. However, where distinctions between these domains are required, they will be explicitly acknowledged. Recognising domains is essential for my study because, as stated in Section 2.2.1, I am seeking to move beyond surface-level observations to identify the broader underlying *generative structures*.

These domains are typically represented by three concentric circles. However, to represent CR's ontological depth, Figure 2.1 reconceptualises these domains as a three-dimensional structure which better illustrates the domains and supports subsequent explanations within this chapter. The dashed line between the *actual* and *empirical domains* acknowledges their ontological differences and also their similarities for this study. While the original two-dimension representation (Hoddy, 2019) was adapted into a three-dimensional cone, as shown in Figure 2.1, all subsequent conceptual elaborations are based on this conic adaptation and are original to this study.

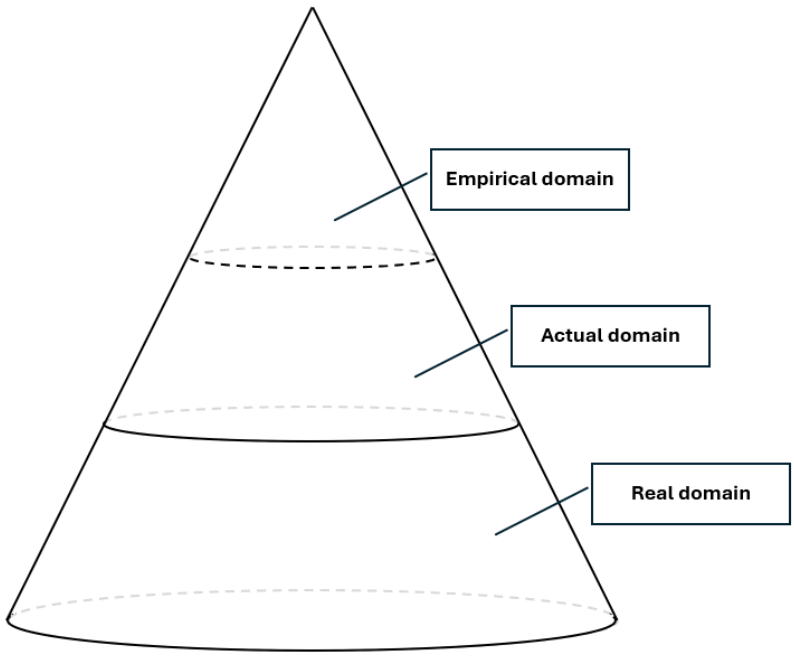


Figure 2.1 *The three domains of Critical Realism*
Adapted from Hoddy (2019)

Further to these three domains, CR's ontological depth includes the concept of stratified *causal powers* and *generative mechanisms* working in concert as *generative structures* to produce outcomes (Sayer, 1992). The ways in which causal powers and generative mechanisms operate are explained in more depth in Section 2.2.3. Figure 2.2 is a hypothetical illustration of how *causal powers* and *generative mechanisms* exist in a stratified reality and the key entities are explained in turn:

(a) represents the *causal powers,* such as an individual's knowledge of a VLE's tools and functions. For example, a VLE's affordances include quizzes, forums, assessment submission and feedback, multimedia embeds, collaborative activities, and administrative tools. Quizzes have different question types such as 'True/False', or 'Short Answer', and each question type possesses different *causal powers*: True/False questions invoke different question creation, or answering strategies, compared to short answer questions.

(b) represents the *generative mechanisms* or systems, such as assessment-design processes, curriculum-design processes, or VLE support systems, which can also be stratified and be disaggregated into separate components.

(c) represents *reflexivity,* or individuals' ability to determine courses of action, an essential aspect in this study, as I had already noted academics' agency in Section 2.2.

(d) represents a simplified illustration of the mutual interaction of *causal powers* and *generative mechanisms,* which are elaborated upon in Section 2.2.3.

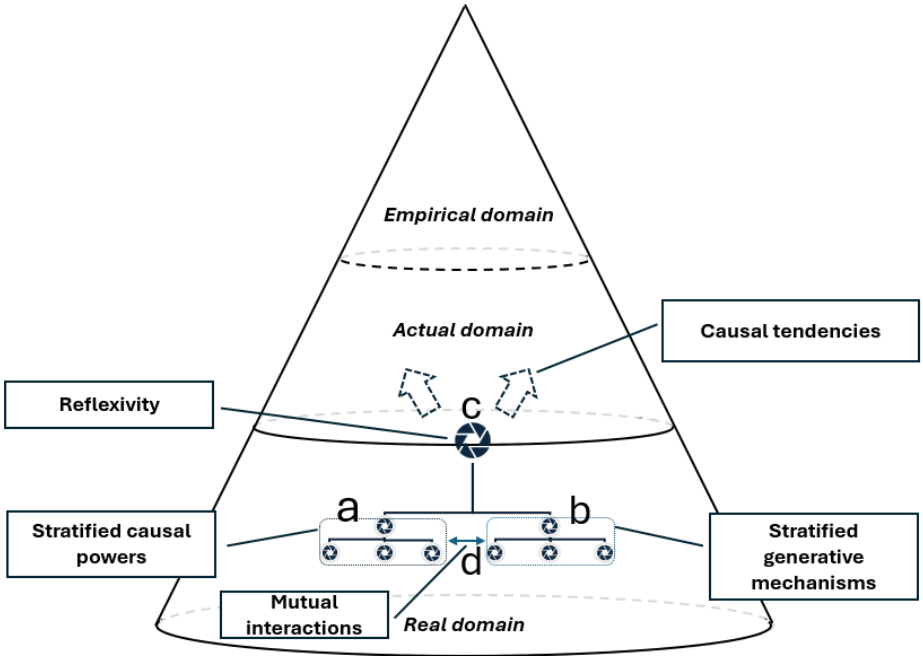


Figure 2.2 *Illustration of stratified causal powers and generative mechanisms*

Understanding domains and *generative structures* is fundamental to CR-based research. This study will not simply describe events in the *actual/empirical domain* but uses the deliberate application of *abduction* and *retroduction* to infer underlying *generative structures*. *Abduction* and *retroduction* are later explained in Section 2.2.4.

Additionally, understanding domains informs the research design by fostering a question protocol designed to elicit responses beyond surface-level experiences and observations to reveal potential influences attributable to the *real domain*. Furthermore, it also informs my sampling strategy by recruiting informants whose perspectives can further suggest aspects of the *real domain*. Perceptual awareness and theoretical sensitivity to these deeper causal influences are essential for coding and categorising the informants' responses related to these deeper layers.

2.2.2 Open systems and tendencies

Ontologically, CR posits that social systems are *open systems* and that social phenomena cannot be isolated as in a laboratory (Mingers, 2004). Sayer (1992) further observes that social systems do not consist of simple constant conjunctions but exist within intricate, interrelated, open worlds and are connected to entities beyond those under consideration. These *open systems* are considered dynamic and external evolving conditions mean they can affect, and be affected by, any of the three domains (Archer, 1995; Bhaskar, 2008). This is represented in Figure 2.3.

In education systems, students, colleagues, leadership, strategy, government policies, and the economic climate are dynamic entities that can affect the system and decision-making within it. Therefore, because of such change, knowledge in CR must be considered provisional or temporal, and any causal

relationships must be presented as *tendencies* or dispositions to influence (Sayer, 1992). Given that academics' VLE engagement occurs within an *open system,* any explanations in this study must be understood as such. These are important ontological tenets as I am seeking to identify explanatory *causal powers* and *generative mechanisms* rather than universal laws and constant conjunctions.

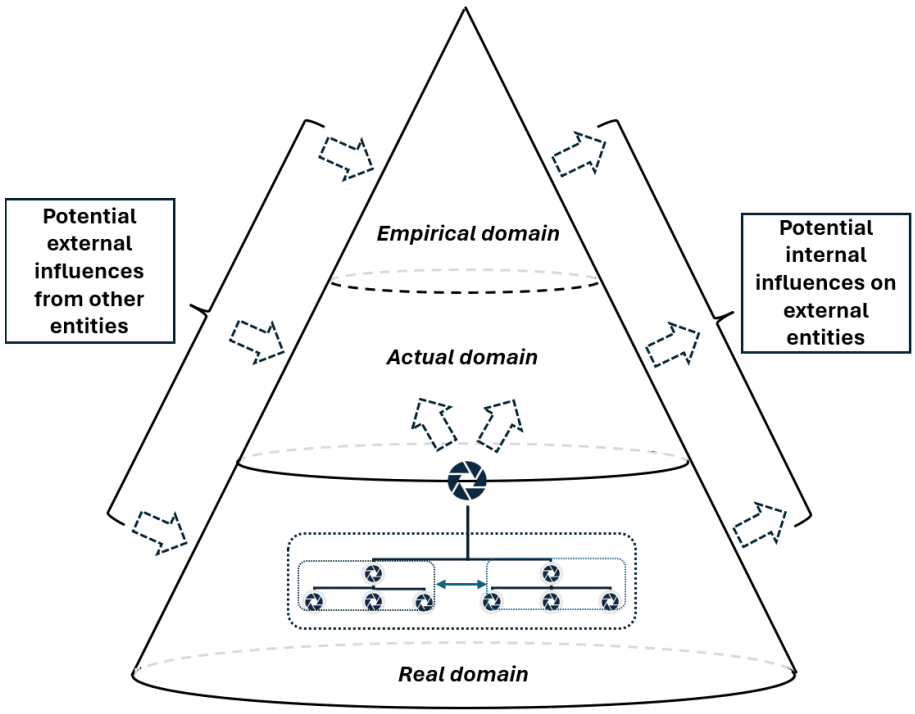


Figure 2.3 *Influences and open systems*

2.2.3 Causal powers and generative mechanisms

The next key ontological aspect of CR concerns the nature of *causal powers* and *generative mechanisms*. A *causal power* refers to an entity capable of producing an effect under particular conditions, while a *generative mechanism* refers to the system or processes that activate or inhibit these powers (Archer, 1995; Sayer, 2003). For example, when tasked with developing tests, teachers engage underlying *generative mechanisms* such as assessment-creation strategies. This

generative mechanism may invoke the teacher's knowledge, beliefs, creativity, or motivation, *causal powers* that can shape the tasks they design.

Causal powers can also trigger *generative mechanisms*. For example, a True/False question has different *causal powers* to short-answer questions. True/False questions may invoke guessing strategies (a generative mechanism) that a short-answer question may not. Through this interaction, *causal powers* and *generative mechanisms* typically form *generative structures*. Because of tendencies, outcomes are manifest in different ways depending on context and conditions. Figure 2.2 (d) illustrates the interaction between *causal powers* and *generative mechanisms*.

Furthermore, as illustrated in Figure 2.4, CR typically identifies three states of *causal powers* and *generative mechanisms* (Sayer, 1992). These are *active and perceived* (Figure 2.4[i])*, active and not perceived* (Figure 2.4[ii]),and *latent and not enacted* (Figure 2.4[iii]). This thesis will describe the states of *generative mechanisms,* noting that states for *causal powers* or *generative structures* are similar. Additionally, these types of *generative mechanisms* exist within individuals as well as within systems (Archer, 1995; Bhaskar, 1979/2015).

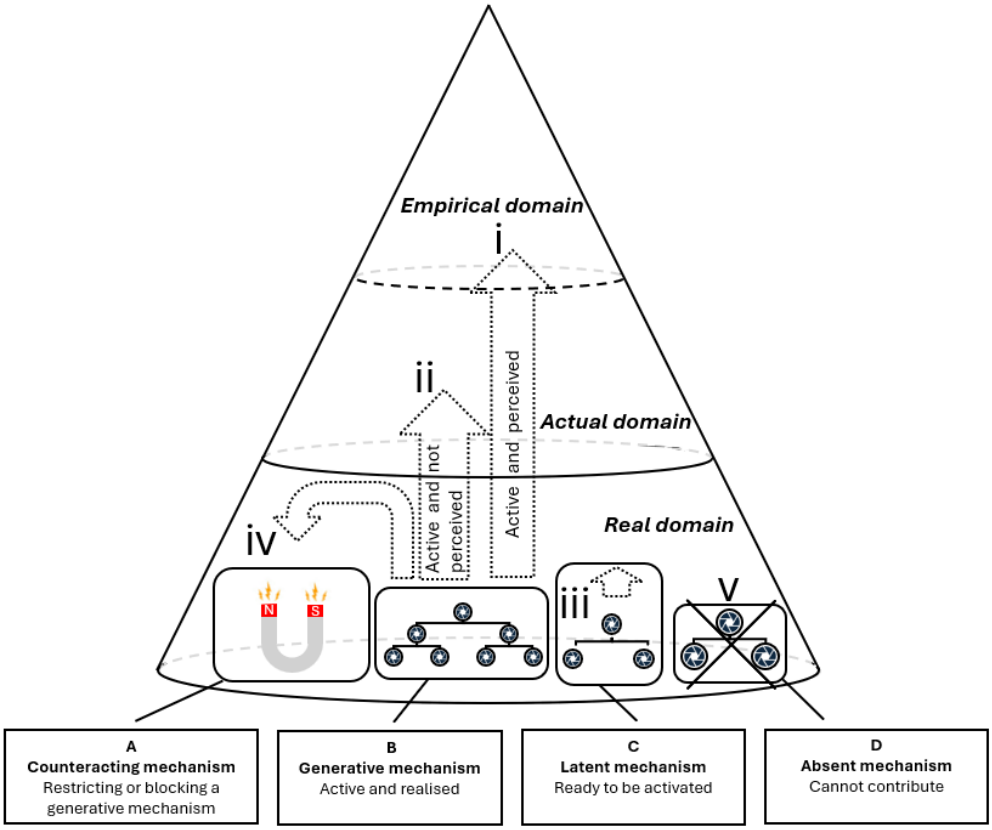


Figure 2.4 *Types of generative mechanism*

The first state, *active and perceived generative mechanisms* (Figure 2.4[i]), represents active underlying structures which are perceived by individuals in the *empirical domain*. For example, a management system which actively monitors VLE use exists in the *real domain* and can be perceived in the *empirical domain* as micromanagement. The second state, *active and not perceived generative mechanisms,* (Figure 2.4, [ii]) are active but remain unnoticed. In the same example, this would occur if teachers were unaware of the VLE monitoring. These distinctions further illustrate why, as described in Section 2.2.1, the *actual* and *empirical domains* are considered ontologically similar by being the same *generative mechanism* but only differing through perception.

The third state, *latent generative mechanisms*, Figure 2.4(iii) exist but are currently unexercised. *Generative mechanisms* existing in latent form can potentially be activated depending on contextual conditions and, once activated, can return to a

latent state if conditions change or cease to exist (Bhaskar, 2008). The arrow within the box, Figure 2.4(iii), highlights its readiness to be exercised. For example, a teacher may possess internal systems for evaluating and adapting their own teaching that can be triggered by poor student progress. After revising their approach, this system can return to its latent state. As Sayer (1992) posits, *latent generative mechanisms* must be acknowledged despite any inactivity.

For this study, perceptual awareness of these mechanisms is important to identify not only *active and perceived generative mechanisms,* but also any *active and not perceived mechanisms,* or *latent generative mechanisms* particularly any emerging from the literature (see Section 2.3.1.1 regarding the use of literature throughout this study). Developing and maintaining such perceptual awareness should enable a more comprehensive understanding of academics' VLE engagement.

Further to generative mechanisms, *counteracting generative mechanisms* also exist that restrict other *generative mechanisms,* thereby preventing or limiting certain outcomes (Figure 2.4[iv]). In CR, *generative mechanisms* must still exist even if counteracted (Wynn and Williams, 2012). For example, an academic may be capable of, and be able to draw upon processes for, designing innovative VLE-based courses. However, competing mechanisms, such as those regarding research output, may supress this mechanism. The lack of VLE use does not mean the *generative mechanism* is non-existent.

Similarly, Bhaskar (1998) later introduced *absent mechanisms*, (Figure 2.4[v]), where a mechanism's absence can exert effects similar to *counteracting generative mechanisms*. For example, a lack of support systems or learning developers to help academics create resources can restrict VLE use. Perceptual awareness of these mechanisms is required throughout the research process, particularly during the data collection and analysis stages, to identify both potential *counteracting generative mechanisms* and *absent mechanisms*, which, by their nature, require identification through the deeper inferential and reasoning

processes of *abduction* and *retroduction* (as explained in Section 2.2.4), or through SGT's tenet of using literature, which is described in Section 2.3.1.1.

Inferring *causal powers* and *generative mechanisms* from data, including literature, is a key aspect of CR's epistemology. Therefore, all these characteristics of *causal powers* and *generative mechanisms* are important research considerations as these influence academics' VLE engagement. The research design (Chapter 4) should elicit data leading to their identification and will also leverage the epistemological tenets of CR and SGT's engagement with literature to identify them.

2.2.4 Abduction and retroduction

As CR recognises that the real domain is unobservable, an analytical and interpretative researcher role is necessary to determine the nature of the real domain. Therefore, epistemologically, CR leverages the practices of *abduction* and *retroduction* to infer the type and characteristics of the generative mechanisms which shape outcomes in the *actual/empirical domain*. CR recognises abduction and retroduction as legitimate forms of knowledge production and these two practices are explained in turn.

Within CR, a*bduction* is a form of inference that seeks to identify plausible explanations of the *empirical domain's* observable events. *Abduction* involves using alternative theoretical frameworks, or perspectives, to guide the interpretation of events and phenomena (Danermark et al., 2019). By abduction, they typically mean using any mid-range theory (e.g., Social Identity Theory) to interpret phenomena. For example, through Social Identity Theory, low VLE uptake could be *abducted* as being caused by perceptions of group identity; the academic identifies as belonging to a group of traditional lecturers and is therefore resistant to becoming a digital educator. For this study, undertaking *abduction* is important for interpreting responses and moving beyond surface-

level understandings. This critical engagement often leads to the practice of *retroduction*.

Retroduction is the process of inferring the *real domain's* underlying *causal powers* and *generative mechanisms* based on observations and experiences in the *empirical domain*. As Bhaskar (2015) argues, in the social sciences, underlying causes exist independently of our experience and must be established through *retroduction*. Danermark et al. (2019) describe retroduction as reasoning to surmise the potential *causal powers* and *generative mechanisms* that plausibly explain observable outcomes. For example, an academic's decision to miss VLE training could be *retroduced* to numerous *generative structures,* including poor time management practices or personal priorities.

Similarly, *abduction* and *retroduction* can be used in concert. To do so, the researcher first abducts an observable event through another lens and then employs retroduction to make inferences about the real domain based on the abduction (Hoddy, 2019). For example, an academic avoiding VLE training sessions is an observable event. Abducted using Social Identity Theory to concepts of 'group identity', this behaviour could then be *retroduced* to an underlying *generative structure* such as identity preservation strategies. Identifying such an underlying generative structure presents a plausible reason why an academic may avoid VLE training.

The use of *abduction* and *retroduction* is vital for uncovering deeper generative structures that shape behaviour. As Archer (2003) argues, interviewing may not fully capture the underlying reasoning or provide insights regarding their decision-making processes. Therefore, these inferential strategies are essential in analysing the interviewees' responses, while further critical literature engagement may uncover plausible insights and explanations concerning academics' VLE engagement. Furthermore, Bhaskar (2008) posits that *causal powers* and *generative mechanisms* can interact in unique ways, producing emergent properties that are now explained.

2.2.5 Emergence

Emergence is generally considered the phenomenon of *causal powers* and *generative mechanisms* combining in specific ways under specific conditions, resulting in new *generative structures* with novel properties (Danermark et al., 2019). *Emergence* is also conceptualised as a synergy whose whole is more than the sum of the parts (Wynn and Williams, 2012) and creates structures whose understanding is irreducible to their components (Bhaskar, 2008). This means that while emergent structures' causal powers depend on their components to produce outcomes, complete understanding cannot be attributed to understanding either the components or the emergent power. A common analogy is water, as understanding water cannot determine any understanding of hydrogen or oxygen, nor vice versa. This also means that adding or removing one *causal power* can fundamentally change the nature of the emergent structure itself: adding one carbon atom to water creates formaldehyde (CH_2O). Such emergent structures contrast with *aggregative* structures, such as a VLEs affordances; adding or removing a feature (a causal power) does not fundamentally change the nature of the VLE. As will be explained in Section 5.10, LTAM itself represents an emergent structure.

Using TPACK as a simplified example of *emergence*, individual academics possess subject-specific knowledge (Content Knowledge), knowledge of teaching methodologies (Pedagogic Knowledge), and the ability to leverage digital technologies (Technical Knowledge). The intersection of these three dimensions, as highlighted in TPACK, reflects an emergent form of professional agency. Similarly, the combination of attendance policies, assessment processes, and course approval processes may combine as an emergent curriculum development structure. Together, professional agency and curriculum development structures can represent the high-level emergent structure of a course design framework (Figure 2.5). Although *emergence* can be highly sophisticated, deeper philosophical description is beyond the scope of this thesis.

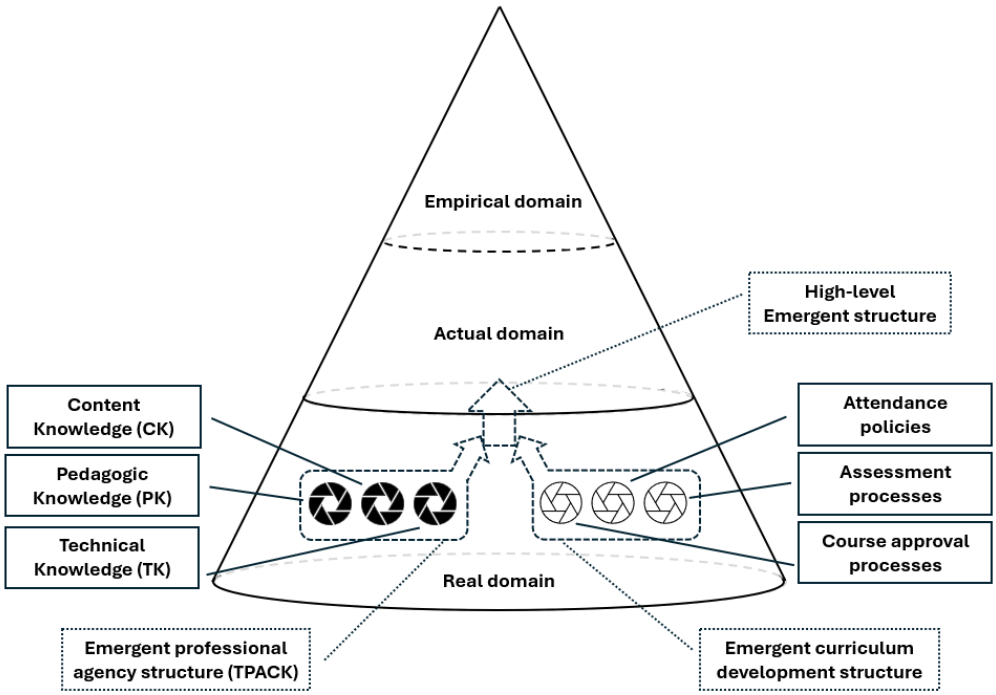


Figure 2.5 *Simplified illustration of emergence*

Perceptual awareness of *emergence* is important, particularly as academics' adoption and use of VLEs in HE is itself an *emergent structure,* and this study is fundamentally aimed at identifying the underlying generative structures contributing to their VLE engagement. It is also essential to recognise that as part of CR's ontological depth, these underlying generative structures may themselves also be emergent structures.

2.2.6 Morphogenetic Approach

Building on CR's stratified reality, the Transformational Model of Social Activity / Morphogenetic Approach accounts for mutual influences between the *real domain* and the *actual/empirical domain*. For context, in Bhaskar's (1975/2008) initial formulation of CR, *causal mechanisms* were seen as one-way. In his later work (Bhaskar, 1979/2015), and with the Transformational Model of the Society/Person Connection, later called the Transformational Model of Social

Activity (TMSA) (Bhaskar, 1998), he recognised that entities in the *actual/empirical domain* can also influence, or change, the *real domain* within a cycle of mutual interaction.

This mutual influence represents a key tenet of Archer's (1995) Morphogenetic Approach, where socio-cultural interaction can lead individuals or groups to either modify the underlying *causal powers* and *generative mechanisms* 'morphogenesis' or reinforce them 'morphostasis' (Figure 2.6). For example, by presenting evidence from this study, I could engender change in the university's processes that encourage academics' VLE engagement. For clarity, this thesis will employ the terms *morphogenesis* and *morphostasis* throughout rather than Bhaskar's (1998) TMSA. For brevity, the term *morphogenesis* will typically refer to both *morphogenesis* and *morphostasis* unless the individual processes are specified.

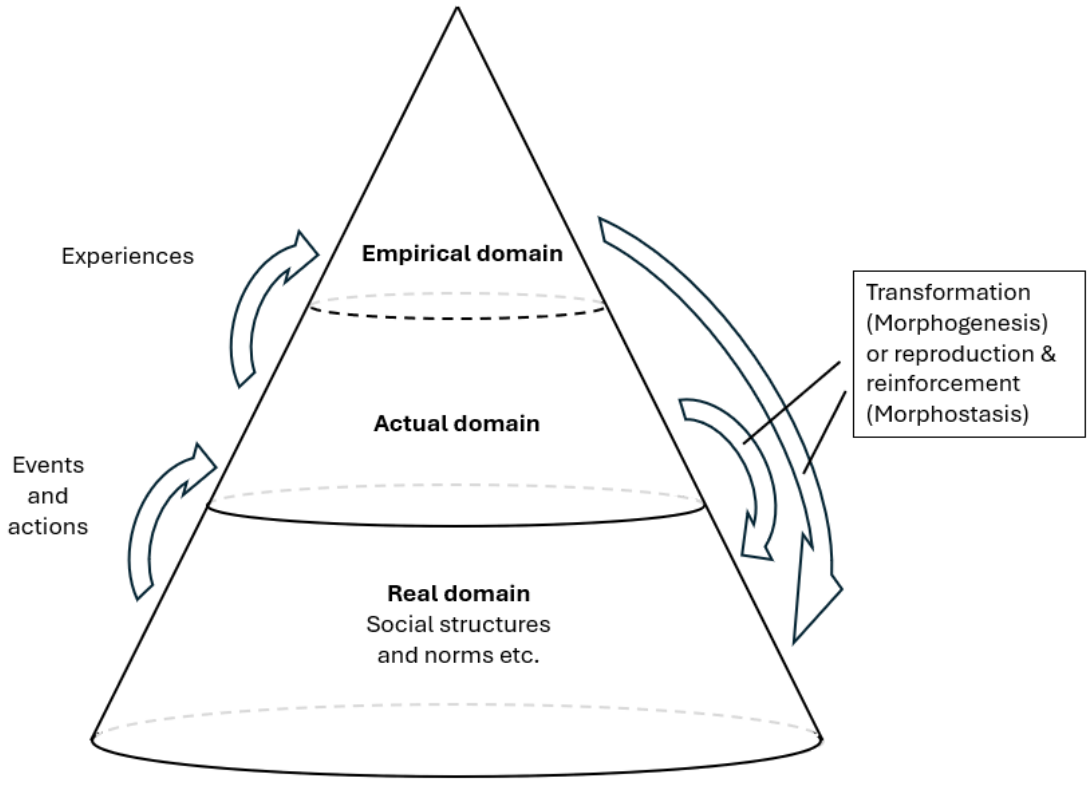


Figure 2.6 *The Morphogenetic Approach*
Adapted from Archer (1995) and Bhaskar (2015)

2.2.7 Agency, personal emergent properties, and reflexivity

Agency, personal emergent properties (PEPs), and reflexivity are crucial aspects of this theoretical framework. Within the Morphogenetic Approach, Archer (1995) stresses the importance of a stratified model of the person. She further argues that, in recognising individuals as distinct from social structures, a concept she terms *analytic dualism*, we must also recognise that individuals have the underlying capacity to deliberate and evaluate courses of action guided by their 'ultimate concerns' or by any hierarchy of ultimate concerns (Archer, 2003).

PEPs refer to each person's unique causal powers which influence their ability to determine courses of action (Archer, 1995). These PEPs, such as professional reputation or identity, are emergent causal powers which can arise from the interaction of an individual's simpler causal powers and, like all causal powers, remain latent until activated. For example, an academic's idealised professional identity is a PEP. It can emerge over time from combinations of simpler causal powers such as curiosity, ambition, confidence, and knowledge. Conscious decisions to strive for an ideal identity causes them to prioritise certain activities over others. If attending VLE training is perceived as threatening or distracting from the attainment of their idealised personal identity, they may reflexively choose to invoke other generative mechanisms, such as avoidance strategies.

Reflexivity is a key generative mechanism and central to human agency. As Archer (2003) argues, *reflexive processes* are inner conversations shaped by beliefs, desires, commitments, or evaluations of constraints. Reflexivity allows individuals to consider various alternatives before determining courses of action. Archer (2003) stresses individuals' ultimate concerns determine how they confront situations and exploit any resources or opportunities. While she frames reflexivity as deliberate, she also acknowledges *habitualised behaviour* or *embodied dispositions* to describe acting without explicit reflection.

It is important to note that capacities, including *reflexivity,* exist in the *real domain,* whereas enacting them lie in the *actual domain*. This distinction is important, as although this study aims to investigate and understand the *real domain*, additional explanatory power may arise by examining and situating processes in the *actual domain*. For example, when confronted by departmental directives to increase VLE use, academics possess the capacity in the *real domain* to evaluate such directives. However, it is in the actual process of deliberation and considering the directive against workload, existing commitments, and their ultimate concerns that a course of action is determined. Understanding how individuals make concessions towards directives while still prioritising their own goals offers additional explanatory power, particularly by actively *retroducing* any plausible PEPs that could be influencing such decisions.

Reflexivity's ontological importance is central to this study especially given that individuals' personal motivations emerged early on as a key factor shaping academics' adoption and use of VLEs in HE. Within a CR framework and the Morphogenetic Approach, reflexivity is a fundamental mechanism through which individuals determine a course of action. Therefore, attunement to aspects of *reflexivity,* especially for inferring underlying causal powers, will be considered throughout, particularly given Archer's (2003) noted difficulty in interrogating informants to comprehensively reveal their inner conversations.

Furthermore, while investigating how academics act within existing social systems, it also recognises Archer's (2007) claim that a social system's success is contingent upon its capacity to become attuned to the individuals within it. In other words, the institution as an education system cannot thrive without accommodating the ultimate concerns of those within it. So, while an institution's systems affect academics' actions, without responsiveness they risk estranging those it is meant to serve. This insight also anticipates a potential implication for the conclusion, that institutional responsiveness is necessary for optimal VLE engagement.

2.2.8 Summary of CR factors

While CR is complex and contains elements not detailed here, the tenets outlined above are central to this study. They will shape the research design by informing the interview protocol, guiding purposive recruitment of participants, and ensuring that conceptual awareness of CR's principles also informs the conduct of the interviews, the data analysis, and the interpretation and discussion of the findings. Taken together, these considerations ensure a principled and coherent investigation designed to encourage participants to reveal insights into, or to suggest aspects of, their reflexivity. Consequently, this study requires a compatible research methodology which is aligned with CR and this study's objectives to identify causal powers or generative mechanisms. The next section will focus on the methodology of Straussian Grounded Theory (SGT).

2.3 Straussian Grounded Theory

To develop a new explanatory model of academics' adoption and use of VLEs in HE, I decided to adopt Grounded Theory (GT) as my research methodology to complement CR. Grounded Theory (GT) is the principal method for inductive 'ground up' theory development from qualitative data and its analysis (Glaser and Strauss, 1967/2006). However, since GT's original conception, various iterations have emerged. I deliberately adopted SGT, an evolution of Glaser and Strauss' original theory (Kenny and Fourie, 2015; Rieger, 2019), due to its suitability to generate new understandings of complex social phenomena and its compatibility with CR, as elaborated upon in Section 2.4.

This study's methodology draws heavily on Corbin and Strauss (2008), an update and revision of Strauss and Corbin's original 1990 publication. This section will first provide a brief introduction to SGT and then outline its core methodology, including its approach to literature and coding. Subsequently, I will justify its

selection as the methodology for a CR-informed study and detail how SGT's core principles align with a CR ontology and epistemology. This alignment will be illustrated through a summary of an existing investigation that used a CR-informed SGT approach.

2.3.1 Overview of grounded theory

GT was first described in the seminal 1967 book 'The Discovery of Grounded Theory: Strategies for Qualitative Research' as a robust, inductive theory development process using qualitative data to generate theory rather than using data to prove hypotheses (Glaser and Strauss, 1967/2006). Since then, GT has evolved and fostered numerous derivations and elaborations (Kenny and Fourie, 2015), meaning GT now represents a family of inductive research methodologies. While numerous variations exist including Glaserian GT (GGT), Straussian GT (SGT), and Constructivist GT, this thesis will refer to GT when discussing the overarching principles and SGT or GGT when denoting the specific methodology employed. However, specific comparisons of these evolutions, their philosophical positions, and procedural comparisons lie beyond the scope of this thesis, as does an in-depth explanation of SGT.

Essentially, GT is a qualitative, iterative research method for developing theory from data. Drawing from Glaser and Strauss (2006), the researcher typically starts by purposively recruiting initial informants, interviewing them, and then identifying key emerging concepts. These concepts then both shape theory development and determine subsequent interviewees and questions. In practice, during the investigation, data is immediately coded then analysed and compared to previous participants' responses. GT also involves memo writing to record the investigator's analysis, thoughts, insights, and speculations. These are considered essential in informing theory generation and guiding research directions. Comparing previous responses and memos is part of the 'constant

comparison' method, which is explained in Section 2.3.2. Overall, GT is a dynamic, iterative, and fluid research process in which only the initial research is predictable, with research directions emerging as the research progresses. However, an important differentiating aspect for this study is SGT's use of literature which will now be explained.

2.3.1.1 Use of literature in SGT

SGT's literature approach is a key methodological consideration and is particularly appropriate for this study. While GGT generally proscribes consulting literature to ensure researcher disinterest and elevate theoretical sensitivity until data analysis has finished, Corbin and Strauss (2008) maintain that an integrated literature approach is essential. Danermark et al. (2019) further argue that SGT's approach to literature can result in more nuanced and robust findings.

SGT encourages literature engagement throughout the entire process. This includes a preliminary literature review to acquire foundational knowledge, identify research gaps, inform the research design, and sensitise the researcher. SGT also recommends consulting literature as part of constant comparison to assist with data analysis, memo writing, and reflection, which improves theoretical sensitivity and theory generation (Kenny and Fourie, 2015). Like other GT approaches, SGT obliges researchers to conduct a substantive literature review after theory development for comparison with existing literature and to help locate it within the broader canon. Importantly, as discussed further in Section 2.4, SGT's integrated approach to literature aligns with CR and also directly supports abduction and retroduction in the development of deeper understandings, and to identify generative structures.

2.3.1.2 Preliminary literature review

Corbin and Strauss (2008) encourage a preliminary literature review to acquire background knowledge which can prompt preliminary research directions and shape questions for early-stage interviews. Although Corbin and Strauss (2008) provide little information on conducting preliminary literature reviews, they stress that comprehensive knowledge is not essential. They further contend that grounding interview questions in existing literature can satisfy everyone of the researcher's professionalism, competence, and can maximise early-stage interviews by not eliciting foundational information. Furthermore, they argue that building awareness of key themes from a preliminary literature review increases researcher sensitivity, which can accelerate the recognition of significant data, including incongruent, divergent, or dissonant responses either while interviewing or during subsequent analysis. This in turn permits earlier thematic inquiry with current or subsequent participants and also guides the purposive recruitment of participants. Such researcher sensitivity is central to Corbin and Strauss' (2008) assertion that integrating literature adds rigour to SGT investigations.

Further to its methodological alignment to CR, I considered that a preliminary literature review conferred further advantages. Firstly, it allowed me to clarify, crystallise, and extend my theoretical understanding of academics' adoption and use of VLEs in HE ahead of the investigation, which until then had been primarily based on knowledge of TAM, UTAUT, and TPACK. Conducting a preliminary literature review also increased my confidence, especially as Digital Learning Directors were identified for early-stage interviews, and it further increased my conviction that I had identified a research-worthy gap in the literature. I also appreciated its guidance for my research design by suggesting potential research directions and question themes. I also believe it enhanced my sensitivity to the participants' responses and attuned me to aspects of their reflexivity and understanding their perspectives.

2.3.1.3 Literature throughout the research

Corbin and Strauss (2008) recommend consulting literature throughout the research process, a notable difference between GGT and SGT. While GGT typically proscribes consulting research-related literature during the research (Glaser and Strauss, 2006), Corbin and Strauss (2008) encourage literature interrogation throughout to both increase theoretical sensitivity and as a legitimate data source during constant comparison. Therefore, while both methods involve simultaneous data collection and analysis, only SGT encourages consulting the literature during analysis, coding, and reflection.

For example, in coding early interviews with Digital Learning Directors, a theme emerged that VLE mastery was not considered a core aspect of many academics' roles. This theme was subsequently reinforced in the fourth interview where the participant mentioned being a researcher and 'my identity is tied up in my outputs' [#04]. Constant comparison and memo writing led me to literature related to academics' identity and education technology adoption, which subsequently appears in this thesis. Comparison between data and literature led me to include questions about professional identity and to approach an academic who I understood to be a committed teacher. Her responses were insightful, and she subsequently suggested other potential like-minded respondents.

Literature engagement throughout further justified adopting SGT particularly given my use of CR. As difficulties in identifying participants' decision-making processes were already noted in Section 2.2.4, recourse to literature can suggest theoretically grounded explanations which can help accelerate the process of accurately identifying these thought processes and assist in determining the more plausible explanations. Such recourse to literature encourages active researcher engagement by further promoting abduction and retroduction. For example, I noted that not all participants identifying as teachers valued the VLE, while one active researcher had fully embraced it despite having a minimal teaching load. Reflection led me to consider expanding upon Davis' (1985) 'Attitude towards

using' from TAM to broader investigations of attitude. Literature research identified Dweck's (2006) concepts of 'Growth Mindset' and 'Fixed Mindset' and also Kelley's (1992) concepts of 'Followership', which could be employed as theoretical lenses regarding attitude. This example further demonstrates the value of literature engagement especially as CR recognises such critical engagement and interpretation as a valid form of knowledge production.

2.3.1.4 Substantive literature review

Both SGT and GGT oblige researchers to conduct a substantive literature review after the core findings have been described (Corbin and Strauss, 2008; Glaser and Strauss, 2006). Such a substantive literature review serves to situate the nascent theory within the broader canon, and to demonstrate and validate the contribution to existing knowledge while further contributing to the research credibility. This later substantive literature review (Chapter 6) also served to inform the discussion (Chapter 7).

2.3.2 Constant comparison

Constant comparison is a key analytical technique in GT (Glaser and Strauss, 2006). It encompasses the process of comparing different elements of the research such as new data with existing data, new codes with existing codes, emerging categories with existing categories, as well as revisiting existing memos and relevant literature. This permits the identification of similarities, differences, consistency, and incongruence while allowing researchers to revisit and refine meanings attributed to any data and help develop theory (Corbin and Strauss, 2008). Constant comparison is used extensively during coding and analysis.

2.3.3 Coding

Coding in GT is well-understood with a detailed explanation lying beyond the scope of this thesis. However, there is a methodological distinction between GGT and SGT concerning coding. Although both approaches follow similar protocols and start with *open coding*, only SGT promotes *axial coding,* as discussed in Section 2.3.3.2, whereas GGT rejects its use. This methodological distinction regarding coding is not just procedural but reflects different epistemological assumptions regarding the generation of knowledge and how categories develop. Furthermore, *axial coding* is congruent with CR, an aspect further elaborated upon in Section 2.4, which strengthens the rationale for adopting SGT in this study. The coding process will be explained.

2.3.3.1 Open coding

Open coding is well understood, and although the process was originally described within GGT (Glaser and Strauss, 2006), the term o*pen coding* was later formalised as an SGT process (Corbin and Strauss, 2008). In *open coding*, researchers systematically analyse data line by line to generate conceptual labels (codes) grounded in the data. Each line in the data can be coded to more than one label or not coded if nothing meaningful emerges.

Both GGT and SGT advocate iterative coding with GGT emphasising recoding to refine and saturate the codes (Glaser and Strauss, 2006), while SGT encourages revisiting previous transcripts once new codes emerge to identify insights originally overlooked (Corbin and Strauss, 2008). Consider one utterance from my study, “The learning section is…is something we developed as a team over lockdown,” [#11]. After being coded twice in context, it was eventually coded as ‘technical knowledge of VLE’, ‘positive attitude towards using the VLE’,

‘collegiality’, ‘pedagogic knowledge’, and ‘structures content appropriately’, reflecting the utterance’s nuanced dimensions.

2.3.3.2 Axial coding

Axial coding represents the second stage of SGT’s coding process. Essentially, it involves integrating discrete open codes into broader concepts. Corbin and Strauss (2008) introduced structured guidance for axial coding, where researchers explore six dimensions: the phenomenon itself, causal conditions, contextual factors, intervening conditions, actions/interactions, and consequences. Using this framework, researchers can organise and integrate codes around conceptual categories. Corbin and Strauss (2008) do not prescribe a rigid method of conducting the integration and instead advocate doing whatever works to help identify relationships and develop categories, including using mind maps, coding matrices, flow diagrams, memoing, and consultation with literature to gain insights and assist with developing categories. For example in this study, codes including ‘avoid cognitive strain for students’, ‘acknowledge differences between students’ and ‘not teaching materials – teaching students’ were all conceptually integrated around the axial category of ‘empathy’. Axial coding represents a key cognitive and interpretivist step towards inferring the underlying causal powers and generative mechanisms that influence academics’ VLE engagement.

2.3.3.3 Selective coding

Both GGT and SGT advocate a final step, *selective coding*, where a single core category is identified to unify all other categories and anchor theory development (Corbin and Strauss, 2008; Glaser and Strauss, 2006). However, instead of identifying a single core category, an accepted adaptation is to construct a new

theoretical framework that includes interrelated categories (Corbin and Strauss, 2008). LTAM, as presented in Section 5.10 as a new explanatory model, retains the axial categories as distinct, but conceptually integrated entities.

2.3.4 Summary of grounded theory

SGT adopts many methods and theoretical principles from GGT including constant comparison, memo writing, theoretical sampling, theoretical saturation, and being iterative. However, SGT was preferred, particularly as the coding paradigm is more compatible with CR and it advocates consultation with literature throughout. The next section will briefly expand on the compatibility between GT and CR and explain why SGT is compatible in this study.

2.4 Compatibility and alignment of CR and SGT

The integration and alignment of CR and SGT form the methodological foundation for this study. The combination and compatibility offer deeper insights into the underlying generative structures and specifically into individuals' reflexivity. Being innovative research, relatively few such combinatorial investigations have been conducted. However, various theorists (e.g., Annells, 1996; Hoddy, 2018; Oliver, 2012) have argued for their compatibility. Similarly, Danermark et al. (2019) also argue that GT methods have the most potential regarding CR-informed social science research.

The compatibility and alignment of CR, particularly the Morphogenetic Approach, with SGT is central to legitimising the research process and ensuring credibility in my findings. As discussed in Section 2.2.1, CR's ontological depth and its emphasis on cognitive engagement to infer generative structures are strongly supported by SGT's methodology. They both share a commitment to explaining

phenomena in depth and both emphasise identifying patterns and relationships in data, which includes using reasoning and inference from primary data. Furthermore, SGT's use of axial coding and focusing on context further demonstrate alignment, while SGT's advocacy of synthesising primary data and existing literature, as well as abduction to generate knowledge, also demonstrates compatibility with CR's use of retroduction.

Additionally, the Morphogenetic Approach's ontology, particularly *analytical dualism* alongside individuals' *personal emergent properties* (PEPs), and the role of reflexivity in shaping behaviours represents a crucial aspect of compatibility. This alignment is further demonstrated by Corbin and Strauss (2008) who identify reflexivity's conceptually similar 'internal thinking' as a reflexive process where researchers mediate between contextual conditions and action/interaction. While situationally different, it represents conceptual alignment. This focus on PEPs further relates to earlier observations in Section 2.2 that academics' VLE engagement behaviours are personal decisions influenced by organisational culture.

Hoddy (2018) in particular provides a strong theoretical and practical description of SGT techniques complementing CR. He described how SGT tenets including preliminary consultation with literature, open and axial coding, and how constant comparison combined with abduction and retroduction can identify causal mechanisms. After presenting their compatibility, Hoddy outlined an investigation to understand and explain the causes of unmet needs amongst Tunisian sharecroppers. Following a clearly articulated iterative SGT process (Hoddy, 2018, p.115), he identified their lived experiences including farming practices, landlords, money lenders, and the 'agri-industry'. Abduction helped reframe many of the participants' experiences in terms of needs. He then retroduced underlying causal powers and generative structures including class, systems of exploitation, economic power, social subjugation, and insecurity within a morphogenetic system, which reinforced and reproduced the social system, depriving the sharecroppers of their needs. This study, although focussing on social justice

rather than education technology, clearly illustrates the compatibility of SGT and CR.

CR combined with SGT is an appropriate theoretical framework for this study. They demonstrate compatibility through commitments to explaining, rather than predicting, events and phenomena. CR provides the ontological and epistemological foundation, while SGT provides the systematic theory-development methodology based on participants' experiences. In concert, SGT facilitates the identification of patterns and themes, while CR helps identify the deeper generative structures related to academics' VLE engagement.

Chapter 3: Preliminary literature review

3.1 Overview

Building on the methodological foundations of SGT, as described in Section 2.3.1.1, and ahead of the research design, this thesis now deliberately presents the preliminary literature review as a separate chapter from the later substantive literature review. As a specific feature of SGT, Corbin and Strauss (2008) advocate for a preliminary literature review to contextualise the research and inform the research design, with a later substantive literature review (Chapter 6). This aspect differs from classic GT approaches, which only include the later literature review (Glaser and Strauss, 2006), and from many research traditions which typically present a single, extensive, early-stage literature review. Like a traditional literature review, this preliminary literature review also serves to identify gaps in the literature and justify my study.

As described in the theoretical framework (Chapter 2), Corbin and Strauss (2008) state that early literature engagement facilitates understandings of the research landscape, generates initial research trajectories and interview questions, and enhances the researcher's sensitivity to interview responses. As such, it can also inform initial data analysis. Furthermore, they claim it demonstrates professionalism to others, including ethics committees and participants, and also contextualises the research for readers. However, they discourage substantial initial investigations to avoid constraining, intimidating, influencing, or biasing the researcher.

As previously stated in Sections 1.1, 1.2, 1.6, and 2.3, this study aims to generate a new explanatory model of academics' adoption and use of VLEs in HE. Therefore, this preliminary literature review focuses on identifying and examining existing models and theories used in such research. This focus on existing models and theories also aligns with my previous desk-based research, as described in Section 1.2, where I had already investigated TAM and UTAUT. This chapter

describes the four most common models which represent a significant majority of models used in such studies. It outlines limitations in existing research and describes how insights from the preliminary literature review are applied in this study.

3.2 Existing models and theories used in VLE adoption

To conduct this preliminary literature review, I searched Google Scholar to identify literature reviews and systematic reviews regarding academics' LMS/VLE/CMS adoption. Saturation was reached after seven such reviews, with subsequent analysis identifying 31 models and theories. Table 3.1 summarises them by theory, and Table 3.2 by publication. As seen in the substantive literature review (Table 6.2), these seven systematic reviews did not capture a small number of other models, each used once, including UTAUT 3, GETAMEL (a modified TAM) and User Centred Design (UCD) in a later paper (Yalamu, Al Mahmud, and Chau, 2025).

General models and theories of adoption and acceptance of technology	
1	Technology Acceptance Model (TAM)
2	Technology Acceptance Model 2 (TAM2)
3	Technology Acceptance Model 3 (TAM3)
4	Extended TAM (ETAM)
5	Unified Theory of Acceptance and Use of Technology (UTAUT)
6	Unified Theory of Acceptance and Use of Technology 2 (UTAUT 2)
7	Three-Tier Use Model (3-TUM)
8	DeLone and McLean's Information Systems Success Model (ISSM)
9	Task Technology Fit (TTF)
10	Diffusion of Innovations (DOI) / Innovation Diffusion Theory (IDT)
11	Information Systems Continuation Model (ISCM)
General psychological models used in technology adoption and acceptance	
12	Expectation Confirmation Model (ECM)
13	Theory of Reasoned Action (TRA)
14	Theory of Planned Behaviour (TPB)
15	Social Cognitive Theory (SCT)
16	Motivational Model (MM) / Motivation Theory (MT)
17	Constructivism Theory (CT)
18	Cognitive Load Theory (CLT)
19	Theory of Human Behaviour (THB)
20	Stimulus Theoretical Framework (STF)
21	Social Determination Theory (SDT)
22	Transformative Learning Theory (TLT)
23	Expectancy Value Theory (EVT)
24	Channel Expression Theory (CET)
25	Computer Self-Efficacy (SE)
Characteristics of the technology and facilitating conditions	
26	Technology Organisation Environment (TOE)
27	Systems Quality Model (SQM) / Quality of Information Systems (QIS)
28	Service Quality Evaluation Model (SQEM)
29	Interpretive Structural Modelling (ISM)
30	Technology Life-Cycle (TLC)
Other	
31	Hypothesised Conceptual Model (HCM)

Table 3.1 *Models and theories used in technology adoption research*

Authors and year	Criteria	Models and theories in Table 3.1
Al-Nuami and Al-Emran (2021)	HE between 2005 and 2020	1, 3, 5, 6, 8, 9, 10, 13, 15, 16, 23
Bervell and Umar (2017)	HE in Sub-Saharan Africa 2007- 2017	1, 5, 8,10
Keyali, Safie, and Mukhtar (2016)	2013-2016	1, 5, 10, 13, 14, 16, 21, 24, 25, 26, 27
Lai (2017)	Not stated	1, 2, 3, 5, 9, 10, 13,14, 20
Omieno (2022)	Not stated	1, 9, 10, 11, 12, 13, 14, 15, 19, 30
Salgado-Chamorro, Noble-Ramos, and Gomez-Jaramillo (2023)	VLEs in face-to-face learning 2018-2022	1, 5, 8, 10, 14, 18, 22, 28, 29
Ziraba, Akwene, Nkea, and Lwanga (2020)	Moodle	1, 2, 4, 5, 7, 13, 14, 17, 31

Table 3.2 *Models and theories in the preliminary literature review*

3.3 Model and theory analysis

As presented in Table 3.1, analysis identified three main categories of models and theories: specific technology adoption models, including TAM and UTAUT, generalised psychological, social, and cognitive theories; and theories associated with characteristics of the technology and facilitating conditions. One additional theory, HCM, was categorised under 'Other'.

Four publications presented usable counts of theory and model use from their qualifying papers: Salgado-Chamorro et al. (2023) (Figure 3.1), Al-Nuami and Al-Emran (2021) (Figure 3.2), Bervell and Umar (2017) (Figure 3.3) and Kayali, Safie, and Mukhtar (2016) (Figure 3.4). These publications indicate that the most popular technology adoption models are TAM, UTAUT, ISSM, and DOI/IDT, with the most popular psychological theories being the Expectation Confirmation Model and the Theory of Reasoned Action. The most popular model regarding the characteristics of the technology and facilitating conditions is the Technology Organisation Environment framework. Unlike the other three papers, Salgado-Chamorro et al.

(2023) only focused on original models, so no derivations were included. The remaining publications listed models but without usable statistics. No specific education technology or VLE adoption models were identified; all investigations using technology adoption models employed either original or modified generalised models. Therefore, research into generating a specific VLE adoption model is warranted.

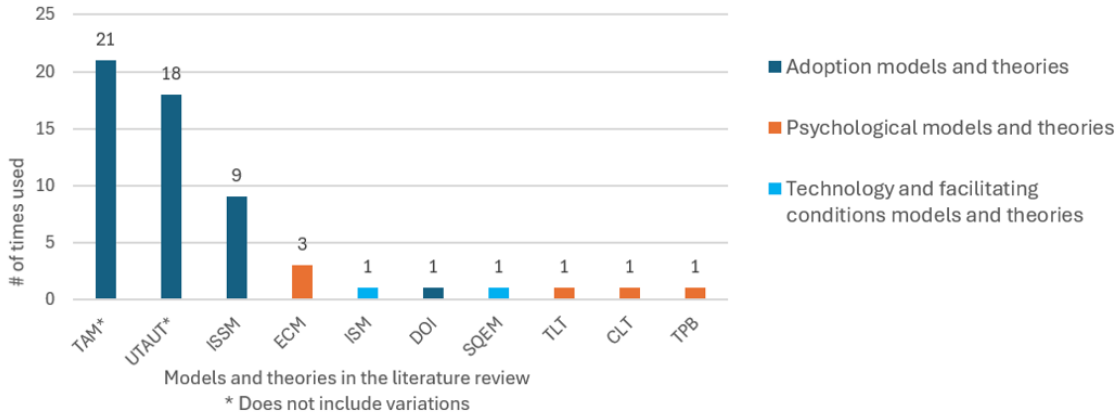


Figure 3.1 *Frequency of models and theories in Salgado-Chamorro et al. (2023)*
Adapted from Salgado-Chamorro et al. (2023)

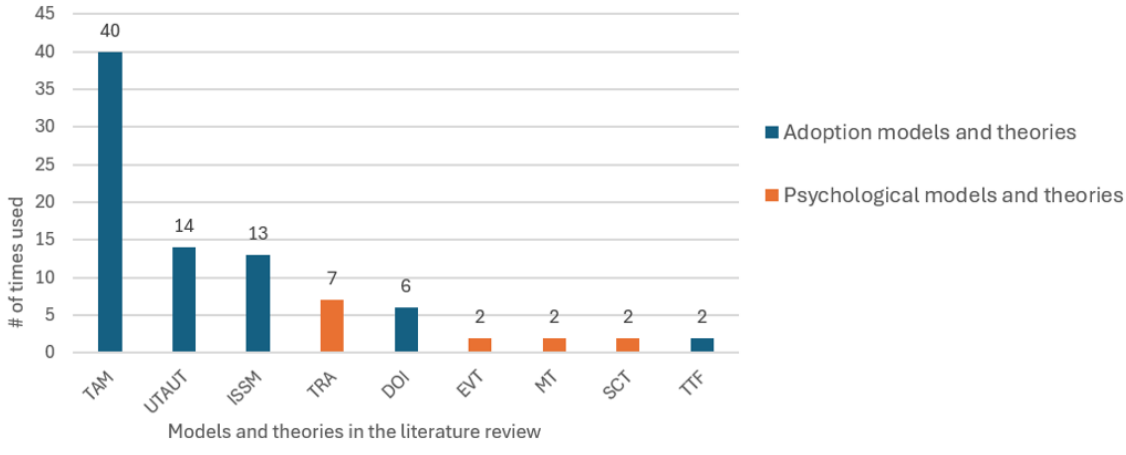


Figure 3.2 *Frequency of models and theories in Al-Nuami and Al-Emran (2020)*
Adapted from Al-Nuami and Al-Emran (2020)

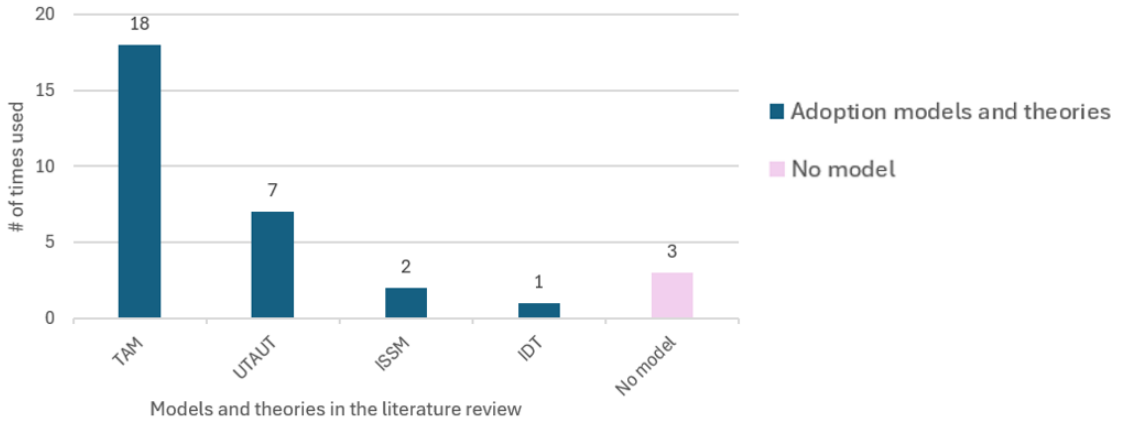


Figure 3.3 *Frequency of models and theories in Bervell (2017)*
Adapted from Bervell (2017)

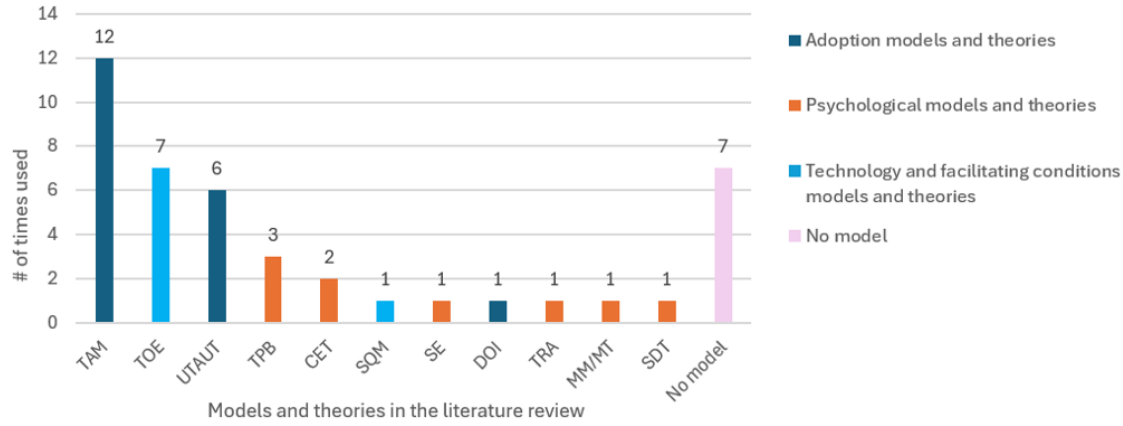


Figure 3.4 *Frequency of models and theories in Kayali, Safie, and Mukhtar (2016)*
Adapted from Kayali, Safie and Mukhtar (2016)

3.4 Description of the four main models

Four models, TAM, UTAUT, ISSM, and DOI/IDT, appeared in over 75% of VLE adoption research and over 90% of research using a technology adoption model. As these models shape much of the existing research into technology adoption, it is important to outline their constructs, contributions, and limitations in advance

of this study. This chapter will now describe these dominant technology adoption models.

3.4.1 Technology Acceptance Model (TAM)

TAM (Davis, Bagozzi, and Warshaw, 1989), based on Davis' (1985) original, is the most popular model identified in VLE adoption studies. TAM contains five named entities presented as influencing acceptance and actual use, including the ontologically undefined precursor *external variables* (Figure 3.5). Davis (1985) developed TAM from the Theory of Reasoned Action (TRA) by adding two hypothesised entities, *Perceived Usefulness* (PU) and *Perceived Ease of Use* (PEU), both seen as affecting *Attitude Towards Using* and, consequently, *Behavioural Intention to Use*. As illustrated in Figure 3.5, this linear model is considered to explain and predict technology adoption, which in this review refers to VLEs.

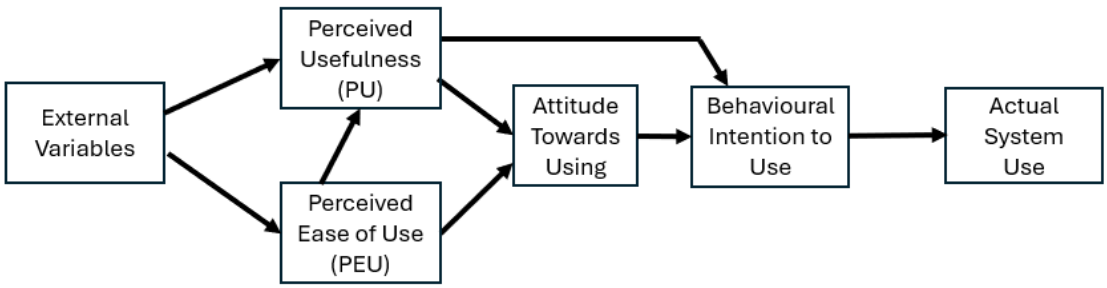


Figure 3.5 *Technology Acceptance Model*
Adapted from Davis, Bagozzi and Warshaw (1989)

While TAM highlights some cognitive factors of technology adoption, it lacks depth regarding deeper human and organisational factors and, as presented, is ontologically indistinct. Focusing on PU and PEU oversimplifies adoption processes and neglects many influences shaping decision-making. Although

external variables can be added, they affect PU and PEU and cannot affect *Attitude Towards Using* or *Behavioural Intention to Use* directly. Subsequently, numerous derivations and extensions of TAM have been proposed to address its perceived weaknesses. These include TAM 2 (Venkatesh and Davis, 2000), TAM 3 (Venkatesh and Bala, 2008), GETAMEL (Matarirano, Jere, Sibanda, and Panicker, 2020), TAM + TFF (Lee, Chiu, Chen, Lin, and Lin, 2022), as well as UTAUT (Venkatesh, Morris, Davis, and Davis, 2003), which incorporated TAM in its formulation.

Despite its limitations, TAM's constructs of PU, PEU, and *attitude towards using* informed the initial question generation, enhanced theoretical sensitivity throughout, and assisted with data analysis. As previously described in Section 2.2.1, as a key ontological tenet of CR, perceptions exist in the *empirical domain* and can be elicited. Attitudes are an important underlying causal power and influence individuals' decision-making, so should be investigated. Furthermore, *Behavioural intention to use* and *Actual system use* (Figure 3.5) are potentially important constructs, as I will start by interviewing participants about their actual VLE use to frame deeper questions about perceptions and intentions.

3.4.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT is the second most common model here. Venkatesh, Morris, Davis and Davis (2003) described UTAUT as a unified model of technology acceptance by incorporating elements from eight separate models and theories: TAM, TRA, the Motivational Model, TPB, TAM+TPB, Model of PC Utilisation (MPCU), IDT, and Social Cognitive Theory. UTAUT (Figure 3.6) is another linear model, with the four elements on the left considered the primary predictors of technology adoption behaviour, which are moderated by the four entities at the bottom (Venkatesh, et al., 2003). As in TAM, UTAUT is seen to predict actual 'use behaviour' of the technology, which again means the VLE.

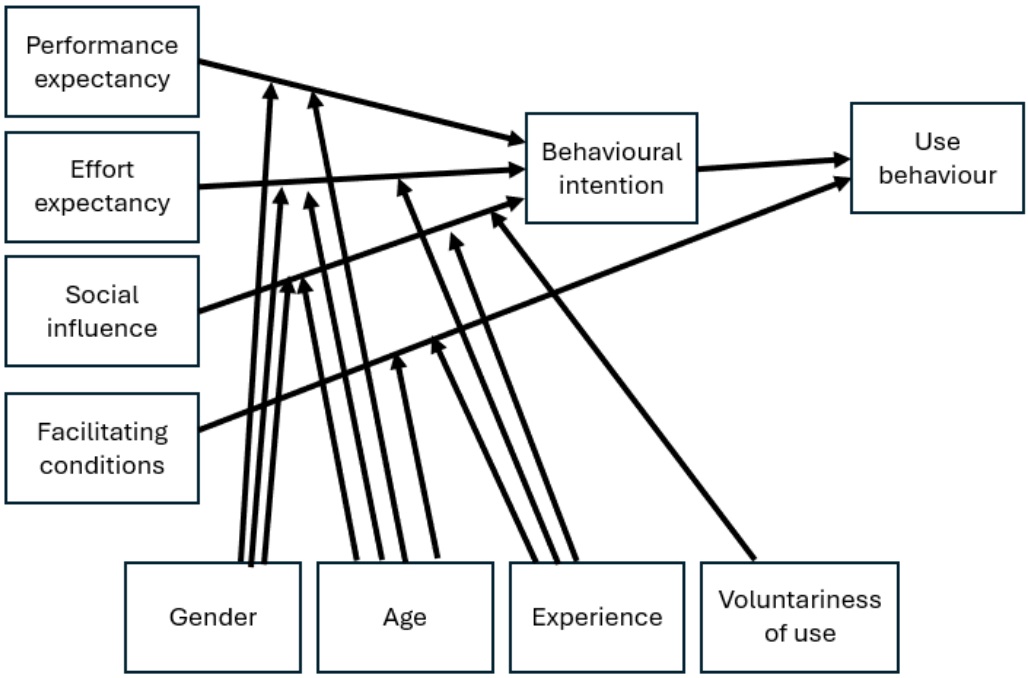


Figure 3.6 *Unified Theory of Acceptance and Use of Technology (UTAUT)*
Adapted from Venkatesh et al. (2003)

Although more comprehensive than TAM, limitations still exist when UTAUT is applied to academics' VLE engagement. Firstly, demographic variables such as gender and age should be considered proxies for deeper factors rather than being explanatory factors themselves. Furthermore, while UTAUT can accommodate academics' autonomy through its construct of 'voluntariness of use' and acknowledges 'social influence', the latter is ontologically shallow and neglects deeper social and cultural dimensions. Furthermore, facilitating conditions in UTAUT represent technology and infrastructure, not deeper organisational culture (Venkatesh et al., 2003).

Insights from UTAUT also informed my study. *Performance expectancy* and *effort expectancy* are broadly similar to TAM's PU and PEU which reinforced my decision

to address them in early-stage interviews. *Social influence* is considered important as it represents a *generative mechanism* that can influence decision-making. *Voluntariness of use* will remain unexplored as I have already established a VLE mandate exists, although in a culture of significant academic autonomy.

3.4.3 Information Systems Success Model (ISSM)

ISSM (Figure 3.7), the third most common model in VLE adoption studies, is not a predictive or explanatory model but instead evaluates an IT system's organisational impact and success (DeLone and McLean, 1992). They describe ISSM as combining process and causation, claiming that ISSM indicates the proper event sequence to foster organisational impact. Instead of measuring why academics use VLEs, its function would show the extent the VLE is meeting its intended purpose. Despite these limitations, it is often employed in VLE studies as an explanatory model.

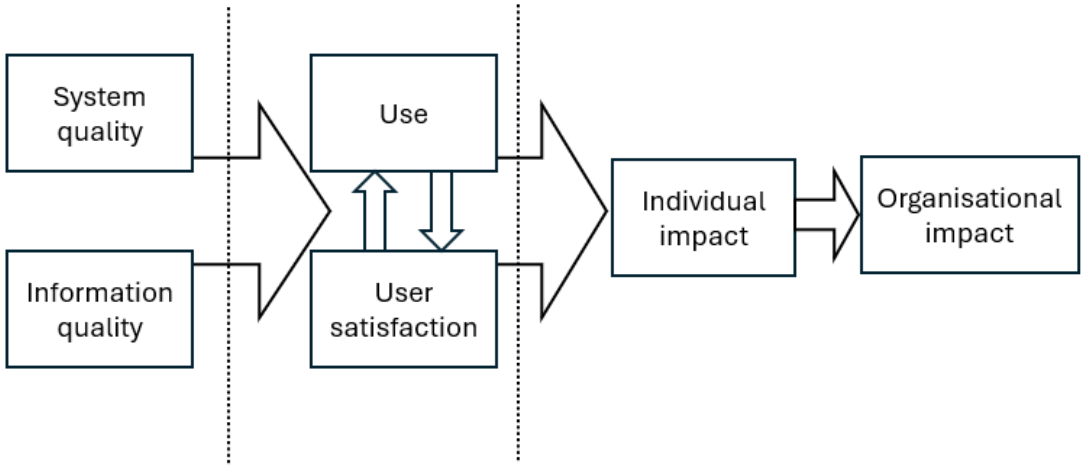


Figure 3.7 *Information Systems Success Model (ISSM)*
Adapted from DeLone and McLean (1992)

In terms of informing this study, ISSM appears to possess minimal utility. The concept of 'Use' is already addressed in greater detail in Section 3.4.1 when discussing *Behavioural intention to use* and *Actual system use* in TAM. Regarding *system quality*, in terms of CR, it must be considered a perception and appears to have significant overlap with PU and PEU. Information quality can be considered irrelevant. 'User satisfaction', as an affective evaluation, offers little explanatory value given potential overlap with TAM's PU and PEU. In terms of CR, satisfaction primarily reflects individuals' feelings about a system; it neither drives engagement nor is the reason academics decide to use a VLE.

3.4.4 Diffusion of Innovations (DOI)

The Diffusion of Innovations (DOI) theory (Rogers,1962/2003), or Innovation Diffusion Theory (IDT) in numerous publications, is the fourth most widely used technology adoption theory reported in the literature. It is neither a predictive nor explanatory model but instead a traditional bell curve describing adoption chronology. The adoption curve (Figure 3.8) names the first 2.5% of adopters as Innovators, with the next 13.5% as Early adopters, followed by the Early majority, Late majority and Laggards.

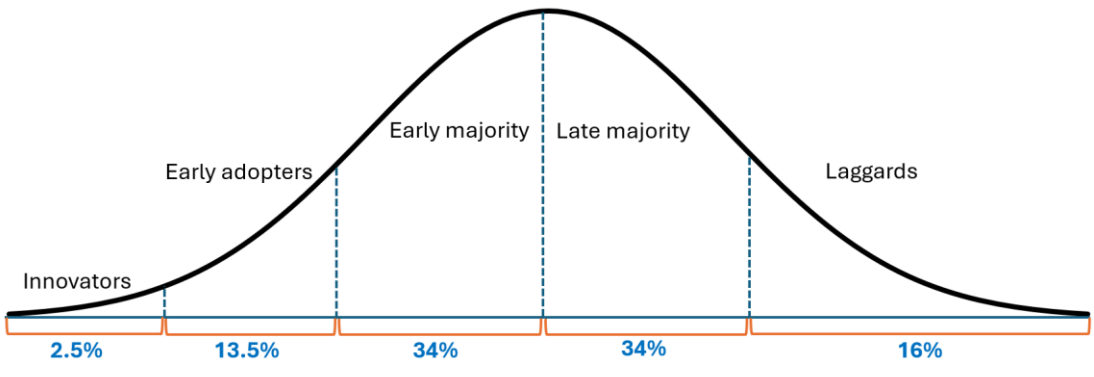


Figure 3.8 *Diffusion of Innovations*
Adapted from Rogers (2003)

While Roger's (2003) seminal DOI theory describes how fast adoption is integrated into academics' practice, it lacks explanatory depth regarding why it happens, and does not account for the personal, institutional, or external dimensions central to this study. Consequently, DOI is unsuitable for generating interview questions or informing the analysis and coding.

3.5 Insights from preliminary literature review

This preliminary literature review highlights numerous important aspects for this study. Analysis indicates that most research employing a technology adoption model uses one of four models or their derivations: TAM, UTAUT, ISSM, and DOI/IDT, with TAM demonstrably the most popular. However, it is warranted to state that only TAM and UTAUT highlight distinct factors influencing adoption, whereas ISSM measures organisational impact and DOI measures adoption chronology.

It is further justified to claim that these models lack robustness and fail to offer empirically consistent explanations. Deeper investigation reveals an appreciable number of VLE studies reporting contradictory findings (e.g., Bansal, Jain, and Seth, 2022; Gunasinghe, Hamid, Khatibi, and Azam, 2018; Radovan and Kristl, 2017). Notably, Venkatesh et al. (2003) stated that UTAUT's *facilitating conditions* have minimal impact on general technology adoption, an aspect supported in some VLE studies (e.g., Raza, Qazi, Khan, and Salam, 2021), but contradicted elsewhere (e.g., Kemp, 2022). Further examples were noted in the later substantive literature review (Chapter 6).

Furthermore, a lack of empirical consistency has resulted in numerous recombinatorial modifications to these models, with hypothesised influences from psychology, technological characteristics, or institutional factors resulting in the proliferation of extended TAM and UTAUT models (Table 3.1). However, many

variables were either statistically insignificant or refuted. Refuted hypotheses include the addition of *e-learning experience during in-service teacher training affecting PU, PEU, and behavioural intention* in an extended TAM (Mailizar, Almanthari, and Maulina, 2021), as well as *personal innovativeness* as significantly affecting *behavioural intention* in an extended UTAUT model (Gunasinghe et al., 2018). Consequently, it is evident that these extended models lack real effectiveness in explaining academics' VLE engagement.

One potential overarching explanation for this lack of effectiveness was reported by Bagozzi (2007), a key contributor in TAM's development (Davis, Bagozzi, and Warshaw, 1989). Bagozzi (2007), in criticising his earlier work, later claimed that, further to the proliferation of additional variables adding little clarity to TAM, the whole technology adoption landscape had become chaotic, and a new approach was required (Bagozzi, 2007, p. 244). He further claimed these technology adoption models' foundational theories possessed numerous shortcomings, particularly their unproblematised premises in linking intentions to actual behaviour (Bagozzi, 2007, p. 245).

Critically for this study, he further argues that TAM overlooks essential determinants of decision-making and posits that a 'dual approach' to technology adoption was required. He proposed that such an approach should incorporate psychological processes in decision-making, with a further focus on their contextual causes (Bagozzi, 2007, p. 252). Although situated outside an explicit CR framework, Bagozzi's call to integrate psychological and contextual dimensions regarding decision-making aligns with the Morphogenetic Approach, which emphasises such interplay. Consequently, this CR-informed SGT research addresses such a call for novel approaches to understand technology adoption.

3.6 Summary of preliminary literature review

This preliminary literature review satisfies Corbin and Strauss' (2008) guidance for a non-exhaustive literature review that contextualises the research landscape. It highlights the existing theories used in previous research into academics' VLE adoption behaviours and highlights the two dominant technology adoption models. This analysis informed the initial research trajectories, interview questions, and early-stage data analysis. Specifically, this review emphasises key areas regarding the research design, including *actual use* or *use behaviour, perceived usefulness*/*performance expectancy*, *perceived ease of use*/effort *expectancy,* and *social influence*. Importantly, it addresses Bagozzi's (2007) call for a 'dual approach' of incorporating decision-making and context.

The next chapter, the research design, will reflect two key aspects: it will outline the principles of CR, including the Morphogenetic Approach, and SGT, and secondly draw upon insights from this preliminary literature review.

Chapter 4: Research design

4.1 Overview

This chapter outlines the research design, which is underpinned by a CR-informed SGT methodology. As explained in Section 2.4, the alignment between CR and SGT provides the ontological, epistemological, and methodological basis for this study. This chapter outlines the research design, including my rationale for qualitative semi-structured interviews, the research site, participants, interview design and process, and then the data analysis and theory generation stage. Finally, ethical considerations will be addressed, followed by reflections on the investigation's trustworthiness and limitations.

4.2 Research process

Given that this study into academics' VLE engagement uses a CR-informed SGT methodology, a compatible research method is essential. This subsection presents a simplified illustration of my SGT compatible research process. Figure 4.1 presents the five main task types in separate streams: preparation and document development, primary research, coding and analysis, memos, and secondary research. The solid lines reflect the general sequence this study follows, while the double-headed dashed lines represent constant comparison. This overview will serve to contextualise the rest of this chapter. The five task streams are described in Table 4.1.

Task stream	Description	Sections
Secondary research	Any desk-based research and literature interrogation, including the preliminary literature review, constant comparison during data analysis and memo writing, and the substantive literature review.	Sections 2.3.1.1, 2.3.1.4, and 3.2. Chapter 6.
Memos	This includes both participant memos and thematic memos written during data analysis, reflection, and constant comparison.	Section 4.5.2.
Coding and analysis	This includes open coding, recoding, constant comparison, axial coding, and model development as the alternative to selective coding.	Sections 2.3.2 and 2.3.3.1 to 2.3.3.3. Sections 4.5.1 to 4.5.4.
Primary research	Participant interviews, including early-stage interviews, and further interviews until saturation.	Sections 4.3.1 to 4.3.4. Section 4.4.
Preparation and document development	This represents early document development ahead of the interviewing, including the initial question protocol, and later changes to the protocol based on data analysis and reflection.	Section 4.6.

Table 4.1 *Description of task streams*

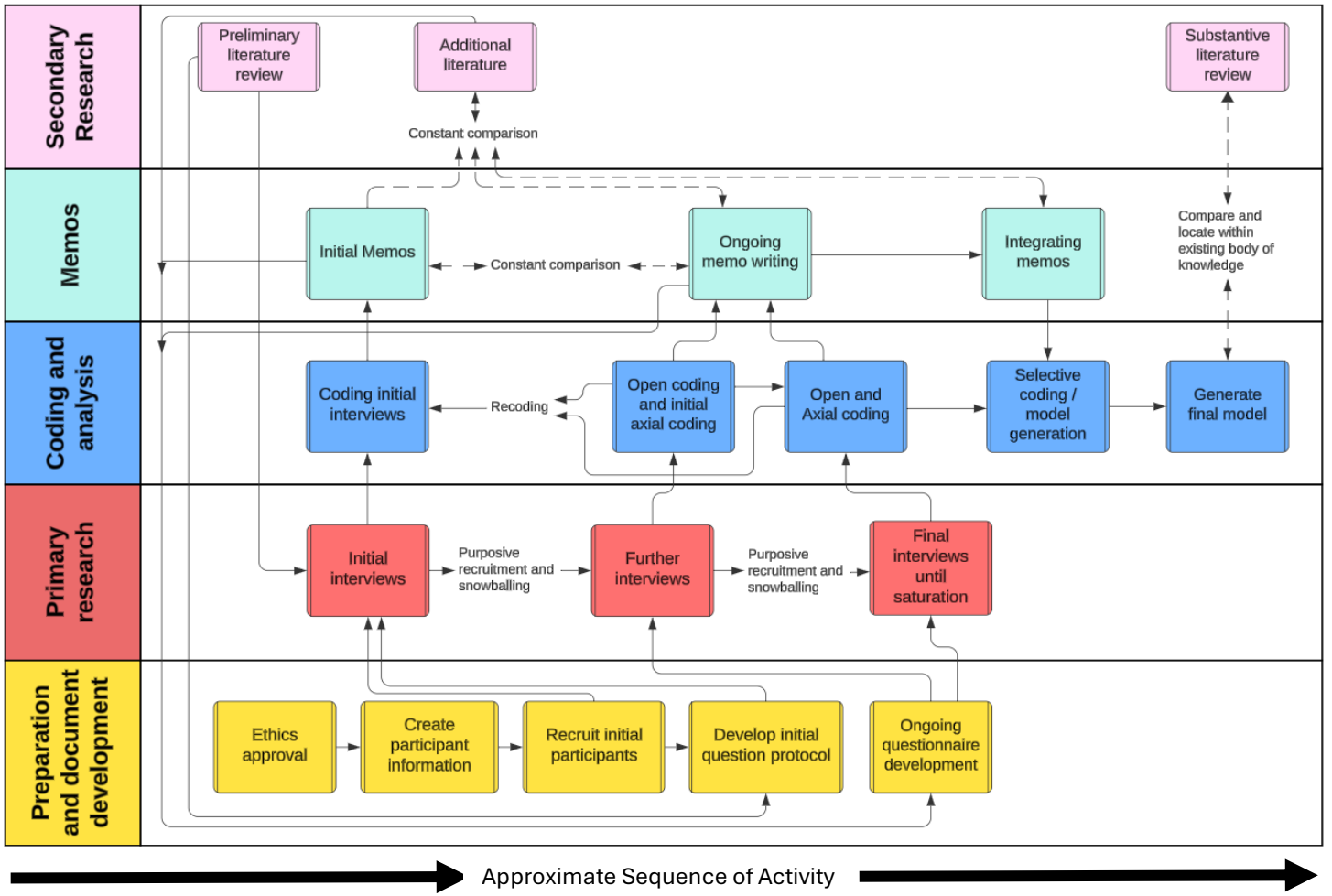


Figure 4.1 *Illustration of the research process*

4.3 Rationale for the research design

This section outlines decisions taken regarding the research design, including decisions about the research site, research method, the interview design, participants and recruitment, and their iterative processes. It also outlines the data analysis and theory generation process and how decisions are aligned with an SGT methodology. It further explains how these design stages were informed by methodological principles, emerging insights, and practical constraints, to ensure research alignment and epistemological rigour throughout the study.

4.3.1 The research site

While Corbin and Strauss (2008) do not prescribe the number of sites for SGT research, their emphasis on analytic depth and theoretical saturation supports the choice of a single site. This decision to focus on a single HEI is further justified by its alignment with CR. As a complex social system, this site comprises formal governance and leadership structures, cultural and institutional norms, and a diversity of role-based perspectives and interpersonal relationships. These conditions represent baseline uniformity and negate the need for further control of variables and influential factors. Single-site research enables a more contextually nuanced investigation, which is key for identifying a social system's underlying causal powers and generative mechanisms, and perceptions of them. A single organisational culture reduces cross-institutional interference and enables a more context-specific investigation.

Building on information that was presented in Section 1.5, the research site is a campus-based, research-intensive Russell Group university with over 30,000 students across foundation, undergraduate, and post-graduate programs, supported by over 7,000 staff. The university has adopted Moodle across all faculties and schools, with minimum use mandated but not formally policed. At

the time of this study, the institution had just adopted Moodle Version 4.0. To use Moodle, all new faculty should attend basic training which covers the interface, some customisation, and introduces some basic affordances. Learning Technologies also conduct optional training on specific tools and features every semester.

Taken together, these contextual aspects, including those from the initial description in Section 1.5, reinforce my decision to conduct this study at a single site. They illustrate how the organisational culture combined with the autonomy afforded to academics create the conditions for autonomous VLE engagement. These are also aligned with both aspects of the Morphogenetic Approach's analytic dualism (Archer,1995) for exploring the interplay between systems and agency in generating outcomes.

4.3.2 Insider research

In alignment with my epistemological stance that knowledge generation is facilitated by an active and interpretative researcher role, as described in Section 2.2, I determined that leveraging my insider status would support my active interpretative role to knowledge generation. While insider status is not a monolithic concept and lies on a continuum (Hellawell, 2007; Mercer, 2007), my professional services role within Learning Technologies, and working closely with academic staff, positions me as a peripheral insider. Being embedded in the research site affords nuanced understandings of the institutional culture, practices, and sociolect, which further aligns with SGT and Corbin and Strauss' (2008) emphasis on theoretical sensitivity, which they consider necessary for deeper analytical insight regarding participant responses.

Although insider status offers numerous advantages when conducting SGT-informed research, particularly regarding access, rapport, and theoretical

sensitivity, potential drawbacks exist. Drawing on Aburn, Gott, and Hoare's (2021) reflections of conducting insider grounded theory research, they identified several challenges, including power differentials, emotional entanglement, the risks of participant over-disclosure, and risks surrounding assumed shared understandings.

Due to my relatively junior status within the institution, any issues concerning coercion or perceived obligation were considered minimal. Emotional entanglement, while a recognised risk in sensitive or traumatic topics, was considered unlikely in VLE adoption research. Similarly, although over-disclosure is often problematised in insider research, I considered this beneficial as detailed insights were actively sought for analysis and insight. Finally, while assumed shared understandings can risk uncritical acceptance, I remained attuned to this risk throughout the interview and data analysis processes as an aspect of my interpretivist-oriented epistemology.

4.3.3 Qualitative semi-structured interviews

Danermark et al. (2019) argue that qualitative methods are particularly compatible with CR research by facilitating the exploration of complex social systems and supporting the inference of unobservable causal powers and generative mechanisms, which quantitative methods struggle to capture. While neither Danermark et al. (2019) nor Corbin and Strauss (2008) prescribe a rigid protocol for conducting semi structured interviews, they advocate for both structure and flexibility to elicit rich, nuanced data while maintaining methodological alignment.

As such, semi-structured interviews align with the recommendations presented in Section 2.3.1.2 for conducting a preliminary literature review, particularly for supporting enhanced theoretical sensitivity during the interviews. Semi-structured interviews permit the pursuit of unexpected, interesting, and emergent themes,

and subsequent probing for elaboration, which, alongside my study's aims, can support the identification of causal powers and generative mechanisms. A description of the interview process will be elaborated upon in Section 4.4.

4.3.4 Participants

This study's participants were academics required to use the VLE, plus three Learning Technologies staff. My initial sampling and recruitment strategy used a purposive convenience approach combined with snowballing. I started with Digital Learning Directors for their overarching knowledge and then Learning Technologies staff who work closely with academics. This initial stage was followed by purposive recruitment of Digital Leads (academics responsible for modelling and promoting learning technologies in their schools and faculties). I then used snowballing to include academics who were both enthusiastic and reluctant VLE users, as well as researchers compelled to teach.

Congruent with Glaser and Strauss (2006), I intended to interview participants using a role-sensitive progression. I planned to first interview Digital Learning Directors, then Learning Technology Consultants, followed by Digital Leads, enthusiastic users, then sceptics from across the university from tutors to professors. However, logistical issues in scheduling meant interviews were conducted at the participants' convenience rather than strict sequential interviewing by characteristic or role. However, this approach did provide richer data and permitted more nuanced interviews by allowing me to interview some new participants within previously investigated role groups.

Although initial recruitment was guided by these pre-determined groups, theoretical sampling identified groups of participants beyond this initial decision. Memo-writing prompted considerations of how contract status, including fixed-term and part-time roles, affected VLE engagement, while another participant's

comments about guest lecturers prompted inquiry into that group. These insights and developments demonstrate how interviews and reflection drove sampling decisions and how this continued until theoretical saturation was achieved, which in the context of this study can be deemed rigorous and robust.

In total, I interviewed 24 staff members comprising three Digital Learning Directors, three Learning Technology Consultants, two Digital Leads, four Professors of Practice, three academics not on permanent, full-time contracts, and nine full-time academics with varying degrees of technology orientation (Table 4.4). Based on an SGT-informed recruitment strategy and my data analysis, I developed a taxonomy of technology orientation (Table 4.2). Further to this recruitment strategy and Mercer's (2007) continuum of insider status, I further developed a typology to describe my insider relationship with the participants (Table 4.3).

The taxonomy of technology orientation in Table 4.2 was informed but not determined by sensitising concepts in the literature on technology adoption, academic identity, and organisational behaviour. These disciplines provided the vocabulary which helped shape the initial categories of 'enthusiast', 'passive user', and 'sceptic'. As the interviews, analysis, and constant comparison progressed, further distinctions emerged, particularly between those who were simply enthusiastic and those who actively promoted VLE use. This process led to the addition of 'advocate'. Drawing on vocabulary from organisation behaviour and leadership theory, the terms 'strategic advocate' and 'operational advocate' were later adopted to accurately differentiate between advocates with overarching strategic responsibilities, those who promoted VLE use locally as part of their role, and those who promoted it informally. In this way, a final taxonomy was achieved that accurately reflected the orientations that were evident in the interview data.

Technology orientation	Description
Strategic advocate	High level decision makers and promoters of the VLE
Operational advocate	Supports and promotes VLE use as part of role
Advocate	Enthusiastic and promotes VLE use amongst colleagues
Enthusiast	Enthusiastic VLE user
Passive user	Uses as directed
Sceptic	Sceptical about the benefits of technology or VLE use

Table 4.2 *Typology of technology orientations*

Relationship	Description
Cold introduction	Speculative request to participate by email. No shared history
Direct colleague	Colleague in Learning Technologies
Peripheral contact	Previously introduced to, or supported as part of my role
Cold introduction via snowballing	Cold introduction by email. Recommended by another participant
Peripheral contact recommended via snowballing	Previously introduced or supported as part of my role. Recommended by another participant

Table 4.3 *Typology of insider relationships*

ID	Role	Teaching role	Research role	Technology orientation	Insider relationship
#01	Digital Learning Director	Minimal	Yes, PhD supervision	Strategic advocate	Cold introduction
#02	Learning Technology Consultant	None	None	Operational advocate	Direct Colleague
#03	Learning Technology Consultant	None	None	Operational advocate	Direct Colleague
#04	Digital Learning Director	Unknown	Yes	Strategic advocate	Cold introduction
#05	Learning Technology Consultant	None	None	Operational advocate	Direct Colleague
#06	Digital Learning Director	Yes	Yes	Strategic advocate	Peripheral contact
#07	Research and teaching scholar	Yes – minimal	Yes, principal role	Advocate	Peripheral contact
#08	Assistant Professor	Yes, principal role	Unknown	Technology sceptic / VLE enthusiast	Peripheral contact
#09	Digital lead	Yes, principal role	Unknown	Operational advocate	Peripheral contact
#10	Digital lead	Yes, principal role	No	Operational advocate	Peripheral contact
#11	Assistant Professor	Yes, principal role	No	Advocate	Cold introduction via snowballing
#12	Assistant Professor	Yes, principal role	No	Advocate	Peripheral contact
#13	Associate Professor	Yes, principal role	Unknown	Advocate	Peripheral contact. Recommended via snowballing
#14	Adjunct	Yes, principal role	None	Passive user	Cold introduction via snowballing
#15	Professor of Practice	Yes, part time	None	Passive user	Cold introduction
#16	Assistant Professor	Yes, part time	Unknown	Enthusiast	Cold introduction via snowballing
#17	Professor of Practice	Yes, part time	None	Passive user	Cold introduction via snowballing
#18	Professor of Practice	Yes, part time	Yes	Enthusiast	Cold introduction via snowballing
#19	Assistant Professor	Yes, principal role	None	Sceptic	Peripheral contact
#20	Professor of Practice	Yes, part time	None	Enthusiast	Cold introduction via snowballing
#21	Assistant Professor	Yes, principal role	Unknown	Sceptic	Peripheral contact. Recommended via snowballing
#22	Assistant Professor	Yes, part time	Unknown	Passive user	Peripheral contact. Recommended via snowballing
#23	Research and teaching scholar	Yes, minimal	Yes, principal role	Enthusiast	Cold introduction via snowballing
#24	Associate Professor	Yes, principal role	Yes	Sceptic	Cold introduction via snowballing

Table 4.4 *Participant status, roles, technology orientation, and insider status*

4.4 Interview design and process

Early-stage interviews commenced with an initial interview protocol for two groups of informants: Digital Learning Directors and Learning Technology Consultants. Aligned with CR, Digital Learning Director interviews were designed to elicit overarching insights regarding the organisational culture, and their perspectives on Moodle and academics' VLE engagement. Learning Technology Consultants were similarly interviewed without including their perspectives on teaching with Moodle.

This initial protocol was informed by my insider knowledge, combined with existing TPACK knowledge as described in Section 1.2, and insights from the preliminary literature review concerning TAM and UTAUT, as presented in Sections 3.4.1 and 3.4.2, which led to questions to elicit information about actual use, PU, PEU, attitude, and social influence. Some example questions are listed in Table 4.5 to illustrate question development with additional information concerning rationale and CR domains.

Guiding questions	Rationale	Domains
What do you use Moodle for, and what do you ask students to do in Moodle?	Elicit *actual use* (TAM) as a gateway into *perceptions* (TAM) and technical/pedagogic knowledge (TPACK)	Actual use/perceptions = *empirical domain* Knowledge = *real domain*
What do you like about Moodle?	Surface affective responses to foster dialogic conversation. Explore PU and PEU (TAM). Start eliciting insights about their reflexivity	*Empirical -> real domain*
What do you find frustrating about using Moodle? What would you change about it? Why?	Surface affective responses. Explore PU and PEU (TAM). Start eliciting insights about their reflexivity	*Empirical -> real domain* Potential reflexivity in the *actual domain*
What are Moodle's most useful features? What other tools are you aware of?	Explore PU (TAM). Start exploring knowledge. Start eliciting insights about their reflexivity	*Empirical* -> real domain Potential reflexivity in the actual domain
Why do you use/not use these tools?	Explore PEU (TAM). Elicit insights about their reflexivity	*Empirical -> real domain* *Potential reflexivity in the actual domain*
Why do you think you have prioritised learning about Moodle and trying to create a good learning experience for the students? Why do you consider Moodle beneficial to your practice?	Uncover *causal mechanism* such as pedagogical knowledge, professional identity, institutional culture, or personal motivations that influence behaviour	*Real domain* Potential reflexivity in the *actual domain*
Where do you get your inspiration from for using Moodle in the way you do? Where do get your ideas for using the VLE or Moodle?	Surface social influences, conceptual frameworks, role models, or institutional cultures that shape practice	*Real domain* (primarily) Potential reflexivity in the *actual domain*
Is there anything about the school/university culture which encourages you to innovate with Moodle? Do you feel there is a particular narrative from the university or leadership about teaching compared to research? What factors do you feel might be preventing you from increasing your use of Moodle?	Surface institutional norms, cultural expectations, and enabling or counteracting mechanisms	*Real domain* (primarily) Potential reflexivity in the *actual domain*

Table 4.5 *Illustrative questions for semi-structured interviews*

Believing academics might be guarded about certain aspects, I adopted a cautious approach and, in alignment with CR, I often decided that, rather than probing too far, I would rely on inference and retroduction to gain deeper understandings. This approach is later elaborated upon in Section 8.3 where I discuss the limitations of the study. When volunteering information about their colleagues, I followed with third-person questioning to identify aspects of their colleagues' attitudes and behaviours.

In alignment with the iterative nature of GT methodologies and Corbin and Strauss' (2008) requirement for flexibility, the interview protocol became an extended living document subject to adaptation and extension based on the different responses and question types. Furthermore, to prepare for potential redundancy, changes of interview direction, or brevity of answers, I developed more questions than could be used in any single interview, an approach justified in the first Digital Learning Director interview, who spontaneously offered insights related to multiple and later questions. A linear interviewing approach proved impossible, especially to maintain a natural flow conducive to making the participant relaxed and willing to divulge information.

While progressing through the participant groups, my interview protocol further evolved. This evolution incorporated insights from interviews, reference to literature, reflection, and the evolving coding categories that emerged from constant comparison and logical reasoning. For example, in the early-stage interviews, I focused more on actual VLE use and perceptions. However, the first interview revealed aspects of identity and recourse to literature identified the teacher/researcher dichotomy as related to professional identity. These insights led to interpretations regarding reputational risk and identity. In later interviews, I shifted the focus beyond professional identity to deeper questions about their role identity, including the kinds of relationships they wanted to foster with students and Moodle's role in that. This process ultimately led to interpretations about empathy.

Further to adapting interviews to accommodate emerging themes, existing questions were continuously evaluated for effectiveness or whether theoretical saturation had occurred. While many scaffolding questions remained, this evolution involved minimising some question themes to permit more time for investigating new and emerging concepts, such as empathetic aspects or software fatigue. This iterative and evolutionary process was essential for capturing the rich data required for this study.

Interviews were conducted over Teams and although they were scheduled for one hour, most lasted between 60 and 90 minutes. They were recorded and transcribed using Teams' automatic speech recognition. The resulting transcriptions were downloaded, cleansed, and prepared for analysis, with transcription errors and disfluencies such as false starts and filler words minimised. This transcription process generated 778 pages of transcripts with over a quarter of a million words. All transcripts were anonymised by removing identifying information and using pseudonyms. After transcription, each interview recording was deleted as per the ethical approval. The transcripts were then uploaded to NVIVO for analysis.

4.5 Data analysis and theory generation

This section describes the process used to analyse the data and generate theory in alignment with a CR-informed SGT methodology. It explains my systematic use of open coding, memo writing, constant comparison, and axial and selective coding. While GT is iterative, these elements will be presented sequentially for ease of understanding. This systematic SGT approach facilitated the development of LTAM.

4.5.1 Open coding

As stated in Sections 2.3.3.1 to 2.3.3.3, SGT starts with open coding before progressing to axial coding and selective coding. Open coding involves microanalysis and the initial identification of early concepts and categories within the data (Corbin and Strauss, 2008). In practice, using NVIVO, I conducted an initial pass of open coding combined with some a priori codes derived from the preliminary literature review to capture key concepts. Although not strictly aligned with open coding, it is a consequence of preliminary literature engagement and is consistent with CR. A priori concepts from TAM and UTAUT included *perceptions* and *actual use* as aspects of the *empirical domain*, with *attitudes* and *social influence* lying within the *real domain*. Because new concepts and categories emerged in later transcripts, I recoded the previous transcripts to capture these emerging entities. Figure 4.2 illustrates some open codes later situated under the category of 'Cognitive empathy towards students'.

Name	Files	References
01_Cognitive empathy towards students	0	0
01_General empathy towards students	14	26
02_Structures content appropriately_makes content easy to find	15	21
03_Phased incremental approach_staggered rollout of materials_timed release	3	4
04_Meeting student expectations of digital	3	3
05_meeting student expectations of non-digital	1	1
06_Avoiding cognitive strain_consistency_simplicity_clarity_avoid frustration	13	27
07_Doesn't want Moodle to be a barrier_reduce barriers	3	4
08_Not teaching materials_teaching students	1	1
09_Wants to help meet students needs_ wants materials to be beneficial for studen	12	24
10_Put examplars so students can see expected standards	1	1
11_Save students time_Students time is valuable too_have other classes	5	7
12_Thinks about what class time should be used for	2	3
13_Strugled as a student so has empathy with students	9	11
14_Didn't struggle at uni but still has empathy	3	3
15_Needs own time to reflect before answering so likes to give student time too	1	1
16_Gives students time to reflect_Help non-native students_Cognitive incubation	3	6
17_Doesn't want the students to feel uncomfortable by keep having to ask questio	1	1
18_Make sure schedules and dates are available	1	1
19_Make sure all necessary information is there	10	12
20_Wants to help the students be organised_Help students be on top of deadlines	5	11
21_Aware students are working and have other commitments	2	3
22_Knows that not all students can attend all classes	5	7
23_Acknowledges differences between students	5	8
24_Aware students have different needs	2	2
25_Wants to make learning accessible	5	6
26_Believes if one student has problem others might but haven't asked so posts to	1	1
27_believes students need anonymity in Moodle_Student self concept	2	5
28_Will show students how to use Moodle_knows students can struggle with Mood	1	2
29_Believes students should see achievement and know what they need to do next	2	2
30_Help transition students to beceom more independent-self sufficient	2	2
31_Helps students monitor their own progress	2	5
32_Will respond_change teaching in response to student feedback	7	12

Figure 4.2 *Example of categorised open codes in NVIVO*

4.5.2 Memo writing

During analysis, I actively engaged in memo writing and constant comparison of interview data, literature, and memos. While acknowledging various forms of

memo-writing exist, Corbin and Strauss (2008) essentially describe memos as written records of analytical thinking. Memos can contain commentary, hypotheses, conceptual insights, potential relationships, diagrams, and serve as space for reflections about the data and categories. Memo writing is a key analytical process and necessary for moving theory development forward. While they encourage the use of conceptual memos, in practice I found a combination of interview-specific and conceptual memos more beneficial. The interview-specific memos (Figure 4.3) captured my thoughts and reflections on the participants' responses, while the conceptual memos (Figure 4.4) helped in consolidating the categories and speculating on potential generative structures. This memo writing approach aligns with the Morphogenetic Approach, where individuals and systems both possess causal powers, and I wished to keep my memos separate.

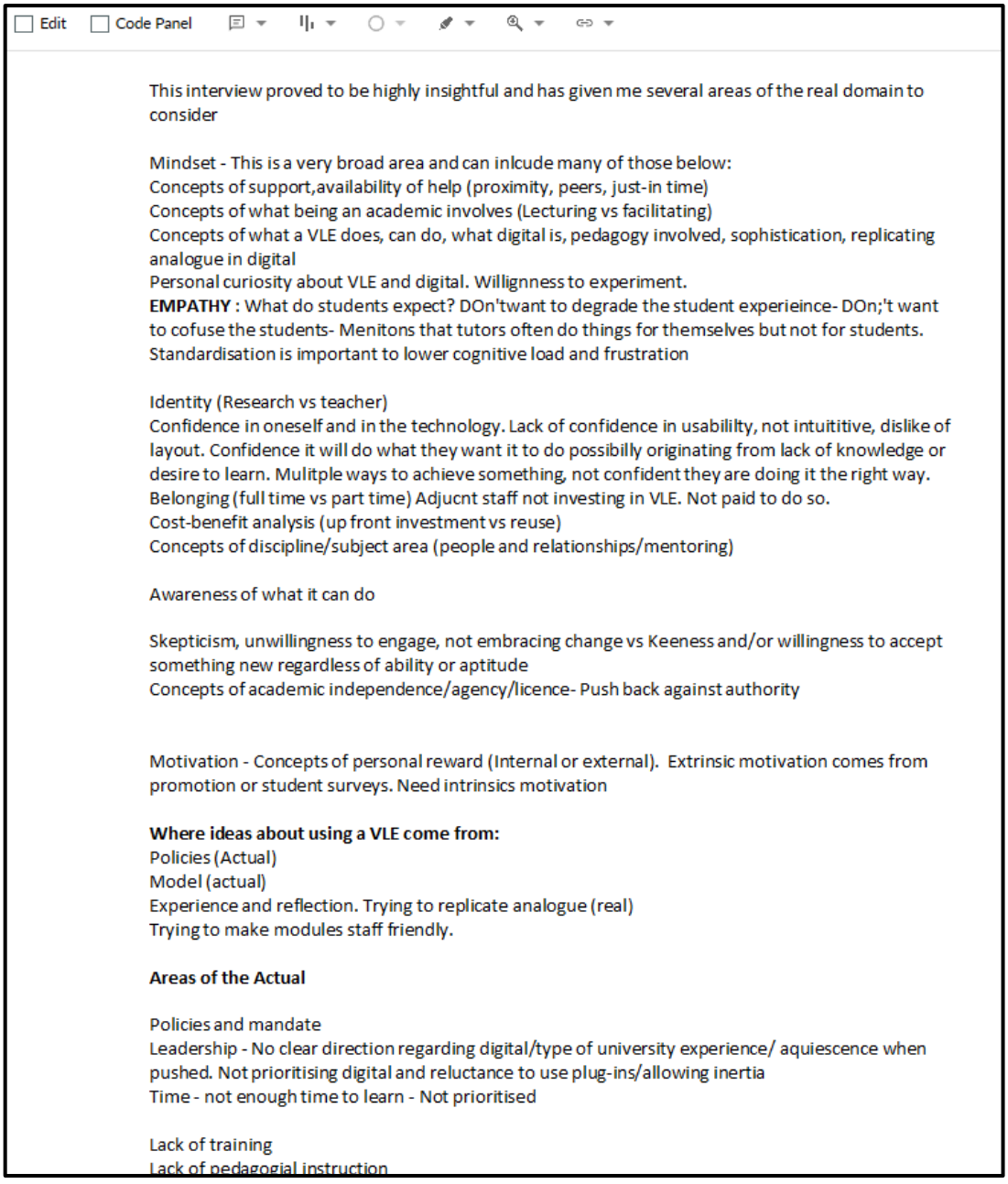
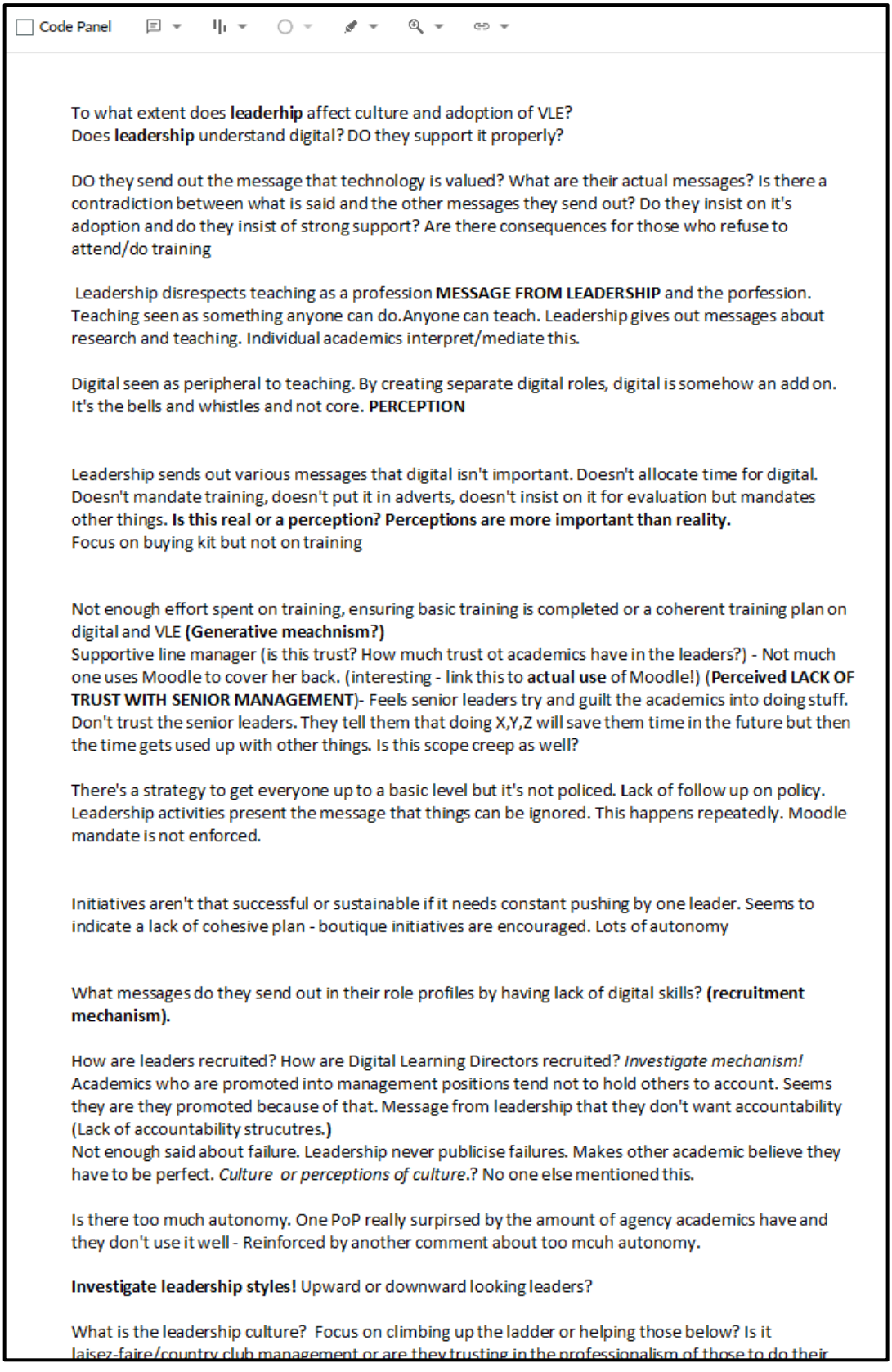


Figure 4.3 *Example participant memo*


Code Panel

To what extent does **leaderhip** affect culture and adoption of VLE?
Does **leadership** understand digital? DO they support it properly?

DO they send out the message that technology is valued? What are their actual messages? Is there a contradiction between what is said and the other messages they send out? Do they insist on it's adoption and do they insist of strong support? Are there consequences for those who refuse to attend/do training

Leadership disrespects teaching as a profession **MESSAGE FROM LEADERSHIP** and the porfession. Teaching seen as something anyone can do.Anyone can teach. Leadership gives out messages about research and teaching. Individual academics interpret/mediate this.

Digital seen as peripheral to teaching. By creating separate digital roles, digital is somehow an add on. It's the bells and whistles and not core. **PERCEPTION**

Leadership sends out various messages that digital isn't important. Doesn't allocate time for digital. Doesn't mandate training, doesn't put it in adverts, doesn't insist on it for evaluation but mandates other things. **Is this real or a perception? Perceptions are more important than reality.**
Focus on buying kit but not on training

Not enough effort spent on training, ensuring basic training is completed or a coherent training plan on digital and VLE **(Generative meachnism?)**
Supportive line manager (is this trust? How much trust ot academics have in the leaders?) - Not much one uses Moodle to cover her back. (interesting - link this to **actual use** of Moodle!) (**Perceived LACK OF TRUST WITH SENIOR MANAGEMENT**)- Feels senior leaders try and guilt the academics into doing stuff. Don't trust the senior leaders. They tell them that doing X,Y,Z will save them time in the future but then the time gets used up with other things. Is this scope creep as well?

There's a strategy to get everyone up to a basic level but it's not policed. Lack of follow up on policy. Leadership activities present the message that things can be ignored. This happens repeatedly. Moodle mandate is not enforced.

Initiatives aren't that successful or sustainable if it needs constant pushing by one leader. Seems to indicate a lack of cohesive plan - boutique initiatives are encouraged. Lots of autonomy

What messages do they send out in their role profiles by having lack of digital skills? **(recruitment mechanism).**

How are leaders recruited? How are Digital Learning Directors recruited? *Investigate mechanism!*
Academics who are promoted into management positions tend not to hold others to account. Seems they are they promoted because of that. Message from leadership that they don't want accountability (Lack of accountability strucutres.**)**
Not enough said about failure. Leadership never publicise failures. Makes other academic believe they have to be perfect. *Culture or perceptions of culture*.? No one else mentioned this.

Is there too much autonomy. One PoP really surpirsed by the amount of agency academics have and they don't use it well - Reinforced by another comment about too mcuh autonomy.

Investigate leadership styles! Upward or downward looking leaders?

What is the leadership culture? Focus on climbing up the ladder or helping those below? Is it laisez-faire/country club management or are they trusting in the professionalism of those to do their

Figure 4.4 *Example thematic memo – Leadership*

4.5.3 Constant comparison

Further to the methodological practice outlined in Section 2.3.2, I engaged in constant comparison throughout the interview, coding, and theory generation phases. In practice during coding, I generally refined code titles or hyphenated them when similar responses emerged from the data. When similar but conceptually different codes were created, I then compared the data in the existing codes and reassigned data for consistency and accurate categorisation. One specific example of refining code titles emerged while coding for empathy (Figure 4.2: Code 02). This refinement started as the code 'Structures content appropriately'. I later appended 'makes content easy to find' so the entire code became '02_Structures content appropriately_makes content easy to find'. The numbering system was adopted to group similar codes and avoid coding difficulties caused by alphabetical listing. Code 06 and 07 (Figure 4.2) were initially one combined code until I noted the frequency of not wanting Moodle to present a barrier, so this theme became a separate code, and data was reassigned to it.

4.5.4 Axial coding

Following open coding, SGT specifies axial coding to identify relationships between emerging concepts and categories, and locate them in terms of contexts, actions/interactions, and consequences (Corbin and Strauss, 2008). Typically, axial coding involves using coding software's hierarchical structure of parent-child nodes and exploration through constant comparison and memo writing. However, in practice, using this hierarchical structure proved challenging due to the vast number of initial codes. A simple utterance such as "I didn't want 100 emails saying, 'Where do I find this?' 'What is going on?'…I wanted all the information to be in one place, nicely laid out so that nobody contacts me," [#07], clearly

demonstrates alignment with multiple categories, including a desire to save time/pre-empt issues, technical knowledge of Moodle, a desire to maintain a boundary with students, a lack of empathy, and insights into the academic's reflexivity.

Within axial coding, while Corbin and Strauss (2008) do not prohibit counts of utterance types, they emphasise researcher sensitivity and interpretations of conceptual richness. Congruent with an interpretivist perspective, category development was driven by salience of meaning, relevance to my prior experience, and resonance with existing literature. Furthermore, drawing on Corbin and Strauss' (2008) suggestion of adopting alternate strategies and being an advocate of mind mapping, I employed Lucidchart (Figure 4.5). Using Lucidchart allowed me to move, group, and connect codes and categories together so conceptual categories could emerge and coalesce into a more coherent map. This process of grouping and connecting codes was continuously repeated until logical categories and relationships emerged. I then restructured the codes logically within NVIVO (Figure 4.2). These categories are comprehensively described in the findings (Chapter 5).

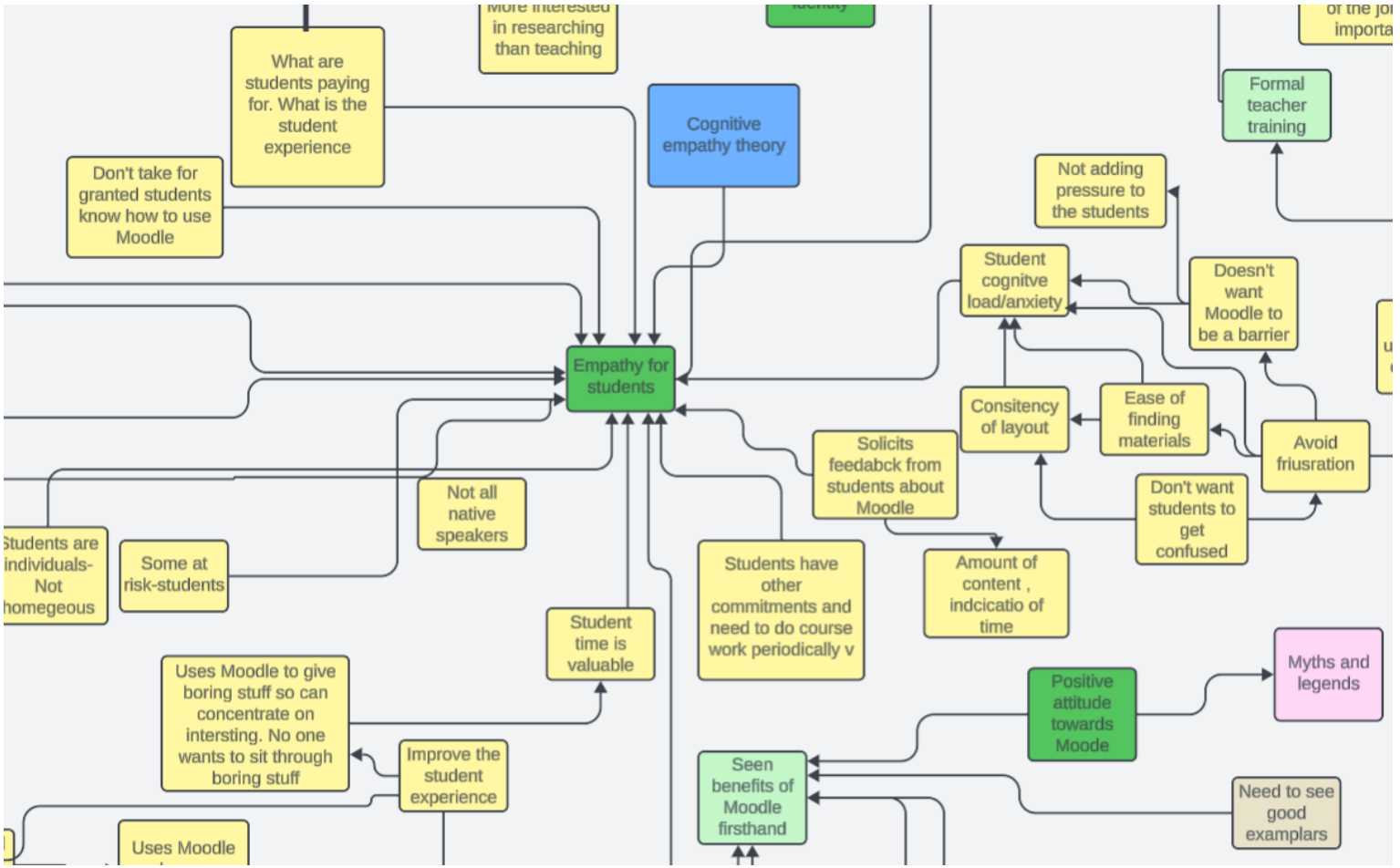


Figure 4.5 *Extract from Lucidchart*

Axial coding leads to selective coding, which generally focuses on identifying a single unifying core category that integrates the other emergent categories (Corbin and Strauss, 2008). However, given the CR framework and that I was actively seeking to identify multiple interacting causal powers and generative mechanisms to explain academics' VLE engagement, this stage required the acceptable GT adaptation of creating a model. This adaptation is outlined in Section 2.3.3.3 as part of the discussion of coding protocols in GT. Therefore, rather than identifying a single core category, the outcome was the development of LTAM to explain the core phenomenon of academics' adoption and use of VLEs in HE. This approach means each category remains a distinctive entity with its own causal powers, while integrating these mechanisms into a single explanatory model. LTAM is presented in Chapter 5.

4.6 Ethical considerations

Ethical approval was granted on 4 November 2022 from the Lancaster FASS-LUMS Ethics Committee. This study was designed and conducted in accordance with the university's research ethics and research governance code of practice, which operate on the same core principles as those articulated in the British Educational Research Association (BERA) Ethical Guidelines for Educational Research (BERA, 2024). This commitment to uphold and maintain the highest ethical and moral principles and practices includes honesty, accuracy, openness, transparency, respect, responsibility, and lawfulness. To adhere to these standards, I created and provided all participants with a participant information sheet (Appendix 1) and consent form (Appendix 2) informing them of the study's purpose and design, rationale for their participation, the study, and their participant rights. While complete confidentiality cannot be guaranteed, participants were informed that summary content and direct quotations may be used, but that all reasonable efforts would be made to protect their identity and institutional anonymity, an

aspect I reiterated in the interviews. I informed them that interview recordings would be deleted post-transcription to further protect privacy and anonymity. I also informed them that data would be kept securely on password-protected university servers with two-factor authentication, and that only I, as the primary investigator, would have access. Potential participant risks were carefully considered. While no appreciable risks were identified, participants were informed that if they felt uncomfortable during the interviews they should tell me and ask me to move on. I also informed the participants of their right to withdraw and that although General Data Protection Legislation (GDPR) allows them to request full or partial deletion of data, complete withdrawal of data post-analysis would not be possible.

4.7 Rigour and trustworthiness

To ensure rigour and trustworthiness, I attended to two sets of standards: Lincoln and Guba's (1985) four principles of trustworthiness: *credibility*, *transferability*, *dependability,* and *confirmability*, and Corbin and Strauss' (2008) method-specific evaluation standards of *fit*, *understanding*, *generality,* and *control*. Essentially, all these principles were addressed through the iterative application of SGT as detailed throughout this chapter and will be expanded upon in turn.

I optimised both my and the study's findings' *credibility*. Mine stemmed from my insider status and professional background, which was further enhanced by SGT's advocacy of a preliminary literature review to ensure appropriate preparation and to raise theoretical sensitivity. *Credibility* of the findings was ensured through adherence to SGT principles guided by the CR framework. Credibility was supported through *constant comparison* from multiple data sources including literature, memo-writing, and theoretical sampling. During coding, *credibility* was further enhanced by recoding the interviews after new codes and categories emerged. I also engaged in some data clarification with the participants through

email, as, due to new insights, I later needed to clarify specific aspects of their responses.

For *transferability*, I described the research site in Sections 1.5 and 4.3.1 which established context. Describing the research site enables readers to assess its applicability for comparison between this study and other contexts for future research. The transparent, in-depth, theoretical framework (Chapter 2) and research design (Chapter 4) allows for clear understandings of the research process and promotes *dependability* (Chapter 2). My description of the process contributes to the audit trail and demonstrates consistency in the research process. It also enables researchers to follow the methodological steps, decisions, and interpretative reasoning that generated my findings.

Regarding *confirmability*, extracts from the findings (Chapter 5) clearly demonstrate that the results and interpretations were grounded in the data. Similarly, my commitment to reflexivity and awareness of potential biases also contributed to confirmability. My evolving practice in memo writing served to document my analytical thoughts and further contributed to the insights, interpretations, and theory development.

In line with Corbin and Strauss' (2008) evaluative criteria for grounded theory, LTAM demonstrates *fit* through alignment with the data rather than being forced. Fit was achieved through iterative processes, constant comparison, and theoretical sampling as described in Section 4.5. *Understanding* emphasises that theory should be understandable by practitioners. While being a CR-informed study, LTAM remains accessible and is aligned with Corbin and Strauss' (2008) emphasis on practical relevance. *Generality* is evident in the model's applicability as it is applicable to other learning technologies beyond VLEs. Finally, *control*, means it should offer explanatory power. As a CR-informed model, LTAM does not predict outcomes but offers explanatory tendencies regarding VLE engagement under similar institutional conditions.

4.8 Methodological limitations

Numerous potential limitations were anticipated prior to data collection and addressed through deliberate design choices. One potential limitation was insufficient foundational knowledge. As outlined in the theoretical framework in Section 2.3.1.2, the preliminary literature review augmented my background knowledge which strengthened my confidence. It also signalled my professionalism to the participants, especially towards my first interviewees, Digital Learning Directors, whose strategic perspectives and limited availability warranted well-informed and purposeful dialogic engagement. Employing a preliminary literature review helped overcome a second potential limitation, where insufficient depth in initial interviews might impede iterative questionnaire development and also constrain theoretical saturation.

A further limitation identified prior to data collection concerned my insider-status. As outlined earlier in Section 4.3.2, insider research offers numerous advantages including context familiarity and privileged access to participants. However, I was concerned the participants would be guarded in their responses and self-censor, demonstrate response bias in aligning accounts with perceived expectations, or project idealised images of professional and technological ability. To mitigate against these concerns, I took several steps to ensure participant comfort. First, I reiterated commitments to confidentiality and anonymity. Secondly, as outlined in the previous paragraph, I adopted a dialogic approach to foster a conversation rather than an interrogation, and used a more exhaustive and extensive question set than could be covered in one hour. This approach, when combined with my enhanced background knowledge, fostered responsiveness to the participants' answers without the constraints of a rigid structure.

Methodologically, as argued by Glaser and Strauss (2006), an inherent advantage of GT is that limitations are partially mitigated by its iterative nature. Furthermore, with CR's ontological perspectives, this combination promotes the identification of underlying generative structures and tendencies, not strict correlations. These

aspects are elaborated on in Section 2.2.3. A CR-informed methodology also means that if participants are being guarded or displaying response bias, their responses can still generate data by suggesting that underlying mechanisms exist that might be generating such responses, and they should be interpreted as symptomatic of deeper personal or institutional structures.

4.9 Summary of research design

This chapter has established that the research design is epistemologically sound and is aligned with the theoretical framework outlined in Chapter 2. It has justified the use of qualitative semi-structured interviews within a single institutional site, showing how such an approach can elicit rich, context-sensitive insights into academics' VLE engagement. This chapter also articulates my insider status, presenting the advantages it affords and outlining how potential drawbacks were mitigated. Through detailed mapping of the 24 participants, their roles, and the insider-relationships, this chapter has described the necessary contextual aspects of this study ahead of the findings chapter.

Furthermore, this chapter has detailed the data analysis and theory generation process. It shows how open coding, memo writing, and constant comparison led to axial coding and the generation of LTAM. It has also documented the iterative development of the question protocol and the coding process, illustrating how theory generation was both systematic and responsive to context. In doing so, this chapter has also demonstrated how I have achieved a rigorous, credible, and transferable design that satisfies both Lincoln and Guba's (1985) trustworthiness criteria and also aligns with Corbin and Strauss' (2008) GT evaluation standards.

Chapter 5: Findings

5.1 Overview

This chapter reports the findings of this study in two parts. The first part presents the six key conceptual categories that emerged from this study through the principled application of axial coding as described in Section 2.3.3.2. Within the *real domain,* such categories are often referred to as *emergent structures*; however, because these categories span different domains, no specific CR-related term has been established. Therefore, they will be referred to as '*categories of influence*'. In alignment with the adapted selective coding paradigm as elaborated upon in Section 2.3.3.3, the second part presents all six key *categories of influence* within a new theoretical model called the Learning Technology Adoption Model (LTAM) which explains academics' adoption and use of VLEs in HE. This second section also outlines how *reflexivity*, a central aspect of the Morphogenetic Approach, is seen to function within LTAM.

In presenting these findings, it is important to reiterate that this study is grounded in a qualitative methodology with an active interpretivist role. As such, the significance of any responses does not depend on frequency but on my interpretation of their significance and of any value in relation to this study. Numerical indicators are included to provide context, but do not imply any quantitative logic, statistical significance, or to rank the importance of themes, especially as certain themes emerged only towards the end of the study. Indeed, significant insights arose from low-frequency or outlying responses, many of which were instrumental in identifying underlying generative mechanisms, including potential counteracting mechanisms. Therefore, any counts included in this chapter should be understood as illustrative and descriptive rather than evaluative. Furthermore, many insights were developed from extended passages from the interviews and could not be fully reproduced within this thesis. Therefore, only representative and indicative extracts have been included.

Furthermore, these findings are presented as a working or provisional theory reflecting the temporal, cultural, and situated aspects to this study. As Glaser and Strauss (2006) explain, any initial explanatory theses generated from GT cannot be considered an ultimate or definitive explanation. Therefore, this model remains open to analysis, revision, and refinement by others in the field. Consequently, it cannot be read as complete or exhaustive, and extensions, revisions, or modifications are welcomed.

5.2 Categories of influence

Table 5.1 presents a brief overview of the six *categories of influence* identified through axial coding: *knowledge and beliefs*, *perceptions, attitudes*, *empathy*, *concepts of self*, and *management and organisation*. In line with CR's stratified reality, these are considered macro-level categories that consist of separate meso-and micro-level dimensions. LTAM does not typically describe the nano level. Significantly, these *categories of influence* are located in the domains where they offer the most explanatory power.

Category of influence	Domain	Overview
Knowledge and beliefs	Real	Underlying and enduring personal emergent properties (PEPs) of knowledge and beliefs about the VLE and other entities. Knowledge and beliefs are key causal powers which can interact with generative mechanisms in different ways.
Perceptions	Empirical	Perceptions represent individual's observations and experiences of the VLE and other entities in the organisation. Perceptions were seen to have both causal and counteracting powers. Within LTAM, I consider perceptions of entities as having more explanatory power than trying to factually describe them.
Attitudes	Real	Underlying and enduring PEPs which can shape the individual's inner conversations. Attitudes are a key PEP which can interact with other *generative structures* such as beliefs, empathy and identity to affect academics' adoption and use behaviours.
Empathy / Being empathetic	Real/Actual	The capacity for empathy exists in the *real domain*. Being empathetic is the mental processes of perspective taking and therefore exists in the *actual domain*. Being empathetic was seen as offering more explanatory power than the capacity to be empathetic.
Concepts of self	Real	Underlying and enduring PEP that, in combination with other properties in the *real domain* can influence how individuals behave. *Concepts of self* were seen as having *causal powers* but interpreted as being strongly associated with the concept of morphostasis and the reproduction or reinforcement of structures which preserve them.
Management and organisation (systems and practice)	Real and Actual	This refers to individuals' desires to manage and organise themselves and others rather than the organisations' systems and processes. In this study, management and organisation in the *real domain* are the needs, desires and *generative mechanisms* while the *actual domain* represents the practice of individuals' using the VLE to manage and organise themselves and others.

Table 5.1 *Categories of influence*

5.2.1 Definitions of the categories of influence

Despite certain *categories of influence* initially appearing self-evident, appropriate study-specific definitions are required, as some terms have varied definitions, have potential overlaps, appear contentious at their peripheries, or include specific characteristics. Furthermore, while these *categories of influence* were determined from data analysis, many definitions required support from existing literature. Additionally, where categories potentially overlap or are ambiguous, the definitions will state limits and specify any exclusions. Finally, with many terms extensively discussed elsewhere, detailed consideration lies outside this investigation's scope. Therefore, definitions are both parsimonious and provided for understanding the thesis and the data.

Furthermore, many responses could be interpreted as arising from several causal powers in different categories of influence. The example, "I didn't want 100 emails saying, 'Where do I find this?' 'What is going on?'...I wanted all the information to be in one place, nicely laid out so that nobody contacts me," [#07] could be inferred as stemming from desires to pre-empt potential issues as discussed in *managing the course and students* in Section 5.9.2; a desire to keep students at a distance, an aspect described as *boundary setting* in Section 5.9.3.2; a means to project a professional image as outlined within *professional identity* in Section 5.8.1; or a lack of consideration for students, which is considered in *recognising and valuing students* in Section 5.7.3. In such cases, responses will be presented where they offer greater explanatory power but may be referred to from other sections.

5.3 The entities within the model

In presenting the categories of influence, each section will provide definitions as used in this thesis. Furthermore, as entities in CR are noted for their ontological

depth, these findings will also present the different meso- and micro-levels within each *category of influence*. Figure 5.1 presents a simplified illustration of *knowledge and beliefs* to illustrate these macro-, meso-, and micro-levels. The thick outer circle represents the macro-level of *knowledge and beliefs*, the circles within the macro-level represent the meso-level, with further circles representing the micro-level. Figure 5.1 also illustrates the three other meso-level types of knowledge without naming them.

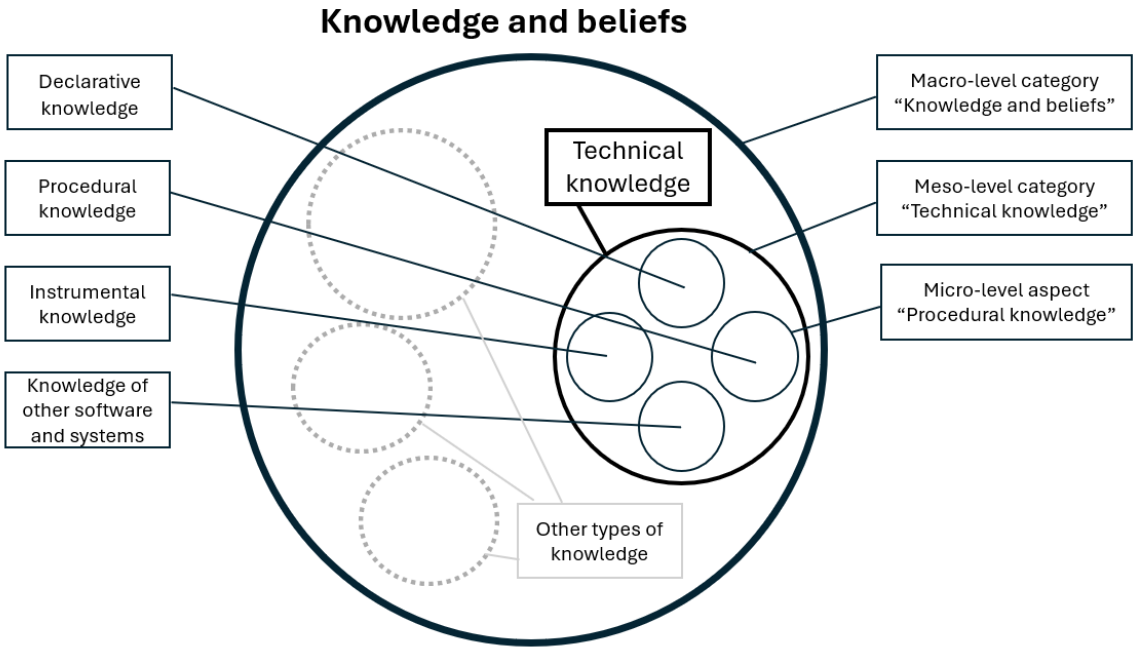


Figure 5.1 *Ontological depth within the categories of influence*

The presentation order of the categories of influence is to facilitate understanding and support a clear progression of the findings. This sequence aims to minimise forward referencing although this was not always possible. Given the interconnected and interrelated nature of the complex integrated findings, some cataphoric mention of later entities may appear before they are explained. These instances reflect conceptual interdependence rather than a lack of structural coherence.

5.3.1 Domains of the categories of influence

Being a CR-informed study, evidence exists in the *actual/empirical domain*. Where appropriate, entities have been retroduced and described in terms of the *real domain*. Retroduction aligns with Danermark et al. (2019) who state the fundamental task of CR research is to identify *generative structures* in the *real domain* alongside their tendencies to influence the *actual domain*. However, this use of retroduction was not always practical or necessary as entities such as *perceptions*, elaborated upon in Section 5.5*,* exist in the *empirical domain*. These offered significant explanatory power without requiring retroduction: academics' perceptions of organisational culture offer greater explanatory power than describing the organisation's underlying *generative structures*. This chapter now describes the six categories of influence.

5.4 Knowledge and beliefs

In this study, *knowledge and beliefs* is a macro-level category and means stored, subjective, fallible representations of entities and processes including those from life's experiences, which is aligned with Bhaskar's (2008, p.11) domain of the 'Transitive Dimension of Knowledge'. In this study, it is specifically taken as academics' knowledge and beliefs connected to the VLE and organisational entities. This includes their representations about the VLE and its affordances, and how to use them, as well as knowledge of entities in the institution, including other people, other technologies, and generative mechanisms such as policies and procedures.

This definition of knowledge is compatible with the widely understood concepts of either being declarative ('know about') or procedural ('know how'), which are important concepts within these findings. As evidence of knowledge and beliefs was surfaced in the *actual/empirical domain*, it was retroduced to the types of

knowledge in the *real domain*. In alignment with the Morphogenetic Approach, these types of knowledge should therefore be considered PEPs (see Section 2.2.7 for the description of PEPs).

In this section, it is also important to distinguish between *knowledge and beliefs*, *perceptions*, and *knowledge of self*. In CR, *knowledge and beliefs* exist in the *real domain* and *perceptions* in the *empirical domain*. *Knowledge and beliefs* were grouped together because of their ontological similarities including origin, causal powers, and social context. Consequently, statements such as, "You know that the user interface is a little bit clunky?" [#05], is considered a perception and not knowledge. Statements such as "I'm quite traditionally rubbish with technology," [#08], was seen as *knowledge of self* and excluded from this category and located within concepts of self, as discussed in Section 5.8.

Analysis and interpretation of the interview data established that *knowledge and beliefs* consists of four distinct meso-level categories (Figure 5.2): *situational knowledge*, *technical knowledge*, *pedagogical knowledge,* and *content knowledge*. *Situational knowledge* and *technical knowledge* are each composed of four identifiable micro-level dimensions, and *pedagogical knowledge* consists of two dimensions. These entities will be described in turn.

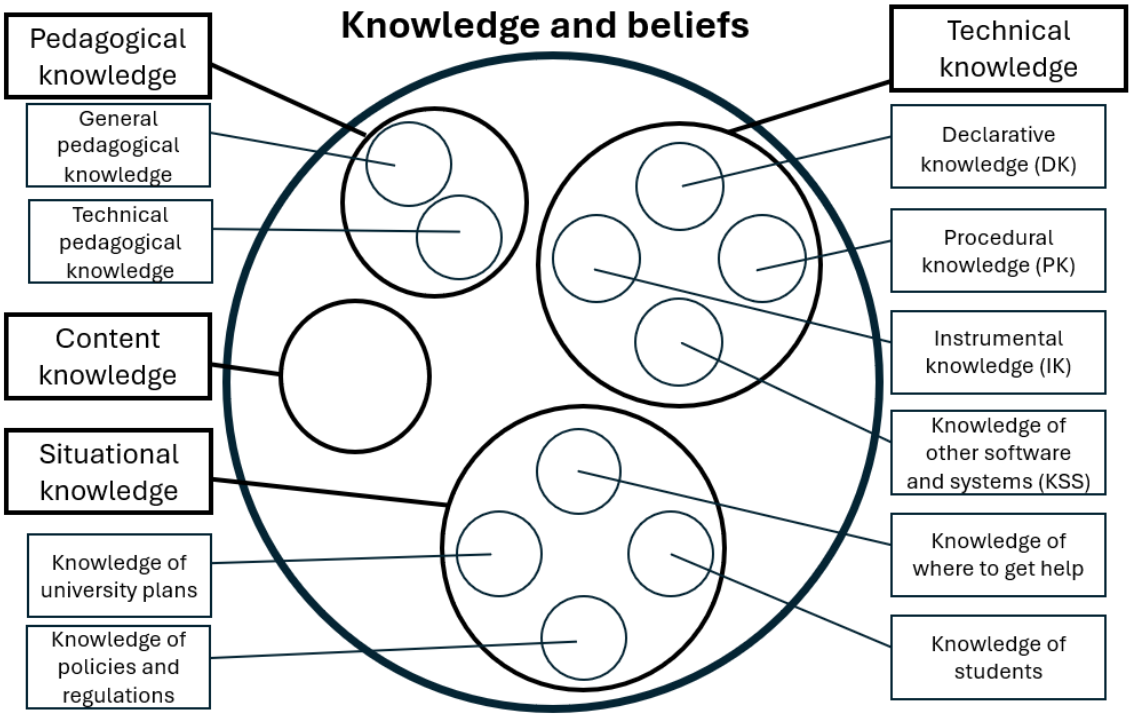


Figure 5.2 *Knowledge and beliefs*

5.4.1 Technical knowledge

The first meso-level category in *knowledge* is *technical knowledge*. With TPACK part of my foundational knowledge, *technical knowledge* was deliberately elicited. However, data analysis and axial coding established that technical knowledge is more nuanced than Mishra and Koehler's (2006, p.1027) definition as (My bold) "...the **skills** required to **operate** particular technologies...teachers should understand information technology broadly enough to **apply** it productively at work." Technical knowledge was seen to consist of four micro-level dimensions: *declarative knowledge*, *procedural knowledge*, *instrumental knowledge,* and *knowledge of other software and systems*.

5.4.1.1 Declarative knowledge

The first micro-level dimension of technological knowledge is *declarative knowledge*. Here, declarative knowledge means knowing or having beliefs about the VLE. It is taken as stored subjective representations of the VLE and its capabilities such as knowing it can act as a repository, manage assignments, host quizzes, and help students learn. *Declarative knowledge* excludes skills or ability to use.

As this was a sensitising question, all the academics clearly stated their declarative knowledge directly after being asked although with differing degrees of knowledge. Responses included:

> It's a way of hosting information and sharing information. [#19]

> You can do quizzes on there, can't you? [#24]

> So, you can use it to run surveys. You can use it to run sort of more sort of Q and A-oriented type of exercises. You can host, I think, various activities on Moodle and have it as a more sort of a learning environment. [#15]

Declarative knowledge was also inferred from actual use. The statement, "*So, I use it to download students' submissions, to upload my feedback*," [#14], implies declarative knowledge regarding submission management.

However, amongst these, there was evidence of uncertainty, or minimal declarative knowledge of particular affordances until prompted:

> So, you can create a quiz on here, yeah? I don't think I knew that. [#22]

> I've no experience of using it for marking work, submitting work if that's indeed what it can do or very much of anything else. [#20]

In this model, declarative knowledge of the VLE clearly represents a separate micro-level dimension of *technical knowledge*, particularly when compared to the next dimension, *procedural knowledge*.

5.4.1.2 Procedural knowledge

The second micro-level dimension of *technical knowledge* is *procedural knowledge*. Here, *procedural knowledge* means knowing how to use the VLE and is taken as representations of processes and the ability to apply them. In this study, it specifically refers to academics' knowledge to surface various VLE functions and activities. These include sending messages, uploading documents, and managing assignments. *Procedural knowledge* is the definition which is most congruent with Mishra and Koehler's (2008) concept of 'technical knowledge' described in Section 5.4.1.

As this was a further sensitising question, all the academics evidenced different examples and varying degrees of *procedural knowledge,* such as:

> I use the Moodle announcements feature. [#06]

> I have uploaded materials to students, effectively lecture notes and pre-reading and material like that, and that's about as much as I've done with it. [#20]

> I record my lectures and they go into the recordings folder on Moodle, but here I've got a section of short videos as well which cover the content. [#11]

One Learning Technology Consultant noted that *procedural knowledge* may not always be retained, with retention depending on reinforcement:

> ...if that's their only exposure to the kind of hands-on use of Moodle, they forget. You know, they'll intensely use it for four weeks and then they won't

> really again apart from a bit of marking here and there, but, you know, they won't be editing and doing stuff like that for another year, at which point they've just like, forgotten how to do it. [#03]

In this model, *procedural knowledge* of the VLE represents a separate micro-level dimension of *technical knowledge* and is connected to, but distinct from, the next dimension, *instrumental knowledge*.

5.4.1.3 Instrumental knowledge

Drawing from Boswell (2009), the third micro-level dimension of *technical knowledge* is termed *instrumental knowledge*. In this study, *instrumental knowledge* is the academics' knowledge of how to manipulate the VLE's affordances to realise numerous additional uses related to the broader teaching processes. In this study, the identification of *instrumental knowledge* from actual VLE use in the *actual/empirical domain* was interpreted as representing underlying needs and desires from multiple categories of influence such as wishing to project aspects of professionalism, demonstrate empathy, nurture student growth, or reduce stress.

15 academics indicated they used the VLE to achieve multiple aims not necessarily explicitly related to the teaching of content. One theme was identified as deliberately managing the course and students, a theme further explored in Sections 5.9.2 and 5.9.3 under *management and organisation*. Examples include:

> I didn't want 100 emails saying, 'Where do I find this?' 'What is going on?'...I wanted all the information to be in one place, nicely laid out so that nobody contacts me. [#07]

> ...on the [NAME OF COURSE] course, we have a module handbook, like a PDF file that's there and that's the main thing they're meant to go and check. [#19]

Another aspect of instrumental knowledge was that two academics stated they are consciously using the VLE for evidence, or for protecting their backs, which also suggests using the VLE for pre-empting potential issues. This can also suggest perceptions of organisational culture:

> I mean you've got the evidence then that you've said to them. I mean, if you said it in a lecture and just left it at that, how do you know everybody's definitely heard you say that? [#10]

> Call me cynical, but that's what often comes out. It's like trying to protect your back because if it's on Moodle you cannot be accused of not telling...not providing this information. [#16]

Responses from five academics further demonstrated instrumental knowledge by using Moodle to deliberately project concepts of tone, professionalism, or formality such as:

> They were first going to see the Moodle page and so that was the first impression of the module, and I wanted that to be really, really good. [#07]

> ...there's a picture of the two academics together, just taken by the lake or something, which immediately says, Oh, these two people actually socialise and they know each other outside of the teaching. It's just amazing. Just that one picture as the start of the Moodle page, it just suddenly sets a tone of it's not completely formal, and you know, it's interesting how you can be very subtle with it, but it does make a difference. [#09]

> I think the first part of the Moodle page does have to set the tone and reflect the tone that you're trying to achieve within the course. [#15]

Two academics stated they access student engagement logs to assess the usefulness/popularity of their own resources rather than just student engagement:

> I like to look at the activity log. I like to see if my students are accessing certain resources and things like that. [#08]

> ...just before the class test, is there suddenly a ramp up in some resources over others and you can start to rank your resources. And, you know, there's all sorts of interesting things you can look at. [#09]

Six academics stated that they use VLE tools to organise themselves, students, and co-teachers, an aspect also covered in *management and organisation* in Section 5.9. In addition to reminders, some academics used Moodle to shift workload and cognitive load to pre-semester. Examples included:

> So, I basically, almost at the start of the year when I know the deadlines for things, I set up all my announcements with two-week warning, you know, next week it's due. I set all that up because I receive the notification and also reminds me. So, I guess it helps the students, but it also is managing my work. [#13]

> So, for me, I want to do a really coherent, robust, vigorous job to free up my time...So, for example, last semester I delivered an elective of mine, and in certain weeks I use my online lectures because it was better that they were recorded...So the energy and the time that I put in [before the start of semester] meant that I had more time and space to be able to do other things. [#04]

> ...I mean there has to be some level of prescription doesn't there? Because otherwise tutors could do whatever they want. So, I think having Moodle with a very clearly defined curriculum and modules and class materials with tutor notes as well with suggestions is a good thing. [#12]

Across extended interview extracts, a recurring theme emerged that showed how academics used Moodle for developing students. Two of them explicitly stated they deliberately used Moodle for developing student autonomy or reflective skills:

> So, we say by the end of semester one and moving into semester two, that hand-holding will be less, okay? ...it's on Moodle, yeah? ... and if you get to the point at which you're still in a mess, then you come to us and contact us, right? [#11]

> ...whereas in an online space, such as Moodle, ...discussion forums can offer more time for reflection and perhaps the students feel more comfortable and more relaxed. [#14]

Additionally, the 15 academics who demonstrated aspects of instrumental knowledge provided a range of other examples of instrumentality including leaving hidden notes on Moodle to their future self about potential modifications, for fostering student independence, maximising the value of face-to-face time, fostering group cohesion, or making learning more accessible.

5.4.1.4 Knowledge of other software and systems

The final micro-level dimension of *technical knowledge* is *knowledge of other software and systems*. In this study, it specifically refers to how knowledge of other VLEs or other applications can help explain academics' Moodle use. Interrogating the literature identified this dimension of knowledge as both a generative and counteracting structure. *Knowledge of other software and systems* considers three phenomena: the first is congruent with Perkins and Salomon's (1992) 'transfer of learning', where 'positive transfer' from one system can accelerate the learning of another, compared to 'negative transfer', where

knowledge hinders such acquisition. The second phenomenon is aligned with David's (1985) concept of 'path dependence', where people lock themselves into known systems even when alternatives exist. The third is termed system/software fatigue.

One academic noted positive transfer when applying their knowledge of Blackboard to Moodle:

> In [PREVIOUS INSTITUTION] we used Blackboard...now we use Moodle, so, it's just one of those things. [#04]

Regarding negative transfer, two participants: one Digital Learning Director and one Learning Technology Consultant, believed academic colleagues wanted everything to resemble familiar websites with differences potentially hindering skills-acquisition and use:

> I think people would prefer it to look like the BBC website, that kind of thing. You know what I mean? I think those kind of websites are seen as, you know, good examples of layout and design. That's what people would like Moodle to look like. [#01]

> They want everything to look like Facebook or the BBC News website or whatever there are [#02]

Four academics demonstrated path dependence by persisting with other applications rather than using Moodle tools. Two notable examples were:

> We tend to use other tools, external of Moodle to do it. So, we might use Padlet or Microsoft Forms to do a questionnaire or whatever it might be. We'll tend to build them externally rather than doing it in Moodle. [#15]

> Usually when I'm teaching, in terms of communication, I'll set up emails anyway, or I'd have a group chat going on Teams. [#19]

Two of the participants: one part-time academic and one Learning Technology Consultant, when describing academic colleagues, also mentioned another factor related to *knowledge of other software and systems,* which is a *counteracting mechanism* that can be termed *systema and software fatigue*. Essentially, academics generally need to have or maintain significant knowledge of specialist software, as well as Windows, the Office suite, lecture capture software, and the online examination system. This demand on cognitive resources can limit capacity or desire to achieve VLE competence. Competing demands were interpreted as analogous to Archer's (2003) concept of personal commitments, as described in Section 2.2.7, where individuals' inner dialogue established a hierarchy of ultimate concerns that shapes their priorities and helps explain what individuals actually do.

> I think I went through…maybe it was just too much for me. Do you know what I mean? …Teams this, that, maybe like, oh God…It's [Moodle's] just one too many thing. [#22]

> There's definitely frustrations around the amount of systems that we have for different things, Moodle just being one of them… there's a lot of things, and they all work very differently. [#03]

All four micro-level dimensions of *technological knowledge*: *declarative knowledge*, *procedural knowledge*, *instrumental knowledge*, and *knowledge of other software and systems* are taken as PEPs and seen as contributing towards explaining academics' VLE engagement.

5.4.2 Pedagogical knowledge

The next meso-level category in *knowledge* is *pedagogical knowledge*. Being part of the TPACK model (Mishra and Koehler, 2006), it was deliberately elicited and recognises two aspects of pedagogical knowledge: *general pedagogical*

knowledge and *technical pedagogical knowledge*. These two dimensions of *pedagogical knowledge* are now explained.

5.4.2.1 General pedagogical knowledge

The first micro-level dimension of *pedagogical knowledge* is *general pedagogical knowledge*. Representing another aspect from TPACK, in this study it is taken as the widely understood concepts of implicit and explicit knowledge and beliefs regarding learning theories, and refers to general pedagogy. Here, it may have potential VLE use but does not imply any specific knowledge of VLE-related application.

Four academics explicitly demonstrated pedagogical knowledge, especially as some stated they were trained teachers. Responses included:

> First of all, what I truly believe in, it's students need to learn something, discuss it, practice it, and then reflect on what they've learned and identify what they need to do to get to the next level. [#11]

> I think being a secondary school trained teacher has had the biggest impact and knowing the theory and the pedagogy and everything about how to teach and what is effective teaching. [#08]

> They [students]are typically given the first couple of tasks of the lesson plan, the lesson materials to do before the class. So, a sort of flipped learning approach…I'm an advocate of flipped learning. [#12]

Two of the Digital Learning Directors and one of the Learning Technology Consultants were quite critical of colleagues' lack of pedagogical knowledge, believing it counteracted VLE use:

> They think that it's their job to transmit to students. [#02]

> I was quite surprised just how basic they [teachers] were in terms of learning theory. [#05]

> They don't in [NAME OF SCHOOL]. They do not like the P word. It's a dirty word. You should not say pedagogy in front of [NAME OF DISCIPLINE] academics. I think, yeah, that, often not willing to engage. [#06]

From the data in the interviews, it is evident *general pedagogical knowledge* is distinct from the next aspect of *technical pedagogical knowledge*.

5.4.2.2 Technical pedagogical knowledge

The second micro-level dimension of *pedagogical knowledge* is *technical pedagogical knowledge*. In this thesis, it refers to the subjective knowledge and beliefs regarding the appropriate tools and affordances of the VLE for teaching. Mishra and Koehler (2006, p. 1028) describe it as *"…knowledge of the existence, components, and capabilities of various technologies as they are used in teaching and learning settings."*

Five academics demonstrated *technical pedagogical knowledge* regarding how technology could improve the quality of learning including:

> So, the teaching comes first in the sense that I'll decide, right, this is a really good experience for learners to have … So, what would be appropriate technology to make this happen? [#09]

> I'm sure you're quite well aware of the limitations of the didactic approach, but what could I do? You know, they struggle with how to do these kinds of problems. Well, why should I be doing problems in the lecture? I should have extra problems for them to do online. [#13]

> I would have a topic per week and I'd use Moodle to structure those topics. And within there I'd give instructions on what students needed to do linked to the resources, be those internal or external, you know, would tell them, you know, what to do when, roughly how long to spend on it so they can gauge and plan. [#06]

> I've had a bit of experience of kind of an interactive course through the work with [NAME OF ORGANISATION], and wanted to sort of bring elements of that into the [NAME OF PROGRAM] stuff we were doing. [#23]

However, there was a concern from one of the Digital Learning Directors that new academics were given insufficient time to develop their *technical pedagogical knowledge*:

> They're not given the time to develop the skills that they need, and they're not given the reward for developing the skills and the practical and the pedagogical understanding of how they can use technology to enhance the student learning experience and how they can use technology to improve their teaching experience, assessment, experience and make it all efficient. [#06]

Both aspects of pedagogical knowledge were seen as explanatory and potentially influential regarding the academics' VLE engagement, either through intuitively applying *general pedagogical knowledge* or explicitly using *technical pedagogical knowledge*. The next aspect is *content knowledge*.

5.4.3 Content knowledge

In this thesis, *content knowledge* is a meso-level category with no specific micro-level entities identified. *Content knowledge* was not deliberately elicited but was assumed based on my experience and insider knowledge. As part of TPACK,

Mishra and Koehler (2006) posit that *content knowledge* is essential in driving decision-making when teaching with technology.

Although content knowledge was not deliberately explored, Participant #06 noted that teaching assignments may often be unaligned with their niche or research interests which meant time was reprioritised to acquire course-specific knowledge which is congruent with academics' ultimate concerns. In this case, the process of acquiring content knowledge is seen as potentially counteracting other processes such as technical knowledge of the VLE:

> ...for the first two years of a module, three years of module, you're developing; you're learning the content yourself. [#06]

However, across extended extracts, a range of responses suggested academics had some awareness of which content is appropriate for uploading to Moodle and which content was more suitable for in-person sessions. Participant #13 explicitly stated:

> Well, why should I be doing problems in the lecture? I should have extra problems for them to do online. [#13]

It should be noted that while this statement, and similar comments or extended extracts, could be interpreted as expressions of technological-content knowledge, closer analysis suggested otherwise. During analysis, the comment from participant #13 was coded as primarily being related to notions of *management and organisation* and as an expression of *empathy* rather than an example of using technology to reimagine disciplinary teaching. During the interviews, the participants were not asked about, nor volunteered information about any specific disciplinary adaptations, nor how teaching content might be reimagined through technology, which was unsurprising as such transformations were not a focus of the investigation. Consequently, and in alignment with Mishra and Koehler's (2006) conceptualisations of technological-content knowledge, such statements, and extended extracts from other participants, were interpreted as having strong

similarities to, and aligning more closely with, using the VLE as a repository and for distributing existing materials. This distinction is analytically important as it highlights that participants' VLE engagement often centres on content management rather than on the deeper forms of technological–content integration that TPACK theorises. This thesis now considers the next meso-level category of *knowledge and beliefs*, *situational knowledge*.

5.4.4 Situational knowledge

In this thesis, *situational knowledge* is treated as a meso-level category referring to the subjective knowledge of the immediate work environment. The term was created in preference to Endsley's (1988) more widely used 'situational awareness', as her term includes perceptions, which as noted in Section 5.4 fall outside the CR category of *knowledge and beliefs*. *Situational knowledge* is interpreted as broadly synonymous with Archer's (2003) 'knowledge of situations', as an influence on reflexivity.

This study identifies four separate micro-level dimensions of s*ituational knowledge* related to the academics' adoption and use of the VLE in HE: *knowledge of where to get help*, *knowledge of students*, *knowledge of policies and regulations,* and *knowledge of university plans*. Together, these different forms of *situational knowledge* highlight the situational considerations that influence academics' decision-making. They further emphasise that VLE adoption is not driven solely by technical competence or pedagogical preference but also by knowledge of different aspects of the landscape in which their teaching is situated. The following sections explain each of these four micro-level dimensions in turn.

5.4.4.1 Knowledge of where to get help

The first micro-level dimension of *situational knowledge* is *knowledge of where to get help*. In this study, it considers three related aspects: colleagues that academics can ask informally, knowledge of formal in-person help and training, and knowledge of online help which means the internet and the university's online documentation. This knowledge can refer to accessing such help ahead of potential VLE activity, or upon encountering difficulties. While such systems can be considered *generative mechanisms*, knowledge of the systems was seen as offering more explanatory power than the systems themselves.

Eight academics indicated they knew which colleagues could provide help: Responses included:

> So, my first port of call would always be somebody that I'd taught with who is more full time than I am and I would pick their brains and get an answer in five minutes as opposed to the, take me three hours to get an answer [From Learning Technologies]. [#17].

> If wanted to figure out how to do something, I'd probably think of a colleague who I know has a decent understanding and ask them for advice on it…So, there's a guy I know who I've contacted on multiple occasions on Teams-related issues but just in terms of Moodle, I'm not really sure who would go to whether it be the same people or not, to be honest. [#19]

> I would normally, I have 1 or 2 colleagues who know me, and they know me and my way as well, and they are sufficiently kind and generous with their time that I'd go to those. [#24]

Two academics said they looked online, checked the institution's help-pages, and also consulted Learning Technologies' staff (helpers):

> I did initially look for Moodle solutions online…sometimes they weren't helpful and so the next step was to go to the Learning Technologies team… it was the staff drop in, so that was the place I would go to if I had any issues. [#08]

> The helpers are my first point of contact because that's what they're there for. [#16]

One Digital Learning Director claimed that 'proximity of help' or knowledge of immediate help rather than attending scheduled drop-ins was important:

> If they need help, they need help there and then, they don't need help, you know, make an appointment next Thursday afternoon kind of thing. [#01]

Knowledge of where to get help is also seen in other responses including those related to *empathy towards colleagues*, a theme further explored in Section 5.7.4, where academics know who they could ask but avoid bothering busy colleagues. Additionally, in response to questions about accessing VLE help, three participants were unsure about how to access formal assistance from Learning Technologies, or incorrectly assumed they needed to contact IT Services rather than Learning Technologies.

> So, there's a guy I know who I've contacted on multiple occasions on Teams-related issues but just in terms of Moodle, I'm not really sure who would go to whether it be the same people or not, to be honest. [#19]

> Not off the top of my head, but I don't think it would take me more than a few minutes to find out. [#21]

> I think I would contact ITS to ask for help [#14]

5.4.4.2 Knowledge of students

The second micro-level dimension of *situational knowledge* is *knowledge of students*. In this thesis, *knowledge of students* includes knowledge of individual students or student cohorts, such as whether they are undergraduates or post-graduates, their major, year, first language, prior history, or pedagogical aspects such as learning preferences. Related to the VLE, it is taken as referring to two distinct aspects: using the VLE to gain knowledge of students and applying knowledge of students towards VLE use.

One aspect expressed by five participants was the use of Moodle's tracking tools to learn more about students such as:

> I will check if the students, because you can see the...the outline view, when people have accessed what and then will just make a note of any students that have not accessed anything and then I might have an informal chat with the personal tutor just to check that they're, you know, they might be aware of something.
>
> I think I've used it (Moodle) in the past just to build up a sort of profile of the student that I'm seeing maybe in a tutorial to find out what they have and haven't done and to question them about that. [#12]
>
> I guess there may have been moments where I've looked at, okay, there's a student who's really struggling. [#19]

While two academics indicated how *knowledge of students* affected their VLE use and the resources they put on Moodle:

> I assist students who have had either a challenging time at school or have chosen the sort of wrong A-levels...Moodle gives me that opportunity to structure that in a way to say, Look, here's lots of different ways that you could learn this content. You need to choose the best way that's going to

> work for you... because we have students who had caring responsibilities, mature students, students who've had really challenging times, a lot of widening participation students. Probably half of our students are widening participation, so they're already on the back foot coming into university. [#11]
>
> So, it's [Moodle's] just really helpful in that regard because if they don't attend lectures and attendance is very slapdash, they can still get access to that important information. [#08]

Four participants also indicated how knowledge of students' majors, previous study, first languages, and other relevant background characteristics affected VLE use. These aspects are considered under *empathy*, a theme further explored in Section 5.7, where cognitive empathy reflects such knowledge.

5.4.4.3 Knowledge of policies and regulations

The third micro-level dimension of *situational knowledge* is *knowledge of policies and regulations*. In this thesis, this is taken as knowledge of VLE-related policies which include digital accessibility, online assessment, and the Moodle Mandate which specifies minimum VLE use. Such mandates are related to 'voluntariness', an aspect included in technology acceptance research such as UTAUT, TAM2 (Venkatesh and Davis, 2000), and its extension TAM 3 (Venkatesh and Bala, 2008). It has also been noted as being commonly employed in other VLE adoption studies (e.g., Jeffrey, 2015; Li, Deeprasert and Jiang, 2024). While policies and regulations could be considered *generative mechanisms* affecting behaviours, in this study, I considered knowledge of them to have greater explanatory power.

Responses from one of the Digital Learning Directors and one of the Learning Technology Consultants indicated *knowledge of policies and regulations,* such as

the Moodle mandate, were either subjectively understood or could only make academics minimally compliant:

> ...when it comes up for their annual review and, you know, it's a box yes, I use Moodle, tick. [#05]

> I think broadly people understand that there's a need to do it, and I do think that most people comply with at least making sure everything's in there, but I wouldn't say it goes much more than that. [#06]

A theme emerging across the interview data demonstrated that 14 academics including Digital Learning Directors were independently engaged and not driven by policy, which reflects my initial observations regarding mandates reported in Sections 1.2 and 1.5. Other aspects of policy and VLE engagement are presented in *perceptions of organisational culture,* themes which are explored in Section 5.5.2.1.

5.4.4.4 Knowledge of university plans

The final micro-level dimension of *situational knowledge* is *knowledge of university plans*. In this thesis, it refers specifically to how knowledge of either continuity or planned changes within the institution potentially affect VLE use, particularly in terms of curriculum design and teaching allocation. While planning is a generative mechanism, in this context I interpreted knowledge of such plans as having greater explanatory power. In line with the Morphogenetic Approach, Archer (2003) claims individuals subjectively determine their actions based on interpretations of circumstances, thus making *knowledge of university plans* a PEP in the real domain.

Knowledge of pending changes was seen by one academic to limit investment in Moodle modules:

> I haven't done much to them [the modules] because of this looming curriculum transformation project that we're doing apparently next year. So, what's the point in expending all that energy knowing that it is less than a year away. [#13]

While a stable teaching assignment meant one participant consistently invested effort in improving their Moodle module:

> I am the module convenor and in charge of the Moodle page. I tend to always look back and then see how can I make it better? How can I modify, or change the visual of Moodle? I've tried a couple of things for that so looking back I always have the Moodle page from the previous year open together…and having that is useful for the teacher as well, I think. [#16]

5.4.5 Summary of knowledge

The findings identified *knowledge and beliefs* as a complex emergent PEP with four meso-level categories of knowledge, and 10 micro-level dimensions that can help explain academics' VLE engagement. The two meriting particular attention in the discussion is the identification of *instrumental knowledge* as a new aspect of *technical knowledge* and *software and systems fatigue,* which appears to be a previously unidentified counteracting causal power. Both of which will be discussed in Chapter 7.

5.5 Perceptions

In this study, *perceptions* is a macro-level category which is in the *empirical domain*. It refers to the individual academics' subjective experiences and observations. Therefore, it means personal interpretations and perspectives of

salient entities including organisational culture in the *real domain,* or the VLE or students in the *empirical domain*. In this thesis, this definition of *perceptions* is reinforced by Tarman's (2012) position that they are subjective and subject to change over time. Perceptions-of-self are excluded from this category of influence. In terms of CR and this study, such perceptions of self should be considered either reflexive knowledge of self or excluded completely as an affective or emotional response, which is presented in the limitations to this theory in Section 8.3.

Given the prominence of perceptions in the preliminary literature review, particularly in seminal technology models such as TAM and its numerous derivations, as well as UTAUT which features 'expectancy', a perception regarding the future, conceptual awareness meant they were recognised and coded for. Moreover, perceptions were retained as a distinct category of influence due to their centrality as a key characteristic of the *empirical domain*. Perceptions include perceptions of organisational culture, social influence, leadership, role, the VLE, and students. These were interpreted as offering more explanatory value regarding academics' decision-making than could be achieved through retroduction of the generative structures or creating factual descriptions. This study identifies two meso-level categories of perceptions: *technical perceptions* and c*ontextual perceptions* (Figure 5.3). These consist of four and five micro-level dimensions respectively, which will be described.

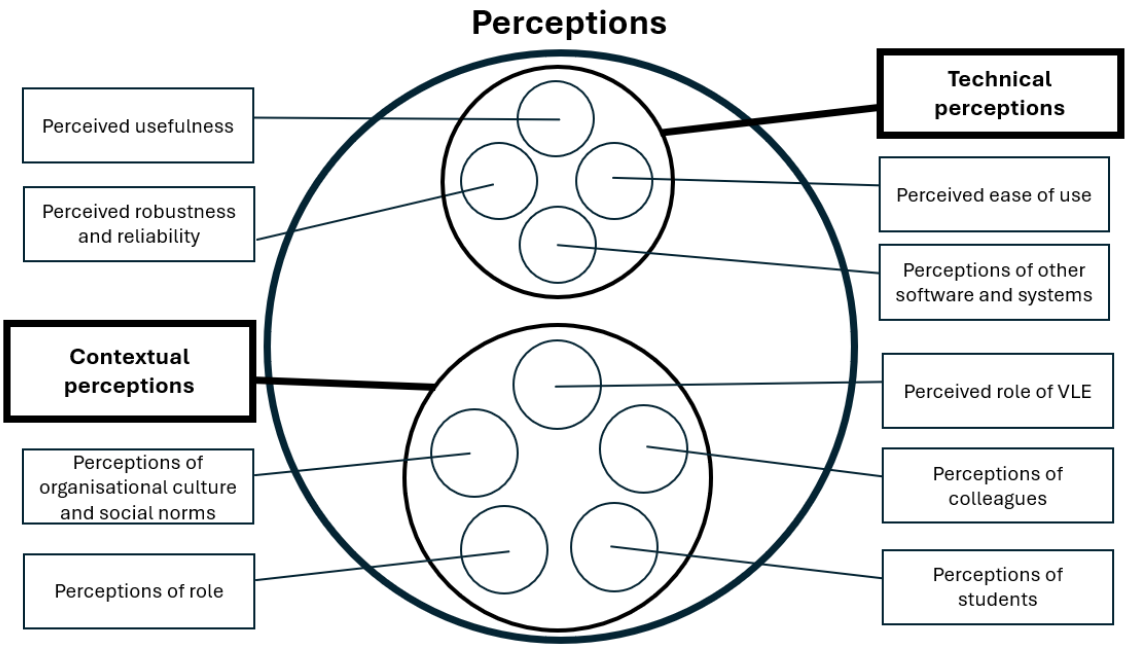


Figure 5.3 *Perceptions*

5.5.1 Technical perceptions

The first meso-level category is *technical perceptions*. This category predominantly refers to the VLE but also includes perceptions of other related technologies. This study identified three VLE-related micro-level dimensions: *perceived ease of use* (PEU), *perceived usefulness* (PU), and *perceived robustness and reliability*. A fourth aspect, *perceptions of other software and systems,* was also identified. PEU and PU are significant dimensions of TAM, while *perceived robustness and reliability* has similarities to 'system quality' seen in other technology adoption models ,such as the Expectation Confirmation Model (Bhattacherjee, 2001). The fourth micro-level category, *perceptions of other software and systems,* refers to other TEL software and systems.

5.5.1.1 Perceived ease of use

The first micro-level dimension of *technical perceptions* is PEU. In this study, it is taken as academics' perceptions regarding how easy or difficult the VLE is to use. PEU, as a major component of TAM, represents a significant established influence within the technology acceptance landscape and is seen as offering significant explanatory power (Davis, 1985). As PEU has been discussed in an appreciable amount of literature including in the preliminary literature review in Section 3.4.1, further explanation is unnecessary here.

A common interpretation from across the interviews indicated that Moodle was perceived as easy to use. One academic described PEU in terms of Moodle being user-friendly:

> ...learning how to use Moodle was quite easy... I'm quite traditionally rubbish with technology but I can work it and I found it quite easy and it's really nice. I think it's really user-friendly as well, both students and for me as an editing teacher. [#08]

However, five academics and one Learning Technology Consultant reported negative PEU, such as:

> It would be nice if it was a bit more intuitive. [#03]

> I think Moodle is very clunky, yeah? I don't think it's very user-friendly. [#17]

> It's [Moodle's] nowhere near as either intuitive or easy and quick as doing things in Teams. [#21]

PEU was also inferred from responses presented in different categories of influence such as in *instrumental knowledge*, which was explored in Section 5.4.1.3, where sophisticated use of the VLE implied positive perceptions regarding ease of use.

5.5.1.2 Perceived usefulness

The second micro-level aspect of *technical perceptions* is PU. In this study, PU considers perceived utility and also any intuited cost-benefit analysis. Regarding the VLE, a particular affordance might be perceived as useful, but too time-consuming to deploy or not sufficiently engaging. As with PEU, PU is another established feature of the technology adoption research landscape and further discussion is beyond the scope of this thesis.

Across the responses, a theme emerged that all participants indicated the VLE was useful to varying degrees, even if it was only used as a way of distributing resources to students. Highly positive responses about Moodle's utility included:

> I've also used Moodle for creating quizzes, for creating vocabulary activities, and also standardisation as well. So, it's quite a versatile piece of technology. [#12]

> And for teaching, it's [Moodle's] been generally great and what it can offer, it's really interesting, I have to say. [#16]

> Moodle gives me that opportunity to structure that in a way to say, Look, here's lots of different ways that you could learn this content. [#11]

However, one academic stated it lacked usefulness for teaching:

> It [Moodle] doesn't have an awful lot to do with the teaching side of it. It's a way of hosting information and sharing information. [#19]

An intuited cost-benefit analysis was noted from one Digital Learning Director, which is congruent with Archer's (2003) account of reflexivity where individuals consider impediments, ease of use, and potential benefits, before pursuing a course of action.

> ...one does talk about a cost benefit analysis... but I don't think it's true in terms of people literally, consciously, always sitting down and engaging with that, but that does frame their practice. [#04]

Another perspective related to the intuited cost-benefit analysis relates to a specific tool rather than the VLE in general, with one academic perceiving that forums could be useful but provided insufficient return for the investment in time and effort:

> I don't want to waste my time setting it [a forum] up...and I don't want to do that if they don't engage with it. [#13]

While some responses explicitly demonstrated PU, it was also inferred from other responses, such as those presented in *instrumental knowledge*, a theme which is explored in Section 5.4.1.3, or *management and organisation,* which is described in Section 5.9*,* where academics demonstrated PU through their application of Moodle's affordances.

5.5.1.3 Perceptions of robustness and reliability

The third micro-level dimension of *technical perceptions* is *perceptions of robustness and reliability*. In this study, *perceived robustness and reliability* refers to academics' perceptions that the VLE will not crash, or their having confidence in it. As such, *perceived robustness and reliability* includes ideas of '*system quality*' from other technology adoption models such as the Expectation Confirmation Model (Bhattacherjee, 2001) or ISSM described in Section 3.4.3. *Perceived robustness and reliability* is interpreted as separate from PU and permits a VLE to be perceived as useful but unreliable.

When *perceived robustness and reliability* was reported, responses tended to be negative. Responses from a Digital Learning Director and an academic stated:

> People are frightened of using it [Moodle] because they don't have confidence that it's always going to work. [#01]

> I'm highly aware that, you know, in the classroom, when things go wrong, it tends to be due to equipment failure. So, when it comes to teaching, I try, I think ideally the less equipment the better…I still print materials. [#19]

With few negative responses, an absence of commentary on *perceived robustness and reliability* generally implied positive *perceived robustness and reliability*.

5.5.1.4 Perceptions of other software and systems

The final micro-level dimension of *technical perceptions* is *perceptions of other software and systems*. In this study, it is taken as meaning how academics perceive other TEL software and systems, including other VLEs or common productivity tools used in education, such as PowerPoint or Teams. Regarding the VLE, *perceptions of other software and systems* refers to how such perceptions can subsequently influence academics' adoption and use of the VLE in HE.

Responses indicate perceptions of other platforms as being superior to Moodle. Two academics noted reasons why other platforms were superior:

> It's [Moodle's] nowhere near as either intuitive or easy and quick as doing things in Teams. [#21]

> [An alternative VLE used outside of Moodle] also anonymous question things where students can post questions that I can then answer. [#13]

Other instances of *perceptions of other software and systems* were presented in other categories of influence, such as *knowledge of other software and systems* in Section 5.4.1.4, especially where academics were noted to persist with other systems and software, and *accommodating student differences* in Section 5.7.2,

where an academic admitted using an alternative VLE because it offered anonymous postings which were perceived as preferable to Moodle's forums.

5.5.2 Contextual perceptions

In this model, c*ontextual perceptions* is a meso-level category and refers specifically to academics' perceptions of aspects of the working environment that may affect their VLE engagement. This focus on perceptions mirrors Schall's (2016) assertion that judgement and behaviour are shaped by perceptions and inferences from everyday life's contextual factors. This study identifies five micro-level dimensions of *contextual perceptions*: *perceptions of organisational culture and social norms*, *perceptions of VLE role, perceptions of colleagues*, *perceptions of students*, and *perceptions of own role*. These aspects of c*ontextual perceptions* will be explained in turn.

5.5.2.1 Perceptions of organisational culture and social norms

The first micro-level dimension of *contextual perceptions* is *perceptions of organisational culture and social norms*. I interpreted individuals' *perceptions of organisational culture and social norms* as intrinsically linked and offering significantly more explanatory power in the *empirical domain* than describing their *generative structures* in the *real domain*. Therefore, through a CR lens, these perceptions can be considered mediated subjective perspectives of the culture and social norms. In alignment with Archer (1995) they can be considered fundamental in explaining individuals' behaviour.

These findings identified three interrelated aspects: perceptions of the organisation's culture, perceptions of social norms within the institution, and perceptions of professional or disciplinary norms. Regarding organisational

culture, the participants' perceptions included explicit and implicit leadership messages; trust; agency afforded to academic staff; accountability structures; and collegiality. In this thesis, leadership refers to both the senior leadership and local leadership teams within faculties and schools.

Perceptions were articulated that align with descriptions of the institution being research-led, with research having primacy over teaching, an aspect which is explored in Sections 1.5 and 4.3.1. This aspect was perceived as pervading the institutional narrative, including resource allocation, job descriptions, interviews, and promotion criteria amongst others. Two Digital Learning Directors with strategic insight noted:

> I think from an institutional perspective, the narrative is that we are researchers, right? We are a research-led institution and therefore teaching should be research-led as well... A range of narratives, competing narratives at play all the time. [#04]

> You know, there isn't a line on there [role profile] about digital capabilities [or] familiarity with the VLEs, that sort of thing...For most academics, their hiring is focussed mostly on their research. 'What's your plan for the next ten years? How are you going to get your first grant?' This sort of thing. [#06]

Reflecting organisational culture, dissonance between explicit and implicit messages was apparent. As described in Section 1.5, many explicit messages, such as internal branding and vision statements, convey ideas of a technology-driven teaching environment with Moodle central to teaching innovation. However, explicit messaging contradicts perceptions of implicit messages such as resource allocation, actions from local management within schools, or insufficient investment in training as mentioned by a Digital Learning Director:

> ... it's awful, that was a quite a hefty investment in that department in massive, massive, big touchscreens...I got a call from the head of department to say these things are still sitting there. We don't know how to

> use them, you know, months on. They bought some stuff and they thought the job was done... [#06]
>
> They're [teaching staff] not given the time to develop the skills that they need, and they're not given the reward for developing the skills and the practical and the pedagogical understanding of how, you know, they can use technology to enhance the student learning experience and how they can use technology to improve their teaching experience, assessment, experience and make it all efficient...So, they're being almost being expected to invest the time themselves without anyone else giving them the time officially, which is something that is a big bee in my bonnet. [#06]

There were also perceptions that the VLE and its role were peripheral to the university's teaching strategy. These perceptions were influenced by having separate Digital Learning Directors and Heads of Teaching and Learning, and the Post Graduate Certificate of Higher Education (PGCHE) blended-learning module being optional, suggesting that lecturing was core strategy. One Digital Learning Director stated:

> I said to [NAME OF PERSON] at the time, I think I've said it since, there shouldn't be a separate module [Developing Blended Learning Environments] because this is core to everything that we're doing...As soon as you make digital something separate, you make it think people can opt out of and ignore it... it makes people think that it's not at the core and at the heart of everything that we do when in fact it is. [#6]

Additionally, building on observations in Section 1.5, three participants perceived that academics had too much agency and were rarely held accountable in implementing strategy or following the Moodle Mandate:

> We give people a lot more agency than a lot of places do, I think, and sometimes for some people, that's too much. [#02]

> What was fascinating to me was the degree of academic freedom that individuals had and the degree to which individuals could isolate themselves from the strategy of the school, even the department. [#18]

> People feel free to ignore [the Moodle Mandate] because it's never policed. [#21]

This perceived lack of accountability and organisational justice was noted to affect certain individuals, especially when others ignored directives. One academic aired such a frustration:

> We were told it had to be videos [on Moodle] in the summer... but what ended up happening was I was the only one that did the videos...I was really annoyed that I spent the entire summer recording these videos when all I had to do was just make my PowerPoint presentations and then just put it up online. [#07]

A theme was interpreted from five interviews that refuted claims that the institution was collegial. Two academics explicitly noted aspects related to collegiality:

> As long as the students are happy with my bit, I don't really care what is going on in the rest of the module. [#07]

> I heard a lot of language when I first joined about the [NAME OF SCHOOL] school being very collegiate...So, there's no sense of end-to-end collaborative working from an input to an outcome and so it means that it's like ships passing in the night when you see colleagues on their way to their office or on our way to a lecture theatre or a seminar room. [#18]

Regarding social norms, in this model, it refers to norms stemming from the organisation's culture and those stemming from professional and disciplinary culture. It is taken as the perception that academics need to align themselves with various expectations. Regarding the VLE, and within technology adoption

literature, such norms are commonly referred to as ‘social influence’. Venkatesh and Bala (2008) also note that social influence affects ‘behavioural intention’ to use.

Analysis of the interviews suggested an implicit theme that academics often perceived the need to align themselves with the teaching team and student expectations. This theme included an explicit comment from one Learning Technology Consultant who had a degree of operational oversight:

> I think this is where the expectation comes in and because if they're not using Moodle then you get peer pressure... So, they're actually falling in with the rest of the teaching team...but certainly, there' s a far higher expectation now, both from students, quite rightly so, and also from academic colleagues. So particularly where it's team-taught I see a lot of pressure. [#05]

One academic explicitly mentioned their school culture differed from the rest of the faculty:

> As far as the [NAME OF SCHOOL] school is concerned, it has a culture of its own, which is protected or insulated from, you know, the culture that might exist across the faculty or other...other parts of the university. [#18]

While this statement was taken to imply a perception of organisational culture, another academic claimed a lack of personal alignment with organisational norms which also suggested a perception of culture:

> I think I'm a bit [of a] lone wolf over things. [#13]

Other instances of *perceptions of organisational culture* were inferred in multiple areas such as those presented in Section 5.4.4.1, *knowledge of where to get help,* or Section 5.9.4, *managing relationships with colleagues,* which implied different aspects of an organisational culture. Trust was inferred from Section 5.4.1.3, where academics used Moodle to cover their backs.

5.5.2.2 Perceived role of VLE

The second micro-level dimension in c*ontextual perceptions* is *perceived role of VLE*. In this thesis, it refers to perceptions regarding the role the VLE can play within academics' teaching assignments or personal pedagogy, particularly whether it is perceived as central or largely peripheral. In this study, *perceived role of VLE* excludes its perceived role within the university's strategy, which was considered in *perceptions of organisational culture and social norms,* a theme explored in Section 5.5.2.1.

Two of the academics explicitly enthused about Moodle and how central they perceived it to be:

> I'm using it [Moodle] a lot. [#10]

> I'm teaching a new module, so I've set up my Moodle page. So, it was time consuming to set up, but when it gets rolled over next year, I've done it now, so I know I don't have to do it. So that is definitely a benefit. [#08]

One Digital Learning Director was particularly vocal about how central the VLE and digital technologies should be:

> I said to [NAME OF PERSON] at the time, I think I've said it since, there shouldn't be a separate module [Developing Blended Learning Environments] because this is core to everything that we're doing...As soon as you make digital something separate, you make it think people can opt out of and ignore it... it makes people think that it's not at the core and at the heart of everything that we do when in fact it is. [#6]

However, two academics indicated it was irrelevant, peripheral or simply appended to their practice:

> I just don't see that (using Moodle) as proper learning, really. [#21]

> I don't see Moodle as a key part of my teaching at all, to be honest. It's just there and I forget it exists sometimes pretty much. [#19]

While another academic in describing colleagues stated:

> ...but then for a lot of academics, if they've gone through a vast majority of their teaching career without technology, to them, it is an add on because they're literally having to add it on to the teaching they did before. [#07]

Other instances of centrality were inferred from statements and extended utterances more relevant to other categories of influence, including *procedural knowledge*, a theme explored in Section 5.4.1.2*, instrumental knowledge* as discussed in Section 5.4.1.3, and *technical pedagogical knowledge*, a theme which is explored in Section 5.4.2.2, all of which implied positive perceptions regarding the centrality of Moodle in their practice.

5.5.2.3 Perceptions of own role

The third micro-level dimension of *contextual perceptions* is *perceptions of own role*. In this study, it refers to two related aspects: perceptions of tasks the academic's role encompasses, and perceptions of what a teacher does. In CR, while roles are shaped by institutional structure, in emphasising the separation of systems and the individual, I interpreted perceptions of role as offering more explanatory power than descriptions of generative structures. Archer (2003) further noted that roles are rarely completely defined which allows role occupants to bring previous experience, knowledge, ideals, attitudes, and other personal qualities to them. Such perceptions related to the VLE may include responsibilities such as module administration, activity creation, maintaining reading lists, monitoring student engagement, and managing the gradebook.

Responses from a Digital Learning Director, a Learning Technology Consultant and a Professor of Practice highlighted that inconsistent boundaries exist regarding academics' responsibilities in terms of developing and populating their Moodle modules. Some faculties expect academics to create their own learning objects and upload materials, while the Digital Learning Director indicated that their faculty promoted collaborative working:

> We've obviously got a mixture of academics, of instructional design type people and also technical people so we're almost like able to sort of hothouse some of those modules. [#01]

This contrasts with a Learning Technology Consultant and the Professor of Practice, in referring to their colleagues where they indicated that some academics expected everything done for them:

> There is definitely a faction who they just want to give their files to somebody who's going to upload it for them. [#05]

> Mr. or Mrs. Module convenor, can you load all of that onto Moodle for me? So, we do have a few people like that and think that's very unfair to the module convenor. [#17]

Perceptions of what a teacher does also refers to concepts of 'content-centredness' or 'student-centredness'; whether academics believe their role is teaching content or facilitating student learning. Some studies (e.g., Geertshuis and Liu, 2021; Lai and Jin, 2021) note that academics who perceived their role as facilitators rather than lecturers are more likely to use technology. While perceptions of own role suggest overlaps with professional identity, in this thesis, professional identity concerns the teacher–researcher dichotomy, not lecturer–facilitator practice.

Extended sections from the interviews with all three Digital Learning Directors suggested academics predominantly used a traditional approach. One explicitly stated:

> I think it's [academics' teaching is] still very much focussed on, um, traditional forms of teaching, not the VLEs [#06]

One academic explicitly stated that was his teaching methodology:

> I turn up and I give them a 50-minute presentation with me at the helm. [#24]

Interpretations from nine academics suggested a more sophisticated perception of their role. Responses articulating this perception included:

> ...in terms of teaching, when I'm in the classroom with the students, whether it's online or face to face, I'm not teaching the materials, I'm teaching the students to think. [#21]

> So, the teaching comes first in the sense that I'll decide, right, this is a really good experience for learners to have ... So, what would be appropriate technology to make this happen? [#09]

> I just like, like to get students to do the hard work, get them to do the processing. I don't want to be, you know, I don't want it to be the teacher show. [#12]

Other instances of *perceptions of own role* included statements about shaping or helping the students, which were seen in the themes of *instrumental knowledge,* in Section 5.4.1.3 and later in *empathy,* which is discussed in Section 5.7, suggesting that some academics perceive their role as that of facilitator.

5.5.2.4 Perceptions of colleagues

The fourth micro-level dimension *of contextual perceptions* is *perceptions of colleagues*. In this study, this dimension is taken specifically as how academics perceive their colleagues in relation to VLE use, particularly in terms of trustworthiness, knowledgeability, willingness to help, judgementalism, or whether colleagues are considered role models. Regarding such perceptions of role models, this refers both to positive role models and a desire to emulate, as well as anti-role models, with negative perceptions of colleagues reinforcing their own VLE rejection.

Positive role modelling was noted by two participants:

> I think I probably do care. If their bit looked better, then I would try and make mine to look better. [#10]

> I like helping people and learning more from my colleagues. [#12]

These examples of positive role modelling contrast with the negative sentiment of some colleagues that was articulated by one of the sceptics:

> And it's absolutely not a dig at any of my colleagues but I do wonder whether their raison d'etre when they give some of these lectures is the IT itself, rather than what they're teaching...I think that 1 or 2 of my, certainly younger colleagues have got that a little bit mixed up in their mind as to where their priority is in that. [#24]

A specific concern was raised by one academic that some colleagues could be perceived as judgemental:

> I do think, well if my colleagues go on that [my Moodle module] and then like thinking, well what's she doing that for? Why is she doing that sort of quiz? [#10]

Perceptions of colleagues was also inferred from statements presented in other categories of influence, such as *knowledge of where to get help,* described in Section 5.4.4.1, especially as soliciting VLE-related help from colleagues indicated perceptions of requisite knowledge, willingness to help, and a lack of judgementalism.

5.5.2.5 Perceptions of students

This final micro-level dimension in *contextual perceptions* is *perceptions of students*. In this thesis, this is taken as including two separate but interrelated aspects potentially affecting VLE use: perceptions of learner attributes, such as character, behaviour, motivation and engagement, either as small groups or students in general; and perceptions of needs, wants, or expectations. *Perceptions of students* is different to the *knowledge of students* as described in Section 5.4.4.2. Differences between *knowledge* and *perceptions* are described in Section 5.4. Therefore, it is unnecessary to explore these differences further.

Eight academics and a Learning Technology Consultant articulated clear perceptions regarding students' wants, needs, and expectations associated with the VLE including:

> I think they want more. They want to be at university and they want that experience, sure, but they want support and help and encouragement and formative stuff so that they can, really get to grips with their learning. [#05]

> I think kind of in this day and age where everything is kind of online and they expect things to be there and things like that. [#23]

> I think expectation of younger people can be often a lot higher than it used to be. I think the expectation is, give me a lecture recording, give me all the resources. Spell it out for me. [#08]

A range of responses also implying perceptions of students' wants and needs were seen in responses presented in other categories of influence, such as those later seen in *empathy*, a theme explored in Section 5.7*,* where academics addressed students' perceived needs for consistency of experience.

5.5.3 Summary of perceptions

The findings identified two meso-level categories of *perceptions,* with a total of nine micro-level aspects that offer significant explanatory power regarding academics' VLE engagement. As perceptions exist in the *empirical domain,* they cannot be considered PEPs although they can have causal powers. However, in alignment with morphogenesis, they should also be seen as having the potential to affect entities in the *real domain,* such as the next entity, *attitudes*, which is a PEP. For this study, the most significant aspect meriting particular attention in the discussion, especially in relation to CR, is the *perceptions of organisational culture and social norms*, which will be discussed in Section 7.3.6.

5.6 Attitudes

In this study, *attitudes* is a macro-level category and refers to a broad set of personal characteristics describing the academics' mental or emotional predisposition or behaviour towards various entities. These entities include the VLE, other technologies, people, situations, events, or the organisation. In this thesis, *attitudes* is seen as a *PEP* in the *real domain*. Constant comparison finds it aligned with existing definitions such as Johnstone and Reid (1981) who describe attitude as the resultant construct of particular conditions including knowledge, experience, and personality, which affect the individual's behaviour towards a particular entity. As attitude was described in both TAM and UTAUT in the

preliminary literature review (Chapter 3), perceptual awareness and heightened theoretical sensitivity meant it was recognised and coded for.

Attitudes is seen as consisting of five meso-level categories (Figure 5.4) *attitudes towards technology, mindset*, *attitudes towards work*, *attitudes towards students*, and *attitudes towards change*. *Attitudes towards technology* is seen to consist of two micro-level dimensions: *attitudes towards the VLE* and *attitudes towards other technologies,* as was *attitudes towards work* which consists of *employee orientation, and followership*. It must be noted that certain aspects of *attitudes towards colleagues* and *attitudes towards students* were identified, but were interpreted as more closely related to *empathy*, presented in Section 5.7, and to *management and organisation*, a theme described in Section 5.9, and are addressed in these sections. These five aspects of *attitudes* will now be described in turn.

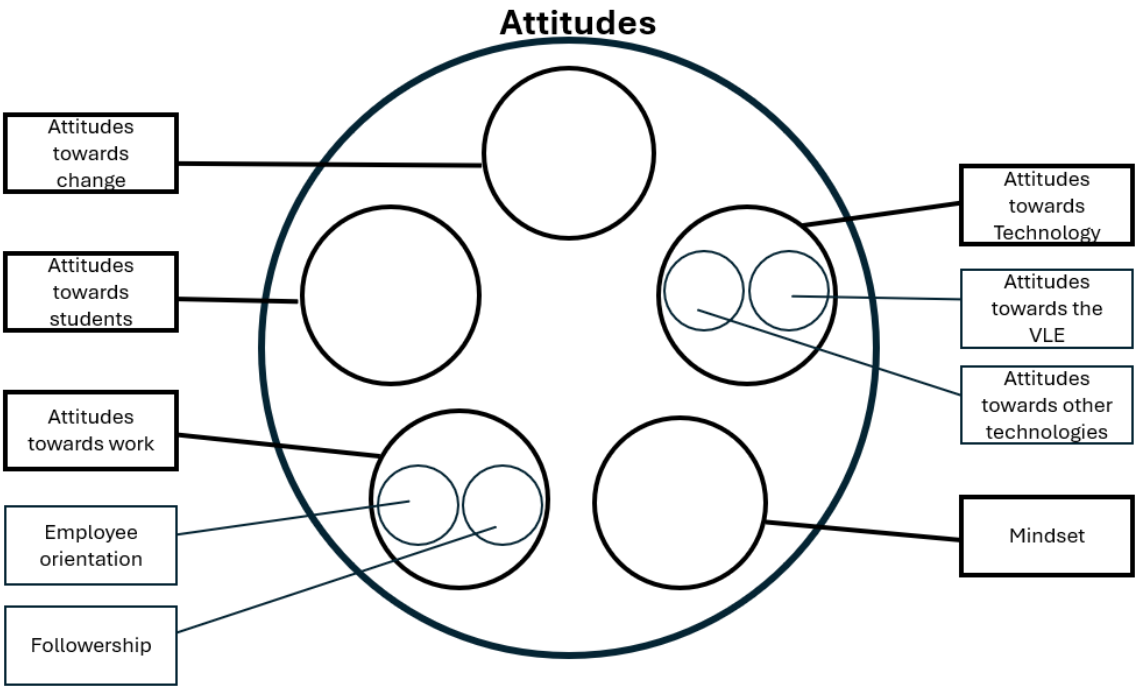


Figure 5.4 *Attitudes*

5.6.1 Attitudes towards technology

The first meso-level category in *attitudes* is *attitudes towards technology*. It is divided into two separate micro-level dimensions: *attitudes towards using the VLE* and *attitudes towards other technologies*. This differentiation is necessary as some respondents possessed a negative attitude towards the VLE but a positive one towards other technologies including education technologies and vice versa. These two micro-level dimensions will now be explained.

5.6.1.1 Attitudes towards using the VLE

The first micro-level dimension of *attitudes towards technology* is *attitudes towards using the VLE*. In this study, it specifically refers to academics' dispositions towards using Moodle and possesses direct similarities with '*attitude towards using*' from TAM (Davis, 1985). Numerous underlying attitudes, such as subversion, ambivalence, or enthusiasm were explicitly stated or retroduced from responses.

Interpretations from all the participant interviews indicated that academics possessed a range of attitudes towards Moodle. Three explicit comments, including two from Digital Learning Directors, highlighted this range of differing attitudes:

> ...why do some people engage [with Moodle] in a really progressive, innovative way? What are the core group of staff doing where they just going through the motions? And then you always have saboteurs, always here. [#4]

> It's sometimes frustrating that I don't have the time to train [on learning Moodle], but I will still do it in my own time if I have to. [#07]

> ...those people who are in a way, overenthusiastic [towards Moodle module development] and that can be problematic in its own right. [#01]

Notably, two participants reported only aiming for a minimum level of competence, which also indicated attitude:

> I think I probably reached a level of knowledge which was sufficient... and that was enough to get me by. [#18]

> I just think it's just about not being incompetent, really. [#19]

However, another academic explicitly reported that their colleagues either refused to learn, or avoided using Moodle, which also indicated attitude:

> ...and part of the reason I've stepped down as module convenor is not only, you know, three, two, one, but what sort of drove that decision is having to backfill for other people [in using Moodle]. [#17]

Furthermore, some interviews implied positive attitudes towards different aspects of Moodle such as being a repository but were negative towards tools such as forums. For example, as noted in Section 5.5.1.2, one participant, who was a noted enthusiast of Moodle, had a completely different attitude towards forums. Academics' attitudes were also inferred from responses more closely associated with other categories of influence such as *instrumental knowledge*, described in Section 5.4.1.3, which implied enthusiasm, while aspects in *knowledge of other software and systems*, as presented in Section 5.4.1.4, suggested some negative attitudes.

5.6.1.2 Attitudes towards other technologies

The second micro-level dimension of *attitudes towards technology* is *attitudes towards other technologies*. In this study, this is taken as the academics' disposition towards TEL and technology in general.

As I anticipated *attitudes towards other technologies* would be a proxy for attitudes towards Moodle, it was deliberately elicited and many, mostly positive, attitudes were given:

> I don't always have the latest things, but I certainly do try to use technology wherever I can to, you know, to enhance things. [#09]

> I like technology but don't care about extreme technologies like nappy crushers or whatever and silly things like that. I'm only really interested in technology that is genuinely useful and practical. [#12]

Although one academic was not so positive:

> I have to say, I'm well-known within the school for being a bit of a technophobe. [#24]

However, a response from another academic demonstrated that it was possible to have a lack of interest in technology in general but appreciate Moodle:

> Are you interested in it [technology]? [Interviewer]
> No, give me a pen and paper. [#08]

But in a separate part of the interview:

> So, I love Moodle. [#08]

5.6.2 Mindset

The second meso-level category of *attitudes* is *mindset*. In this thesis, *mindset* only refers to academics' attitudes towards learning to use the VLE and is taken as being consistent with Dweck's (2006) concepts of 'fixed mindset' and 'growth mindset'. In terms of CR, 'mindset' is considered a PEP that can influence behaviour. It is seen as a desire to grow and is considered separate from *self-belief,* which is explored in Section 5.8.2. Therefore, academics with a *fixed mindset* are seen to avoid learning about the VLE ,while those with a *growth mindset* are willing to learn. Although I could disaggregate mindset into these two categories in the model, it was left as a meso-level category. Furthermore, although mindset has potential overlap with *concepts of self,* a theme discussed in Section 5.8, in this study, it is interpreted as aligning more closely with *attitudes* as it reflects a disposition towards learning rather than broader concepts of self.

A response from a sceptic indicated both a fixed mindset towards IT and consequently the VLE:

> I'm probably in the last tranche of academic staff who came through the system without having to be IT literate...and I'm of an age where I didn't have that, and when it comes to not minding admitting these things, well, it's a fact, I can't do these things. [#24]

In addition to sentiments implied across extended responses, one explicit response from an advocate indicated a growth mindset:

> ...because I made that effort with Moodle to go as far as learning how to look at HTML coding, I was able to get the best out of Moodle. [#07]

Further examples of *mindset* were inferred from responses presented in other categories of influence, such as in *knowledge of where to get help* which is explored in Section 5.4.4.1, where help-seeking was interpreted as indicative of a growth mindset.

5.6.3 Attitudes towards work

The third meso-level category of *attitude* is *attitudes towards work*. In this study, this category specifically refers to attitudes which influence academics' adoption and use of VLEs in HE. This study identifies two micro-level dimensions related to the VLE that emerged from the data: *employee orientation* and *followership,* which capture different ways academics position themselves towards work and how these dimensions affect their engagement with the VLE. These will now be explained in turn:

5.6.3.1 Employee orientation

The first micro-level dimension is *employee orientation*. *Employee orientation* is congruent with De Dreu and Nauta's (2009) conceptualisation of a continuum, where employees either prioritise their own interests or those of the organisation. This prioritisation has similarities with Archer's (2007) *ultimate concerns*. In this study, *orientation-towards-self* can be taken as prioritising a work-life balance or prioritising promotion-related activities such as research output, grant capture, or committee membership; these are considered more impactful towards promotion than teaching quality or VLE mastery.

Seven participants, including two Digital Learning Directors, explicitly stated that academics were conscious of promotion requirements which could affect VLE engagement:

> … our progression system uses a lot of metrics, so if you can say, yep, I've got this, I've got that, you know, or I've got ten publications in my research, I've got this amount of research funding then, you know, that obviously ticks a lot of boxes, [#01]

> I think it's [promotion's] something that's always in the back of your mind as well. [#10]

One academic noted that focusing on teaching limited career progression:

> I'm also teaching active, and one of the big bugbears I have with this particular university is that they don't recognise that enough...so basically you cannot beyond level six, which is Associate Professor. [#24]

A Digital Learning Director mentioned work-life balance:

> So, what you're prepared to do in terms of your work-life balance is going to have a major implication on actually what you subsequently do. [#04]

An organisation-orientation was noted which was exemplified by three academics:

> It's sometimes frustrating that I don't have the time to train [on learning Moodle], but I will still do it in my own time if I have to. [#07]

> My main motivation, at the moment, is to improve the system, but not to get a promotion. [#08]

> It [a Moodle initiative] was to create something meaningful and beneficial for the institution [#09]

This sentiment was seen throughout many interviews with extended responses indicating the academics were motivated in varying degrees by teaching and spent additional time on Moodle-related activities.

5.6.3.2 Followership

The second micro-level dimension in *attitudes towards work* is *followership*. Here, it is taken as the academics' attitudes towards the work environment or work tasks, particularly those affecting VLE use. Such attitudes can include disillusionment, eagerness, compliance, and engagement. *Followership* is taken from Kelley's (1988) 'Theory of followership' which was identified through constant comparison and literature interrogation. It lists five categories of employee: *passive*, *conformist*, *alienated*, *pragmatic,* and *exemplary*.

Across the interviews with all academic staff, which included observations by the Digital Learning Directors, the five categories of *followership* were seen, and all five categories are explicit in the following examples:

> I don't particularly use it [Moodle]. I mean, I use it passively insofar as others will, like put the [NAME OF COURSE] stuff up on there. [#21] (Passive)

> ...the kind of core group of staff doing where they just going through the motions and doing what they have to do. [#04] (Conformist)

> I think people are just sick of trying new things...They feel that there's been massive scope creep in what they envisage the role of an academic to be. [#06] (Alienated)

> You got to play the game, I guess you have to play the game. [#13] (Pragmatic)

> I'm surprised that people thought it was so good. Like, for me, I was just making my [Moodle] page and I was making it to the best of my ability. [#07] (Exemplary)

These attitudes were also seen in responses presented in other influences such as *instrumental knowledge* described in Section 5.4.1.3, which typically implied an

exemplary attitude, or *perceptions of organisational culture and social norms,* which is explored in Section 5.5.2.1, where some academics felt able to ignore the Moodle Mandate.

5.6.4 Attitudes towards students

The fourth meso-level category is *attitudes towards students*. It refers to the academics' disposition or related behaviours towards students. Here, *attitudes towards students* refers to attitudes such as positivity, negativity, acceptance, or indifference, and is taken as a non-empathetic disposition. *Empathy* has its own category which is discussed in detail in Section 5.7.

A theme emerged from across extended responses which suggests that academics possess differing attitudes towards the students. Three of the participants articulated insightful comments that specifically demonstrate their attitudes towards the students:

> I have a totally different attitude to the one undergraduate lecture I do as a guest lecturer. They're basically a lazy bunch, never read anything in advance and probably don't pay very much attention, and that's being paid for by my tax money. My attitude to teaching the undergraduates is totally different. [#20]

> You're very welcome to have a look at our Moodle page ...it's your only shop window, and if you're trying to sell something and give a good service to the customer, then it's a good idea to use it as best you can. [#17]

> I love helping people if I can. It gives me a tremendous sense of satisfaction if I can see that I've helped somebody in some way, even if it's a small thing. The university is a great place to do that, and it's not just for the students. [#12]

Attitudes towards students were also inferred from numerous responses related to other categories of influence such as *instrumental knowledge*, a theme presented in Section 5.4.1.3, and also in *declarative knowledge* in Section 5.4.1.1, and *perceived usefulness* in Section 5.5.1.2, where academics indicated positive attitudes towards students and a desire to support student learning through their administrative and pedagogical application of the VLE.

5.6.5 Attitudes towards change

The final meso-level category in *attitudes* is *attitudes towards change*. Here, it refers to the academics' openness or otherwise towards adopting new technologies, methods, and adapting their VLE use. This category could include attitudes stemming from top-down initiatives, suggestions from peers and students, and reflection.

Responses from all three Digital Learning Directors suggested academics were reluctant to change:

> You get those people that absolutely do not want to change... it might be specific to the digital or it might be just they don't like change, they just want to get on with what they're doing and that's it. [#01]

> And then you always have saboteurs, always here. [#4]

> But as you get further along your career, you establish your patterns and your modes of teaching...and, you know, repetitive way year on year. [#06]

However, explicit comments and extended responses across the interviews from nine academics suggest *attitudes towards change* is more nuanced, with aspects of change originating from inner conversations regarding their Moodle use, seeing

others' Moodle use, and in response to suggestions and feedback from students. Explicit comments include:

> Sometimes I make notes actually on Moodle saying this activity didn't work well, try something else next year and so, when I get to that, I'm like, I have to check that, and so ...compared to the previous year, what I want to modify. As I said I keep notes. [#16]

> I remember last year somebody suggested something as well. Actually, that's a really good idea and, so, I included it....So, I always change things when I can. [#08]

> On the, on the modules that I'm involved with, you know, we try to improve the Moodle pages, we try to think, well, how can we improve it, how can we make it clearer. [#15]

> The whole point of getting feedback is to be able to see what the what they like and don't like and then either change it or keep it. [#07]

Analysis of the contrasting responses suggest that academics have more positive *attitudes towards change* than the Digital Learning Directors believed. The main theme which emerged from the interviews indicated that nine of the academics were willing to try something new, were receptive to feedback, and embraced change on their own terms but less so to imposed change. Change will be revisited in the discussion where *willingness to try* is decoupled from common definitions of innovativeness and reframed as part of *attitude towards change*. Willingness to try is explored in more detail in Section 6.3.4.

5.6.6 Summary of attitudes

The findings identify *attitudes* as a PEP with five meso-level categories with additional micro-level dimensions, all of which can plausibly help contribute to explaining academics' adoption and use of VLEs in HE. Although attitudes are considered here as non-empathic dispositions, they share some similarities with the next entity, *empathy,* particularly in how they help shape academics' orientations towards their VLE engagement. Key aspects of empathy that emerged from the interviews are presented in the next sub-section.

5.7 Empathy

Here, *empathy* is a macro-level category and is taken to mean the ability to understand others and their situations. In terms of CR, empathy is complex. The capacity for empathy is a PEP in the *real domain*, whereas 'being empathetic' lies in the *actual domain*. In this thesis, and related to VLE use, empathy's main explanatory powers lie in considering the academics as being empathetic and acting on others' imagined needs, differences, priorities, and feelings.

In this study, *empathy* can refer to both known individuals or groups, such as students, other academics, and professional services staff. Regarding students, *empathy* can refer to students in general, or specific groups, including those with accessibility requirements, neurodiverse students, widening-participation students, or international students. As explained in Section 5.6, *empathy* is separate from *attitudes,* as in this study *attitudes* is taken as non-empathetic.

Empathy must be further defined as literature identifies two main types: 'cognitive empathy' and 'affective empathy' (Aldrup, Carstensen, and Klusmann, 2022). In this study, empathy means 'cognitive empathy' through perspective-taking and understanding others' situations and differences, not emotional responses.

Notably, in the preliminary literature review (Chapter 3), empathy was absent from the existing technology adoption models.

This study identifies four meso-levels of *empathy*: *student use of the VLE, accommodating student differences*, *recognising and valuing students*, and *empathy towards colleagues* which all demonstrate perspective-taking (Figure 5.5). *Student use of the VLE* has two micro-level dimensions: *appreciation of students' difficulty learning to use the VLE* and *appreciation of cognitive load using the VLE*. All these aspects of *empathy* will be explained.

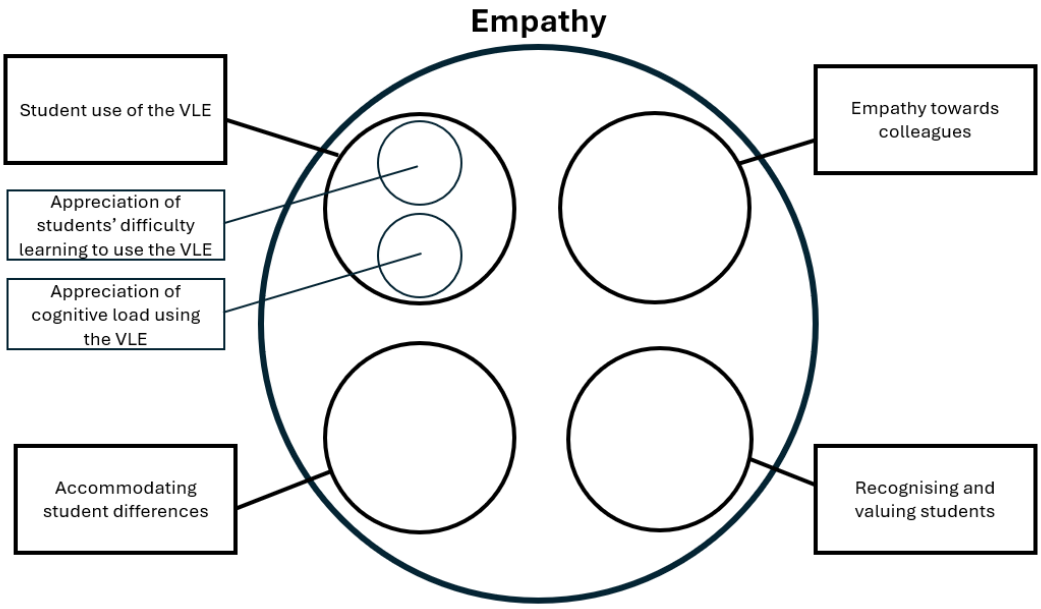


Figure 5.5 *Empathy*

5.7.1 Student use of the VLE

The first meso-level category is *student use of the VLE* which consists of two separate micro-level dimensions: *appreciation of students' difficulty learning to use the VLE* and *appreciation of cognitive load using the VLE*. This differentiation is important as it captures two separate mechanisms: initial conceptual and procedural difficulties, and ongoing challenges often associated with inconsistent layouts. These two dimensions will now be described.

5.7.1.1 Appreciation of students' difficulty learning to use the VLE

In this study, *appreciation of students' difficulty learning to use the VLE* refers to recognising and appreciating that students may encounter difficulties learning to use the VLE. These difficulties can include understanding what a VLE is, how it works, how content is organised, or where buttons are located and what they do. This category of *empathy* demonstrates congruity with Hinds' (1999) concept of the 'curse of expertise' where experts can fail to appreciate novices' difficulties. Consequently, *appreciation of students' difficulty learning to use the VLE* is taken as academics empathising with novice students and making adaptations for them.

Two academics specifically recognised that students do have their own perceptions and perspectives:

> I think one of the things that's really important about any kind of digital learning is student expectation and student perceptions. [#01]

> ...[it's] sometimes difficult to see things from the students' perspective of the technology. [#21]

Nine participants including Learning Technology Consultants and Digital Learning Directors recognised students lack familiarity with VLEs and may require either training or simplicity of presentation: Responses include:

> I have some introductory session where we go through the module a bit more, just give the usual kind of spiel, but also actually go and show Moodle and ask them to go on to it as well... So, we just kind of go through it together and explain, here's where you can find some content, some interactive notes with videos, practice problems. [#13]

> ...if you can make the access to the information and the kind of engagement with the information as simple as possible, then there can be focus on what's actually there. [#09]

> Finding the same kind of things in the same kind of place makes it easier. [#03]

> The aim is to make the learning resources accessible, but not become over patronising and then not be overly complex and so convoluted that it loses students. [#11]

However, a contrasting theme also emerged that not all academics were empathetic towards those who might struggle to use the VLE. One DLD noted that colleagues often showed little consideration for students when designing Moodle sites, while a Professor of Practice openly implied that he had no empathy for students who were finding the technology or the VLE difficult to use:

> We design Moodle sites almost for the benefit of tutors, not for the benefit of the students [#01]

> Nearly everything you want the IT that's on your laptop to do, you can figure it out for yourself with an Internet search…If you have a motivation, you'll find it online, you'll find the answer. Someone's done it, someone's made a video of it, someone's produced some notes. What, you want to sit on your arse and tell me that you can't do it because actually you don't really want to do it, do you? You want to be spoon fed because you want to use that as a barrier, as an excuse for not using a system [Moodle] that you don't really want to use. [#20]

Other instances of such empathy are described in other categories of influence such as *knowledge of students,* a theme which is explored in more detail in Section 5.4.4.2. For example, knowing which students are foundation students and which are post-graduate students is considered a causal power which can affect empathy.

5.7.1.2 Appreciation of cognitive load using the VLE

This next micro-level dimension is *appreciation of cognitive load using the VLE*. In this study, it is taken as recognising the potential difficulties that haphazard or inconsistent organisation of Moodle modules may pose. Therefore, this recognition is consistent with Sweller and Cooper's (1985) conceptualisation of cognitive load and schema. With inconsistently organised modules, students must rely less on schema and more on cognitive processing capacity, which could affect their use of Moodle.

Interpretations from 13 interviews indicated an awareness of cognitive load. Two respondents explicitly indicated that inconsistency could add to students' cognitive load:

> ...if you get somebody who takes one module and develops it into some kind of really complex thing, that really might be fantastic, but although that might really improve the student experience in that one module, it tends to actually overall degrade the student experience, because you're adding more cognitive load to that module. [#1]

> I do appreciate there's an element that it might be straining on the, I guess, the cognitive load of it all might be a bit much because if every module does things slightly differently and you lose track of what every module is run, then that can be problematic for some students. [#13]

Although these aspects have similarities with PEU as described in Section 5.5.1.1, PEU refers to academics' own use and not empathy towards students' use.

5.7.2 Accommodating student differences

The second meso-level category in *empathy* is *accommodating student differences*. In this study, *accommodating student differences* refers to recognising students have different abilities, first languages, entry routes, responsibilities, accessibility requirements, and that some may require additional scaffolding. Therefore, in this thesis, *accommodating student differences* is taken as academics empathising with students and adapting their Moodle use or the resources on Moodle for them.

Five academics explicitly recognised that students had different levels and abilities while one academic acknowledged the linguistic difficulties Chinese students might have. Several responses explicitly indicated that they used Moodle to accommodate them:

> So, I guess the other thing is that when you're teaching a class, you're going to have students at different levels so, you've got to differentiate certain tasks…So again, just seeing Moodle as a way to enable that, it's an enabling technology. [#12]

> One of the things that I've had to do is…is change the approach and the content and the structure of the modules…in… in almost every case to suit the kind of students that we're teaching. [#18]

> …and was really, really mindful when we had a much higher proportion of Chinese students, and I was teaching people where English was a second language… It's really essential for them to have as much as they can have in advance [on Moodle], to encourage them to record things, to allow them to reflect on things and come back to you, because the barriers for them are much, much higher. [#20]

Similarly, in interpreting a response from another academic, it could be inferred that some students were perceived as reticent in a live classroom setting and that

Moodle forums allow all students to contribute by providing them with time and space to consider their responses:

> ...in an online space, such as Moodle, discussion forums can offer more time for reflection and perhaps the students feel more comfortable and more relaxed. [#14]

Additionally, regarding forums, it was interpreted that some students preferred anonymity. Alongside Moodle, one academic admitted using another VLE with this functionality:

> ...also anonymous question things where students can post questions that I can then answer. [#13]

Two academics explicitly indicated empathy regarding accessibility requirements and that some academics tried to use Moodle accordingly:

> So, the way I set it up, one thing is accessibility for me as being quite dyslexic... it's quite important that I try and make it as accessible as possible without diminishing the learning experience. [#11]

> So, instead of having a PDF uploaded you can actually have some [NAME OF DISCIPLINE] on the [Moodle] screen which a screen reader can interpret correctly. [#09]

Two academics stated that they deliberately used Moodle to provide materials ahead of class:

> So, Moodle is an ideal platform for delivering content to students before they come to the classroom. I can signpost them and say, Task two is quite, there's a bit of reading there. It's recommended you look at that before you go to the class, and again, all of those materials are on Moodle. [#12]

> I was teaching people where English was a second language, and it was really essential for them to have my lecture [notes] in advance and to be able to read it. [#20]

A similar provision was described by one academic who posted exemplars and marking rubrics to avoid ambiguity:

> We also put up a 3000-word or 5000-word submission. We put up examples on Moodle about what excellence looks like…and what I also did for a time was to put up the marking scheme and my comments on what I'd marked so they could see what was good, what was not good, and then any sort of feedback, comments. So, we want them to do well. [#17]

Interpretations of responses presented in other categories of influence including, *instrumental knowledge,* as described in Section 5.4.1.3, suggested other examples of *empathy,* such as recognising student absence can be unavoidable and that materials should be available on Moodle.

5.7.3 Recognising and valuing students

The third meso-level category of *empathy* is *recognising and valuing students*. Here, this is taken as appreciating students as valued individuals with expectations and needs and are not just passive consumers of education. In this study, this appreciation can be seen as academics recognising students are people, that their time is valuable, that education is expensive, or that students want a good learning experience and to be challenged.

Seven academics indicated their awareness that student time and the time spent in lectures is valuable. Responses include:

> One thing I know is that if my time is valuable, so is the one of the student. [#16]

> Now, many students are very busy. They've got various courses running. [#15]

> I have on the Moodle page kind of a live document where I put every week what are the topics we're going to be covering in the live session that you have. So, here are the materials you need to have done before you come so that we can kind of jump in a bit and get to the meat, the proper meat of the topic, rather than kind of going through the definitions and all that usual crap. [#13]

Across the interviews, 11 academics indicated an awareness that students want value or a good experience. Explicit responses include:

> ...these guys and girls that pay a lot of money and they want value. [#17]

> I guess part of it [using Moodle] is you want them to have the best experience because the students are people at the end of the day. [#10]

One academic asserted that students want to be challenged:

> ...they're our customers, yeah? We should be challenging them intellectually, not challenging them logistically or linguistically. [#20]

These statements contrast with other responses such as the ones presented in Section 5.5.2.3 and Section 5.7.1.1 by two different academics which suggest that students may not always be highly recognised or valued:

> I turn up and I give them a 50-minute presentation with me at the helm. [#24]

> Nearly everything you want the IT that's on your laptop to do, you can figure it out for yourself with an Internet search...If you have a motivation, you'll

> find it online, you'll find the answer. Someone's done it, someone's made a video of it, someone's produced some notes. What, you want to sit on your arse and tell me that you can't do it because actually you don't really want to do it, do you? You want to be spoon fed because you want to use that as a barrier, as an excuse for not using a system [Moodle] that you don't really want to use. [#20]

Furthermore, the sentiment seen throughout many interviews indicated that students were widely valued as individuals and this empathy was often reflected in academics' use of Moodle.

5.7.4 Empathy towards colleagues

The final meso-level category of *empathy* is *empathy towards colleagues*. In this study, *empathy towards colleagues* is taken as academics recognising they work with others and that their own VLE use, or non-use, can affect colleagues. Here, e*mpathy towards colleagues* was understood to include aspects such as recognising colleagues' time is valuable, or colleagues' lives should not be made difficult. Although empathy towards colleagues could be interpreted as representing aspects of the organisational culture, it was interpreted as having more explanatory power within *empathy*.

Three academics explicitly indicated they were mindful of academic colleagues' time regarding support with Moodle:

> So, the first thing is, can I figure this out on my own? Can I just not...not create workload for someone else? [#09]

> ...rather than taking the time of a colleague whose purpose is not to support, but then they have their own job to do. [#16]

> it's an increased workload to involve them in your module and think that's unfair because you know we are paid and we should be competent to do the job, which includes being competent at Moodle [#17]

Similarly, one respondent thoroughly investigated any issues before contacting Learning Technologies so not to waste each other's time

> [It] makes it easier for them to give me the right solution without having to sort of go back and forth all the time. [#23]

Three academics clearly indicated that any Moodle use should be of benefit to their colleagues.

> We should be driven by what's best and what's best for colleagues. [#17]

> If there's a benefit to the students and reducing workload for staff as well...I'll be embracing it. [#11]

> It is so that students can reach their potential and is to make working conditions easier for staff as well. [#08]

However, there was a complaint from one academic that not all colleagues were so mindful:

> Otherwise, you say, Mr. or Mrs. Module convenor, can you load all of that onto Moodle for me? So, we do have a few people like that and think that's very unfair to the module convenor. [#17]

Other statements, such as those already presented in *perceptions of own role*, a theme explored in Section 5.5.2.3, also suggested different levels of empathy towards colleagues exist; some academics seemed unconcerned with burdening colleagues with general VLE work, while others were cognisant of others' workloads and avoided adding additional burden.

5.7.5 Summary of empathy

The findings identified four meso-level categories of *empathy* and two micro-level dimensions that can all affect and help explain academics' VLE adoption and use behaviours. While *empathy* is a PEP in the *real domain*, significant explanatory power exists by considering *empathy* in the *actual domain*. Moreover, *empathy* merits specific attention in the discussion as this appears to be an unacknowledged and undertheorised aspect of VLE adoption and use, and is seen as a key differentiator between adopting technology that can benefit others and adoption purely for personal gain. Empathy will be discussed in greater detail in Section 7.3.1. This thesis now moves on to the next category of influence, *concepts of self*.

5.8 Concepts of self

In this thesis, *concepts of self* is a macro-level category and is taken to mean a broad set of stored subjective knowledge, beliefs, and understandings about oneself. Therefore, it refers to numerous self-concepts including *professional identity*, *self-knowledge*, *self-efficacy* and *self-esteem*. In this study, *concepts of self* are retroduced and interpreted as existing in the *real domain,* with enduring causal powers and emergent properties that influence decision-making. As outlined in Section 5.5, perceptions of self are excluded from this study by being more closely aligned with affective dispositions. This conceptual limitation is explored in Section 8.3, where the limitations to this study are presented.

Concepts of self are recognised as more complex than this thesis can explain but this study identified four broad overlapping meso-level categories: *professional identity, self-knowledge, self-efficacy* and *self-esteem,* none of which were seen as having micro-level factors (Figure 5.6). These categories will now be described in turn.

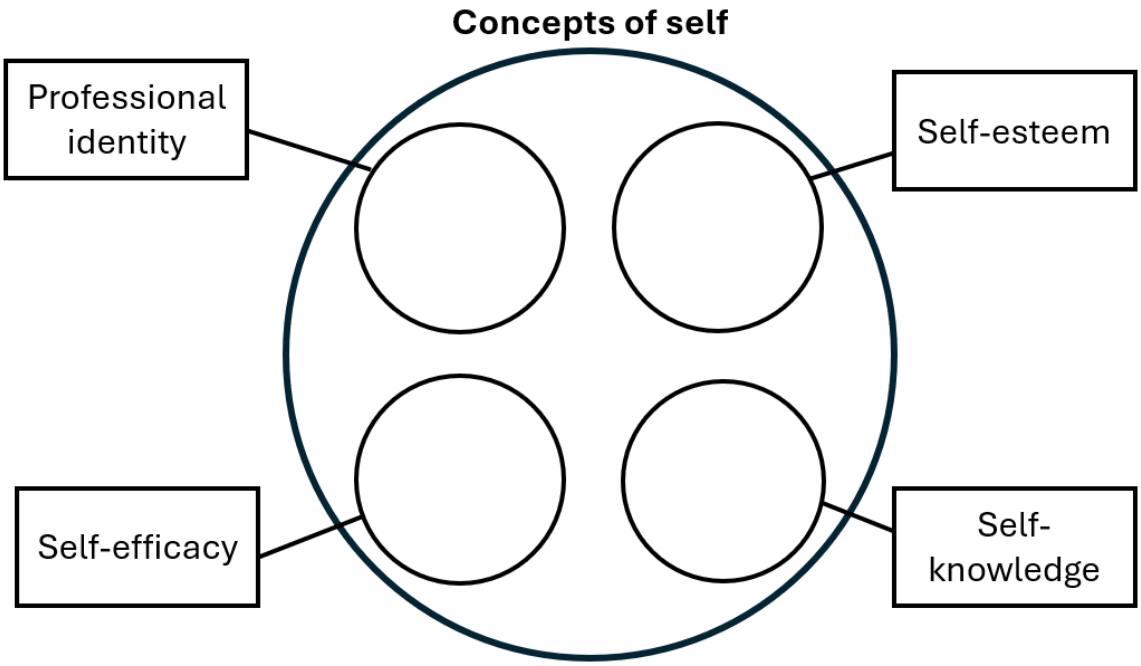


Figure 5.6 *Concepts of self*

5.8.1 Professional identity

The first meso-level category in *concepts of self* is *professional identity*. Here, it refers to academics' orientation regarding their internalised professional identity, such as whether they are researchers, teachers, guest lecturers, or leaders. Professional identity was considered important especially as Brownell and Tanner (2012, p.339) maintain, "Some faculty continue to perpetuate the myth that a researcher should not want to teach," and that academics identifying as researchers would not embrace learning technologies. Furthermore, Geertshuis and Liu (2021, p3) claim *professional identity* represents a strong factor in education technology adoption, "...if an innovation such as a new LMS align with the existing professional identity, adoption is likely to take place."

Eight academics explicitly identified as teachers. Responses include:

> I don't consider myself to be an academic...I am a teacher, so, I teach [#08]

> Well, fundamentally, I'm a teacher. [#11]

> Right now, I'd probably say...probably just tell them, I'm a teacher of [NAME OF SUBJECT]

Three academics who also teach explicitly identify as researchers and that they deprioritise teaching:

> I think if you're a on an R and T contract, I mean, teaching is at the bottom of the list. [#07]

> I've always been an R and T scholar and so I do have a research agenda that has kind of, I think, been a primary kind of driver. [#04]

> Research tends to be where most of my effort is. [#01]

Which contrasted with a Professor of Practice who stated:

> What we bring to the table is a different perspective from those of, say, our more traditional research-focussed academics or indeed those who have more of a teaching focus. [#15]

Notably, in addition to job family, permanence of contract appeared to shape identity, and therefore affect Moodle use, as articulated by one academic:

> If I were on a permanent contract, I would try to find opportunities to learn more about Moodle because perhaps I would need to use it to a greater extent. [#14]

By comparing statements of identity and actual VLE use, it is notable that some academics with a researcher identity had embraced Moodle while many with teacher identities eschewed it. Notably, permanence of contract appears to represent an additional dimension which can affect *professional identity* and consequently VLE use. The next aspect is *self-belief*.

5.8.2 Self-belief

The second meso-level category in *concepts of self* is *self-belief*. In this study, it is taken to mean the academics' orientation and confidence in shaping how they approach the use of information technology and consequently the VLE. In this study, s*elf-belief* is considered separate from PEU and *mindset*, as *self-belief* is seen as more associated with an individual's underlying confidence, whereas PEU describes the technology, and *mindset* considers willingness to learn rather than confidence.

Across extended responses, a theme emerged indicating lower self-belief. One academic explicitly stated:

> I'm hopeless. I'm completely hopeless at it [learning technology]. [#24]

While two academics indicated higher levels, including one who had taught themselves XERTE, a rapid authoring tool used to create Moodle activities:

> So, I had a very good understanding of the computing infrastructure and I've always been aware of, you know, what needs to be done to make something. [#07]

> I'm pretty good at adapting to new technology. So, I learned to use XERTE, kind of self-taught myself to do that and sort of similar things. [#23]

Further to these responses, statements presented in other categories of influence such as *knowledge of where to get help,* a theme explored in Section 5.4.4.1, supported the theme of self-belief. *Knowledge of where to get help* implied self-belief as academics would experiment with Moodle activities believing they could overcome challenges with assistance if necessary.

5.8.3 Self-esteem

The third meso-level category in *concepts of self* is *self-esteem*. In this study, s*elf-esteem* is conceptualised as a PEP through which academics appraise themselves. This PEP is theorised to influence their reflexivity and engagement in professional situations. Self-esteem was retroduced from empirical evidence from both the participants' reflexive responses and their observations about others. This theme includes responses of self-evaluation, their sense of their own self-worth, having a vulnerable self-esteem, or their dependency on external validation and approbation. In this study, it specifically refers to all aspects of self-esteem which might impact their VLE engagement, including admitting not knowing how to use the VLE, concern about being judged, or concern about their reputation with colleagues or students.

Six academics were seen to have a healthy self-esteem which included a willingness to admit when they do not know something. Responses included:

> I will ask the stupid…I always say there is no such thing as a stupid question. I am more than happy to ask anything. [#08]

> Because there's so many things I don't know, I need to find out, so, have to ask people. [#22]

> When it comes to not minding admitting these things, well, it's a fact, I can't do these things. [#24]

Three respondents including a Digital Learning Director expressed insights about colleagues who were seen to possess aspects of an unhealthy or vulnerable self-esteem through a refusal to seek help:

> They think that they should know how to do everything and they like spend hours and hours and hours just trying to do something instead of asking,

you know, that sort of attitude and waste lots of time just trying and failing. [#10]

A lot of academics are very proud and they're world leaders in their research fields, and they don't necessarily want to feel, I don't know, vulnerable or questioned or like they're not doing something right, or they don't know how to do something. [#06]

Actually, what's driving this [Moodle avoidance], is that people are afraid to fail or to try something new because of the potential for failure, or they might then out themselves that they aren't as good, or maybe that's going to challenge their own perceived identity, right? [#04]

Two academics presented a need, or were motivated by approbation or positive feedback which could indicate a lack of self-esteem:

That's a big drive for me if a student says, Oh, I love the Moodle page, I love X, Y, and Z about it. [#08]

I want them to give me fantastic feedback and want them to have a great experience because these are all tenets of just basic [NAME OF DISCIPLINE] philosophy. So, the Moodle page has got to look good. [#15]

It also appeared that seven academics seemed mindful of their reputation particularly with their use of Moodle.

I wanted to make a good impression on the students. [#07]

But pride is part of it as well, because I'd be embarrassed if I ended up on Rate My Lecturers or whatever...Imagine you go on you got one star and everybody gives you one star and it would be awful, yeah?... You just wouldn't want to be thought of as somebody who doesn't try and, you know, it would be terrible" [#10]

> I think you should be able to use it [Moodle}. I mean, the students might ask you about it. [#21]

Additionally, a range of responses more closely aligned with other categories of influence including *perceptions of organisational culture and social norms*, as elaborated on in Section 5.5.2.1, implied different levels of self-esteem. These included the belief some academics felt comfortable enough in themselves that they could wilfully ignore the Moodle mandate or isolate themselves from strategy.

5.8.4 Knowledge of self

The final meso-level category in *concepts of self* is *knowledge of self*. Here it is taken as meaning academics' knowledge of their values, abilities, and beliefs about themselves. *Knowledge of self* is considered a PEP but does not include any empirical data such as age.

Interpretations from across the interviews with academics indicated knowledge of self. Specific responses from two academics highlighted insights regarding self-knowledge although they could also be interpreted as implying *self-belief* too.

> I'm quite traditionally rubbish with technology but I can work it and I found it quite easy and it's really nice. [#08]

> I'm very good with software. [#07]

Other aspects of *knowledge of self* were seen in other categories of influence including *perceived role of VLE* which is outlined in Section 5.5.2.2, or *perceptions of own role*, as explored in Section 5.5.2.3, *which* could indicate beliefs about their teaching skills and that the VLE was not necessary.

5.8.5 Summary of concepts of self

The findings identified four meso-level categories of *concepts of self* which can plausibly affect academics' adoption and use behaviours. No micro-level aspects within these meso-levels were identified. However, the aspects which merit particular attention in the discussion chapter are *professional identity,* especially in concert with vulnerable self-esteem and viewing this in the context of morphostasis to preserve professional identity. Professional identity will be discussed in greater detail in Section 7.3.4. This thesis now considers the final category, *management and organisation*.

5.9 Management and organisation

In this study, *management and organisation* is treated as a macro-level category within the *real domain* and refers to a broad set of internalised dispositions which describe how academics' want to manage or organise themselves and others. As a PEP, it influences individuals' decision-making regarding their use of the VLE to realise these underlying dispositions. Here, it is not related to the organisation's management and organisational systems.

This aspect was retroduced from participant responses regarding VLE practices manifest in the *actual/empirical domain*. Academics employ the VLE to exert various levels of control, such as managing expectations, others, courses, self, events, or environments. The explanatory power is seen as PEPs in the *real domain,* or the underlying dispositions or needs to be in control, seek order, orchestrate events, or manage impressions.

This study identifies five meso-level categories of *management and organisation*: *managing expectations, managing the course and students*, *managing relationships with students*, *managing relationships with colleagues*, and

managing self (Figure 5.7). *Managing relationships with students* was seen to consist of two related micro-level dimensions: *bridging* and *boundary setting*, while *managing relationships with colleagues* also consists of two micro-level dimensions: *stewardship* and *cultivation*. These aspects will now be described.

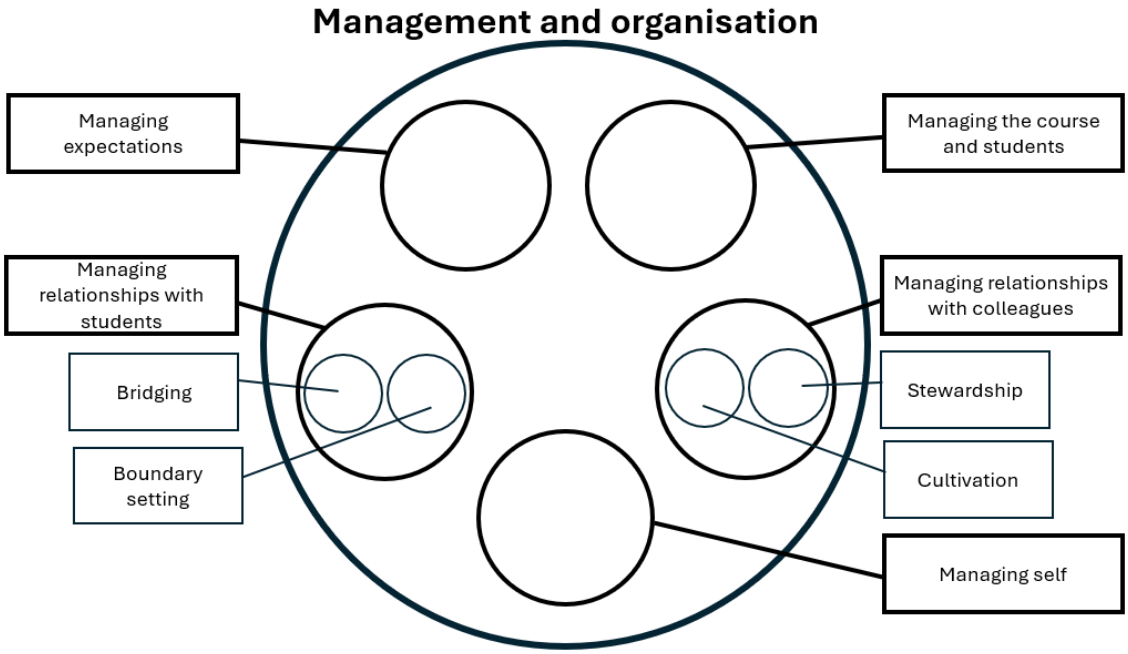


Figure 5.7 *Management and organisation*

5.9.1 Managing expectations

The first meso-level category of *management and organisation* is *managing expectations*. In the *actual/empirical domain*, it represents the academics using the VLE to establish and maintain the tone of the course, as well as impressions regarding the institution, the course, and the academics. As stated in Section 5.9, *managing expectations* was retroduced to a PEP representing their underlying disposition to do so.

One aspect expressed by seven participants including one Digital Learning Director was the use of Moodle to manage impressions and establish a sense of professionalism or tone regarding the course. Examples include:

> This is the gateway into our learning. This is the shop window for our learning experience. [#06]

> ...also I think once students could think they very quickly pick up with me that I'm extremely organised and that I'm that I'm really on top of all these things, they very rarely are like give me excuses for missing things. They just kind of know they've failed. [#09]

> I think the first part of the Moodle page does have to set the tone and reflect the tone that you're trying to achieve within the course. [#15]

Other examples of managing expectations were inferred from other statements, such as those presented in *instrumental knowledge,* a theme explored in Section 5.4.1.3, and *self-esteem* as described in Section 5.8.3, where academics were also seen using Moodle to manage student expectations of the academics and the course.

5.9.2 Managing the course and students

The next meso-level category in *management and organisation* is *managing the course and students*. In this study, it is seen as academics using the VLE to organise information, learning activities, and assessments to ensure structure and consistency while fostering student engagement in a prescribed or managed way, again a manifestation of underlying needs and desires.

Eight academics explicitly stated that they deliberately structured Moodle content to manage the course and students which can also pre-empt issues such as:

> I think that weekly organisation and in the announcements we say every week, this week you should be doing, it's on the Moodle and it says you should be doing this, this, this. Point one is always, if you haven't already, go back to the previous week announcement and look through that. [#10]
>
> So, for assessments and things like that, and so I keep that at the very top of my Moodle page and then I split it up into weeks. So, my students know this week I've got the date, I've got this week, and I've got all the content that we're going to be learning, all the questions we're going to be doing in that week. [#08]
>
> I wanted all the information to be in one place, nicely laid out so that nobody contacts me." [#07]

Two academics stated that they use the activity completion tool with conditional release in their modules:

> They need to read the guidance before they [Check] the disclaimers or whatever before they can access the coursework. [#13]
>
> I do time restricted [materials]... then there are reveals. So, you know, we don't want to give them all on Moodle [at the beginning].[#17]

Another academic said they also used the activity completion tool to help manage the students:

> Did I do that last week? Was it ticked off? No, I'd better go back. [#10]

Other instances of *managing the course and students* included information presented in other categories of influence such as *technical knowledge* described in Section 5.4.1, where academics stated they used Moodle to manage assignments, further reflecting the desire to manage the course or students. The next category describes academics using the VLE to manage their relationships with students.

5.9.3 Managing relationships with students

The second meso-level category in *management and organisation* is *managing relationships with students*. In this study, this category refers to using the VLE to deliberately shape and manage the relationships between academics and students. It is divided into two micro-level dimensions: *bridging* and *boundary setting*. These two concepts refer to the act of either trying to reduce or to maintain any perceived distance between academics and students. These are described in turn.

5.9.3.1 Bridging

The first micro-level dimension of *managing relationships* is *bridging*. *Bridging* resonates with Chandler (2022), who noted that students valued tutors who make deliberate efforts to reduce the perceived distance between themselves and the learners. In the *actual domain/empirical domain*, it specifically refers to the academics using VLE's affordances to manage their relationships with students by bridging the gap between them. In the *real domain,* it represents the academics' underlying dispositions regarding the types of relationship they want.

12 academics indicated that they used Moodle to build rapport and make themselves seem more authentic or approachable. Examples include:

> I think I was very intent on kind of reducing the distance between students and staff. [#04]

> ...when I post an announcement or I upload some extra materials for them to use, I think that indirectly this conveys the message that I care about them and I really want them to be successful and the message that I'm providing them with different tools that they can use in their learning experience...we can make comments like have a good weekend and I think

such comments also help; they contribute to a positive relationship with the students. [#14]

So, what I've done for my new module that I just started a few weeks ago is I put a photo of me and my name so that then they can put a face to a name kind of thing as well. [#08]

I do put at the end of every announcement like every week, if you have any questions, please do contact me. [#10]

So I've got the, um,...picture of me particularly at the start because just reassure [the students] that this is the person that I want to speak to in the corridor if they've not seen me before. [#11]

Bridging leads on to the next concept, *boundary setting*.

5.9.3.2 Boundary setting

The second micro-level dimension of *managing relationships* is *boundary setting*. In this study, it is taken as the academics' underlying desire to establish and maintain distance between themselves and the students. Therefore, Moodle is used to deter students from contacting or interacting with them.

Three participants volunteered they used Moodle to avoid engagement with students:

I wanted all the information to be in one place, nicely laid out so that nobody contacts me. [#07]

I wanted to make sure that I didn't get 400 emails, that students knew what they had, and it's basically, they would leave me alone. [#04]

They still ask me questions, and I will say it's on the Moodle page. [#08]

In addition to these statements, other responses seen throughout could also be interpreted as using the VLE to reinforce the role and authority of the teacher and hence maintain distance between academics and students.

5.9.4 Managing relationships with colleagues

The next meso-level category of *management and organisation* is *managing relationships with colleagues*. In this study, this refers to using the VLE to deliberately build and maintain particular connections and relationships with other academics. It refers to both the deliberate use of the VLE to do so or as a boundary object that can be the topic of conversation. This is divided into two micro-level dimensions: *stewardship* and *cultivation,* which will be explained in turn.

5.9.4.1 Stewardship

The first micro-level dimension of *managing relationship with colleagues* is *stewardship*. In this study, it is a PEP and taken as the need or desire to manage, or exert some measure of control over colleagues, either directly or indirectly, and often in the absence of formal authority. In the *actual/empirical domain* it is manifest by the academics deliberately using the VLE to manage colleagues' behaviour through different aspects including content, structure, organisation, settings, navigation and activity type, or using it to model desired VLE use. It can be seen as a non-directive, non-confrontational method although stewardship may not always be perceived.

Two academics noted that they used Moodle to manage or influence their co-teachers in this way:

> ...I mean there has to be some level of prescription doesn't there? Because otherwise tutors could do whatever they want. So, I think having Moodle with a very clearly defined curriculum and modules and class materials with tutor notes as well with suggestions is a good thing. [#12]

> I have actually shown them my bit and said, 'Can you put it in, combine it in a separate page like this?' So, I have actually tried to show where I can influence people as the module convenor. [#07]

Other statements throughout could plausibly be interpreted as academics using Moodle to manage or nudge their colleagues towards particular behaviours. For example, using Moodle to set the tone for the students could be interpreted as doing likewise for colleagues. This leads onto the next aspect, *cultivation*.

5.9.4.2 Cultivation

The second micro-level dimension of m*anaging relationships with colleagues* is *cultivation*. In this study, it is taken as the desire to either build relationships with colleagues or manage their impressions. It therefore refers to actions, such as deliberately using the VLE as a boundary object to foster impressions of trust or collegiality.

Eight participants conveyed the idea of using the VLE to foster and cultivate relationships and manage others' impressions of them. Examples include:

> I think if you can end up influencing others as well, particularly for the higher tiers because I did quite a lot of work on [name of a Moodle plug-in]. [#09]

> I also think it's, again, colleagues who value my expertise in the area [of using Moodle] and have trust in me, yeah? [#13]
>
> I like helping people and learning more [about Moodle] from my colleagues. [#12]
>
> The learning section is...is something we developed as a team over lockdown. [#11].

Some responses are seen as more closely aligned with statements and sentiments in, *self-esteem,* which is explored in Section 5.8.3, and also implied that academics used or avoided Moodle to manage academics' impression of them.

5.9.5 Managing self

The final meso-level category in *management and organisation* is *managing self*. In this study it is taken as the academics using Moodle to manage their time and effort. This use of the VLE to manage time and effort includes creating delayed announcements to shift effort to the start of semester, to receive reminders of due dates, enforcing activity completion, and automated grading and feedback of quizzes. Again, the responses represent dispositions in the *real domain,* such as being organised or desire to minimise stress.

Four academics mentioned using Moodle to help manage themselves, often through reminders or by keeping information together. Examples include:

> I set all that up [timed announcements] because I receive the notification and also reminds me. So, I guess it helps the students, but it also is managing my work. [#13]

> Sometimes I make [hidden] notes actually on Moodle what I'm saying, like this activity didn't work well, try something else next year and so, when I get to that, I'm like, oh yeah, I have to check that. This is all already on Moodle because I know it's all in one place and it's all on there...what I want to modify and as I said like I keep notes. Sometimes I'll put a label that is just intended for me. [#16]

Other instances of *managing self* include information presented in other categories of influence such as in *instrumental knowledge,* which is explored in Section 5.4.1.3, where it was seen that Moodle was being used to manage time.

5.9.6 Summary of management and organisation

The findings identified five meso-level categories of *management and organisation* and four micro-level aspects which can influence academics' VLE adoption and use behaviours. Furthermore, this category identified substantive relationships between *management and organisation* and *instrumental knowledge,* such as using Moodle for *managing relationships with students* and for *managing colleagues*. These will be discussed in greater detail in Section 7.3.2.

Having presented the six new categories of influence, including the stratified dimensions which comprise them, this thesis now moves on to the main contribution of this investigation, the Learning Technology Adoption Model (LTAM). The following section will show how these categories of influence are related to one another, and how, in concert, they explain academics' adoption and use of VLEs in HE.

5.10 Learning Technology Adoption Model

The second part of this chapter presents the new explanatory model of academics' adoption and use of VLEs in HE, called the Learning Technology Adoption Model (LTAM) (Figure 5.8). LTAM represents the outcome of the accepted adaptation to SGT's selective coding presented in Section 2.3.3.3 and incorporates all six categories of influence explained earlier in the findings, and as such it represents an emergent structure.

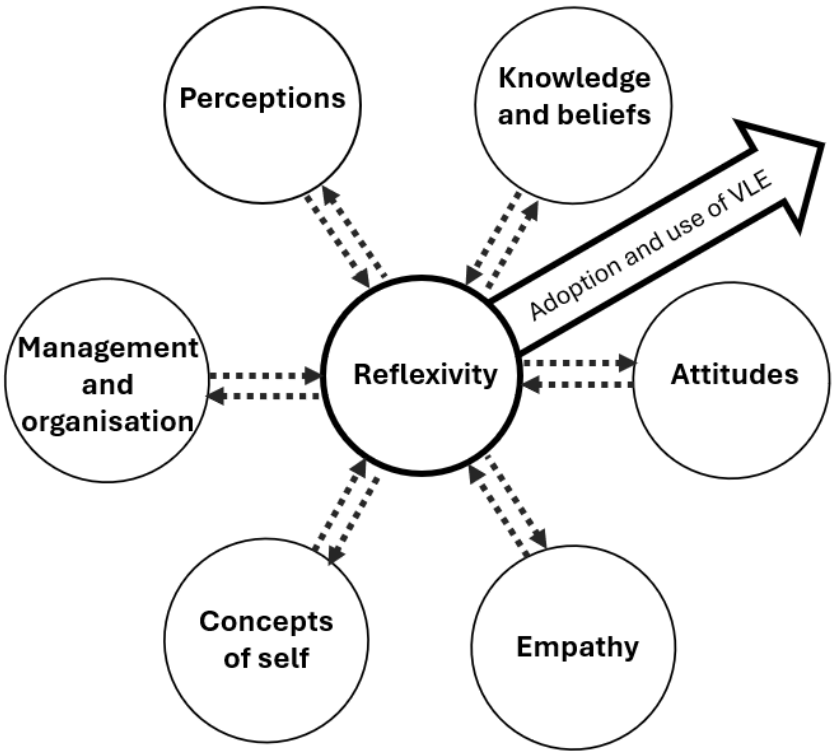


Figure 5.8 *Learning Technology Adoption Model (LTAM)*

In LTAM, the six categories as described above are connected through Archer's (1995) conceptualisation of *reflexivity*, a core construct from the Morphogenetic Approach that is placed at the centre of the model. Consistent with Archer's conceptualisation of reflexivity, in LTAM there are two types of arrows: the dashed arrows representing the connections between the six core categories and

reflexivity, while the larger block arrow represents the actual VLE engagement based on realisations of these six categories. Being a CR-informed model, connections within LTAM are understood to represent tendencies. Additionally, as HEIs exist as part of an open system, any of the six categories of influence and the whole model can be influenced by entities not captured in this study. LTAM will now be explained in more detail.

5.10.1 Reflexive processes within LTAM

Through the central entity of reflexivity, LTAM captures both the explanatory processes of academics' VLE engagement and the morphogenetic processes which modify or reinforce the underlying dimensions of the six categories of influence. For simplicity, and related to the evaluative criteria for GT (Corbin and Strauss, 2008), as elaborated on in Section 4.7, LTAM is a parsimonious model and does not attempt to represent the domains in which the categories of influence lie nor the depth of the meso- and micro-levels as explained in Sections 5.4 to 5.9. To help explain the model, this thesis will separate the morphogenetic processes which modify or reinforce these entities from the generative processes accounting for the academics' VLE adoption and use behaviours.

5.10.2 Morphogenetic processes within LTAM

Further to this investigation's foundational aim of developing an explanatory model of academics' adoption and use of VLEs in HE, LTAM also accounts for morphogenetic processes which either shape or reinforce the dimensions underpinning the six categories of influence. While not an initial aim of this study, it illustrates a methodological benefit of using CR. Consequently, it is necessary to explain the morphogenetic processes as represented by the dashed arrows

connecting *reflexivity* to the six categories of influence. For simplicity, Figure 5.9 only shows *reflexivity* and not *habitualised behaviour*

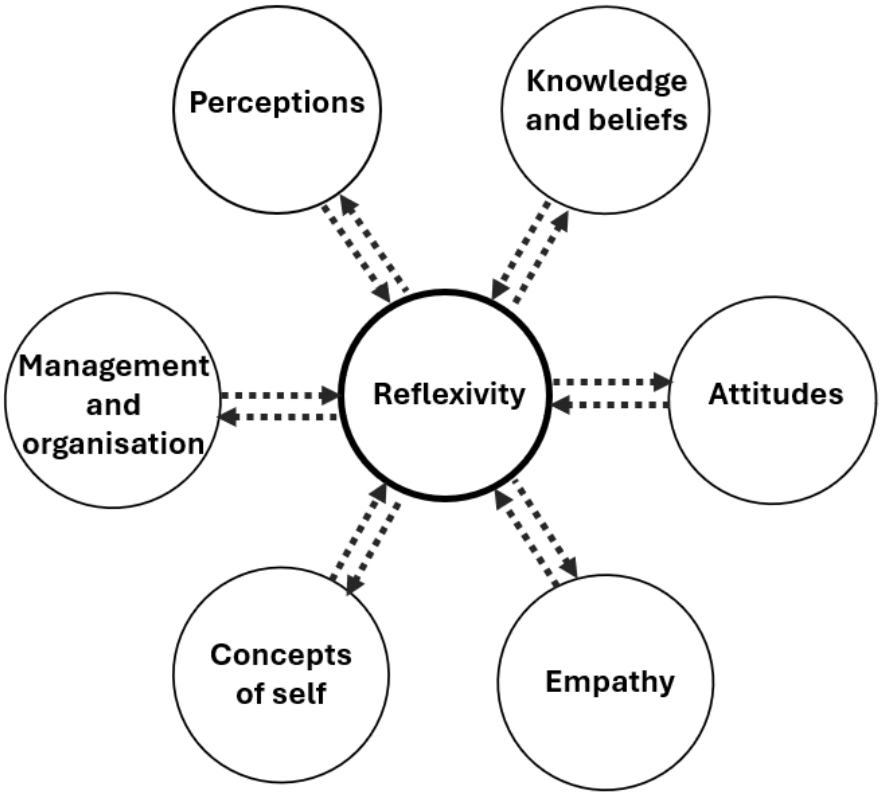


Figure 5.9 *Morphogenetic processes within LTAM*

Figure 5.9 illustrates how the six categories of influence are seen to influence or reinforce one another through the central entity of *reflexivity*. Although the Morphogenetic Approach can be highly complex, this thesis will isolate some of the entities to provide some simple and easily understood examples and highlight the explanatory power of LTAM.

The first example, as shown in Figure 5.10, draws on the constructs of *perceptions* and *attitudes* as these are two familiar components which are already described in TAM. In TAM, PEU and PU are theorised as shaping an individual's *attitudes towards using*. In contrast, in LTAM, *attitudes* are also conceptualised as being capable of affecting *perceptions*. Figure 5.10 serves to illustrate how LTAM

recognises that academic's attitudes can actively shape their perceptions rather than just representing an outcome of perceptions.

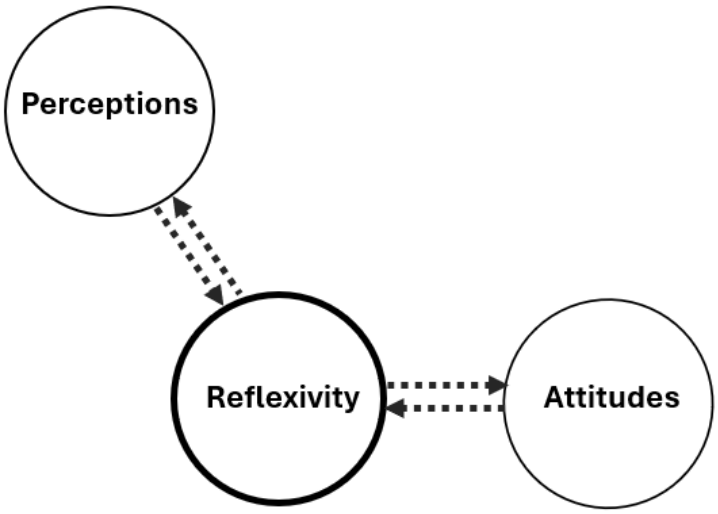


Figure 5.10 *Perceptions and attitudes*

While LTAM only indicates the macro-level categories of *perceptions* and *attitudes* being connected to *reflexivity*, Figure 5.11 illustrates morphogenesis through a three-dimensional image with some explanatory dimensions added underneath. This three-dimensional figure includes some underlying aspects from *perceptions* and *attitudes*. To recap, *perceptions* is a macro-level category of influence which has two meso-level categories, including *technical perceptions* that has four micro level dimensions including PU. *Attitudes* was also seen as comprising similar levels which includes *attitudes towards technology* and the micro-level dimension, *attitudes towards using the VLE*.

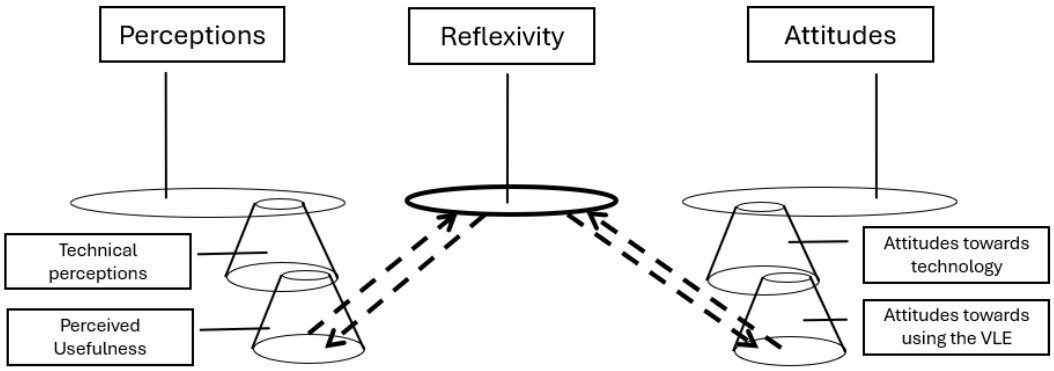


Figure 5.11 *Perceptions and attitudes with ontological depth*

Figure 5.11 captures how PU and *attitudes towards using the VLE* can have a mutual influence as part of a morphogenetic process. In TAM, perceiving the VLE as useful is seen as engendering a positive *attitude towards using*. However, LTAM also captures how a positive attitude could make the academic perceive the VLE as being useful. Similarly, through morphostasis, negative PU could reinforce negative *attitudes towards using*, while negative *attitudes towards using* could reinforce negative PU.

LTAM can also capture the notion that one dimension of a category of influence can also affect another dimension within the same category. Through the dashed arrows, Figure 5.10 therefore also illustrates how *reflexivity* allows certain attitudes to modify or reinforce other attitudes. Figure 5.12 demonstrates how a change in *attitudes towards technology* could modify *attitudes towards using the VLE* and vice versa. Similarly, a reinforcement of negative *attitudes towards technology* could reinforce negative attitudes towards the VLE.

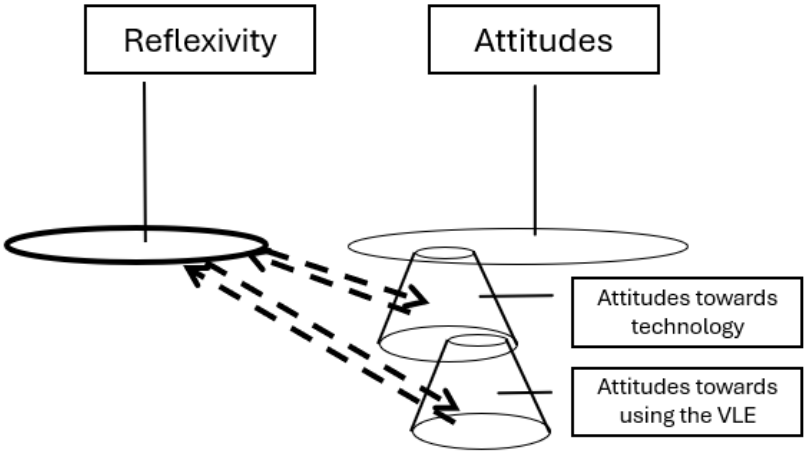


Figure 5.12 *Attitudes towards technology affecting attitudes towards using the VLE*

To reiterate, these figures do not convey the full complexity of the Morphogenetic Approach nor capture the full nature of reflexivity within a complex system. As they cannot present comprehensive depictions of a complete analytical sequence, they are intended to model representations of reflexivity based on the elements that emerged during this study. By being a CR-informed model, LTAM highlights the centrality and importance of *reflexivity* in shaping morphogenesis and decision-making, while illustrating potential tendencies to influence.

5.10.3 Integrative and generative powers in LTAM

This section now explains the integrative and explanatory powers of LTAM. It explains the significance of dashed arrows leading from the six categories of influence towards the central element, *reflexivity,* and also explains the large block arrow 'Adoption and use of VLE' leading away from *reflexivity.* Figure 5.13 represents these in isolation from the morphogenetic relationships in the model. Again, for simplicity, LTAM does not visually account for differences between *reflexivity* or *habitualised behaviour*. *Habitualised behaviour,* or *embodied dispositions,* were acknowledged earlier in Section 2.2.7, but is not explored further as *reflexivity* is the primary focus of this thesis.

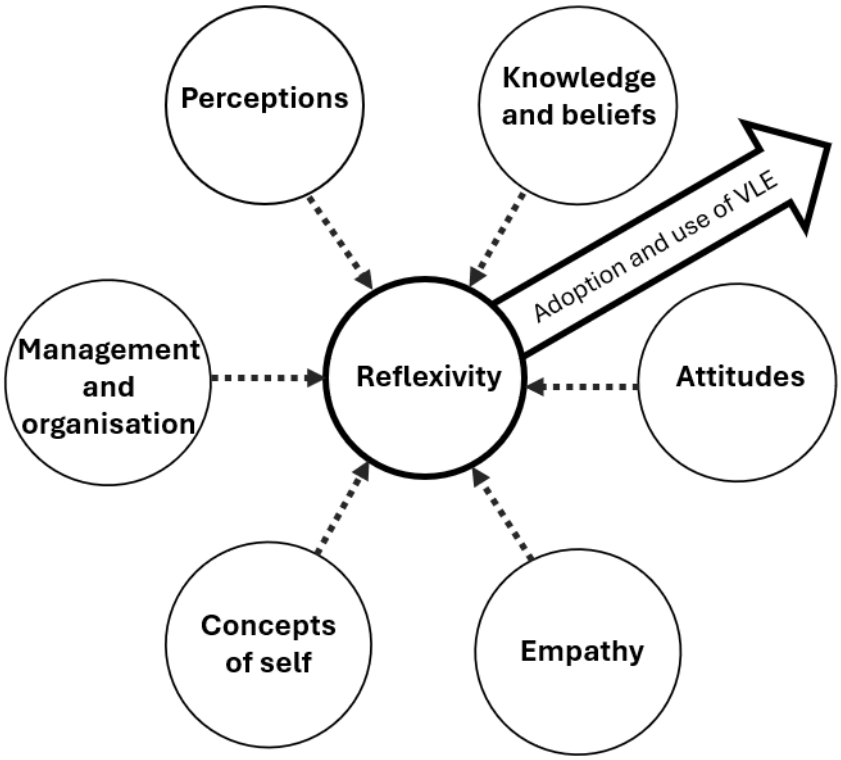


Figure 5.13 *Integrative powers of LTAM*

Figure 5.13 illustrates how the six categories of influence are seen as combining to explain academics' adoption and use of VLEs in HE. In LTAM, the combination of all six categories mediated by *reflexivity* explains academics' adoption and use behaviours. In brief, the differing *knowledge and beliefs*, *perceptions*, *attitudes*, *empathy*, *concepts of self*, and *management and organisation,* combined with personal reflexivity account for academics' adoption and use of the VLE in HE. In concert with reflexivity, each academic will necessarily have different realisations of the six categories of influence because of the different emergent powers of each. This section will now explain how LTAM is seen to work in explaining academics' VLE engagement.

LTAM in its entirety can be considered as an emergent structure through the interaction of each of the six categories of influence and how they combine in specific ways under specific conditions. Its emergence is dependent on these

component categories but is irreducible to them. Furthermore, each category similarly demonstrates emergent characteristics arising from the stratified entities from which they are composed.

For example, consider an academic with optimal realisations of all six categories of influence. In such a case, their knowledge and beliefs are optimal with high levels of technical knowledge, excellent pedagogical knowledge, high content knowledge and favourable situational knowledge. They will have favourable perceptions of everything from the organisational culture to the VLE and the students. They will have an excellent attitude towards technology, work, the students, and have a growth mindset with a high level of empathy towards all students and colleagues. Furthermore, they will have an optimal concept of self with a healthy self-esteem, strong teacher identity, and optimal levels of self-belief. They will also have well-developed and principled personal management and organisational needs and desires. Therefore, it should be expected that, depending on their own reflexivity and hierarchy of ultimate concerns, the academic would prioritise learning about and using the VLE, so their adoption and use behaviours should be similarly optimal.

However, as an emergent structure, it could also be expected that any pessimal realisation of any one of the six elements or underlying dimensions, either as a constraint or counteracting mechanism or an absence, could result in sub-optimal or minimal VLE use. For example, strong perceptions that teaching is secondary to research, that leadership and colleagues do not value teaching, that research output is more likely to lead to promotion, or that VLE-related labour is largely invisible, may provide the academic with the self-justification to avoid VLE engagement. Similarly, any one of negative attitudes, negative perceptions, a lack of empathy, or vulnerable self-esteem, could also counteract potential VLE engagement behaviours regardless of the strength of the other elements.

Highlighting the provisionality and temporality of the influences, an academic overlooked for promotion may demonstrate a negative attitude which could

significantly affect VLE engagement, but such engagement may only be temporary, and once disappointment has been overcome, previous levels of engagement may return. Similarly, desire to maintain boundaries may be stronger at the start of the semester but diminish as rapport improves and perceptions of a student cohort change. These simplified examples demonstrate how LTAM can explain academics' adoption and use of VLEs in HE.

5.11 Summary of LTAM

LTAM represents the emergent mechanism that explains academics' adoption and use behaviours, and was developed through logical reasoning, interpretation, retroduction, and recourse to related literature. The six categories of influence were identified through axial coding and then combined into LTAM as a legitimate adaptation of selective coding. Using the Morphogenetic Approach, it was reasoned that *reflexivity* and the academics' inner conversations transform or reinforce the six categories of influence, and that reflexivity mediates and shapes academics' adoption and use behaviours. Reflexivity is central to these processes, and it is the combination of each of the six categories of influence combined with reflexive processes which explains academics' ultimate VLE engagement. The next chapter, as part of an SGT methodology, presents a substantive literature review.

Chapter 6: Substantive literature review

6.1 Overview of substantive literature review

In a GT methodology, as presented in Section 2.3.1.4, a substantive literature review is conducted post research and analysis. Therefore, this substantive literature review examines the existing literature regarding research into academics' adoption and use of VLEs in HE to locate the research contributions within the broader canon. This substantive literature review differs from the preliminary literature review (Chapter 3), whose purpose is to enhance the researcher's sensitivity to salient themes in order to optimise the semi-structured interviews and data analysis, while also outlining the research landscape and providing context for the reader.

This chapter provides a more comprehensive, systematic, and detailed analysis of the relevant literature necessary for anchoring the discussion (Chapter 7). This comprehensive literature review is essential for presenting how new findings compare to existing research, highlight any similarities, articulate discrepancies between existing literature and research findings, and to contextualise any extensions to existing knowledge. This literature review will first explain how the literature was selected before examining the salient themes emerging from the literature.

6.2 Literature selection

This section presents how the literature was identified and subsequently analysed. It begins by outlining the scoping stage which establishes the conceptual boundaries of the review and the areas of scholarship to be included or excluded. It then describes how the search was conducted and the criteria that were used to locate relevant articles. It subsequently describes the filtering stage

and how the number of articles was refined through the manual application of the inclusion and exclusion criteria, before describing the process by which the resulting articles were analysed using NVIVO.

6.2.1 Scoping

As this study's aim is to develop a new explanatory model and understanding of academics' adoption and use of VLEs in HE, the scope of this literature search considers the intersection of these four areas: academics, adoption and use, VLEs, and HE. This ensures that the review remains aligned with the research objective and avoids adjacent but conceptually distinct literature. In addition to these four areas, it also stresses that this study is TEL-related.

Firstly, specifying academics is important as significantly more research focuses on students' perspectives because, and, as acknowledged in Section 1.4, some research focuses on administrators' perspectives. Therefore, in this literature review, if investigations consider multiple perspectives it will be evaluated and included when presenting identifiable findings related to academics.

The second aspect, adoption and use, needs articulating especially as many VLE studies investigate other aspects including the impact of Covid, popularity of various VLE tools, perceived alignment with discipline, and case studies detailing VLE implementation. Therefore, research where adoption and use or synonymous terms are used will be identified.

The third aspect, VLE, LMS, or CMS, needs specifying to differentiate the target publications from those focusing on other platform types, including VR, augmented reality, the metaverse, or social media platforms, such as Facebook or Discord as teaching tools.

The fourth aspect is a focus on HE. This study was conducted in a UK HE institution to identify sector-specific characteristics. Therefore, it will exclude research related to schools or compulsory education. However, no geographic qualifications or restrictions to the UK are needed.

Finally, it is also important to stress that although this study uses CR, the scope is not limited to CR-specific research, as these dimensions can be identified in the literature analysis. GT-specific research will not be identified either as this study discusses the findings related to existing knowledge, not make comparisons with existing GT research.

6.2.2 Searching

To assist with literature identification, a Boolean search string was developed through an iterative process to automatically return the smallest selection of literature without excluding relevant articles. To ensure validity, the search strategy was refined until it returned results situated at the intersection of the study's core themes. The search was conducted in the SCOPUS database because it offers a broad range of multidisciplinary and reliable peer-reviewed sources, making it well suited for a literature search that spans technology, pedagogy, and higher-education contexts. Table 6.1 shows the result of the string development process.

Search component	Search terms
Field: Technology in Education	"education technolog*" OR "learning technolog*" OR elearning OR e-learning OR "technology-enhanced learning" OR "digital learning" OR "online learning" OR "virtual learning"
Tool: Learning Platforms	vle OR lms OR cms OR "virtual learning environment" OR "learning management system" OR "content management system" OR "online platform"
Context: Higher Education	"higher education" OR university* OR colleg* OR "post-secondary education" OR "post-compulsory education" OR "tertiary education"
Population: Educators	teacher OR lecturer OR educator OR instructor OR academic OR professor OR faculty OR "teaching staff" OR trainer
Practice: Adoption and Use	acceptance OR adoption OR use OR implementation OR utilization OR engagement
Exclusions	
Student Focus	"student* experience" OR "learner* experience" OR "student performance" OR "student preference" OR "student acceptance" OR "student satisfaction" OR "learner engagement" OR "engag* students" OR "engag* of students" OR "student* adoption" OR "student* use" OR "student* e-learning" OR "student* feeling" OR "student engagement" OR "student academic performance" OR "student achievement" OR "academic achievement" OR "student perceptions" OR "student perspectives" OR "student participation" OR "student success" OR "first-year students" OR "college students" OR "vocational" OR "self-directed" OR "attitude of student" OR "student attitude" OR "student* intention" OR "on students"
Exclusion - Other Irrelevant Topics	"distance" OR "MOOC" OR "massive open" OR "remote learning" OR "AI" OR "virtual reality" OR "augmented reality" OR "COVID" OR "assessment" OR "feedback"
Exclusion - Miscellaneous	"well-being" OR "early childhood" OR "school" OR "RSS" OR "Facebook" OR "3D" OR "e-textbook" OR "digital textbook" OR "open source" OR "metaverse" OR "gamif*"

Table 6.1 *Boolean search parameters used in SCOPUS database*

6.2.3 Filtering

The search identified 290 potential publications, including book chapters, journal articles, and published conference papers relevant to this study. These initial results were manually filtered to identify which publications met the scoping

criteria of academics, adoption and use, VLEs, and HE, alongside their synonymous and closely related terms. This manual screening process required careful reading of titles, abstracts, and where necessary, full texts to ensure that only studies directly addressing the intersection of these themes were included. Through this refinement, a more precise body of literature was identified for the substantive literature review and subsequent discussion.

From the 290 publications, three duplicates were removed leaving 287 unique articles. By reading all 287 abstracts, 75 were screened in and 180 were immediately rejected. 32 abstracts were too vague to determine inclusion or exclusion, so these papers were located and scanned for consideration. Of these, 30 were subsequently rejected meaning 77 articles were closely assessed for eligibility. From these 77 papers, a further 34 were excluded for various reasons including abstracts not accurately representing the paper, abstracts being in English but the full paper in another language, while others were excluded for focusing on impact rather than acceptance, contained unfinished research, were theoretical papers suggesting potential research, or presented implications for teachers after researching students. One further paper was excluded at this stage as a virtual duplicate. This left 43 papers for analysis in the substantive literature review. The filtering process is described below (Figure 6.1).

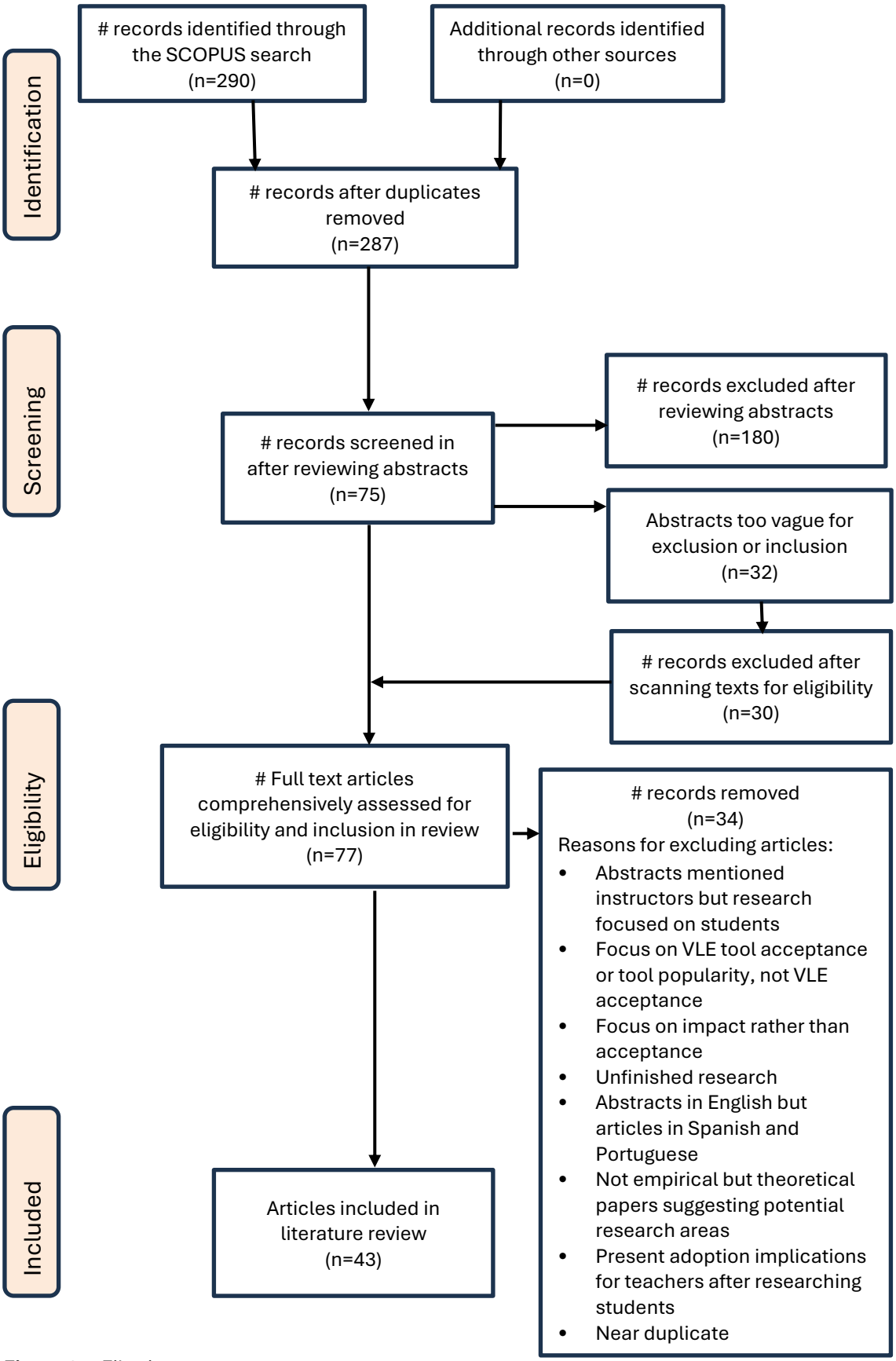


Figure 6.1 *Filtering process*

6.2.4 Analysis

After identification, the articles were imported into NVIVO and coded in two phases. In phase one, the papers were analysed for underlying theoretical frameworks, epistemological orientation and whether they adopted a hypothetico-deductive approach, to identify any variables appended to existing models and theories, and identify the research method. Table 6.2 presents a summary of the literature regarding academics' adoption and use of VLEs in HE.

Phase two was an iterative coding method based on SGT coding principles (Corbin and Strauss, 2008). Coding started with open coding before the papers were retrospectively recoded to ensure all articles' themes were captured (Figure 6.2). This process was also undertaken to minimise biases due to potential sensitivity to the research results and themes seen in the emerging model. Furthermore, during the coding process, memos were made related to themes, reflections, and insights for later exploration and discussion (Figure 6.3).

Author(s)	Theoretical framework ++ Extended model	Variables appended to framework	Hypothetico deductive Y/N	Research method	Data collection method
Adnan et al. (2022)	TAM ++ (TRAM)	Technological readiness	Y	Quantitative	Survey
Amankwah et al. (2024)	Concerns based adoption model		N	Quantitative	Survey
Amoush and Sandhu (2019)	TAM ++	Self-efficacy, System quality	Y	Mixed methods	Interviews and survey
Azman et al. (2020)	TAM++	Jordanian culture, IT in Jordan	Y	Quantitative	Survey
Bansal et al. (2022)	UTAUT ++	Hedonic motivation, Course quality	Y	Quantitative	Survey
Bousbahi and Alrazgan (2015)	TAM ++	Motivation, Load anxiety, Support	Y	Mixed methods	Survey
Dube and Scott (2018)	Structuration theory		N	Qualitative	Interviews
	TAM ++	Self-efficacy, System quality	Y	Quantitative	Survey
Findik and Özkan (2010)	TAM ++	Compatibility, Tech simplicity, Subjective norm, Self-efficacy	Y	Quantitative	Survey
Findik Coşkunçay and Özkan (2013)	TAM ++	Compatibility, Tech simplicity, Subjective norm, Self-efficacy	Y	Mixed methods	Survey and interviews
Geertshuis and Liu (2016)	Professional identity theory		N	Mixed methods	Document analysis and focus groups
Geertshuis and Liu (2022)	Professional identity theory		N	Mixed methods	Focus group, document analysis, and evaluations
Gunasinghe et al. (2018)	UTAUT ++	Personal innovativeness	Y	Quantitative	Survey
Gunasinghe et al. (2020)	UTAUT 3		Y	Quantitative	Survey
Gunasinghe and Nanayakkara (2021)	UTAUT ++	Technology anxiety	Y	Quantitative	Survey
Hasnan and Mohin (2021)	TAM ++	Instructor factors, Organisation factors, Technology factors	N	Quantitative	Survey
Keller (2006)	UTAUT + DOI		N	Qualitative	Interviews
Lavidas et al. (2022)	TAM ++	Perceived self-efficacy, Subjective norm, Image, Facilitating conditions, Technological complexity	Y	Quantitative	Survey
Lee et al. (2022)	TAM + TFF		Y	Quantitative	Survey
Legowo et al. (2019)	Kirkpatrick		Y	Quantitative	2 x Surveys
Mafuna and Wadesango (2016)	TAM ++	Subjective norm, Facilitating conditions	N	Mixed methods	Survey and Interviews
Makhaya and Ogange (2019)	Unacknowledged TAM ++	Self-efficacy	N	Mixed methods	Survey and case study

Author(s)	Theoretical framework ++ Extended model	Variables appended to framework	Hypothetico deductive Y/N	Research method	Data collection method
Matarirano et al. (2020)	TAM ++ (GETAMEL)	Experience, Subjective norm, Enjoyment, Computer anxiety, Self-efficacy	Y	Quantitative	Survey
McGill et al. (2011)	Technology to performance chain	Social norms, Facilitating conditions	Y	Mixed methods	Survey and document analysis
McGill and Hobbs (2006)	Technology to performance chain	User satisfaction, Attitude to using Expected consequences, Social norms, Facilitating conditions, Utilization, Performance impact	Y	Quantitative	Survey
Milliner and Cote (2018)	TAM ++	Employment status, Experience	Y	Quantitative	Survey and VLE logs
Mlitwa and Van Belle (2011)	Activity theory		Y	Qualitative	Interviews
Mohammed et al. (2025)	TAM ++	Instructors' quality, Motivation, Learning resources	N	Quantitative	Survey
Mohsen and Shafeeq (2014)	N/A		N	Mixed methods	Survey and Interviews
Mouakket and Bettayeb (2015)	Expectation confirmation model ++	Training, Technical support, User-interface design, Computer self-efficacy	Y	Quantitative	Survey
Al-Mubireek et al. (2023)	Unacknowledged TAM ++	Satisfaction	N	Mixed methods	Survey
Ndebele and Mbodila (2022)	TAM		N	Mixed methods	2 x Surveys
Ng et al. (2019)	N/A		N	Mixed methods	Survey and Phone interviews
North-Samardzic and Jiang (2015)	UTAUT		N	Quantitative	Survey
Onyeagbako et al. (2017)	N/A		N	Quantitative	Survey
Quimno et al. (2015)	N/A		N	Mixed methods	Interviews and Observation
Radovan and Kristl (2017)	UTAUT + COI		Y	Quantitative	Survey
Rienties et al. (2016)	TAM ++	Perceived training need	Y	Quantitative	Experimental
Salajan et al. (2011)	TAM ++	Perceived quality of teaching	Y	Quantitative	Survey
Sidawi (2013)	N/A		N	Quantitative	Survey
Sinclair and Aho (2017)	N/A		N	Qualitative	Interviews
Yalamu et al. (2025)	UCD		N	Mixed methods	Survey and focus group
Zanjani et al. (2017)	N/A		N	Qualitative	Interviews

Table 6.2 *Summary of literature in the substantive literature review*

Codes

Name	Files	References
Potential Themes for Discussion chapter	0	0
added flexibility for teachers	1	1
agency _voluntariness	4	6
Anonymity	1	3
Anxiety	4	5
Apprehensive	1	2
Attitude	6	7
Autonomy and agency	1	1
Autonoumous learning	2	2
Awareness - Know about	3	3
Behavioural intention_intention to use	2	4
beliefs	1	1
Caring-empathy	1	3
Collaboration	1	1
Concerns	1	2
Continuence intention	2	2
culture_General	3	9
Culture - Collectivism or Social influence_CoP peripheral to central	1	2
Discomfort	1	1
Efficiency_improved perfomance (Cost benefit)	5	7
Effort expectancy	4	6
Empathy - allowing catch up	3	4
Empathy - fair for students	1	1
Empathy - good _bad experience for students	4	6
Empathy - Good for student development	4	8
Empathy - Language	1	1
Empathy - Look for ways to support students	2	2
Empathy - more interesting for students	2	4
Empathy - student access issues	2	2
Empathy - students have different learning strategies	1	1
Empathy - trainging of students	1	1
Empathy (Not) make students lazy and non-critical	1	2
Empathy _worried disadvantaged students might get left behind._ late a	2	3
Engagement_ measure engagement	2	2

Figure 6.2 *Extract of open coding of articles for the literature review*

Numerous papers mention training. This seems to be almost a default conclusion. I will need to frame it in my paper related to critical realisim and real domain. Investigate if it really is a lack of training as this research seems to indicate that it isn't plus academcis didnt' really seem to want to attend training.

Means-end chain theory is a possible. People dont' really want trainig that what they really want is the knowledge.

Other papers seem to suggest that Instructors don't want training but need to see from somewhere how VLE is being used, preferable some innovativeness. Here most training is how to press the buttons and there is nothing innovative.

Although they are confident in using the system, they revealed that lack of ideas to teach the subject using the system give them the perception that the system is not being helpful. Paper 034

This has some ptential as traingin seems to focus on proicedureal knowledge without givng the declarative knowledge. Maybe this whould be in the a conclusion suggest that training needs to provide a spark and show innovative usee and not the standard functions. Thsi will be related to the Instrumental knowledge gained from others

More papers seem to focusing on training. DOes anybody want training? DO they want to do it themselves, in bite-sized chunks on a needs to know basis rather than attending an hour-long session. What they want is knowledge and skills.

What does this mean in CR?
Training in terms of physical sessions -empirilca domain whereas the underlying needs are in the real domain. What do teachers want in terms of real domain? Knowledge, some may want to attend the actual sessions and meet others etc but most probably just want to know what it can do and how to do it. Go back to Menas end chain theory. They don't wnat a mattress they want a good nights sleep

Trainign doesn't necessarily lead to user satisfaction or use. See paper 107. There seems to be an idea that trainig automatically leads to use:
"In regard to PU, universities should organize seminars and workshops to explain the benefits of Blackboard system and familiarize the instructors with any updates of the system which can be useful to motivate them to have continuance intention to use it." !107.

This links to my findings of instrumental knowledge. There needs to be training sessions not on how to use the VLE but raising awareness on the instrumental uses that bring real benefits to the academics and give them a reason to want to learn it.

Interesting comment in paper 147.

Therefore, training and specifically on how to use a technology will have a limited effect on performance. It will not change the way teachers see the learning technology nor will it speak to their practice.

Seems to be an unsubstantiated conclusion that teachers anxiety will be lessened through trainign. It seems plausible
As computer anxiety has been found to have a strong and negative effect on intention to adopt e-learning systems, training should be designed to increase lecturers' computer knowledge. !159

Figure 6.3 *Thematic memo of 'need for training'*

6.3 Main themes in the literature

Being a CR-informed study, this section identifies and explores the principal CR-related themes in the literature and emphasises aspects associated with the *real domain*. It excludes numerous aspects of the *actual/empirical domain* considered proxies for underlying attributes, including demographic variables, such as age, gender, nationality, job rank, or years of experience. Other excluded aspects from the *actual/empirical domain* included electricity blackouts, lack of home internet access, slow internet, and computer availability.

Furthermore, in this study, certain themes could be attributed to either the *real domain* or the *actual/empirical domain*. For example, *training* exists in the *real domain* if considered conceptually as a *generative mechanism* that can engender new practices, or a *causal power* if retroduced as a need or desire for training. It also exists in the *empirical domain* if focusing on organised training sessions. In such cases, any reasoning will be explained.

Finally, it is also acknowledged that additional themes exist in the literature but they are not addressed when only seen infrequently or lack relevance. Such themes include optimism, consistency of experience, readiness, value for money, perceived threat, and habit amongst others. This chapter will now present the main themes seen in the literature: need for training, perceptions, attitudes, innovativeness, concepts of self, social influence and social norms, empathy towards students, culture, satisfaction, and motivation.

6.3.1 Need for training

A principal theme identified in the literature is a *need for training*. Five main aspects related to training were seen: a generalised need for VLE training, a need to raise awareness regarding VLE tools and affordances, addressing VLE-related

anxieties, training on VLE-related pedagogy or pedagogy in general, and finally, another related theme was of training being appended as a variable to existing technology adoption models.

The first of these emphasised a generalised need for VLE training by determining that such training would increase VLE engagement. Various publications (e.g., Hasnan and Mohin, 2021; Lavidas et al., 2022; Mouakket and Bettayeb, 2015; Ndebele and Mbodila, 2022) highlighted the responsibility for institutions to provide appropriate VLE training, noting that proper training was customary in HE, a prerequisite for technology use and VLE adoption, and was required for VLE competence. Furthermore, an appreciable amount of research (e.g., Gunasinghe, Hamid, Khatibi, and Ferdous, 2020; Lavidas et al., 2022) noted deficiencies regarding institutional support, with insufficient training presented as constraining VLE adoption and use. Even when initial training was provided, research also reported unmet needs for in-depth training (e.g., Makhaya and Ogange, 2019), private training (e.g., Geertshuis and Liu, 2022), or personalised training (e.g., Milliner and Cote, 2018; Mouakket and Bettayeb, 2015).

Secondly, a prominent theme in the literature was that insufficient awareness of VLE functionality and affordances inhibited VLE adoption and use (e.g., Bousbahi and Alrazgan, 2015; Lavidas et al., 2022; Mafuna and Wadesango, 2016; Mouakket and Bettayeb, 2015). Consequently, training was suggested to raise awareness, improve perceptions, and promote understandings of the VLE's potential. Moreover, occasional training was deemed to be insufficient and refresher training was suggested. Hasnan and Mohin (2021) concluded that training was needed every semester, while Gunasinghe et al. (2018) opined that after training, recurrent messaging was required to remind academics about the VLE's features and benefits. However, it is evident that training is not a universal solution. For example, research by Geertshuis and Liu (2016) indicates training does not necessarily change how academics perceive a technology or make it resonate with them.

The next aspect, *computer anxiety,* was seen as impacting academics' VLE use intentions with training recommended to address anxieties or raise comfort levels (e.g., Mafuna and Wadesango, 2016; Matarirano, Jere, Sibanda, and Panicker, 2020; Ndebele and Mbodila 2022). Mafuna and Wadesango (2016) proposed training to increase self-efficacy and therefore reduce anxiety. Matarirano et al. (2020) suggested improved technical support, inferred as just-in-time training, to improve self-efficacy and reduce anxiety. Amankwah, Sarfo, Aboagye, Konin, and Dzakpasu (2024) recommended that to alleviate academics' VLE use concerns, professional development programs were needed, while Lavidas et al. (2022) also recommended supplementary forums alongside disseminating guidelines to help reduce computer anxiety.

A further training-related aspect was recommendations to provide VLE training related to pedagogy (e.g., Amoush and Sandhu, 2019; Mohsen and Shafeeq, 2014; Ndebele and Mbodila, 2022). This theme focused on knowledge gaps at the intersection of pedagogy and the VLE with training recommended to overcome such pedagogical gaps, claiming that technological-pedagogical training would mitigate against negative attitudes, allow teachers to examine their own pedagogical beliefs, and help foster an environment of increased VLE use. Other studies (e.g., Rientes, Giesbers, Lygo-Baker, Ma, and Rees, 2016; Sinclair and Aho, 2017; Yalumu, Mahmud, and Chua, 2024) identified insufficient generalised pedagogical knowledge as impeding VLE adoption, again implying training was needed.

A further significant aspect was investigations appending training as a variable to technology adoption models. A range of studies investigating TAM (e.g., Lavidas et al., 2022; Mouakket and Bettayeb, 2015; Ndebele and Mbodila, 2022) found insufficient training reinforced academics' negative opinions regarding both PEU and PU of the VLE. They suggested increased training would improve academics' perceptions and consequently affect adoption and use behaviours. Regarding UTAUT, Bansal et al. (2022) noted that formal training and workshops were key

factors influencing academics' perceptions of *performance expectancy,* a construct similar to TAM's PU.

In summary, many publications' focus on training mirrors the observations outlined in Section 1.1**.** of the Introduction. They suggest that institutions must deliver increased training to maximise academics' potential uptake of the VLE. Although structured and formalised training sessions are suggested throughout*,* through a CR perspective, literature analysis combined with abduction and retroduction highlights needs for the results of training such as raising awareness, improving perceptions, increasing knowledge, or reducing anxiety rather than training itself. This focus on training has obvious implications regarding LTAM and is discussed in Section 7.3.3.

6.3.2 Perceptions

Further to the above, *perceptions* were a recurring theme throughout the literature. The main perceptions were PEU, and PU, particularly as constructs of TAM were extensively researched. TAM, extended TAM, and unacknowledged uses of TAM appear in nearly half of the literature. Additionally, perceptions also include analogous concepts such as UTAUT's *performance expectancy*. Other perceptions in the literature include quality, perceptions of facilitating conditions, and perceived enjoyment.

As a principal construct of TAM, PU appears throughout the literature with most research findings consistent with Davis' (1985) research that correlations between PU and use intentions exist (e.g., Lavidas et al., 2022; Mlitwa and Van Belle, 2011; Radovan and Kristl, 2017). Some studies only investigated and reported PU. For example, Mafuna and Wadesango (2016) simply reported that 50% of instructors did not find the VLE useful, while Sidawi (2013) found numerous instructors only perceived it useful for theoretical courses and for

particularly motivated and disciplined students. Mlitwa and Van Belle (2011) reported that many instructors had mixed perceptions of VLE usefulness as some perceived it useful for administration but not teaching. Other research (e.g., Gunasinghe et al., 2018; Mafuna and Wadesango, 2016; Mouakket and Bettayeb, 2015) just noted that some instructors did not perceive the VLE as being particularly useful but, as highlighted in Section 6.3.1, these perceptions were often attributed to insufficient VLE training or awareness building.

Related to PU were perceptions of efficiency. For example, Al-Mubireek et al. (2023) identified potential time savings as a perceived benefit, while Ndebele and Mbodila (2022) indicated VLEs offered savings in time and workload reduction, especially regarding assessment administration. Gunasinghe et al. (2020) also reported perceptions of improved efficiency regarding time and effort. However, there were also negative perceptions regarding time. Findik and Ozkan (2013) noted some academics perceived the VLE as being overly time-consuming to learn and only realised minimal benefits, which rendered PU as low and discouraged VLE use. This aspect can be interpreted as a combination of PU and the next perception, PEU.

PEU is another principal construct in TAM and analogous to UTAUT's *effort expectancy*. Subsequent studies (e.g., Bousbahi and Alrazgan, 2015; Lee, Chiu, Chen, Lin, and Lin, 2022; Zanjani, Edwards, Nykvist, and Geva, 2017) consistently reflect Davis' (1985) findings that PEU shapes technology adoption. Literature also noted perceived difficulties as constraining VLE use. For example, Zanjani et al. (2017) found a lack of user-friendly tools combined with unexpected complexities in configuring and administering the VLE's features led to low use intentions. These perceptions are congruent with Mlitwa and Van Belle (2011) who found that instructors often perceived the VLE as unintuitive even for those who consider themselves computer literate. This resulted in many instructors limiting VLE use to that of content repository and communication platform.

Furthermore, *quality* should also be considered a perception, particularly with the literature lacking objective measures of what constitutes quality. Salajan, Welch, Peterson, and Ray (2011) noted the VLE's effects on *perceived quality of teaching,* while Bansal et al. (2022) appended *course quality* as a construct to their conceptual model of VLE use. *System quality* was a noted aspect in a range of other studies (e.g., Amoush and Sandhu, 2019; Fearnley and Amora, 2020; Hasnan and Mohin, 2021; Sinclair and Aho, 2017). Related to system quality are perceptions of *facilitating conditions* which, as established in Section 3.4.2, represent technology and infrastructure. Literature (e.g., Bousbahi and Alrazgan, 2015; Fearnley and Amora, 2020; Hasnan and Mohin, 2021; Sinclair and Aho, 2017) includes how academics perceive the *quality of support*, *timeliness of support*, *quality and availability of IT infrastructure*, *interface design*, or *leadership support*

Finally, other studies consider other perceptions, including *perceived enjoyment* of the VLE (Matarirano et al., 2020) and *perceptions of relevance of the VLE to the role or practice* (e.g., Geertshuis and Liu, 2016; Matarirano et al., 2020; Sinclair and Aho, 2017). Geertshuis and Liu (2016), while investigating *professional identity*, noted that academics who considered their role as broader than lecturing perceived the VLE as having greater relevance. Matarirano et al. (2020) also found that perceptions of job relevance were statistically relevant in determining PU.

In summary, the literature indicates that various *perceptions* exert a significant influence on academics' VLE engagement. PEU and PU are significant throughout VLE adoption literature, as are other perceptions such as *systems quality*, *quality of support*, and perceptions of congruity with the course and role. As noted in Section 3.4.1, *perceptions* are located within CR's *empirical domain*, and due to their prominence in TAM, the literature, and inclusion within LTAM, *perceptions* are discussed in more detail in Section 7.3.6.

6.3.3 Attitudes

Attitudes were identified as a recurring literature theme and warrant recognition for their importance, particularly as TAM identifies PEU and PU as affecting *attitude towards using* and subsequently *behavioural intentions*. Consequently, this review first examines literature about how PEU and PU affects *attitude towards using* VLEs followed by considerations of consequent effects on *behavioural intentions*. Additional studies investigating attitudes more broadly will then be described.

A common theme in the literature was a quantitative analysis of the effects or relative strengths of PU and PEU on *attitude towards using* VLEs (e.g., Azman, Kamis, Kob, Abdullah, Jerusalem, Komariah, and Budiastuti, 2020; Fearnley and Amora, 2022; Hasnan and Mohin, 2022; Legowo, Abdurachman, Herwidiana, and Budiastuti, 2019). For example, Legowo et al. (2019) determined that PU and PEU were statistically significant in predicting *attitude towards using*. Azman et al. (2019), in comparing PU and PEU, claimed PU was the stronger influence, while Fearnley and Amora (2022) using a modified TAM found PEU statistically insignificant in predicting *attitude towards using*. Al-Mubireek et al. (2023) also investigated *attitudes* related to PU, PEU, and *user satisfaction*. While they concluded that the instructors' VLE *attitudes* were predominantly positive, they also suggested a reciprocal arrangement that *attitudes* also affect PU.

Secondly, within TAM, *attitude towards using* is shown to influence *behavioural intention* or *behavioural intention to use*. Consequently, many papers which investigated TAM measured the influence of *attitude towards using* on *behavioural intention,* concluding that *attitude towards using* exerted varying degrees of influence on *behavioural intention,* which then influenced *actual use* (e.g., Azman et al., 2020; Fearnley and Amora, 2020; Matarirano et al., 2021; Milliner and Cote, 2018). Milliner and Cote (2018) noted that *attitude toward using* improved as PEU and PU increased, which consequently increased *behavioural intention to use*.

Matarirano et al (2021) simply concluded that *attitude towards using* affected *behavioural intentions* resulting in *actual use*.

Other papers claimed to specifically investigate attitudes or other factors affecting attitudes. For example, Mafuna and Wadesango (2016) reported that 35% of respondents had positive attitudes towards the VLE, 22% responded negatively, with the rest neutral. In investigating attitudes, Bousbahi and Alrazgan (2015) found that measures of *motivation*, *organisational support*, PU, and *load anxiety* significantly predicted *attitude towards using* the VLE. Makhaya and Ogange (2019), while investigating institutional support factors on VLE adoption, identified low perceptions of support as impacting on PU, which in turn affects instructors' *attitude towards using*. Legowo et al. (2019) also investigated the effect attitudes had on instructor effectiveness using the VLE and identified a significant positive correlation.

In summary, literature, particularly TAM's chain of influence from PEU and PU to *attitude towards using* and then to *behavioural intention to use* highlights *attitudes'* importance in academics' VLE engagement. Furthermore, studies suggest a positive correlation between attitude and use intentions. Al-Mubireek et al. (2023) suggestion of a reciprocal relationship between *attitude towards using* and PU is of particular relevance to this investigation. Consequently, given the prevalence of *attitudes* in the literature, Al-Mubireek et al.'s (2023) suggestion, and as a constituent of LTAM, attitudes warrant further discussion and is elaborated upon in Section 7.3.7.

6.3.4 Innovativeness

A theme identified in the literature was *innovativeness* or *personal innovativeness* as a factor affecting VLE adoption behaviour. *Personal innovativeness* stems from Rogers' (1983) seminal DOI model of technology adoption and is characterised as

a willingness to experiment with new technology and a key personality trait for those at the vanguard of technology adoption. Since then, *personal innovativeness* has been investigated in general technology adoption research and multiple VLE adoption studies. In this literature review, *innovativeness* was seen as being appended to both TAM and UTAUT for investigation but also appeared in some conclusions as a potential factor regarding VLE adoption, or an avenue for future research.

Firstly, *personal innovativeness* and *innovativeness* was seen in modified versions of TAM and UTAUT, as both a precursor variable and embedded within the model. For example, using an extended TAM, called the Technology Readiness and Acceptance Model (TRAM), Adnan, Agustiningsih, and Ariefianto (2022) included *innovativeness* as one of four precursor variables to *perceptions* and determined a positive effect on both PEU and PU, especially when combined with the additional variable of *optimism*.

Similarly, Gunasinghe et al. (2018), in extending UTAUT, found that *personal innovativeness* exerted a notable influence on *performance expectancy*. They noted no significant direct effect on *behavioural intention* instead claiming an indirect effect. They concluded that their research demonstrated the importance of identifying innovative personalities and using such academics as catalysts in fostering VLE adoption. In later research using the separate UTAUT3 model, Gunasinghe et al. (2020) confirmed that *personal innovativeness* lacked significance in predicting *behavioural intention* and *use behaviour,* noting that these findings contradicted Farooq, Salam, Jaafar, Fayolle, Ayupp, Radovic-Markovic, and Sajid (2017) and Venkatesh, Thong, and Xu (2012), who determined that *personal innovativeness* was significant in predicting *behavioural intention to use*.

Further to *innovativeness*, Makhaya and Ogange (2019), when researching lecturer self-efficacy, noted that some academics innovated with various VLE tools and affordances to improve their teaching and maximise their course benefits.

Similarly, Sinclair and Aho (2017) noted that while many only used the VLE as a repository, others through experimentation, demonstrated a willingness to innovate and find inventive uses of the VLE. Sinclair and Aho (2017, p. 337) also noted an 'absence of curiosity' in some teachers regarding the VLE's affordances, a trait mirrored by Milliner and Cote (2018, p. 171) who uncovered a lack of 'creative implementation'.

In summary*, innovativeness* has received notable attention in VLE adoption research. It has been hypothesised as an influential variable although with inconsistent findings regarding the precise role or amount of influence *innovativeness* exerts. It has also emerged separately from other research as a candidate explanatory variable for further exploration. Related to CR, *innovativeness* possesses the characteristics of PEPs. Its visibility in the literature and emergence in this investigation's findings warrants further discussion, which is developed in Section 7.3.2.

6.3.5 Concepts of self

The target literature in the substantive literature review highlights a range of themes related to academics' concepts of self. These include *self-efficacy*, *computer self-efficacy, application self-efficacy, IT self-confidence, professional identity*, *image*, and *reputation*. Together, these themes illustrate different ways in which academics understand their own abilities or how they perceive themselves. These themes will now be elaborated upon in turn.

Self-efficacy, also referred to as *computer self-efficacy*, *IT self-efficacy*, or *application self-efficacy* was prominent in the literature, with some publications (e.g., Hasnan and Mohin, 2021; Matarirano et al., 2020) suggesting it influences adoption and use behaviours and is primarily investigated as a precursor variable for its effects on PEU or PU, often in combination with other variables such as

experience. Venkatesh and Davis (1996) researched *computer self-efficacy* as a potential external variable for a theoretical extension to TAM and determined it directly influenced PEU. However, Venkatesh et al. (2003), in developing UTAUT, determined *self-efficacy* was insignificant and subsequently omitted it, claiming *self-efficacy* was analogous to PEU.

Similarly, Findik and Özkan (2013), using an extended TAM, concluded *application self-efficacy* affected both PEU and PU, while Fearnley and Amora (2020), also using an extended TAM, demonstrated that *perceived self-efficacy* affected both PU and PEU, claiming it is significant in predicting VLE adoption. Lavidas et al. (2022) noted that instructors' *perceived self-efficacy* influenced both PU and PEU, and also determined a small indirect effect on *behavioural intention*. Hasnan and Mohin's (2021) modified TAM included *personal innovativeness*, *experience,* and *self-efficacy*. In addition to supporting the positive effects of *self-efficacy* on PEU and PU, their research further indicated that *self-efficacy* was necessary for both teaching students VLE skills and for facilitating student-teacher VLE communication.

However, not all research agrees. Mouakket and Bettayeb's (2015) research supported correlations of self-efficacy and PEU but reported that high computer self-efficacy is not necessarily related to PU. This is supported by Legowo et al.'s (2019) findings that instructors' IT capability was a significant factor affecting PEU but was insignificant regarding PU.

Regarding *IT self-confidence*, Findik and Özkan (2013) found that most participants reporting high *IT self-confidence* reported high PEU of the VLE, which engendered its acceptance. Moreover, they noted this was reciprocal and systems perceived as easier to use increased instructors' *IT self-confidence*. Sinclair and Aho (2017) found that low self-confidence constrained instructors' willingness to use a VLE, with some instructors reporting fear of technology. Similarly, Ndebele and Mbodila (2022) found that numerous participants lacked self-confidence and admitted feelings of apprehension, which they identified as a barrier to VLE use.

Furthermore, those who initially struggled to learn about the VLE encountered additional difficulties with successive VLE upgrades. In another paper, Bousbahi and Alrazgan (2015) noted that IT faculty felt confident with any VLE or any other technical tool. Computer self-efficacy and synonymous terms will be discussed as an aspect of *knowledge of other software and systems* in Section 7.3.5.

Also featuring in the literature was *professional identity*, primarily related to the instructor/researcher continuum. Geertshuis and Liu (2016) found academics with a teaching-centred identity that extended beyond the lecture theatre perceived the VLE as pedagogically beneficial and were more receptive to it. Geertshuis and Liu (2022) later noted that some teaching academics with a researcher identity perceived VLE activity as increasing their workload. They also noted that academics who considered teaching as lecturing also avoided using the VLE.

Other findings identified perceived effects on reputation as affecting VLE acceptance and use. Geertshuis and Liu (2016) identified staff concerns about making public VLE errors that could constrain its use. Geertshuis and Liu (2022) also reported that to protect their reputation, some academics were unwilling to cede aspects of their work to the VLE or technical staff, evidence of morphostasis. Similarly, Sinclair and Aho (2017) found some academic staff were reluctant to admit lacking VLE-related knowledge and skills or expressed concerns about insufficient progress in learning about the VLE. Further related to reputation, Lavidas et al. (2022) found that academics who believed their colleagues' professional standing was shaped by their VLE proficiency had more favourable perceptions of the VLE, an aspect considered related to positive role models and perceptions of colleagues.

In brief, *concepts of self*, such as *self-efficacy, self-confidence*, *professional identity*, *image*, *reputation,* and their synonymous terms have received significant attention in the VLE adoption literature and are noted to influence academics' VLE engagement. Given their prominence in the literature, their PEP characteristics,

and emergence in the research findings leading to their inclusion within LTAM, *concepts of self* merit further discussion, which is developed in Section 7.3.4.

6.3.6 Social influence and social norms

Another recurring theme refers to *social influence* or synonymous terms such as *social norms, subjective norms, and peer influence*. Throughout the literature, *social influence* is typically characterised as the extent to which individuals moderate their behaviour, or adopt normative behaviours, depending on how they wish to be perceived. In TAM 2 (Venkatesh and Davis, 2000) *subjective norms* is a named variable linked to both PU and *intention to use* while *social influence* is a component of UTAUT and was determined to affect users' *behavioural intention* (Venkatesh et al., 2003). Consequently, *social influence* has been investigated repeatedly in TAM2- and UTAUT-specific research and also appended to other models.

Social influence as a named variable in VLE adoption research has been extensively investigated although with contradictory results. Some papers (e.g., Findik and Özkan, 2010; Findik and Özkan, 2013; Gunasinghe et al., 2020; McGill, Klobas, and Renzi, 2011) reported a negligible influence of *social influence* on *behavioural intention, attitude towards using,* or *actual use*. Findik and Özkan (2013) found *subjective norms* positively affected PEU and PU but not *behavioural intention* while Gunasinghe and Nanayakkara (2021) in investigating non-adoption also found *social influence* was statistically insignificant in predicting *behavioural intention to use*. Lavidas et al. (2022), using an extended, TAM found that *subjective norms* positively affected a VLE's PU but was statistically insignificant regarding *attitude towards using*.

Studies included in the substantive literature review noted that many academics were conscious of appearing enthusiastic regarding VLE use (e.g., Bansal et al.,

2022; McGill and Hobbs, 2006, McGill and Hobbs, 2007; Radovan and Kristl, 2017) with Radovan and Kristl (2017) reporting that *social influence* affected *acceptance* but lacked direct influence on *actual use*. McGill and Hobbs (2007) noted that instructors were more influenced by peers than students, although McGill and Hobbs's (2011) later research reported the effect was negligible. Similarly, Findik and Özkan (2013) found only 12% of participants admitted colleagues' use or opinions influenced them. Keller's (2006) study of three separate institutions in three countries found the effect of *social influence* was high in one but low at the other two, suggesting additional factors are significant. Mafuna and Wadesango (2016), in appending *subjective norms* to TAM, also presented mixed findings, with some instructors reporting no peer influence, which was similar to Findik and Özkan's (2013) findings. Bansal et al. (2022) found that faculty members are only influenced by others whose opinions they value despite concluding that VLE users must motivate others in their VLE use.

In summary, findings regarding *social influence* or *subjective norms* appear inconclusive, with results ranging from statistically insignificant to notable. However, neither social desirability bias nor a lack of awareness of susceptibility to influence was mentioned nor controlled for in these research examples. With *social influence's* and *subjective norms*' prominence in a range of studies and having been included in or appended to various models, it is a principal theme in the literature. *Social influence* and *subjective norms* have obvious characteristics related to the *real domain*. They were determined in Section 5.5.2.1 to be closely related to *organisational culture* and discussed within *perceptions* in Section 7.3.6.

6.3.7 Empathy towards students

Another theme emerging from the literature concerns instructors' empathy towards students, although empathy itself was not mentioned. Various aspects

occurred throughout the literature such as using the VLE to support students with learning differences or additional needs, helping improve student learning outcomes, improving digital skills and employability, overcoming the negative effects of digital poverty, the need for student training, and concerns about the VLE deskilling students. Another view was that the VLE would serve to support students in engagement with each other and the course.

A significant finding was beliefs that VLEs were generally beneficial for students. They were seen to promote student learning (e.g., Matarirano et al., 2020; Yalamu et al., 2024), promised an excellent or improved student experience (e.g., Amankwah et al., 2024; Bansal et al., 2022; Sinclair and Aho, 2017), could make courses more engaging, varied, active, and less monotonous (e.g., Mohsen and Shafeeq, 2014; Ndebele and Mbodila, 2022), and strengthened digital skills, which would increase employability in the global economy (e.g., Ndebele and Mbodila, 2022; Onyeagbako, Adíeme, and Nwokolo, 2017).

Furthermore, academics opined that VLEs supported students with additional needs or those with learning differences (e.g., Dube and Scott, 2018; Sinclair and Aho, 2017), although Dube and Scott (2018) cautioned against adopting a narrow e-learning approach that could neglect various student differences. Another additional benefit was in supporting students with a first language other than English. Sinclair and Aho (2017) identified the benefits of repeated access to lecture recordings, while others claimed the VLE helped students learn English (e.g., Al-Mubireek et al., 2023; Hasnan and Mohin, 2021). Literature also reported that the VLE could help students catch up (e.g., Mohsen and Shafeeq, 2014; Ndebele and Mbodila, 2022; Sinclair and Aho, 2017).

Studies included in this review indicated that many instructors were motivated to use the VLE to engage students. A theme emerged that indicated many instructors believed that the VLE could encourage active student participation and foster engagement with the materials, each other, and the instructor. (e.g., Makhaya and Ogange, 2019; Matarirano et al., 2020; Mohsen and Shafeeq, 2014; Mouakket and

Bettayeb, 2015). Mohsen and Shafeeq (2014), in particular, noted that the VLE offered multimedia, quizzes, and communicative aspects, such as chatting and forums which fostered peer learning. Furthermore, North-Samardzic and Jiang (2015) claimed that using Moodle increased students' motivation and competence.

Despite these perceived advantages, some research highlighted instructors' concerns. For example, Amankwah et al. (2024) reported some generalised concerns of negative impacts on students. More specifically, Yalamu et al. (2024) noted lecturers' opinions that English-language VLE interfaces potentially disadvantaged students with other first languages, while other studies (e.g., Mohsen and Shafeeq, 2014; Ndebele and Mbodila, 2022) noted other disadvantages that included issues of digital poverty or digital inequality, particularly access to devices or the internet, especially for rural inhabitants. It was also opined (e.g., Ndebele and Mbodila, 2022; Sidawi, 2013; Mohsen and Shafeeq, 2014) that students with skills deficits or inadequate training provision could fall behind. Mlitwa and Van Belle (2011) presented some academics' concerns that providing resources through the VLE could limit students' research skills and abilities to locate information independently, thereby inhibiting critical thinking. Mlitwa and Van Belle (2011) and Sinclair and Aho (2017) also noted concerns that VLE-based courses could discourage students from attending class.

In summary, despite not being a named, nor considered as a unified entity, *empathy towards students* is a recurring theme throughout the literature. Furthermore, it appears to be undertheorised as a named variable in any technology adoption models or their extensions. Through a CR lens, *empathy* possesses the characteristics of PEPs in the *real domain*, while being empathetic exists in the *actual domain*. As a recurring theme in the literature and a significant theme in the findings, it warrants further discussion and is elaborated upon in Section 7.3.1.

6.3.8 Culture

In the literature, three notable aspects related to culture were identified: as a research rationale based on a lack of generalisability from investigations undertaken in other countries and cultures; as a specific variable based on perceptions of uniqueness of a particular culture; and organisational culture. These will be explored in turn.

A range of studies (e.g., Bousbahi and Alrazgan, 2015; Matarirano et al., 2020; Ng, Yeung, Rivera, and Lee, 2019; Quimno, Imran, and Turner, 2015) justified their investigations by claiming insufficient research exists within their own cultural context. A common theme is a claimed lack of relevance, or external validity, of existing studies to their own country or cultural setting. For example, Matarirano et al. (2020) stated that most VLE acceptance research was conducted in Asia and lacked relevance to Sub-Saharan Africa and South Africa in particular. Other papers, such as Azman et al. (2019), specifically investigated TAM in a Malaysian context, while Gunasinghe et al. (2020) focused on the applicability of UTAUT3 to Sri Lanka.

Other investigations deliberately focused on including national culture as a variable. For example, Yalamu et al. (2024) investigated the influence of Papua New Guinean (PNG) culture on VLE adoption by staff and students, finding that numerous respondents expressed an incompatibility between western pedagogies, including those of the VLE and teaching and learning in PNG. Quimno et al. (2015) justified research in the Philippines due to its unique socio-cultural factors and investigated Bayanihan culture on VLE adoption. Amoush and Sandhu (2019) appended 'Culture in Jordan' as an external variable to a modified TAM and noted that some respondents claimed the unique Jordanian culture was a significant factor in VLE acceptance.

Organisational culture was also a noted factor. Keller (2006) claimed national and organisational culture affected VLE acceptance and further noted that a culture of

on-campus teaching with lectures and seminars inhibited VLE use. This intersection of national and organisational culture was also combined with a culture of academic freedom, with pushback against perceived VLE imposition from management. Similarly, Dube and Scott (2018) also found that a top-down management culture could negatively affect lecturers' VLE adoption behaviours. Makhaya and Ogange (2019) noted that organisational culture, particularly blanket policies, structures, and practices disincentivised VLE adoption despite noting that leadership claimed it supported VLE adoption and use. Quimno et al. (2015) also suggested that organisational culture may impact on VLE adoption if failing to realign with the changes that technology promotes, especially as it introduced opposing forces and mixed messaging.

In summary, national and organisational cultural aspects regarding academics' VLEs adoption have received an appreciable amount of attention. The target literature suggests it imparts an influence, although many relationships between national culture, organisational culture, and VLE adoption were undertheorised. Regarding CR, culture is another theme which can be attributed to both the *actual domain* and the *real domain*. Culture is commonly conceptualised as having tangible or perceived aspects, such as food, music, clothing, and symbols that lie in the *empirical domain*, but it also has deeper underlying *generative structures* such as values, beliefs, processes, and systems in the *real domain*. In this study's context, culture refers to the deeper aspects, but consistent with the Morphogenetic Approach and recognising the separation of agency and systems, as in Section 5.5.2.1, academics' perceptions of the underlying culture were seen as having more explanatory power. Therefore, culture will be discussed in terms of academics' perceptions in Section 7.3.6.

6.3.9 Satisfaction

The next theme seen in the literature is *satisfaction,* or *user-satisfaction*. In this literature review, satisfaction is taken as instructor satisfaction rather than instructors' perspectives of student satisfaction. *Satisfaction* was predominantly seen as an external variable or investigated as a factor in *continued use intention*. *Satisfaction* was also inferred through researching other variables.

As an external variable, McGill and Hobbs (2006), using the Technology-to-Performance Chain, appended *user-satisfaction* as a precursor variable to assess and compare students' and instructors' VLE satisfaction levels. Their study determined that students were more satisfied than instructors and recommended that institutions should address instructors' VLE satisfaction levels.

Mouakket and Bettayeb (2015), using a modified Expectation Confirmation Model, investigated whether several variables including *training*, *user-interface design*, and PU affected *satisfaction* and consequently *continuance intention*. They found that *user satisfaction* is a strong predictor of *continuance intention* and that PU and *user-interface design,* but not training, influenced *satisfaction*.

Al-Mubireek et al.'s (2023) research into instructors' VLE perceptions, investigated aspects such as PEU and PU, and consequently inferred high levels of instructor satisfaction; the VLE was seen to facilitate interaction, feedback, grading, and motivation. It was also reported to develop autonomy and raise levels of attainment, which were taken as proxies for satisfaction. However, technical issues and a perceived lack of training were interpreted as detracting from instructor satisfaction.

In summary, literature suggests satisfaction affects continued use rather than initial adoption intentions, with high levels of *user-satisfaction* resulting in increased *continuance intentions*. However, satisfaction was mainly inferred from

positive sentiments from respondents and not measured directly. Its prominence in the literature means it merits further attention and is discussed in Section 7.3.8.

6.3.10 Motivation

The final notable theme is *motivation*. Davis (1985, p.133) originally described TAM as a 'descriptive model of user motivation' with the combination of PU, PEU, and *attitude towards using* described as 'User motivation'. Furthermore, as noted in the preliminary literature review, the Motivational Model was a theory used in developing UTAUT, and when creating UTAUT2, Venkatesh et al. (2012) appended *hedonic motivation* to UTAUT as an additional construct. In the literature, motivation also included how instructors could be motivated to use the VLE, and the factors causing low motivation.

Motivation was appended as an antecedent variable affecting one or more constructs, such as PU or *behavioural intention to use* (e.g., Bansal et al., 2022; Boushabi and Alrazgan, 2015; Salajan et al., 2011). Bansal et al.'s (2022) research using UTAUT2 and Gunasinghe et al.'s (2020) research using UTAUT3 noted that *hedonic motivation* positively affected instructors' intention to use and continue using a VLE. Salajan et al.'s (2011) extended TAM investigated the factors motivating faculty members to use the Blackboard VLE and found that PU combined with *improved quality of teaching* was a motivator.

Several studies (e.g., Matarirano et al., 2020; Mouakket and Bettayeb, 2015; Ng et al., 2019) concluded that leveraging their research insights could foster motivational environments. Mouakket and Bettayeb's (2015) research suggested that raising instructors' PU of the VLE would motivate instructors regarding their VLE continuance intentions, while Sinclair and Aho (2017) suggested using super-users or those with strong adoption and use characteristics could inspire and motivate others. As mentioned in Section 6.3.4, Gunasinghe et al. (2018) also

suggested using innovators to encourage other academics to use the VLE. One notable conclusion (e.g., Lavidas et al., 2022) was that management should promote training programs to motivate instructors and increase their likelihood of using the VLE.

The final aspect related to *motivation* was seen when researchers tried to identify demotivating factors or factors inhibiting motivation. Sinclair and Aho (2017) identified perceptions of poor technical support or time aspects as demotivators, while Azman et al. (2019) noted that unreliable systems could contribute to instructor demotivation. Similarly, Mohammed et al. (2024) found that insufficient resources combined with insufficient motivation contributed to poor VLE adoption, while Makhaya and Ogange (2019) indicated perceptions of lower status for those involved in blended and online learning compared with traditional lecturers, combined with insufficient time allowances for developing VLE resources contributed to low motivation.

In summary, motivation recurs throughout the literature and includes both motivational and demotivational factors, while several studies added motivation as an additional variable to TAM when TAM had already been described as a model of motivation. Related to CR, the capacity for motivation resides in the *real domain,* while being motivated is in the *actual/empirical domain*. With motivation recuring throughout much literature, it merits further attention and is discussed in Section 7.3.8.

6.4 Summary of literature themes

As shown, the literature features a significant number of factors used in explaining and predicting academics' adoption and use of VLEs in HE. Many factors were appended to VLE adoption models and researched as named variables, emerged from various investigations, or presented as conclusions from research. Given

their prominence in the literature, the context of this research, and in the context of LTAM, they warrant further discussion.

Chapter 7: Discussion

7.1 Overview

This chapter discusses this study's findings and presents its key contributions to scholarship. With LTAM representing a novel model of technology adoption and the first indigenous theory of learning technology adoption developed from the ground up, this chapter reflects on three key aspects related to LTAM and its development. Firstly, it examines how LTAM addresses gaps in the literature. Secondly, LTAM introduces new entities influencing technology adoption, while also reconceptualising established entities in existing technology adoption theory. In doing so, it demonstrates how new and reconceptualised entities contribute to scholarship and also how they draw on theoretical insights from adjacent disciplines. Thirdly, it highlights how this study's novel methodology contributes an alternative approach to technology adoption research. This study's contribution to the literature is therefore threefold: theoretical, conceptual, and methodological. These contributions to scholarship are explained in turn.

7.2 Theoretical contributions from LTAM

The core contribution of this study is to present LTAM as a novel explanatory model for understanding academics' adoption and use of VLEs in HE. Unlike the dominant recombinatorial models such as TAM and UTAUT, LTAM was developed from the ground up and is explicitly grounded in the educational context it seeks to explain. As such, LTAM as a whole contributes to four significant aspects in the literature: the noted absence of indigenous theories for explaining learning technology adoption; Bagozzi's (2007) critique of the technology adoption landscape and his call for adopters to be placed at the centre of adoption; the lack of a coherent theory of technology adoption in which adopters can actively transform the factors influencing their adoption; and finally, the absence of

models and theories that consider altruistic technology adoption, where technology is adopted for the benefit of others beyond the adopter.

Firstly, as a novel and distinctive model of learning technology adoption, LTAM directly addresses Bligh's (2020) critique that the discipline lacks an indigenous theory and instead relies on conceptual imports. As outlined in Chapter 2, the preliminary literature review identified 31 imported models and theories, most of which are either generalised technology adoption models, general psychological theories, or theories focusing on aspects of the technology itself. In presenting LTAM, this study offers the first theory of learning technology adoption to emerge from academics' situated experiences, thereby addressing the recognised absence of indigenous theory. In doing so, LTAM establishes a theoretical platform that other researchers can now draw upon to advance the field and further develop theory.

Secondly, in addressing Bagozzi's (2007) critique of TAM, which he co-developed and which also informed later models such as UTAUT, LTAM responds to his calls for a 'dual approach' to technology adoption. As elaborated upon in Section 3.5, Bagozzi called for a focus on decision-making processes while incorporating contextual causes to address shortcomings in existing technology adoption literature. As such, LTAM is the only technology adoption model to place reflexivity at its core and is the only model to highlight the centrality of agency in shaping engagement. It emphasises how academics' decision-making is shaped by their situated perspectives, knowledge, dispositions, and ultimate concerns in consciously adopting and using technology.

Furthermore, by adopting the Morphogenetic Approach and placing the individual at the centre of decision-making, LTAM is the first VLE adoption model to recognise that individuals not only produce outcomes based on the interactions of the component influences, but significantly, can also actively reshape or reinforce these influences based on experience, engagement, and changes in the wider environment. This reciprocal relationship is expanded upon in Section 7.4.5 which

discusses reflexivity. By using the Morphogenetic Approach in directly addressing Bagozzi's (2007) call for a 'dual approach', LTAM advances a new theoretical foundation for further investigating the interplay between contextual causes and decision-making in learning technology adoption.

Finally, a further significant contribution of LTAM is its recognition that technology can be altruistically adopted for the benefit of others, rather than solely for the benefit of the adopter. Despite TAM, UTAUT, and their derivations being the dominant models used in VLE adoption research, both were developed by focusing on the adopter as end-user. For TAM, Davis (1985) researched personal productivity gains and user-acceptance of word-processing and email packages, whereas for UTAUT, Venkatesh et al. (2003) investigated similar aspects using corporate IT software. While both models advanced theories of personal technology adoption, third-party benefits were unacknowledged. This study contributes to scholarship in technology adoption by demonstrating that these established models remain relevant only for personal adoption, while LTAM explains altruistic technology adoption and introduces a new dimension in technology adoption by accounting for technology adopted for the benefit of others. Aspects of altruistic technology adoption are developed further when discussing cognitive empathy in Section 7.3.1, which also suggests specific avenues for future research.

Taken together, these four aspects of LTAM contribute to technology adoption scholarship by providing a new, indigenous, theoretically grounded, contextually sensitive, explanatory model that both addresses long-standing gaps in the literature and establishes a foundation for future research into learning technology adoption. Taken together, LTAM marks a substantive shift in learning technology adoption theory and presents a new model that addresses long-standing gaps in the literature.

7.3 Conceptual contributions arising from LTAM

Further to the overarching contributions of LTAM, the critical analysis undertaken during its creation resulted in the development and reconceptualisation of seven key entities, each of which represents a further contribution to scholarship. An eighth subsection provides a conceptual clarification concerning two frequently discussed constructs: motivation and satisfaction, and explains their exclusion from LTAM. All seven reconceptualised entities, together with the final conceptual clarification, are explained in turn and situated within the existing body of knowledge. Furthermore, where this study draws upon scholarship from different disciplines to augment or substantiate its findings, these interdisciplinary connections and conceptual imports are made explicit.

7.3.1 Cognitive empathy

A revelatory contribution of this study is *to identify and present cognitive empathy as a distinct and significant named entity in learning technology adoption*. Section 5.7 of the findings presented a range of empathetic attitudes towards students and colleagues that were later determined to be instances of *cognitive empathy*, simply referred to in LTAM as *empathy*. As described in Section 5.7, cognitive empathy provides a key underlying mechanism through which altruistic technology adoption arises, and its identification extends existing scholarship on technology adoption by highlighting a previously unacknowledged driver of engagement. This contribution is also discussed in Section 7.2 when outlining altruistic technology adoption.

Despite a fundamental purpose of teaching being to benefit others, *cognitive empathy* has been undertheorised in the technology adoption literature. Empathetic attitudes are largely absent from existing technology adoption models and theories, and only appear incidentally in a few publications (e.g., Amankwah

et al., 2024; Mohsen and Shafeeq, 2014; Ndebele and Mbodila, 2022), which were discussed in the substantive literature review (Chapter 6). In one notable example in the substantive literature review, Ndebele and Mbodila (2022) deliberately elicited the VLE's perceived positive and negative impacts on students but these perceptions were not identified as empathy. Although other examples of *cognitive empathy* are evident in the substantive literature review and are elaborated upon throughout Section 6.3.7, they were not acknowledged as a specific entity and featured minimally in the studies' discussions.

The existing literature contrasts significantly with this study's findings. Section 5.7 presented multiple aspects of academics' empathetic use of Moodle, including saving students time, helping students develop, realising student aims, attending to different learning styles, accommodating students' other commitments, and reducing cognitive strain. In addition to empathy towards students, this study also makes further contributions to scholarship by identifying empathy towards both peers and professional services staff as an influence in academics' adoption and use of VLEs in HE, an aspect similarly undertheorised in the literature. Drawing on its origins in psychology, where empathy is a widely recognised and investigated phenomenon, LTAM introduces this construct into learning technology adoption. Consequently, a key contribution of this study is presenting LTAM as the first model of technology adoption to recognise and theorise *empathy* as a specific named entity affecting decision-making.

Identifying and introducing *cognitive empathy* as a new and specific entity in technology adoption is revelatory. Not only does it represent a key PEP that shapes the adoption and use of learning technology, but it also validates the empathetic findings that were identified in the substantive literature review (e.g., Amankwah et al., 2024; Mohsen and Shafeeq, 2014; Ndebele and Mbodila, 2022). As a PEP that generates altruistic tendencies, cognitive empathy can be seen as exerting a direct influence on reflexivity. Therefore, as a contribution to scholarship, it offers a robust and coherent variable for investigating not only VLE

adoption and use, but also TEL and technology adoption in general, particularly as it obliges researchers to consider whether the technology could benefit others.

As a further consequence of this finding, LTAM's acknowledgement of empathy as a key influence in learning technology adoption and use may further encourage researchers to report empathetic findings more explicitly, engage with them more analytically, discuss them, and make recommendations grounded in *empathy*. Furthermore, foregrounding empathy can help validate academics' empathetic traits, dispositions, capacities, and behaviours, which may be particularly significant in contexts where teaching is framed as a means of demonstrating expertise rather than supporting students.

However, although it is recognised that researchers may persist with established models such as TAM and UTAUT, and attempt to extend them by adding *empathy* as an external variable or integrated construct, its emergence from academics' situated experiences and its development within LTAM suggest that appending it to existing models may offer only limited explanatory utility. Consequently, this study does not position empathy as a peripheral addition to existing models but as a specific PEP that directly influences individuals' reflexivity and as a named entity, which directly addresses the recognised lack of theory regarding altruistic technology adoption.

7.3.2 Instrumental knowledge and innovativeness as an aspect of technical knowledge

The next contribution is *to redefine technical knowledge of the VLE*. Findings from this study indicate that technical knowledge should be understood as comprising declarative knowledge, procedural knowledge, and the additional construct of instrumental knowledge. Alongside these constructs, LTAM reframes the concept of innovativeness and argues for its inclusion within instrumental knowledge. I

further contend that *willingness to try* should be decoupled from innovativeness and repositioned within *attitudes towards change*. These reconceptualisations are explained in turn.

Learning technology adoption literature consistently conceptualises technical knowledge as comprising declarative knowledge (knowing about) or procedural knowledge (knowing how). As summarised in Section 5.4.1, in Mishra and Koehler's (2006) seminal TPACK model, technical knowledge is described as 'knowing about' and 'skills', a distinction also supported elsewhere (e.g., Anderson, 1983; Saks, Ilves, and Noppel, 2021). While this two-dimensional disaggregation of technical knowledge has encouraged research and provided some understandings of technical knowledge, evidence from this study indicates that technical knowledge is more nuanced. Specifically, it can be further understood by building upon Boswell's (2009) notion of 'instrumental knowledge' as introduced in Section 5.4.1.3 and extending it from its origin in policy contexts into technology adoption. The adoption of the term 'instrumental knowledge' captures the concept of conscious manipulation or innovative application of knowledge to achieve goals potentially beyond typical or stated uses. Consequently, LTAM contributes to the literature by formalising and extending TPACK's treatment of technical knowledge by specifically naming 'knowing about' and 'skills' as *declarative knowledge* and *procedural knowledge* respectively, while introducing and recontextualising the concept of *instrumental knowledge* from policy studies and extending it to technology adoption and use.

Alongside LTAM's reconceptualisation of technical knowledge, examples of existing research, as detailed throughout Section 6.3.4, have demonstrated instances of innovativeness or personal innovativeness frequently being appended to different theoretical models. In these studies, innovativeness is primarily considered a personality trait that predisposes individuals to try new technologies before others do so (Agarwal and Prasad, 1998; Rogers, 2003). While innovativeness as a personality trait has helped explain adoption chronology, the literature's treatment of innovation appears an oversimplification and fails to

account for instrumental knowledge or the concept of ‘exaptation’, a theoretical import from evolution studies that refers to the novel uses of existing tools or affordances for alternative purposes (Andriani and Cattani, 2016). As noted in this study’s findings and outlined throughout Section 5.4.1.3, innovation was not the predisposition to try Moodle, but was seen primarily as deliberately leveraging the VLE in innovative ways to achieve a range of outcomes, including managing relationships with students, managing expectations, stewarding co-teachers, reducing cognitive burden, rewarding one’s future self, time-shifting workload, giving students time and space for reflection, or obtaining feedback on one’s own resources.

Consequently, by combining this study’s findings that identified instrumental knowledge with the critique of the existing literature’s treatment of innovativeness, I take the position that innovativeness is not the willingness to try but is more closely aligned with ‘exaptation’ or using the VLE for purposes not originally envisaged or typically promoted. Therefore, as a contribution to scholarship, I contend that it is more coherent to consider innovativeness as a form of instrumental knowledge which resides within technical knowledge. This study still recognises a willingness to try. However, as a further contribution to scholarship, I contend that it is more logically understood as an attitude. This conceptualisation is congruent with Agarwal and Prasad’s (1998) adoption of Hurt et al.’s (1977, as cited in Agarwal and Prasad, 1998, p. 206) definition of innovativeness as a ‘willingness to change’.

Significantly, LTAM’s redefinition of technical knowledge to include instrumental knowledge makes an important contribution to scholarship by acknowledging the role and importance of exaptation, a conceptual import from evolutionary theory, and validates the efforts of academics who experiment, repurpose, and find novel uses for the VLE. This study therefore emphasises that without instrumental knowledge, or exaptation, technical knowledge represents or is reduced to the reproduction of formulaic training. As a scholarly contribution, by foregrounding exaptation in VLE adoption studies, it also highlights that exaptation can foster

other attributes such as creativity, experimentation, and risk-taking, which helps grow knowledge and offers further research opportunities. It emphasises that exaptation should be recognised as a core aspect of university culture in reimagining and extending knowledge.

Redefining technical knowledge to include instrumental knowledge, while recasting innovativeness as a form of instrumental knowledge within LTAM, offers multiple avenues for further scholarly endeavours. One such opportunity is collating and disseminating academics' exaptive VLE uses which can encourage wider VLE engagement by showcasing beneficial applications beyond explicit teaching. Additionally, a further contribution exists for researchers investigating academics' technical knowledge; instrumental knowledge can be positioned as a formalised additional construct for determining proficiency by differentiating between those who can replicate others' general use and those who can consciously manipulate the tools and affordances to achieve novel outcomes.

7.3.3 Need for training

The next contribution is *to problematise the need for training as necessary in encouraging and facilitating technology adoption*. This study challenges popular beliefs that substantive additional training is necessary to increase VLE adoption or to overcome adoption hesitancy. In doing so, this contribution further underscores the methodological strength of CR in social science research through its ontological distinction of the three domains, as elaborated on in Section 7.4.1 as a methodological contribution. Leveraging these ontological distinctions enables a differentiation between training sessions in the empirical domain and the desired outcomes of training, namely increased knowledge and proficiency, which reflect generative structures in the real domain. Consequently, it becomes evident that the need for training is better reframed as the need for knowledge, the need for readily available reference materials, and the proximity of support rather

than formal training sessions. This recasting is entirely congruous with, and extends the applicability of, Gutman's (1982) Means-End Chain Model from marketing, which states that consumers do not necessarily want a product but want to achieve desired ends: customers do not want a mattress, they want a good night's sleep; academics do not want training, they want proficiency.

While the dominant technology models do not typically conceptualise training as a named causal variable, as training is seen as customary within HE, many studies in the substantive literature review (e.g., Hasnan and Mohin, 2021; Lavidas et al., 2022; Mouakket and Bettayeb, 2015; Ndebele and Mbodila, 2022) present it as a default solution for VLE adoption hesitancy or underutilisation. Although introductory VLE training may be practical, positioning additional training as the default solution to VLE hesitancy and underutilisation neglects the possibility that academics may not necessarily want training sessions. Both the literature and this study showed that academics are typically busy, struggle to commit time to training sessions, and, as discussed in Section 5.4.4.1, primarily need timely help or good quality reference materials. Problematising the need for training is further reinforced by Dweck's (2006) concept of 'growth mindset', presented in Section 5.6.2, which indicated that many of the participants have tried and are willing to achieve VLE competency independently. Furthermore, as explained in Section 6.3.5, academics may not wish to be seen at such training sessions to preserve their projected reputation or status.

Taken together, this study contributes to three main aspects of scholarship concerning the need for training. Most significantly, it obliges researchers and leadership to problematise the assumption that training is required and to consider how best to address knowledge and skills gaps. Secondly, by extending Gutman's (1982) Means-End Chain Model to technology adoption, this study highlights the need for institutions to focus on desired outcomes rather than the quantifiable interventions that are assumed to produce them. Finally, by introducing Dweck's (2006) concept of growth mindset from psychology, it enhances learning technology adoption studies by contributing a social-cognitive

theoretical foundation to decisions related to VLE training and the provision of training resources.

Such problematising can prompt further considerations. Firstly, it highlights the need for a multi-dimensional approach to helping academics realise their VLE objectives rather than relying on repeated formalised training. The findings in this study, particularly those presented in Section 5.4.4.1 regarding *knowledge where to get help*, suggest an appetite for alternative professional development approaches beyond formal training exists. This appetite aligns with and reinforces research by Son, Park, and Liu (2024) whose findings highlight a clear desire amongst academics for informal and self-directed professional development appropriate to their contextual needs and supported by peer communication to enhance and reinforce their practice. However, another insight from this study revealed that while many academics may approach colleagues, institutions should not depend on informal networks. While absent from the extant literature, this study further contributes to scholarship by recognising that empathetic academics often avoid troubling colleagues due to an awareness of their already heavy workloads.

Findings from this CR-informed study also present numerous opportunities for subsequent investigations. Potential future research could investigate the desired content of initial VLE training, themes that academics identify as priorities for further support, and through which media it should be made available. Significantly, these avenues for future research could be combined with the insights on *instrumental knowledge* developed in Section 7.3.2, particularly regarding LTAMs reconceptualisation of *technical knowledge* and how it can be captured, disseminated, and supported.

7.3.4 Concepts of self and professional identity

The next contribution is *to reemphasise the importance of concepts of self, particularly professional identity in learning technology adoption*. Findings from both the interview responses and the literature highlight several aspects of concepts of self that shape academics' VLE engagement, with self-belief, professional identity, and identity preservation particularly influential.

As discussed in Section 6.3.5, self-belief and synonymous terms recur throughout the literature and are conceptualised in LTAM as a PEP that shapes engagement with the VLE. In addition to being present in interview responses, this characteristic was often retroduced from other statements including those referring to instrumental behaviours as highlighted in Section 5.4.1.3 or as mindset in Section 5.6.2. Existing technology adoption models typically subsume this construct implicitly within PEU. However, as explained in Section 5.8.2, self-belief must be distinguished from PEU. While both constructs may exhibit conceptual overlap, self-belief emphasises the individual, whereas PEU is directed towards the VLE. Informed by the Morphogenetic Approach, this distinction is essential as the individual cannot be subsumed within system-level perceptions and their reflexivity must remain analytically distinct. As a contribution to scholarship, LTAM recognises self-belief as a distinct entity and clearly separates it from PEU.

Furthermore, although identity does not represent a specific variable within the dominant technology adoption models, this study, in emphasising the centrality of the academic, highlights the significance of identity as another concept of self, and argues that it must constitute an essential aspect of learning technology adoption scholarship. Archer (1995) repeatedly stresses the importance of identity and how individuals maintain a vested interest in preserving both their identity and their role scope. While TAM and UTAUT undertheorise identity, LTAM, by framing VLE adoption and use as a person-centred phenomenon, highlights the importance of identity on VLE engagement.

By foregrounding identity, this study contributes to existing scholarship in several ways. Firstly, it substantiates the findings of Geertshuis and Liu (2016) who argue that academics engage in activities which reinforce their existing professional identities or avoid those, such as VLE use, if they threaten their self-esteem, reputation, professional identity, or could be seen to modify their role scope. Secondly, it extends understandings of identity by augmenting their findings and incorporating the notion of vulnerable self-esteem, which was identified in Section 5.8.3 to be a key aspect of identity preservation. Most significantly, this study reconceptualises identity as a PEP rather than an additional variable that can be appended to existing models of technology adoption which treat adoption and use as a result of either perceptions or attributes of the technology. As a PEP, identity must instead be considered an entity that shapes reflexivity and is tied to adopters' ultimate concerns.

As self-belief and professional identity are undertheorised in the literature, they present numerous avenues for further research, including how other entities can amplify or inhibit the effects of professional identity and vice versa. Furthermore, the integration of self-belief and professional identity within LTAM demonstrates how they can influence other entities such as perceptions, empathy, and attitudes. By considering the preservation of identity and the avoidance of situations which may threaten an already vulnerable self-esteem, researchers could investigate activities that contribute to concepts of self, or the reflexive deliberations academics have in navigating them.

7.3.5 Knowledge of other software and systems

The next contribution is *to identify knowledge of other software and systems as a new variable in learning technology adoption research.* In investigating VLE adoption and developing LTAM, multiple generative mechanisms related to technical knowledge were identified and described in Section 5.4.1, one micro-

level dimension of which was *knowledge of other software and systems*. Consequently, this study led to the identification of a previously unrecognised phenomenon related to VLE adoption, described in Section 5.4.1.4 as *systems and software fatigue*. This phenomenon considers the burden associated with the academics' need for competence in too many software packages which can result in VLE hesitancy or the deliberate limiting of one's VLE competence. *Knowledge of other software and systems*, and in particular the concept of *systems and software fatigue* therefore represent novel contributions to the literature, both of which will be explained in turn.

Firstly, related to *knowledge of other software and systems*, existing studies identified in Section 6.3.5 theorised how general IT literacy could influence VLE adoption and use. However, this study identified and substantiated the causal mechanism of how experience with another VLE platform can facilitate the learning of Moodle, as well as the counteracting causal mechanism where expectations based on familiar websites negatively affected perceptions of how Moodle should work. Through ongoing comparison to literature, these expectations were found to align with Perkins and Salomon's (1992) concepts of 'transfer of learning' and the notions of 'positive transfer' and 'negative transfer', as described in Section 5.4.1.4. Similarly, this study found that two participants stated they persisted with legacy applications, such as using email for announcements rather than adopting the announcements function in Moodle. This persistence with familiar tools represents a counteracting mechanism and was found to be entirely congruous with David's (1985) notion of 'path dependence', introduced in Section 5.4.1.4, where individuals remain locked into existing systems.

Therefore, this study contributes to scholarship by drawing these two familiar concepts from cognitive psychology, and not typically associated with technology adoption, into theoretical discussions of VLE use. Consequently, the concepts of 'transfer of learning' and 'path dependence' present two additional mechanisms that can enhance understandings of technology adoption and use. Furthermore,

as new theoretical imports to the discipline, they offer potential avenues of future research that can be explored in relation to technology adoption in general or, more specifically, to learning technology and VLE adoption studies.

Similarly, related to *knowledge of other software and systems*, this study identified frustrations with the number of different teaching-related systems that academics are expected to use, and that a saturation of software and platforms may have occurred. Consequently, VLE mastery can represent 'one platform too many', thereby limiting the cognitive space available for developing VLE competence. This saturation has clear parallels with the *attitudes towards technology* identified in Section 5.6.1, where three participants reported satisficing attitudes and only sought a minimum level of competence. These findings are completely congruent with Archer's (2003) conceptualisation of 'ultimate concerns' where individuals, through their inner conversations, determine which 'projects' to prioritise. This means that different academics will have different priorities and that learning how to use the VLE may be deprioritised due to cognitive saturation.

In identifying *systems and software fatigue*, this study extends the literature related to barriers to VLE adoption, especially as existing literature undertheorises the negative effects associated with the quantity of software packages that academics are expected to use. As discussed in Section 6.3.2, Zanjani et al. (2017) not only highlighted perceived ease of use in configuring a VLE, but they also acknowledged a related phenomenon called 'technology overload'. However, their focus was limited to how VLEs with a surfeit of tools and options affected the perceptions of user-friendliness. While this study recognises 'technology overload' as a phenomenon, it argues that it should be subsumed within PEU, especially as Zanjani et al. (2017) located it within the functionally-equivalent 'perceptions of user-friendliness'. By again emphasising the separation of the system from the individual, this study demonstrates that *systems and software fatigue* represents a distinct entity from any consideration of the technology itself. Therefore, LTAM contributes to existing VLE adoption scholarship by uniquely

recognising that beyond the quantity of tools and options, cognitive saturation can occur regarding the number of software packages academics can be expected to learn, which ultimately influences VLE adoption and use.

Consequently, as a further contribution to scholarship, the identification of *systems and software fatigue* also presents implications related to *the need for training,* as identified in Section 6.3.1. Instead of insufficient awareness or lack of knowledge leading to VLE underuse, *systems and software fatigue,* as a counteracting mechanism, represents a phenomenon which cannot be overcome by additional training. Recognition of *systems and software fatigue* further consolidates the argument for problematising the assumed need for training, which is discussed in Section 7.3.3. Therefore, as *systems and software fatigue* has been undertheorised in existing VLE adoption literature, it represents a novel avenue of potential research in understanding why mandated training may be ineffective in overcoming VLE adoption hesitancy.

Taken together, this section makes three distinct contributions to scholarship. Firstly, it extends existing understandings of technical knowledge by identifying knowledge of other software and systems as a new variable in VLE and learning technology adoption research. Secondly, it introduces two additional concepts, 'transfer of learning' and 'path dependence', from cognitive psychology into learning technology adoption scholarship and offers explanatory concepts regarding VLE adoption and use. Finally, it presents *systems and software fatigue* as a distinct barrier to VLE adoption and offers new insights into why mandated training may be ineffective in addressing adoption hesitancy.

7.3.6 Perceptions

The next contribution is *to underscore the explanatory power of perceptions*. Throughout Sections 5.5.1 and 5.5.2, this study identifies a range of technical and

contextual perceptions that are seen to offer greater explanatory power than factual descriptions alone. In line with Archer's (1995) analytic dualism, this study maintains the distinction between agency and systems. Therefore, while Danermark et al. (2019) advocate retroducing phenomena in the empirical domain to generative structures in the real domain, the Morphogenetic Approach argues for maintaining the separation of agency and systems. By maintaining this separation and placing reflexivity at the centre of LTAM, academics' perceptions must be retained instead of simply reducing them to descriptions of the underlying generative structures.

While recognising that the identification of these underlying generative structures offers context and some explanatory power, this study argues that perceptions are analytically more significant than basic descriptions of these structures. As established in Section 6.3.2, the prominence of PU and PEU within TAM, alongside the functionally analogous construct of *expectations* in UTAUT, establishes that explanatory power regarding technology adoption rests with perceptions of the technology, not factual descriptions of utility or simplicity. Additionally, with Sections 5.5.1.1 to 5.5.1.3 highlighting contrasting perceptions of Moodle's PU and PEU, alongside differing perceptions of robustness and reliability, this study further reinforces the necessity to focus on the explanatory power of perceptions over factual descriptions of the VLE.

This emphasis on perceptions also has further reciprocal implications regarding contextual factors. Findings presented in Section 5.5.2.1 identified numerous generative structures within the real domain related to organisational culture, including the dual demands of research and teaching, recruitment practices, social norms, leadership messages, collegiality, agency, accountability structures, and organisational justice. However, while these contextual factors operate as generative mechanisms in the *real domain*, applying the Morphogenetic Approach and maintaining the importance of perceptions in the empirical domain compels this study to acknowledge perceptions of these generative structures rather than simply presenting factual descriptions of these

conditions. Therefore, as developed in Section 5.5.2, LTAM explicitly emphasises these contextual perceptions.

Consequently, LTAM makes several contributions to scholarship regarding perceptions. Firstly, it reinforces the established importance of perceptions, such as PU and PEU that pervade the VLE adoption literature. Secondly, it further extends the theoretical use of perceptions by challenging how existing models such as TAM2, UTAUT, and any recombinatorial derivations conceptualise contextual factors such as social influence or social norms. These models typically consider contextual factors as factual attributes that exert influence on adoption and use. LTAM, as an ontologically principled CR-derived model, emphasises that it is the perceptions of these factors, rather than any factual descriptions that carry explanatory power.

Additionally, this study also contributes to VLE adoption scholarship by emphasising additional constructs related to organisational culture that may offer further explanatory power. While organisational culture as a distinct concept has attracted limited attention in the VLE adoption literature, related constructs such as organisational context (Keller, 2006), institutional support (Makhaya and Ogange, 2019), and policy (e.g., Dube and Scott, 2018; Sidawi, 2013) have been discussed in the substantive literature review (Chapter 6). This study identifies additional undertheorised aspects which are accountability structures, organisational justice, and collegiality. Therefore, LTAM advances VLE adoption scholarship by introducing well-established theoretical constructs from organisational behaviour and challenges existing TAM- and UTAUT-derived theories, where contextual conditions are reduced to simple generalised statements of social norms or facilitating conditions.

Furthermore, LTAM extends scholarship by recognising that not only do perceptions influence academics' adoption and use of learning technology but, consistent with the Morphogenetic Approach, perceptions can also both mediate and modify other entities within LTAM. As shown in Figure 5.9, and in the

explanation of morphogenetic processes within LTAM, perceptions can shape the processes of both morphogenesis and morphostasis. This recognition also requires acknowledgement of Archer's (2003) concept of habitualised behaviour. Informed by perceptions of contextual factors, habitualised behaviour emerges and therefore operates alongside reflexive deliberation. Although the literature discussed in Section 6.3.6 and this study's findings in Sections 5.5.2.1 and 5.5.2.4 indicated a claimed lack of susceptibility to influence, multiple statements in the interview data, including third party comments about colleagues, suggest that contextual factors have been internalised and behaviours have become habitualised. Therefore, this study contributes to scholarship by recognising that although academics may not be actively making VLE adoption and use decisions based on perceptions, their behaviours may have become habitualised through both explicit and tacit perceptions of contextual or technological factors.

Together, this section makes four contributions to scholarship. Firstly, it reinforces and extends the phenomenon of perceptions in explaining VLE adoption by demonstrating that perceptions carry more explanatory power than factual descriptions of both technological and contextual conditions. Secondly, in doing so it challenges how existing models such as TAM2 and UTAUT conceptualise contextual factors as factual descriptions by arguing that LTAM's CR-derived ontology requires these to be understood as perceived rather than objective attributes. Thirdly, it introduces the undertheorised organisational constructs of accountability structures, organisational justice, and collegiality into VLE adoption scholarship. Finally, it reinforces and extends theoretical understanding by recognising that perceptions can mediate and modify other entities within LTAM, shaping both morphogenesis and morphostasis, and enabling the development of habitualised behaviours alongside reflexive deliberation.

Consequently, by recognising the significance of perceptions, this study offers leadership insights into ways of fostering an organisational culture which supports academics to enhance their practice and address factors which limit it. These

insights could help prevent dissonant messaging, strengthen accountability structures, create more meaningful role profiles, and guide resource allocation. Furthermore, as organisational culture is a substantial area of leadership and management research, this study presents interdisciplinary research opportunities as there is significant scope to investigate additional organisational factors influencing academics' adoption and use of VLEs in HE.

7.3.7 Attitude

The next contribution is to *highlight the ontological depth of attitude*. This study demonstrates that attitude is a stratified PEP and consists of multiple causal powers rather than being a simple construct. In the preliminary literature review in Section 3.4.1, *attitude towards using* was noted as a significant factor in TAM and influencing *behavioural intention to use*. Based on the centrality of *attitude towards using* within TAM, attitudes were deliberately elicited in the interviews and theoretical sensitivity guided their coding. Consequently, *attitudes* became a core category of influence.

However, many studies treat attitude as a monolithic construct or focus on one aspect of attitude, with limited ontological depth. In line with CR's conceptualisation of emergence, this study identifies *attitudes* as a complex stratified structure in the *real domain*, comprising multiple causal powers including attitudes towards change, attitudes towards students, attitudes towards work, and mindset, in addition to attitudes towards using the VLE.

LTAM contributes to scholarship by emphasising that *attitudes* are not a simple construct but a stratified emergent power and, as shown in Section 5.6, they possess considerably more ontological depth than TAM's narrow construct of *attitude towards using*. As described in Sections 5.6.3.1 and 5.6.3.2, LTAM introduces two aspects from adjacent disciplines. The first is De Dreu and Nauta's

(2009) continuum of *employee orientation* from organisational behaviour, which demonstrates congruence with Archer's (2007) notion of ultimate concerns. The second is Kelley's (1988) 'theory of followership' from leadership and management studies, which categorises employees as passive, conformist, alienated, pragmatic, and exemplary. Together, these two conceptual imports represent a further contribution to literature by broadening the range of theoretical constructs available for explaining VLE adoption and use.

These scholarly contributions offer several potential avenues for further research, including factors that amplify or inhibit academics' attitudes. Scope also exists to explore how other generative mechanisms such as *perceptions* and *concepts of self* can interact with and potentially transform through morphogenesis, different aspects of *attitudes*. Furthermore, by introducing employee orientation and followership into LTAM, additional scope exists for researching how perceptions of organisational culture, identity, role, and other entities within LTAM interact with these constructs and shape them in relation to academics' adoption and use of VLEs in HE.

7.3.8 Motivation and Satisfaction

A final significant conceptual contribution of this study is to *problematise the roles of motivation and satisfaction in VLE adoption*. While both constructs are frequently cited in the literature and are examined in both Sections 6.3.9 and 6.3.10, there are strong reasons to consider them together and to omit them from LTAM. Firstly, Davis (1985) originally described TAM as a motivational model, meaning that motivation is already embedded within its constructs and UTAUT included the Motivational Model in its creation (Venkatesh et al., 2003). Similarly, LTAM, which represents academics' adoption and use of VLEs in HE, can similarly be understood as a complex motivational model of VLE engagement. Therefore, identifying motivation as a separate factor appears unnecessary.

Secondly, as satisfaction frequently appeared in the literature but had not been coded for during the data analysis, the participants' responses and the literature were re-examined. This re-examination revealed that although *satisfaction* recurred throughout the literature, it was largely absent in the interviews. During reanalysis of the literature, satisfaction appeared to consist of two dimensions: student satisfaction and user satisfaction. It must be recognised that while student satisfaction could potentially exist as an aspect within Section 5.7.3 on *recognising and valuing students* and the potential exists to force a category of *user satisfaction* by projecting it onto extended sections of the responses, doing so would conflict with GT principles which emphasise the emergence of categories rather than imposition of codes.

Furthermore, deeper analysis of the literature revealed that practical definitions of *user satisfaction* were largely absent. Therefore, satisfaction merited defining in terms of CR. From a CR perspective, satisfaction, as an emotional response, exists in the *empirical domain*. However, such responses lack explanatory power, particularly regarding choice: academics do not adopt a VLE because they anticipate they will feel satisfied, although dissatisfaction may deter continued use. Consequently, as an emotional response, satisfaction lies outside the scope of this study by not representing a causal mechanism nor having sufficient explanatory power to contribute meaningfully to LTAM. This position is further elaborated upon as a conceptual limitation in Section 8.3.

This study problematises the inclusion of *motivation* and *satisfaction* as separate constructs in VLE adoption. As a contribution to scholarship, it challenges the widespread assumption that these constructs must be investigated separately by reminding readers that TAM is already a motivational model and by highlighting that LTAM's overarching construct similarly encompasses motivation. It further contributes to scholarship by demonstrating that satisfaction, as an emotional response in the empirical domain, lacks real explanatory power and cannot meaningfully contribute to this ontologically principled model of technology

adoption. This critique also serves to clarify LTAM's conceptual boundaries by omitting affective responses.

7.4 Methodological contributions from developing LTAM

Beyond the development of LTAM and its theoretical and conceptual contributions, this study also makes five main methodological contributions to technology adoption research scholarship. As detailed in Chapter 2, this study employs a combined CR-informed SGT methodology to generate LTAM. This methodological choice directly addresses Bagozzi's (2007) critique of the technology adoption literature, as outlined in Section 3.5, in which he, despite being a key contributor to the further development of TAM (Davis, Bagozzi and Warshaw, 1989), argued that new theoretical directions were required, and that psychological and contextual dimensions regarding decision-making needed to be integrated.

This methodological synthesis represents an innovative approach to theory generation for understanding and explaining academics' VLE engagement, particularly in contrast to the ubiquity of positivist cause-and-effect research. As outlined in Section 6.1.4, most research to date employs statistical techniques to investigate hypothesised relationships. While these have produced broad but reductionist and oversimplistic explanations, they neglect many of the complexities and nuances of VLE adoption. Moreover, as highlighted in Section 3.5 and throughout Section 6.2, they have produced inconsistencies and contradictions which have seemingly offered little additional clarity and instead invited repeated reinvestigation.

SGT, as employed in this study, inductively develops theory through systematic investigation and treats literature as a legitimate data source alongside primary data. This methodological tenet enables literature to inform initial research

trajectories, guide analysis and inductive reasoning, substantiate emerging theoretical insights, and support conceptual reframing throughout the research process. Alongside SGT, CR provides an ontological and epistemological foundation that highlights causal complexity, a stratified reality, and emergent mechanisms, while the Morphogenetic Approach highlights the role of human agency. This section highlights the five key methodological contributions to education technology adoption scholarship that emerged from this approach.

7.4.1 Domains of CR

The first methodological contribution is to *problematise the ontological separation of reality into the real domain*, *actual domain*, and *empirical domain for TEL research*. In developing LTAM, CR provided a strong theoretical underpinning with consistent criteria with which to identify, classify, and locate the main influences within the three domains. A notable advantage of this ontological separation is exemplified in the substantive literature review regarding the theme of *culture* which, as discussed in Section 6.3.8, often has a taken-for-granted definition. For example, Amoush and Sandhu (2019) appended 'Jordanian culture' as a variable without abstraction or detailing which cultural aspects their model considered and then subsequently claimed the unique culture significantly affected VLE adoption. Such examples illustrate and substantiate Danermark et al.'s (2019) argument that failure to abstract underlying generative structures leads to ontologically shallow explanations.

Drawing on Bhaskar's (2008) stratification of reality, the critical analysis of culture in Section 6.3.8 determined that culture exists in both the *empirical domain* as observable artifacts such as flags, clothing, and art, and when theorised as such in the *real domain* as deeper generative structures such as values, beliefs, processes, and systems. This ontological distinction combined with critical analysis was instrumental in subsequently clarifying in Section 5.5.2.1 how

organisational culture operates as a *generative mechanism* in the *real domain,* while *perceptions of organisational culture,* as experienced by individuals, reside in the *empirical domain*. This distinction supports a more nuanced explanation of how organisational culture and institutional narratives can function. Ultimately, employing Archer's (1995) analytic dualism and its separation of systems and agency helped determine that *perceptions of organisational culture* offered more explanatory power than generating or retroducing factual descriptions of the underlying culture.

Similarly, the ontological distinction of the different domains further help differentiate between *perceptions,* which exist in the *empirical domain* and *knowledge and beliefs,* which reside in the *real domain*. In Section 5.4.4, these distinctions were instrumental in developing the term *situational knowledge* rather than adopting Endsley's (1988) term 'situational awareness', a definition which includes perceptions. CR's ontological separation was also significant in characterising other entities, such as distinguishing between the capacity for empathy in the *real domain* from being empathetic in the *actual/empirical domain*.

As demonstrated throughout this study, as a contribution to scholarship, principled application of CR obliges researchers to focus on the different domains and consequently adopt a more critical approach to conceptualising entities and identifying their explanatory powers. This methodological contribution reinforces Danermark et al.'s (2019) call for deeper explanations of phenomena and more precise conceptualisations and theorisation of entities. It further challenges the dominant technology adoption models, which routinely mix entities from different ontological domains and treat them as functionally equivalent variables within a single predictive model. For example, UTAUT (Venkatesh et al., 2003) fails to differentiate between descriptions of institutional structures and perceptions of them within its construct of 'facilitating conditions'. Similarly, TAM (Davis, 1985) treats 'external variables' as an ontologically indistinct category, which invites

researchers to conflate system and contextual characteristics with perceptions of those characteristics.

Taken together, this study contributes to scholarship by exposing the lack of ontological coherence underpinning the dominant technology adoption models and extends CR's stratified ontology from this study into the broader technology adoption research landscape. It offers a structured approach for analysing and conceptualising adoption-related entities and enables a deeper and more coherent theorisation of their influences on technology adoption and use. Furthermore, by focusing on ontological stratification, it invites the re-examination of established entities and assumptions in existing technology adoption research and supports future research through domain-consistent constructs.

7.4.2 Epistemic conditions for fostering criticality

The second methodological contribution is *to promote the epistemic conditions for fostering criticality.* As an ontology for open systems, CR rejects the search for constant conjunctions and instead focuses on using critical reasoning to identify tendencies, causal powers, and generative mechanisms (Bhaskar, 2008; Danermark et al., 2019). In alignment with these tenets and in rejecting statistical regularities, a CR-informed SGT methodology creates the epistemic conditions for critical reasoning and reflexivity, and fosters deeper engagement with the complexities of the research context. By rejecting positivist research, this approach provides the conditions necessary to challenge existing assumptions, interpretations, definitions, orthodoxies, and biases within the existing technology adoption landscape.

This study also reinforces Danermark et al.'s (2019) position that a CR-informed methodology can increase theoretical sensitivity. For example, in the theme of *empathy,* as explored in Section 6.3.7, the target literature evidenced numerous

empathetic observations but a lack of theoretical sensitivity, criticality, and the tendency to locate research within conceptually closed systems meant that *empathy* was predominantly undertheorised. Notably, Amankwah et al. (2024), who investigated academics' concerns regarding VLE adoption, used empathetic findings to speculate on differences between male and female academics without recognising the broader significance of empathy on VLE adoption. However, as reported in Section 5.7 of the findings, empathy is a significant influence and represents a novel contribution to scholarship surrounding learning technology adoption. Empathy is further discussed in Section 7.3.1.

Consequently, as a contribution to scholarship, this study challenges the prevailing orthodoxy of employing the hypothetico-deductive approaches that dominate VLE-adoption research (see Table 6.2 in the substantive literature review). This study highlights the methodological contribution of a combined CR-informed SGT approach in creating the epistemic conditions required for deeper critical engagement and conceptual innovation. This approach enables TEL researchers to move beyond predictive modelling and towards more conceptually rich and theoretically grounded explanations of technology adoption.

7.4.3 Abduction, retroduction, and generative structures

The third methodological contribution is *to demonstrate the power of abduction and retroduction in identifying generative structures in learning technology adoption*. Section 2.2.4 outlined how a key tenet of this CR-informed SGT methodology is the recognition that generative structures in the *real domain* are unobservable and complex, and their existence and characteristics must be retroduced through critical reasoning from primary data and relevant literature. Consistent with Bhaskar (2008; 1998) and Danermark et al. (2019), this study applied the ontological tenets that further to entities having causal powers, these may be negated by counteracting mechanisms, constrained by absent or weak

mechanisms, and remain latent until activated under particular circumstances. This approach therefore offers the potential for a more nuanced understanding of TEL adoption than positivist research can provide.

These ontological tenets are exemplified in LTAM through constructs such as 'mindset'. While aspects of mindset, as described in Section 5.6.2, were evident in participant responses, it was the combined epistemological approach of employing SGT's coding protocol, engagement with literature, and abduction alongside CR's retroduction that helped identify Dweck's (2006) concepts of 'fixed mindset' and 'growth mindset'. CR's recognition of counteracting mechanisms allowed 'fixed mindset' to be incorporated as a limiting influence. The same theoretical sensitivity to counteracting mechanisms enabled the identification of other entities such as *software fatigue* and 'path dependence'. This outcome underscores how abduction and retroduction can surface generative mechanisms that may otherwise remain invisible, or be theoretically impossible, within descriptive or correlational approaches.

Despite evidence of weak and counteracting mechanisms appearing throughout the substantive literature review (Chapter 6), they were predominantly undertheorised. For example, in the theme *need for training* that was explored in Section 6.3.1, studies (e.g., Lavidas et al., 2022; Mafuna and Wadesango, 2016; Mouakket and Bettayeb, 2015) often stated 'insufficient awareness' (a weak causal mechanism) as inhibiting VLE adoption and use, or that 'anxiety' (a counteracting mechanism) impacted use intentions (e.g., Lavidas et al., 2022; Matarirano et al., 2020; Ndebele and Mbodila 2022). However, these were undertheorised and neither abduction nor retroduction were employed to explore them. Consequently, recommendations defaulted to generic calls for additional training.

By embracing retroduction and being sensitive to the types of generative mechanisms, this study contributes methodologically to VLE adoption scholarship by offering an approach that moves beyond empirical descriptions and towards identifying the different types of generative mechanisms that exist in

the real domain and may shape technology adoption. Furthermore, by advocating for the use of literature as a legitimate data source and promoting abduction, this study demonstrates how generative mechanisms from adjacent disciplines such as *mindset*, *path dependence,* and *followership* can be identified and integrated into technology adoption studies. Taken together, this study demonstrates that these tenets of a CR-informed SGT methodology offer a powerful means for exploring learning technology adoption even when evidence is not immediately evident in the primary data.

7.4.4 Ontological depth and emergence

The next methodological contribution is *to reconceptualise explanatory constructs as possessing ontological depth and as expressions of emergent structures*. A significant advantage of employing a CR-informed methodology is its emphasis on emergence, in which constructs in the *real domain* must be recognised as ontologically deep and complex mechanisms potentially composed of multiple layers of underlying causal structures. LTAM incorporates such structures and demonstrates that the optimal realisation of these ontologically deep mechanisms can result in strong emergence, as shown in Section 5.11, where their interactions can amplify one another's effects with the outcome being more than the sum of their parts. This emergence contrasts with much of the existing literature in which findings are typically aggregative rather than emergent. For example, Davis (1985, p.109) reported PU as contributing a standardised regression factor of 0.65 and PEU contributing 0.12 towards *attitude towards using,* an aggregative approach that overlooks the possibility that such constructs may interact in emergent ways.

Furthermore, while models such as TAM, UTAUT, and their extensions highlight that constructs such as perceptions help explain adoption and use behaviours, they lack ontological depth by presenting *perceptions* as simple, flat constructs.

In contrast, this study's methodological approach demonstrates that macro-level categories such as perceptions possess ontological depth and can be understood as emergent structures composed of multiple layers of causal mechanisms. LTAM highlights ontological depth by demonstrating that constructs, such as *perceptions,* comprise both technical and contextual perceptions, and that each of these contain further underlying constructs. This identification of ontological depth challenges methodological approaches that treat variables as flat, aggregative entities and highlights how attention to ontological depth and emergence can offer more nuanced and powerful explanations of technology adoption.

This study demonstrates how a CR-informed SGT approach fosters theoretical sensitivity, enabling researchers to recognise and remain attentive to the ontological depth of the different entities influencing VLE engagement, and to critically examine and explore their underlying conceptual dimensions. By combining SGT's iterative coding and constant comparison processes with CR's focus on ontological depth and emergence, this methodology supports the identification of explanatory mechanisms that may otherwise remain hidden. Furthermore, this methodological approach contributes to scholarship by offering a more systematic way to theorise beyond flat, aggregative structures, and supports more nuanced theorisation. Therefore, it stands as an alternative approach to the identification of monolithic categories and reductive entities commonly seen in existing adoption studies.

7.4.5 Reflexivity

The final methodological contribution is *to foreground the Morphogenetic Approach and its recognition of the importance and centrality of reflexivity*. Unlike existing models, such as TAM and UTAUT, LTAM acknowledges that individuals can actively consider context, identify and overcome constraints, and determine

how to leverage any resources or opportunities in pursuing their ultimate concerns. As discussed in Section 5.10.1, in LTAM, reflexivity functions as a core entity which mediates and shapes the characteristics of all other entities while also generating the final temporal realisation arising from their interaction.

Moreover, by presenting their models as a unidirectional process, dominant models fail to account for reciprocal effects where one variable may influence precursor variables or affect other dimensions within the same macro-level category. As explained in Section 5.10.1, LTAM accounts for bidirectional relationships such as potential interactions between *perceptions* and *attitudes*. As a contribution to scholarship, the focus on reflexivity reinforces Al-Mubireek et al.'s (2023) suggestion, identified in Section 6.3.3, that attitude can also affect perceptions and supports Findik and Özkan's (2013) findings in Section 6.3.5 that PEU both affects and is affected by *self-confidence*. Through this study's emphasis on ontological depth, LTAM further contributes to scholarship by demonstrating how different dimensions of individual categories of influence can interact and affect each other. For example, Figure 5.12 illustrates how *attitude towards technology* can affect *attitude towards the VLE* and vice versa.

As a CR-derived model employing the Morphogenetic Approach, LTAM places significant importance on, and reinforces the need to recognise individuals not as passive adopters but as reflexive agents whose decisions are shaped by complex reasoning that is influenced by context. This understanding aligns with Webster and Son (2015) who underscore the nature of reflexivity by illustrating how university teachers make situated, context-sensitive decisions about technology use based on pedagogical goals, institutional constraints, and professional judgement. LTAM recognises that individuals possess their own dynamic causal powers and that reflexivity is both personally unique and temporal.

This study further demonstrates how leveraging the Morphogenetic Approach and recognising analytic dualism and the importance of reflexivity not only enables richer explanations of the processes of academics' learning technology adoption

but also reveals how reflexivity can transform or reinforce the individual categories of influence. These morphogenetic processes are predominantly overlooked in existing technology adoption research where the different types of influence are typically treated as unidirectional and fixed rather than bidirectional and dynamic.

7.5 Summary of discussion

In summary, this study presents a set of significant and multi-faceted contributions to scholarship. LTAM as a whole makes four key contributions. Firstly, it is the first indigenous model of learning technology adoption based on educators' situated experiences and is grounded in the educational context it seeks to explain. Secondly, it responds to calls for new directions in technology adoption research and for adopters to be placed at the centre of decision-making. Thirdly, by positioning individuals' reflexivity at the centre of adoption, it is the only technology adoption model to explicitly acknowledge that adopters can actively reinforce, modify, or reshape the entities that affect their adoption behaviours. Finally, LTAM is the first technology adoption model to explicitly recognise altruistic adoption and to acknowledge that technology can be adopted for the benefit of others rather than solely for personal gain.

Related to the specific generative mechanisms that are incorporated within LTAM, this study makes further contributions to scholarship by introducing new entities into learning technology adoption while problematising or reconceptualising others. New entities include empathy, instrumental knowledge, and software fatigue, while problematised or reconceptualised entities include the need for training, perceptions, attitude, motivation, and satisfaction. In doing so, this study also introduces concepts from adjacent theories into learning technology adoption including mindset, followership, employee orientation, path dependence, transfer of learning, and exaptation. These additions and reconceptualisations both extend the available constructs for explaining learning

technology adoption and present opportunities for increased interdisciplinary research.

A third area of contributions to scholarship concerns the methodological implications for both technology adoption research and social science researchers. This study highlights the methodological strengths of a combined CR-informed SGT approach. SGT fosters critical engagement with both literature and primary research data while enhancing theoretical sensitivity, and CR fosters the epistemic and ontological foundations for developing a more coherent understanding of the underlying complex generative mechanisms and emergent structures in open systems. This study also makes a further methodological contribution to scholarship by foregrounding agency and individual reflexivity as the central construct in explaining complex decision-making processes and how individuals work towards achieving their ultimate concerns. As such, LTAM represents both a unique explanatory model and this study foregrounds a novel methodological approach in explaining academics' adoption and use of VLEs in HE.

Chapter 8: Conclusion

8.1 Overview

This final chapter draws together the key insights and contributions of the study and demonstrates its conceptual, methodological, and practical significance. It begins by revisiting my study's original objectives, summarises the key findings, before acknowledging limitations including conceptual scope and epistemological boundaries. It then highlights the contributions to knowledge followed by broader implications for policy and practice. It concludes with suggestions for future research and my final reflections on the potential of a CR-informed SGT methodology as well as how this study has fulfilled my objectives.

8.2 Contributions of the study

Driven by the question: *How do academics' personal motivations, dispositions, and situated perceptions shape their adoption and use of VLEs within a research-intensive university?* this study sought to determine the underlying personal and institutional factors influencing academics' adoption and use of VLEs in HE and generate a new explanatory model situated in current practice. My objective was achieved through the development of the Learning Technology Adoption Model (LTAM).

I justified developing a new model as no specific learning technology models existed, and that existing scholarship presents significant limitations by predominantly drawing on models designed for technology adopted for personal use, psychological theories, and theories regarding characteristics of technology and facilitating conditions. I further argued that these models and theories fail to account for engagement with technologies adopted for the benefit of both the adopter and others; the complex, dynamic nature of educational institutions

operating within open systems; or the centrality of academic agency in shaping technology use.

As established in Chapter 2, I adopted the CR-informed Morphogenetic Approach combined with SGT, a combination noted for established theoretical compatibility and its capacity to support in-depth investigations into the underlying generative structures shaping academics' VLE engagement. A particular strength of CR is its ontological commitment to a stratified reality, while its extension, the Morphogenetic Approach and its conceptualisation of analytic dualism, resonated with my observations and experience, as outlined in Section 1.2, by presenting a clear distinction between contextual conditions and agency. A further strength is that epistemologically, CR supports critical reasoning and recognises abduction, retroduction, and critical analysis as legitimate forms of knowledge production.

This integration of a CR-informed SGT methodology enabled the development of my key contribution to the body of knowledge: the Learning Technology Adoption Model (LTAM) which synthesizes the six key categories of influence into a conceptually grounded explanatory model for understanding academics' VLE engagement. Not only does LTAM explain how the six categories of influence, mediated by reflexivity, influence academics' VLE engagement, but by employing the Morphogenetic Approach, it also captures how these categories of influence can themselves be reinforced, or modified, through reflexivity.

The six categories of influence which emerged are: *knowledge and beliefs*, *perceptions, attitudes*, *empathy*, *concepts of self*, and *management and organisation*. In line with CR's stratified ontology, these are conceptualised as macro-level categories, with each consisting of separate meso-level categories and micro-level dimensions that reflect the depth and complexity of the entities influencing academics' VLE engagement.

Furthermore, and related to CR, LTAM as a whole is a model that demonstrates the concept of emergence. To illustrate, combinations of *declarative knowledge*,

procedural knowledge, *instrumental knowledge* and *knowledge of other software and systems* constitute the emergent generative structure of *technical knowledge*, while the integration of *technical knowledge*, *pedagogical knowledge*, *content knowledge*, and *situational knowledge* reflect the emergence of the broader category of influence *knowledge and beliefs*. The six categories of influence: *knowledge and beliefs*, *perceptions, attitudes*, *empathy*, *concepts of self*, and *management and organisation* together represent the emergent mechanism of LTAM. As LTAM can be considered as representing a complex emergent structure, understanding academics' VLE engagement is irreducible to these categories of influence.

A further contribution that LTAM makes to knowledge, and based on its grounding in the Morphogenetic Approach, is the recognition that entities within the six categories of influence are not static: they can be conditioned, reshaped, or reinforced through experience, social interaction, other entities, and reflexive deliberation. LTAM's inclusion of morphogenesis contrasts with the dominant models of technology adoption, such as TAM and UTAUT, which tend to conceptualise adoption as a linear or cascading process. While Al-Mubireek et al. (2023) did suggest *attitude towards using* can also reflect back on PU, and Findik and Özkan (2013) also found that PEU could affect its precursor variable of self-confidence, by being the only two examples in the literature, these reciprocal processes are clearly undertheorized. As illustrated in Section 5.6.4, participant #20 expressed an *attitude towards students* which was shaped by evolving perceptions of them and demonstrated how attitudes are not static dispositions. This dynamic further underscores temporality, provisionality, and highlights the importance of tendencies over statistical correlations within LTAM.

Finally, though its incorporation of empathy, LTAM differs from the dominant models by recognizing that learning technology is often adopted not solely for the benefit of the adopter but also for others' benefit. Despite identifying some empathetic traits in Section 6.3.7 of the substantive literature review, none of the other research I reviewed categorised empathy or investigated it further. As such

this explicit identification of empathy represents another undertheorised dimension of learning technology adoption and a key finding from this study.

In summary, LTAM has more than fulfilled my initial objective which was to identify the underlying factors explaining academics' VLE engagement. Not only does it establish how these factors are mediated to explain academics' adoption and use of VLEs in HE, but it also offers a framework with which to understand how these same factors can themselves be shaped or reinforced. LTAM represents an alternative explanatory model for learning technology adoption that offers explanatory depth and can inform both theoretical understanding and institutional strategy.

8.3 Limitations

I now consider some of the methodological limitations to this study and some conceptual and epistemological limitations of LTAM. While anticipated methodological limitations were explained in the research design and attended to through the methodological decisions as described in Section 4.8, additional limitations arose while conducting this study that will be presented before outlining LTAM's conceptual and epistemological limitations.

Firstly, an unexpected limitation that arose from employing a CR-informed SGT methodology is that the quantity and complexity of data combined with the nuances of the findings exceeded what could be fully presented within the permitted scope of this thesis. While adhering to SGT principles, certain findings, interpretative threads, and discussion themes were necessarily abridged for parsimony.

In terms of method, several limitations also arose while conducting this study. Despite efforts to foster dialogic interviews, brief and vague responses suggested that some participants still remained guarded in their responses, which echoes

Archer's (2003) observation regarding difficulties in encouraging comprehensive participant disclosure. I recognised that sustained probing, particularly into personal dispositions or institutional critique, risked interviewee disengagement or withdrawal. One example concerned a participant who preferred Teams messages over Moodle announcements partly because she enjoyed receiving student responses. While this behaviour suggested deeper PEPs than bridging alone, such as a need for validation, I judged that deeper probing could affect rapport. Consequently, at times I had to exercise caution and prioritise surface-level descriptions over deeper exploration. While this constraint did not prevent theoretical saturation, it often necessitated increased emphasis on interpretation over individuals' empirical accounts.

Furthermore, as the iterative requirements of GT necessitate ongoing analysis, reflection and an evolution to the interview protocol, the interviews were conducted over several months. This protracted interview schedule led to two potential limitations. Firstly, my understandings of the institutional landscape and the influences deepened over time. While representing an inherent feature of the methodology, it means that early-stage interviews may have lacked similar levels of theoretical sensitivity or nuance in probing as later ones, during which I became more sensitive and the questions became more nuanced. As explained in Section 4.7, I engaged in some email clarification to address these earlier shortcomings. However, certain early-stage interviews may have yielded more elaborate or deeper responses had I been better attuned to the nuance at that time. Later interviews were more sensitive and focused.

Additionally, the participants in later-stage interviews were approaching the end of term and may have been experiencing fatigue or increased marking workload that could have affected the depth or nuance of their responses. Again, while not preventing theoretical saturation, it affected the uniformity of data complexity and richness across the interviews, which then required further interpretive analysis to ensure consistent category development.

Regarding the epistemological limitations, as outlined in Section 5.1, new GT models are presented as provisional, open to ongoing analysis, revision, and extension. As Danermark et al. (2019) argue, explanatory models in CR-informed research are necessarily partial and bounded, therefore their theoretical limits must be acknowledged. These will be outlined below.

Firstly, as mentioned in Section 2.2, CR-informed research is explanatory and not predictive, so LTAM does not predict VLE engagement; it highlights the interactions, generative structures, and perceptions to offer explanatory insight into the processes that shape academics' VLE engagement. Similarly, LTAM cannot claim to offer universal explanations of technology adoption. With reflexivity as the central entity, it acknowledges the diversity of individuals and that each academic possesses a distinct combination of contexts, perspectives, experiences, identities, and priorities that, when combined, affect their VLE engagement.

A further bounded limitation to LTAM is the deliberate exclusion of affective factors on the grounds that these offer minimal explanatory power. As discussed in Section 7.3.8, although satisfaction or user satisfaction recur throughout many studies, it was omitted by predominantly functioning as an emotional response. Through a CR lens, academics use VLEs to achieve their strategic priorities, not pursue satisfaction. Similarly, LTAM also discounts other models' affective factors such as *perceived enjoyment of the VLE* from an extended TAM (Matarirano et al., 2020), *hedonic motivation* from UTAUT2 (Venkatesh et al., 2012), and *computer playfulness* and *perceived enjoyment* from TAM3 (Venkatesh and Bala, 2008). While such factors may correlate with aspects of learning technology adoption, LTAM was developed to explain VLE engagement as a learning, not recreational technology. This distinction also means that any perceptions of self must either be reconceptualised as knowledge of self or alternatively as affective factors and therefore outside the scope of the model.

An additional conceptual limitation of LTAM concerns any external factors. While this study acknowledges that academics' VLE engagement is shaped by broader institutional and social-political contexts, these lie outside LTAM's structure. LTAM focuses on academics' VLE engagement within their situated and temporal context and the mediated realisation of the generative structures within the six stratified categories of influence. As such it recognises, but does not model external shocks, policy interventions, or similar disruptions. This exclusion is not a shortcoming of LTAM but a conceptual limitation in highlighting the centrality of academics' reflexivity as the primary explanatory mechanism.

A final epistemological limitation concerns the generalisability of LTAM. I made a deliberate decision to conduct this study at a single site for the reasons presented in Section 4.3.1. The detailed description of the research setting in Sections 1.5 and 4.3.1 and my insider status, as discussed in Section 4.3.2, was highlighted when describing transferability. While LTAM offers explanatory depth within this context, it is presented as being theoretically transferrable with its generative structures open to adaptation, an aspect outlined in Section 5.1. This conceptual limitation does not diminish LTAM's explanatory power but instead reflects GT's and CR's epistemological commitment to context-sensitive explanations and the fallibility of knowledge.

Collectively, these epistemological and conceptual limitations represent theoretical boundaries rather than limitations. Presenting this distinction clearly recognises that these boundaries are intentional features of the model's design rather than weaknesses in its explanatory power and in alignment with the methodological tenets of CR and SGT, they serve to clarify LTAM's scope and explanatory intent.

8.4 Contributions to knowledge

The primary aim of this study was to develop a new explanatory model of academics' adoption and use of VLEs in HE. While the key contributions have been described across Sections 5.2 to 5.10, this section will briefly reiterate the main contributions to knowledge. The first is the key contribution of LTAM as a theoretical model followed by a summary of theoretical contributions based around the analysis of key entities in the substantive literature review and the newly theorised categories of influence in LTAM.

The development of LTAM represents the central contribution to the literature. As outlined in Sections 1.4 and 3.3, no specific models of education technology adoption nor VLE adoption were identified in the literature. LTAM specifically contributes to this gap by offering a comprehensive explanatory model that captures the complex factors influencing academics' adoption and use of VLEs in HE. Moreover, as no models were identified that explicitly account for technologies adopted for the benefit of others as well as the adopter, LTAM, through its identification of cognitive empathy, is novel in specifically recognising this aspect of technology adoption.

Furthermore, as highlighted in Sections 3.4.1 and 3.4.2, dominant technology adoption models such as TAM and UTAUT lack real explanatory depth. Their constructs are presented as self-evident without any meaningful account of what underpins or shapes these entities in practice. This tendency was clearly demonstrated by TAM's ontologically undefined 'external variables' or UTAUT's 'facilitating conditions'. This study, in adopting a CR-informed SGT methodology, provided the epistemic conditions to move beyond surface-level interpretations towards conceptual depth in the identification, redefinition, and extension of key constructs that influence VLE engagement. As detailed throughout Sections 5.4, to 5.9, LTAM achieves this depth by explicitly highlighting the macro-, meso-and micro-levels of each entity, and demonstrates the conceptual depth that the dominant models fail to provide.

The recognition of academics' reflexivity regarding VLE adoption and use represents another significant contribution that should be emphasised. Although the dominant models evolved from psychological theories, as outlined in Section 3.5 when discussing Bagozzi's (2007) critique of technology adoption models, a noted shortcoming is an absence of the psychological processes involved in decision-making and the contextual causes that shape them. LTAM addresses this gap by recognising that academics are reflexive agents capable of interpreting and navigating their contexts to pursue their ultimate concerns.

Significantly, LTAM's treatment of reflexivity not only accounts for adoption outcomes but also for the transformation or reinforcement of generative structures, an undertheorised phenomenon in the technology adoption literature. LTAM explicitly accounts for how academics reflexively shape their PEPs through evaluation and analysis of their perceptions and experiences, or how such experiences reinforce them. Consequently, as a further contribution to the literature, LTAM addresses this gap by placing reflexive individuals at the centre of the model; academics not only deliberately navigate their contexts but can shape them.

Alongside the main contribution of LTAM, there are numerous additional theoretical contributions to learning technology adoption. These are all discussed in Section 7.3 and are also summarised in Table 8.1 below.

Contribution	Description
Identify and present cognitive empathy as a distinct and significant named entity in learning technology adoption	LTAM is the first technology adoption model explicitly including empathy, specifically cognitive empathy, as a named and significant entity. Empathy differentiates between technology adopted for personal use and adopting technology to benefit others. Empathy is a coherent variable for investigating adoption behaviours across all learning technologies, obliging researchers to consider how technologies may affect others. LTAM raises awareness of empathy's relevance in education and encourages its inclusion in other research, analysis, and recommendations.

Redefine technical knowledge of the VLE	LTAM reconceptualises technical knowledge as comprising declarative, procedural, and instrumental dimensions, and knowledge of other software and systems. It reframes innovativeness by incorporating it into instrumental knowledge and decouples 'willingness to try' from innovativeness, to reposition it within attitudes towards change.
Problematise the need for training as necessary in encouraging and facilitating technology adoption	LTAM challenges prevailing assumptions that substantive additional training is necessary to increase VLE adoption and use. CR's ontological stratification distinguishes between training sessions as events in the *empirical domain* and the desired outcomes of knowledge and proficiency as entities in the *real domain*. Advocates for multi-dimensional, personalised approach to professional development by recognising that training is not always the preferred or most effective solution.
Reemphasise the importance of concepts of self particularly professional identity in learning technology adoption	LTAM emphasises the importance of the individual and maintains the distinction between agency and systems, as illustrated by distinguishing between concepts such as *self-belief* from *perceived ease of use* (PEU). LTAM highlights the importance of *professional identity* and recognises that academics may adopt or eschew technologies based on whether they support or threaten their role scope, identity, or reputational standing.
Identify *knowledge of other software and systems* as a new variable in learning technology adoption research	LTAM introduces *knowledge of other software and systems* into learning technology adoption. This incorporates Perkins and Salomon's (1992) concepts of *transfer of learning* and David's (1985) notion of *path dependence* in highlighting how prior experience can facilitate or constrain VLE adoption. LTAM also introduces *software fatigue* as a novel phenomenon where the need to maintain competence across too many platforms can lead to rejection or deliberate limitation of VLE use. This further challenges the notion that additional training will overcome adoption hesitancy.
Underscore the potential of perceptions to be analytically more significant than factual descriptions.	LTAM maintains a clear separation between agency and structure, recognising that academics' perceptions of entities can be analytically more influential in shaping VLE engagement than factual descriptions.

Highlight the ontological depth of attitude	LTAM underscores the Morphogenetic Approach's ontological foundation of PEPs and reframes *attitude* not as a monolithic concept but as a complex stratified entity situated in the *real domain*.
Problematise the roles of motivation and satisfaction in VLE adoption	LTAM challenges the necessity to include motivation as a distinct variable in VLE adoption. Satisfaction as an affective response lies outside the scope of LTAM as it is not considered a causal mechanism nor does it have sufficient explanatory power to make a meaningful contribution.

Table 8.1 *Theoretical contributions*

In summary, LTAM is a novel explanatory model of academics' adoption and use of VLEs in HE. It is unique in explicitly recognising that learning technologies are often adopted for the benefit of others rather than just the adopter. It offers explanatory depth by situating entities within a stratified ontology and explicitly highlighting the macro-, meso-, and micro-levels of each entity. Furthermore, LTAM not only accounts for adoption outcomes but also for the reinforcement or transformation of generative structures that account for adoption and use behaviours.

8.5 Implications for policy

As discussed in Section 1.3, while the dominant high-level TEL declarations, strategies, and mandates reflect laudable commitments to quality, equality, open access, and creating engaging learning environments, they tend to default to calls for quantifiable interventions such as training programs, procurement strategies, and minimum use mandates. This study responds directly to these assumptions and narratives by demonstrating that such interventions overlook the complexity of individuals' dispositions and the contextual factors that shape adoption. It

suggests that decision-makers need to consider each category of influence articulated in LTAM before drafting strategic frameworks or policies.

As further outlined in Section 1.3, these TEL publications typically promote formalised training as the primary means of driving engagement. However, my analysis suggests that defaulting to such training programs to overcome VLE adoption hesitancy or underutilisation is fundamentally flawed. As established in Section 6.3.1, training alone cannot make technology resonate with academics, nor overcome entrenched perceptions of organisational culture, professional identity, or the technology itself that can shape VLE engagement. Additionally, as discussed in Section 7.3.5, the newly identified concept of *software fatigue* cannot be overcome by training. Moreover, as highlighted in Section 5.4.4.1, many academics are self-directed learners who prefer contextual and appropriate just-in-time support over generic, formalised training, an aspect clearly articulated by several respondents and echoed in the literature (cf. Son et al., 2024). To address this issue, this study suggests that institutions must instead offer a suite of professional development options that respect academic autonomy, learning preferences, and recognise that academics often require responsive, just-in-time support when they are actively engaging with the learning technologies.

As also highlighted in Section 1.3, these high-level visions and strategies often assume they will automatically resonate with educators' needs and dispositions. These assumptions echo my initial observations, as discussed in Section 1.2 regarding the facilitation of a TPACK-informed curriculum redesign project where strategic intent ignored academics' entrenched dispositions and reflexive deliberations. This study shows that narrow strategies and policy declarations risk a lack of alignment with those they are intended to serve. Therefore, strategy and policy decisions should reflect the complex dynamic factors that shape engagement for which LTAM would be a useful model. Such an approach also aligns with Archer's (2007) position, presented in Section 2.2.7, that institutional responsiveness and attunement are necessary to prevent individuals' estrangement.

Further to the previous point, initial research into policy highlights a general lack of consideration for individuals' and institutions' perceptions and interpretations of declarations and strategies, especially as such declarations and statements will typically be mediated by context and shaped by perceptual lenses. Therefore, decision-makers must consider the power of perceptions over factual statements concerning organisational initiatives and technology implementation. Analysis and interpretations in this study found that perceptions of different dimensions, such as organisational culture, role scope, peer expectations, and the robustness or utility of the technology itself, can exert more influence than systems or policies. These findings suggest that any such TEL policies must consider not only how culture is cultivated and systems introduced and operated, but also how context is interpreted and how technology is experienced.

Extending the emphasis on perceptions, as presented in Section 5.5.2.1, this study also identified dissonance between leadership messaging and actual practice. Therefore, this thesis suggests that explicit and implicit leadership communication should reflect teaching as a core academic activity and strategic priority, with appropriate technology enhanced learning embedded meaningfully throughout the institution and not be predominantly employed as a marketing tool, or for projecting illusions of a high-tech centre of excellence. Alongside the dissonance between leadership messaging and actual practice, as described in Section 5.6.3.1, this study also noted emphasis on research output in the promotion criteria. Therefore, this thesis also suggests that the organisational culture and promotion criteria should reflect that teaching and digital competence are legitimate institutional contributions and, as such, should be embedded within promotion frameworks. This reframing of teaching and digital skills will signal that teaching holds similar status to research and will encourage sustained engagement with teaching-related activities and digitally enhanced teaching innovation.

Furthermore, as noted in Sections 1.1 and 1.3, many institutions default to minimum use policies to drive VLE engagement. However, this study suggests that

leadership should move beyond such policies by advancing additional methods to further VLE engagement. This study highlighted in Sections 5.5.2.1 and 5.5.2.3 the importance of perceptions of role profiles and the interpretations of role scope. Therefore, organisations can signal the importance of TEL to both existing and prospective academics by embedding context-sensitive digital competence and digital pedagogy into role profiles. However, as noted in Section 5.5.2.1, if institutions mandate minimum use policies, failure to equally apply them risks alienation and disengagement

Finally, as a direct result of employing a CR-informed methodology, institutions should be encouraged to identify potential counteracting mechanisms that inhibit or impede the development of exemplary teaching. These can include inconsistent teaching allocation or repeated curriculum redesigns: activities that undermine the provision of excellent courses and positive learner experiences.

8.6 Suggestions for future research

In meeting my objective of developing a new explanatory model of academics' adoption and use of VLEs in HE, reflection identified several extensions to this study, many of which were identified in Sections 7.3.1 to 7.3.6. However, there are some more substantial areas of potential research which are personally compelling.

The first area of potential research emerging from a methodological reflection involves extending the scope of the interview protocol to deliberately explore academics' perceptions of their peers' practice and dispositions towards learning technologies. Despite focusing on academics' individual experiences and insights, a theme was noticed where participants often justified their positions through unsolicited comparisons of practice. For example, participant #07's comment, as presented in Section 5.5.2.1, about other academics not adhering to

directives provided insight concerning organisational justice. Formal and systematic attention to these perspectives through questions about peers could provide more nuanced information regarding generative structures. Furthermore, they could encourage candour and avoid defensive or biased responses by allowing the participants to project their own impressions onto imagined third parties.

The second area of investigation that I find personally compelling concerns cognitive empathy. As I identified cognitive empathy as a novel causal power influencing not only VLE engagement but potentially a broader range of learning technologies, future research could investigate the conditions which give rise to cognitive empathy in academic contexts. Within a CR-perspective as a causal power, it is understood as being conditioned by generative mechanisms. Consequently, CR-informed research would seek not only to identify generative mechanisms which foster cognitive empathy but also investigate counteracting generative mechanisms that temper, constrain, or negate empathetic orientations towards students.

Additionally, regarding another causal power I identified, instrumental knowledge, a clear next step would be targeted research to identify and curate an inventory of instrumental applications used by practising academics. While the range of uses elicited in this study was comprehensive enough to determine that instrumental knowledge constitutes a micro-level dimension within LTAM, I am personally excited about identifying a larger inventory than those elicited by this study and disseminating it amongst the broader academic community. Eliciting these uses could resonate strongly with academics by being grounded in their peers' situated experiences and being used to overcome everyday challenges.

These three suggestions represent legitimate extensions to this study and offer potential for additional insight, enhanced explanatory power for LTAM, and make meaningful contributions to scholarship. They each present avenues for examining aspects of VLE adoption beyond the current study but remain

theoretically connected to LTAM's core principles. Pursuing them would allow future work to enhance the foundational aspects that LTAM offers and deepen understanding of academics' adoption and use of VLEs in HE as well as the broader learning technology adoption landscape.

8.7 Methodological reflections and implications for practice

In a research field dominated by hypothetico-deductive approaches and recombinatorial variations of TAM, it is interesting to reflect on the generative potential of a CR-informed SGT methodology, both through the collection and analysis of primary data and also the heightened theoretical sensitivity afforded though literature engagement throughout the research process. SGT provided a formal, principled, and iterative methodology to generate LTAM, while CR provided the critical lens to interpret the evidence as deeper stratified generative structures. This combination was instrumental in generating LTAM and represents a powerful methodology for future technology adoption research.

Furthermore, this study has not only fulfilled my initial objective of developing a new explanatory model of academics' adoption and use of VLEs in HE but has also realised the personal motivation that initiated this study. A significant observation shaping this study was the lack of institutional appreciation for individuals' orientations. Therefore, as a research-intensive institution committed to research-informed practice, LTAM offers both the means and opportunity for the institution to reflect on their own practices, to design strategies, and align policies with the complex and dynamic conditions that shape learning technology adoption and ensure they resonate with the academics' perceptions and contextual realities.

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Appendices

Appendix 1: Participant information

I am a PhD student at Lancaster University and I would like to invite you to take part in a research study about Academics' Adoption and Use of VLEs in HE

Please take time to read the following information carefully before confirming whether or not you wish to take part.

What is the study about?

- This study aims to investigate why different academics have different opinions, attitudes and beliefs regarding the use of computer-based learning environments, commonly known as Virtual Learning Environments (VLEs).
- While a sizable amount of research has been conducted in this area, most existing research focuses on measurable factors such as age, gender, nationality, computer experience, training, VLE features, ease of use, or infrastructure quality, etc. to try and explain different adoption and usage patterns.
- However, I believe there are additional, unexplored personal and social factors, both positive and negative which affect academics' adoption and use of VLEs, including VLE rejection which no amount of training, mandating, or additional software features will significantly influence. While some research has suggested that some 'external variables' exist there is a dearth of research in this area.

Why have I been invited?

I have approached you for one or more of the following reasons:

a) Because of your role within the university in which you are a noted advocate of the VLE and therefore have particular insights regarding your adoption and use of the VLE.
b) Because it was suggested that you were a noted innovator regarding the VLE, have embraced it in your teaching and therefore have unique insights regarding this type of VLE adoption and use.
c) Because you have a specific role at the university and as such have valuable insights other academics may not possess.
d) Because you are a new academic and have only more recently started to become familiar with the VLE as a teaching tool. I believe you have insights particular to new academics who are trying to learn how incorporate a VLE in their practice.
e) Because it was suggested that you have identified fundamental issues or flaws regarding the adoption and use of the VLE and could provide insights that other academics are unaware of.
f) Because it was suggested that you have a particular dislike of the VLE and oppose its use. I believe this is a perspective which is often ignored and I would like to understand it in more detail and believe it could make a significant contribution to the field of academics' adoption and use of VLEs

g) Because it was suggested that you may have a particularly unique or nuanced view of the VLE and would be able to provide insights into its adoption and use from this perspective.

Therefore, I would be very grateful if you would agree to take part in this study.

What will I be asked to do if I take part?

If you decided to take part, this would involve me interviewing you using a semi-structured interview protocol. I will start by asking you some basic questions about your VLE use and what you expect students to do when using the VLE. Then, depending on your responses I will ask further questions exploring some reasons which might influence why you envisage VLE being used in these ways. If you avoid VLE use, either partially or completely, I would like to explore reasons for this too.

I anticipate it will take no more than an hour to complete. However, if you have particular insights you would like to share and this requires more time then I am happy to extend the interview. This interview will be recorded and transcribed. I will then analyse your responses and compare them to other participants' responses to see if I can identify any commonalities and patterns which can inform any new theory.

If, I discover any themes from later interviews which we didn't explore at the time but I feel you might have relevant insight or opinions then I would like to request a brief subsequent interview to understand your views although you are under no obligation to do so. Additionally, once I have finished analysing your responses I may ask you to clarify any of my interpretations to make sure your views are not misrepresented. If I intend to include any verbatim quotes in my thesis I will seek your agreement that you are not identifiable from the quotation.

What are the possible benefits from taking part?

Most research in this area is based around the testing of researchers' hypotheses regarding easily measurable factors I have previously mentioned such as age, gender, nationality, computer experience, training, or VLE features. These simple hypotheses include themes such as 'Academics are more receptive to VLEs with a wider range of features than a VLE with fewer features.' Consequently, this type of research can lead to conclusions such as 'Universities must get the VLE with the most features as more academics will use it.'

There is also a lack of research which has actually tried to find out directly from academics what their thoughts and opinions are. I therefore consider this kind of research valuable and hope that any findings may help decision-makers arrive at more informed decisions based on the actual views of the academics which can help them avoid 'intuitive' best guesses or make flawed conclusions.

Do I have to take part?

No. It's completely up to you to decide whether or not you take part. Your participation is entirely voluntary. As part of this information pack I am required to declare that declining to participate will have no potential negative consequences.

What if I change my mind?

If you change your mind, you are free to withdraw at any time during your participation in this study and up to two weeks after the interview. If you want to withdraw, please let me know, and I will remove any data or information you contributed to the study and destroy them.

However, please understand that it is difficult and often impossible to completely remove your influence particularly if the insights you have provided are used to inform subsequent interviews or my analysis of other participants' transcripts. This will also be the case if I have made summary conclusions based on data from multiple interviews.

As noted in the consent form, all data storage will comply with GDPR and you can request partial or complete deletion of any data at any time.

What are the possible disadvantages and risks of taking part?

I do not anticipate any risks associated with your participation above and beyond any encountered during a normal day. As noted earlier, it will require approximately an hour out of your time.

Will my data be identifiable?

After the interview, only I, the researcher conducting this study will have access to the ideas you share with me and I will be transcribing the interviews myself. As this is for a PhD, access may be required by my supervisor and the internal or external examiners. I will keep all personal information about you (e.g. your name and other information about you that can identify you) confidential, meaning I will not share it with others.

I will remove any personal information from the written record of your contribution. Although summary content will be used in my PhD and potential publications and presentations, and direct quotations may be used, I will take all reasonable steps to protect your anonymity and that of the other participants involved in this project.

How will we use the information you have shared with us and what will happen to the results of the research study?

I will use the information you have shared with me only in the following ways:

I will use it for academic purposes only. This will include my PhD thesis and potentially other publications, for example journal articles. I may also present the results of my study at academic conferences including conferences and workshops at this university.

When writing up the findings from this study, I will amalgamate your insights with similar views of other participants and present this as summary findings within my research. Additionally, I may wish to reproduce select quotes to substantiate these findings. In this case I will only use anonymised quotes so that although I will use your exact words all reasonable steps will be taken to protect your anonymity. Furthermore, if I feel any information or turns of phrase with the quotes could potentially lead to your identification I will seek your approval before including them.

Are there any risks associated with my participation?

While I anticipate there will be no risks associated with your participation, please note that I will be asking you to explore any underlying personal beliefs, attitudes, feelings or influences regarding VLE use in teaching and learning. If you feel uncomfortable sharing these insights then please tell me and request that we move on.

How my data will be stored

Your data will be stored in encrypted files (that is no-one other than me, the researcher will be able to access them) and on password-protected cloud storage. This storage is protected by two-factor authentication meaning a code will be sent to my mobile phone before access is granted. I will not be keeping any hard copies of any data. In accordance with University guidelines, I will keep the data securely for a minimum of ten years although GDPR legislation allows you to request its complete or partial deletion.

What if I have a question or concern?

If you have any queries or if you are unhappy with anything that happens concerning your participation in the study, please contact me using my university email address n.rea1@lancaster.ac.uk. You may also contact my supervisor, Brett Bligh either by email, b.bligh@lancaster.ac.uk or by post Dr. Brett Bligh, Department of Educational Research, County South, Lancaster University, Lancaster, LA1 4YD

If you have any concerns or complaints that you wish to discuss with a person who is not directly involved in the research, in the first instance please contact the Head of Department, Paul Ashwin, paul.ashwin@lancaster.ac.uk

This study has been reviewed and approved by the Faculty of Arts and Social Sciences and Lancaster Management School's Research Ethics Committee.

Appendix 2: Participant consent form

CONSENT FORM

Project Title: Academics' Adoption and Use of VLE's in HE
Name of Researchers: Nicholas Rea
Email: n.rea1@lancaster.ac.uk

Although we do not anticipate any risks associated with your participation, UK institutions require that the researcher has the participant's informed consent before continuing. Please read the following consent form and tick each box.

1. I confirm that I have read and understand the participant information sheet for this study. I have had the opportunity to consider the information, ask questions and have had any questions satisfactorily answered. I understand that I may contact the researcher in the future with any further questions.	☐
2. I understand that my participation is voluntary and that I expect no reward for participating.	☐
3. I understand that I can withdraw from the research project up to, during, and for a maximum of two weeks after the interview without giving any reason and my data will be removed.	☐
4. I understand that if I withdraw the researcher will try to disregard my views but my responses may have influenced subsquent interviews or analysis of other data. I am aware that in such a case complete withdrawal may not be possible.	☐
5. I understand that this research is confidential and neither my identity or information which could reveal my identify will be disclosed.	☐
6. I understand that my name/my organisation's name will not appear in any reports, articles or presentations and reasonable steps will be taken to ensure no such identities can be determined from any content.	☐
7. I understand that the interview will be recorded and transcribed for analysis. All data will be encrypted and kept secure. Only the researcher, as the sole investigator will have access to this although access may be required by the researcher's PhD supervisor or examiners.	☐
8. I understand that summary content as well as some direct quotations from this interview may be published and disseminated in the researcher's PhD thesis and possible subsequent academic publications and articles. I understand that no personal information will be included, and all reasonable steps will be taken to protect my anonymity.	☐

9. I understand that data will be kept according to Lancaster University guidelines for a minimum of 10 years after the end of the study.	☐
10. I understand that under GDPR legislation I can request access to both the recording and transcript and may request its complete or partial deletion at any time.	☐
11. I agree to take part in the above study.	☐

_____ _____ _____

Name of Participant Date Signature

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher /person taking the consent  **Date** _____ Day/month/year

One copy of this form will be given to the participant and the original kept in the files of the researcher at Lancaster University