Creating the eDesign Assessment Tool (eDAT) to Represent and Evaluate Online Distance Learning Designs: A Mixed Methods Study

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Abstract

There are concerns that retention is lower in ODL (online distance learning) than in face-to-face courses and that this has a negative impact on both student and institution. Learning design has been shown to have an impact on retention, but a tool for a variety of developers, designers and tutors to consistently describe and compare learning designs of ODL courses remains elusive. This study argues that the lack of a common terminology and different tutor perspectives about learning hamper both development and representation of ODL designs.

Existing research suggests that a complex mixture of student demographics, characteristics and skills, as well as course and institution features including level, subject and amount and type of tutor support may impact on ODL student retention. In particular, research suggests that activities that include interaction and feedback in ODL have a positive impact on retention. However, much of this research has been conducted using a range of student surveys that do not allow for comparison to retention data, or across courses or institutions due to their subjective nature. There has been little research on the impact of tutor perspectives on developing, representing and sharing learning designs.

This study examines the creation of the e-Design Assessment Tool (eDAT) that represents and quantifies interaction and feedback activities so they can be compared to retention and other learning data for a course. A mixed methods approach was used to:

a) test the effectiveness of existing terminology for categorising learning activities using a content analysis methodology by trialling sets of terms with a sample set of ODL course activities.

b) identify tutor perspectives about learning and teaching using repertory grids based on personal construct psychology, and exploring the impact of these perspectives on the different meanings and uses of learning activity terminology.

The content analysis testing of learning activity terminology was challenging. The pilot studies had low inter-rater reliability, suggesting difficulties in independent rating of existing learning design terminology. However, the final eDAT tool created through data collected for this study used terms that did lead to a greater level of inter-rater reliability.

A significant contribution of this study is the use of repertory grids to gain insight into the issues relating to the development of a quantitative tool. The repertory grid interviews indicated that there were significant differences in the ways tutors and raters understood and used key educational concepts including interaction and feedback, and that there was a variety

of vocabulary used when describing learning activities. This study argues that tutor perspectives impact on designing, representing and evaluating ODL courses in a way that has implications for learning design and for professional development of tutors.

The final eDAT builds on and develops existing learning design representation and evaluation tools, but utilises more consistent terminology. Thus it offers a simplified approach to pedagogic guidance in the form of quantification of interaction and feedback activities in a course, and embeds reflection on tutor perspectives underpinning the design to support sharing and reuse. This combination will lead to better ways to represent learning designs, as well as providing a method for gathering learning analytics data useful for the comparison of learning designs to student retention data and thereby improve practice in ODL.

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List of Abbreviations

CAL: Computer-assisted Learning

CSCL: Computer-supported Collaborative Learning

CHAT: Cultural Historical Activity Theory

DL: Distance Learning

eDAT: e-Design Assessment Tool

HEA: Higher Education Academy

IRR: Inter-rater reliability

JISC: Joint Information Systems Committee

MOOC: Massive Open Online Course

ODL: Online Distance Learning

PCP: Personal Construct Psychology (sometimes called PCT)

PCT: Personal Construct Theory (sometimes called PCP)

VLE: Virtual Learning Environment

CHAPTER 1: INTRODUCTION TO REPRESENTING AND EVALUATING ONLINE DISTANCE LEARNING

'*England and America are two countries separated by the same language'*,

(George Bernard Shaw).

Laurillard argues that it is an educational imperative to develop ways to represent learning designs so that they can provide feedback to the tutor about their effectiveness (Laurillard, 2012). However, the lack of a common vocabulary and different ways that tutors think about and talk about learning hampers development of representations.

This study aims to create an effective tool, the e-Design Assessment Tool (eDAT), to categorise and represent learning designs to improve online distance learning (ODL). The eDAT provides information to the tutor about the impact of key learning activities on retention to enable evaluation and to improve practice. The impact of tutor perspectives on the use of key activities in ODL is explored and the study makes recommendations for professional development activities that focus on tutor perspectives to enable effective sharing of learning designs.

In this chapter, section 1.2 discusses concerns about ODL retention in higher education and section 1.3 states the aims and objectives of the study and how this study will improve ODL practice. An outline of the mixed methods methodology used in this study is in section 1.4 and a discussion of current approaches to professional development for ODL design and delivery is in section 1.5. Section 1.6 includes an introduction to the main themes that emerged during this study and a guide to the content of each of the subsequent chapters is in section 1.7.

1.2 Introduction to online distance learning

Digital technology has transformed learning. It offers ways to improve teaching, but concerns have been raised about its impact on student learning. It enables access to rich multimedia and interactive resources, and a variety of ways to communicate and collaborate. It has enabled flexible learning, and for learning to be accessed from a range of devices in a range of locations (Conole, 2017). It has transformed distance learning from paper-based correspondence

courses to include an array of online courses with learning designs incorporating multimedia, live web-conferences, international group collaborative projects and peer-to-peer interactivities. The New Media Consortium report states that "Online, mobile, and blended learning are foregone conclusions" in Higher Education (Adams Becker *et al.*, 2017, p.2). Many higher education students are now combining face-to-face learning with distance courses. Six million US students took at least one online course as part of their degree, which represented approximately 30% of all students in 2015 (Allen and Seaman, 2017). In the UK, 10% of all students in 2012/13 were distance learners (Garrett, 2015). Furthermore, the University of Edinburgh, building on its expertise in delivering Massive Open Online Courses (MOOCs), aims to include at least one fully online course in every undergraduate programme by 2025 (Haywood, 2016).

ODL has its critics, however. There are concerns that in the UK, distance learning is a "cottage industry" developed by a few individuals in isolated departments, and does not always offer the rich interactive experience that technology can (Lentell, 2012, p.24). Instructors do not always use quality course features including synchronous activities or course projects (Lenert and Janes, 2017). Retention rates for students on ODL courses are often lower than for students on face-to-face programmes, for example, the UK Open University retention rate was 22% in 2010 and this has been shown to have a negative effect on both the student experience and the institution (Simpson, 2010).

The literature reviewed in Chapter 2 and Appendix 1 illustrates a variety of complex reasons for lower retention, including student demographics, characteristics and IT skills, as well as course and institutional features including level, subject, amount and type of tutor support. The study of distance learning retention is made difficult due to the variety of ways retention is calculated and differences in the way that distance learning is itself defined. There is no common terminology and no agreed way to represent ODL learning activities. This makes comparing or evaluating learning designs difficult. Also, there is also a lack of comparable data between institutions in the UK (Garrett, 2015).

The literature reviewed in Chapter 2 and Appendix 1 also suggests that levels of interaction and feedback activities in a course have a positive impact on retention (Hattie, 2003; Croxton, 2014). However, these are difficult to measure and researchers have used a range of student surveys that make comparisons across courses and institutions difficult (for example, Boston *et al.*, 2011). What is missing is a "feedback loop: the built-in evaluation of designs" (Mor *et al.*, 2015, p.224). This would enable exploration of the specific impact that ODL designs have on

students' learning, and make possible recommendations for effective learning activities to enhance student learning and retention. To achieve this it is necessary to "develop a more widely used language or framework for sharing Learning Designs" (Dalziel *et al.*, 2016, p.260), but so far, the development of a learning design "educational notation" has not been realised (Dalziel, 2015, p.4). Some researchers have attempted this by mapping taxonomies of learning activity types to courses, but this has been problematic. For example, an instrument, the AMP (Assessing MOOC Pedagogies), was developed to characterize MOOC pedagogies used broad categories of pedagogic types but these were difficult to identify independently (Swan *et al.*, 2015). Laurillard's (2012) learning activity taxonomy was used to organise a large number of ODL courses into broad types but the mapping of activities to the taxonomy proved difficult to do objectively (Rienties *et al.*, 2015). Analysis of a number of US community college online courses used a rubric for raters to score each of four key elements against a three-point scale and similarly had difficulty in gaining agreement among the raters (Jaggars and Xu, 2016).

High retention rates on ODL are often used as a measure of overall quality of the course (Lenert and Janes, 2017). However, there are other reasons why students leave a course early that are not related to course quality (Woodley, 2004). In addition, differences in retention terminology and disparate ways of measuring and sharing data suggest caution in over-reliance on retention rates. A combination of retention, satisfaction, attainment and other data in a learning analytics framework using 'big data' can provide tutor feedback on the learning design (Bakharia *et al.*, 2016).

In this study, the actual learning activities and student tasks that the tutor has presented to students in the VLE are investigated as 'what the student does' is significant for their learning (Biggs and Tang, 2011). A learning activity can be defined as: "an interaction between a learner and an environment (optionally involving other learners, practitioners, resources, tools and services) to achieve a planned learning outcome" (Beetham, 2004, p.7). The learning activities are thus an expression of pedagogy, the tutor's guidance to the student about how to learn. The focus is then on teaching that has learning as its goal (Beetham and Sharpe, 2013) as expressed in the VLE. It is noted, however, that online learners "seldom do exactly as expected" (Sun, 2016, p.350), and there may be communication and feedback activities that do not appear in the VLE (Piña and Bohn, 2014).

1.3 Aims and objectives

To address retention rates for ODL by improving representation and evaluation of learning design this study aimed:

1. *To create the eDAT to improve quality and retention rates of ODL courses by quantifying and representing key elements of learning designs.*
2. *To develop a fuller understanding of the impact of perspectives about learning that designers and tutors employ to develop online learning activities.*

The objectives are:

a) *To review factors that impact on ODL retention with a focus on learning design*
b) *To review personal construct psychology (PCP) and the impact of tutor perspectives on teaching and learning*
c) *To review a range of learning theories used to develop ODL courses and establish a set of key learning activities.*
d) *To develop and improve the eDAT by testing with a range of raters to measure key elements of the learning design of a sample of ODL courses.*
e) *To identify a range of tutor perspectives and consider the impact these perspectives have on designing, categorising, evaluating and sharing learning designs*

1.4 Introduction to mixed methods methodology

Online learning and distance learning necessarily involve inter-disciplinary research (Conole, 2017). In the present study, content analysis and repertory grids were identified as two methods to analyse ODL designs. The results from these methods were combined in the mixed methods approach. The first method was the systematic use of content analysis to compare the effectiveness of different types of terminology to describe learning activities. The most effective terminology would then be used in the e-Design Assessment Tool (eDAT) to enable tutors, learning designers and researchers to easily categorise and describe ODL learning designs. Content analysis is a systematic approach and has been used in online learning research, for example to analyse content of discussion forums (Dubuclet *et al.*, 2015). In the current study content analysis was used by independent raters (a small group of academic staff) to 'rate' or categorise a set of learning activities using the eDAT. The second method of data collection used specifically constructivist methodology i.e. repertory grids derived from Kelly's (1963) PCP. This was used to explore the terminology and teaching perspectives used by different tutors.

The eDAT can thus be used in a way that does more than measure ODL activities. It enables reflection on the impact of designers and tutors' perspectives when creating and evaluating online learning activities.

1.5 Introduction to online distance learning professional development

This study aims to improve the quality of ODL by supporting learning designers and tutors in designing and evaluating their online learning activities. The roots of this study lie in the researcher's work as an e-learning specialist at a UK university, advising on Best Practice

Models for eLearning. Academic colleagues often requested evidence to justify the use of new technology and to develop their practice. However, research produced by the JISC [1] and the HEA [2] included mainly supportive case-studies but little evidence from experimental studies (Kirkwood and Price, 2013). In addition, professional development activities for staff to improve online teaching skills is often delivered in a traditional, transmissive model. There seems to be a:

> dissonance between the philosophical underpinnings expected of good teaching and learning and the philosophical underpinnings of how universities attempt to encourage and enable good teaching and learning, especially in e- learning.
>
> (Jones, 2011, no pagination)

It is suggested that,

> if students learn best with hands-on, authentic learning, would it not make sense then to assume that teachers also learn best when the process is hands-on, interactive and authentic?
>
> (Gunter and Reeves, 2016, p.3)

The approach to professional development taken by the researcher was a community of practice (Wenger, 2006) that involved academic colleagues sharing, contributing and developing a range of models for best practice in online teaching and learning (Walmsley and Yorke, 2010). This has similarities with other reflective, constructivist approaches, for example, rhizomatic models (McIntyre, 2012) and the use of teacher-developed case studies (Thomas, 2013).

In addition, a 'design thinking' approach to creating, sharing and reflecting on learning designs can include the use of creative activities, experiments, soliciting feedback and re-designing (Sharples *et al.*, 2016). These are practical and pragmatic approaches (Barab and Squire, 2004). This can be combined with a 'learning design' approach which gives the opportunity to offer guidance, representation and sharing of ideas for effective activities between educators (Dalziel, Conole, *et al.*, 2016) as is the case in the current study. This 'design for learning' approach is useful as it focusses on student activity, improves planning, incorporates data and

[1] Joint Information Systems Committee www.jisc.ac.uk
[2] Higher Education Academy www.heacademy.ac.uk

leads to the development of artefacts that may mean something to the final user (Goodyear, 2015).

As a result of data gathered, this study highlights the impact of tutor perspectives on their design decisions. It proposes an approach to professional development that integrates tutor perspective, design thinking, learning design and learning analytic data. It is intended that this combination will aid effective professional development and increase the quality of learning designs. This approach provides the "feedback loop" (Mor *et al.*, 2015, p.224) required to enable tutors to develop learning designs in a 'Learning Design studio' approach (Mor and Mogilevsky, 2013) and in collaborative curriculum design processes (Voogt *et al.*, 2011). In doing so it makes a significant contribution to the research and available literature on ODL professional development.

1.6 Overview of themes

In the course of this study, three themes emerged that have implications for practice: the importance of differences in terminology for communication of key educational concepts; the significance of interaction and feedback activities in online learning; and the impact of tutor perspectives when creating, describing, sharing and re-using learning activities.

1.6.1 Communication

Content analysis highlighted differences in the language used to write learning activities, and differences in the way they were interpreted. Repertory grid interviews illustrated the variance in terminology use and underlying meanings. It is also noted that some poorly defined research terms and a variety of terminology usage exists in some social science textbooks (Hammersley, 2016). This study therefore includes definitions of all terms used sourced from educational dictionaries (Wallace, 2009; Gillies, 2015), social science dictionaries (Jupp, 2006), textbooks where available and the OED if no other suitable definition was available. The conclusion discusses the extent to which issues with terminology were indicative of differences, not just in vocabulary, but of different underlying personal meanings for participants in this study.

1.6.2 Interaction and feedback

Interaction has been a significant theme in the distance learning research field (Zawacki-Richter and Naidu, 2016) and research supports the use of interaction in online learning. Most learning theories highlight the value of both interaction and feedback activities. However, there are differences in definition, and they are difficult to measure. Therefore, tutors are not able to get accurate information about effectiveness of learning designs that incorporate

interaction and feedback. This study focussed on these key aspects of learning to enable analysis and evaluation.

1.6.3 Tutor perspectives

The impact of tutor perspectives on teaching and learning are highlighted in this study. These influence the writing of learning activities, the interpretation of those activities and the inclination to reuse another tutor's learning activities. The literature review in Chapter 2 includes a discussion of the impact that student beliefs and constructs have on their online behaviour and perceptions of learning activities.

A reflexive commentary is included in Chapter 6 (see page 134), to highlight significant areas of the impact of the researcher's own perspectives and philosophical approach on the methodologies chosen and interpretation of results.

1.7 Structure of study

This section includes an overview of each chapter and comments on their contribution to the aims and objectives.

Chapter 2: Literature review: online distance learning retention, learning design and tutor perspectives

The literature review is in three sections that together highlight the need for ways to describe and quantify learning activities to improve ODL. The first section in Appendix 1 (page 153) is a review of factors impacting on retention in ODL with a focus on course design undertaken at the beginning of the study. The second section (2.2) is an updated version of section 1 with further examples of learning design representations in section 2.3. The third section (2.4) is a literature review examining the impact of tutor perspectives on teaching practice. The research questions that follow from the literature review are in section 2.5.

Chapter 3: Theoretical approaches to online distance learning and personal construct psychology

This chapter discusses a range of learning theories used to develop ODL and considers how PCP offers a way to understand the impact of tutors' perspectives on learning. Section 3.2 considers the very concept of theory, how it can be understood and its relation to methodology. Section 3.3 focusses on underpinning theories that attempt to explain or understand learning in general, and more specifically ODL. In section 3.4 PCP is specifically considered as an approach to understanding tutor perspectives on effective teaching and learning.

Chapter 4: Mixed methods methodology

This chapter outlines the rationale for the mixed methods approach and begins with a short summary of the methodology used in section 4.2. A discussion of positivism is undertaken in section 4.6 which explains how it supports the content analysis method. Interpretivism is discussed in section 4.7 which explains how it supports the repertory grid method. In sections 4.8 and 4.9, the case for a critical, pragmatic, mixed method approach that combines both postpositivism and interpretivism is made. A review of the ways that care has been taken to conduct an ethical study is in section 4.10.

Chapter 5: Design of content analysis and repertory grid methods

This chapter describes in detail the design of each phase of the study and how each of the methods were used. Section 5.2 describes phase one and details of the content analysis conducted to examine the effectiveness of different terminology to describe learning activities. A description is given of the two eDAT pilot studies and the final eDAT, and includes clarification of the methodology used to ensure objectivity and validity. Section 5.3 describes phase two and includes a detailed description of the repertory grid methodology and the technique for elicitation of constructs from the participants to explore tutor perspectives.

Chapter 6: Findings, analysis and application of the eDAT

This chapter presents the findings from each phase of the study and compares the results. Section 6.2 includes the learning activity content analysis and IRR results, section 6.3 includes the tutor persectives and repertory grid content data, a combined discussion of the results is in section 6.4. This leads to a final version of the eDAT presented with examples of its application in practice in section 6.5. A consideration of the researcher's own perspectives and how these have both been changed by, and impacted on the study is in section 6.6.

Chapter 7: Conclusion: Using the eDAT to represent, evaluate and develop online distance learning

The concluding chapter considers how the eDAT contributes to knowledge. Section 7.1 highlights the main findings and 7.2 reviews the extent to which research questions of the study have been addressed. The approaches to theory and the mixed methods approach are evaluated in sections 7.3 and 7.4. Section 7.5 reviews themes and implications for practice that have emerged through the study, and section 7.6 considers some limitations of the study. A set of recommendations for using the eDAT to improve ODL professional development, develop other learning design tools and use data to evaluate effective ODL designs are proposed in section 7.7. Some final remarks concude the study in section 7.8.

CHAPTER 2: LITERATURE REVIEW: ONLINE DISTANCE LEARNING RETENTION, LEARNING DESIGN AND TUTOR PERSPECTIVES

2.1 Overview

A wide range of overlapping factors are associated with ODL retention including student demographics, motivation, course level and design features. However, the demographic studies are inconclusive and specific course design features are not easy to measure, nor is it easy to assess their impact on retention. This literature review is in three sections. Section 1 (in Appendix 1 page 153) is a review of factors impacting on ODL retention with a focus on course design that was undertaken at the beginning of the study that should be read at this point[3]. Section 2 is an updated version of section 1 completed more recently to include contemporary literature and is below. Section 3 below, is a literature review of the impact of tutor perspectives on practice. Together, the literature reviews aim to achieve objectives *a* and *b* of the study as stated in Chapter 1:

a. *To review factors that impact on ODL retention with a focus on learning design*
b. *To review PCP and the impact of tutor perspectives on teaching and learning*

The literature reviews include a variety of different terms for ODL and retention and Appendix 1a (page 177) includes a list of search terms used. In this study, ODL refers to any course where most of the teaching is delivered remotely via an online learning management system (e.g. Blackboard or Moodle) and retention is used to refer to the percentage of students who complete their final assessment in the programme, module or course.

2.2 Factors impacting on online distance learning retention

2.2.1 Impact of student factors

This section of the literature review explored the impact of age, gender, prior academic qualification, course level and previous experience of online learning on retention. Some recent examples include a study of STEM[4] subjects in community colleges that reviewed previous success on an online course and students' academic attainment, and found that this was an important predictor of future completion of online courses (Hachey *et al.*, 2015). A

[3] The university regulations for the EdD stipulated that an initial literature review be submitted for assessment prior to the start of the main study. Regulations do not permit the inclusion of the review in the main body of the study but require it to be added as an appendix. Accordingly, it is added in Appendix 1 and it is recommended that it be read at this point.
[4] Science, Technology, Engineering and Mathematics

study of online nursing students found that full time students under 40 were more likely to be retained on a course (Knestrick *et al.*, 2016), which contrasts with the study of online STEM classroom courses at community colleges which found that older students had a much greater persistence rate (Wladis *et al.*, 2015). A US study of courses that were part of the degree major had higher success rates than elective courses, and higher-level courses retained more students than lower-level courses (Wladis *et al.*, 2017).

2.2.2 Impact of course level and design

Features of online course design can impact on retention. For example, the required completion of an online course orientation with a variety of online activities increased student retention and satisfaction with their subsequent course (Glazer and Murphy, 2015). It was found that the length of time between assignment submissions impacted on retention (Lim, 2016) and similarly, the regularity of student activity was correlated with success in MOOCs (Brooks *et al.*, 2015). The factors that lead to student retention and completion on a course are complex as illustrated by a study that analysed the reflective videos that students were required to produce as part of their coursework. The analysis found a number of themes linked to retention and suggested that the

> most important factors for online programs to improve retention are to link coursework to student practice, help students acquire specific skills, and help students see the value of their learning.
>
> (Yang *et al.*, 2017, p.33)

Thus, there are many course design features that impact retention, and the discussion below focusses on interaction and feedback activities as these appear to have a significant impact (see Appendix 1 pages 162 and 165).

2.2.3 Impact of interaction

Interaction in ODL takes many forms and is defined in several ways. In this study, it is taken to be learning activities including discussion, debate and comments between tutors, students and peers, using a variety of tools. The term 'social presence' is used in the context of the Community of Inquiry (COI) model (discussed on page 169) and this also incorporates the concept of interaction. The literature review on page 165 includes several examples illustrating the impact of online interaction on student satisfaction, attainment and retention, but inconsistencies in the research indicate that more detailed studies are required. For example, a study using a survey of interaction types found that students interact more with content than

with instructors or other students, and whilst learner-instructor interaction contributed highly to student satisfaction, it was not correlated to attainment (Ekwunife-Orakwue and Teng, 2014).

A large study of 151 online distance learning modules calculated the time that students were expected to spend on 'communication' activities by estimating this from the learning activity description (Rienties and Toetenel, 2016). Their analysis suggested that time spent on communication activities was the primary predictor for academic retention. A study of learner-learner interaction found that students' attainment and satisfaction increased when working with their peers online (Kurucay and Inan, 2017). However, interactions do not always have a positive effect. For example, a survey of Korean online students found that Learner-Instructor interactions were associated with higher intention to persist, but Learner-Learner interactions were negatively associated with intention to persist. The authors suggested that this was related to difficulties visually impaired students had with online interactions with less-impaired students (Oh and Lee, 2016). Rather than analysing the amount of interaction, that is, how many times in total students posted, a study used data from the learning management system to show that the frequency and consistency of interaction over time was most closely associated with retention on the online course (Shelton *et al.*, 2017). Thistoll and Yates (2016) suggest that interaction can increase student retention by being a "bridge between the theoretical and practical aspects of the course content" and by making course material more personally relevant to them (Thistoll and Yates 2016, p.190).

The quality of interaction activity is significant and good quality discussion forum learning activities are clear, structured, scaffolded and focus on the cognitive nature of questioning (Akin and Neal, 2007; Salmon, 2004). Design patterns provide examples of effective collaborative discussion activity designs (Liyanagunawardena *et al.*, 2015). In addition, interaction activities should include less formal opportunities for "spontaneous and unintentional – trustworthy – communication" to build social presence and enable collaboration (Jaber and Kennedy, 2017, p.227). Student motivation to participate in online discussions can be increased by the use of small groups, a participation grade and by focussing the discussion on the application of learning (Lee and Martin, 2017).

Each of these studies used different methodologies, identified and quantified interaction differently, so making comparisons between the studies difficult. Bernard *et al.,* note that whilst interaction increases retention, many of the studies in their review focus on the course design or tutor's intention rather than on the actual interaction in the course which may be

rather different (Bernard *et al.*, 2009). The use of learning analytics offers an opportunity to combine course design information and data on actual interactions, but an agreed pedagogic format for describing and quantifying interaction activities is still needed (Corrin *et al.*, 2015).

2.2.4 Impact of feedback

Assessment and feedback occur in many different types in ODL including formative individual and group comments, provision of model answers and summative assignments. The literature review in Appendix 1 (page 162) notes their impact on retention. More recent studies confirm the effect, for example, of regular feedback and responses to student postings as highlighted by Stott (2016). This suggests that low levels of student engagement and satisfaction may be the result of a lack of tutor feedback. A cross-unit diagnostic that gave feedback to online learners from different learning units had a positive effect on retention (Lin *et al.*, 2014). Bonk and Khoo's review of the literature highlighted, amongst other factors, the negative impact of a "lack of personal and immediate feedback on coursework" on online retention (Bonk and Khoo, 2014, p.25). A systematic review of the impact of peer-assessment in online learning indicated "that the use of peer assessment approaches improves performance of students in learning environments in over 60% of the evaluated articles" (Tenório *et al.*, 2016, p.103). However, there are differences in student perceptions of peer and tutor feedback related to gender and international status (McCarthy, 2017). Assessment can also provide feedback to tutors about their students' learning and, potentially, feedback on the learning design itself (Laurillard, 2012; Hattie and Yates, 2014). The quality of the feedback is also significant, and Nicol developed a set of principles for good feedback that supports students in becoming self-regulated learners (Nicol and Macfarlane-Dick, 2006) which in turn can impact on retention (see Appendix 1 page 164).

Although interaction and feedback are treated separately in the discussion above, they are inherently linked. A tutor giving feedback to learners is a form of interaction in itself, and interactions with learners provides feedback to the tutor on how learners are progressing (Hatzipanagos and Warburton, 2009).

2.3 Learning Design

The impact of course design on retention can be investigated using the Learning Design Conceptual Framework developed as part of the Larnaca Declaration (Dalziel *et al.*, 2013). Learning Design:

> seeks to develop a descriptive framework for teaching and learning activities ("educational notation"), and to explore how this framework can assist educators to share and adopt great teaching ideas.
>
> (Dalziel, Conole, et al., 2016, p.5)

There are different definitions for learning design (see also page 174) and to clarify the different uses of the term, Dobozy suggests the following definitions:

1. Learning Design (Capitalised) – the *concept* (LD-1)
2. Learning design – the *process* of creating lessons, learning sequences etc. (LD-2)
3. Learning design – a specific *product* or instance of a learning design, a representation (LD-3)

(adapted from Dobozy, 2011, p.2, italics added)

This provides a useful nomenclature and will be used in this study to clarify the different uses of the term.

2.3.1 Learning Design as concept

The tutor is a learning designer in the 'design science' sense in which they continuously improve their practice, use principles to test improvements and collaborate with others (Laurillard, 2012). There are several guides to Learning Design that aim to support the practitioner when designing for learning and a selection are discussed below. There are still differences in terminology, with Learning Design, Design for Learning and Design Science all being used to describe similar activities (Laurillard, 2012). Most approaches focus on the learning design prior to teaching, but 'forward-oriented design for learning' focusses on what might happen after the learning design goes live (Dimitriadis and Goodyear, 2013). More details about Learning Design terminology and theory are in Chapter 3, page 50.

2.3.2 Learning Design as process

The process of creating learning designs generally includes a focus on specific classroom or online learning activities, often utilising technology (Laurillard, 2012). This contrasts to curriculum design, a broader concept encompassing a "totality of the specified learning opportunities" (Wallace, 2009, p.66).

Several learning design guides have been developed for tutors and learning designers (see page 173). For example, the 7Cs framework helps tutors identify their sociocultural context and teaching beliefs, and aims to "shift from a teaching approach that is implicit and belief-based to one that is explicit and design-based" (Conole, 2016a, p.119). The 7Cs include

Conceptualise, Create, Communicate, Collaborate, Consider, Combine and Consolidate. This framework encapsulates many other aspects of learning design approaches (for example, the Conversational Framework (Laurillard, 2002)) and is used to guide tutors through the entire learning design process, with a focus on creating learning activities.

A review of learning design approaches in the literature between 1999-2014 concluded that the so-called ADDIE approach (which includes Analysis, Design, Development, Implementation and Evaluation) to learning design was the most commonly cited (Göksu *et al.*, 2017). The review also suggested that using this approach improved student academic success (Göksu *et al.*, 2017). However, some users of the ADDIE model make less use of 'Implementation' and 'Evaluation' elements and this hindered the design process (Hoogveld *et al.*, 2002). A study of the learning design process identified that the most significant factor influencing tutors' design processes was an understanding of student characteristics (Bennett, Agostinho, *et al.*, 2016). Unfortunately, tutors rarely have access to this information when designing for learning.

Repertory grids (Kelly, 1963) were used by Schneider *et al.*, (2009) as a method of eliciting the personal perspectives of tutors when reviewing a selection of educational design tools. The study suggested that repertory grids were a useful way to engage tutors in a discussion about representations, features and tools that could support learning design. In particular, it was noted that usability was a much discussed aspect and expert users had more complex, richer understandings about learning design tools than novices (Schneider *et al.*, 2009).

Learning Design is presented in the discussion above as a linear process, but it can also be a 'messy' and 'organic' process (Rankin *et al.*, 2016). The key elements of Learning Design are representation, guidance, and sharing (Dalziel, Conole, *et al.*, 2016). Each of these are considered below in terms of how they support the investigation of retention on ODL courses.

2.3.3 Learning Design representations

A learning design representation is a way to represent or 'codify' a learning design to help tutors analyse and develop innovations, and facilitate software developers to instantiate lessons in software, or to share designs with others (Conole, 2013). Representations can include practice-based, conceptual, abstract or technical types and those based on a specific theoretical approach. They can represent individual lessons or whole courses, and they can provide different lenses to explore specific features including the nature of the task, the tools, resources, pedagogic principles or data. The most common type of representation is textual, but other examples include content maps, course maps, pedagogy profiles, task swim-lanes

and learning outcomes maps (Conole, 2013). Some example learning design representations are discussed below.

The AUTC[5] project focussed on representing tasks or activities; content or resources and student support mechanisms in the learning design (Agostinho *et al.*, 2002). In this swim-lane style learning design representation, triangles represent resources, squares represent the tasks and circles represent supports.

Although this representation was described by users as useful, there was concern that there was ambiguity between the terms 'resource' and 'support' and that this was confusing for some users (Agostinho, 2011). The users commented that there were elements of the design that could be assigned to either (or both) of these categories. This confusion noted by users is significant because these are commonly used educational terms that designers and tutors might be expected to use consistently. The AUTC representation does not specifically include any pedagogic guidance.

Alternatively, two approaches have been developed to specify learning design representations by focusing on activity type alone. An Open University project to map courses to learning designs used a learning activity taxonomy that included: assimilative, finding and handling information, communication, productive, experiential, interactive/adaptive, and assessment activities (Cross *et al.*, 2012). The resulting learning designs were then used to visually represent the relative amount of time spent on these different activities in the course, and this led to improvements in learning designs (Toetenel and Rienties, 2016).

However, mapping to activity types proved to be a challenging, subjective process (Rienties *et al.*, 2015) making it unclear if this approach could be used by others. Pedagogic information is indicated in the activity types, but no pedagogic quality guidance is included. A similar tool, the Course Resource Appraisal Model, created to provide cost/benefit analysis of different learning designs enables tutors to classify their own learning activity types based on Laurillard's (2012) taxonomy (Kennedy *et al.*, 2015). Whilst the use of activity types can encourage tutors to reflect and use a wider variety of activities, it is not clear how these subjectively created representations could be used to share designs with other tutors. The specific terminology used for these activity types is also tested in the current study to explore

[5] Australian Universities Teaching Committee

the extent to which raters and tutors use them effectively or otherwise to categorise learning activities (see Chapter 5, page 101 for discussion and page 111 for content analysis findings).

Despite the development of a Learning Design Specification (IMS Global, 2003) to support representations, it has not been widely adopted and has been criticised as too complex for teacher-designers to use (Hermans *et al.*, 2016). In an attempt to simplify the specification Hermans *et al.,* created templates to use within a standard virtual learning environment and this has aided design by bringing standard tools and elements together (Hermans *et al.*, 2016).

Learning design representations are challenging because they need to be both simple for tutors to use yet flexible enough to represent complex teaching ideas. An effective representation based on a table format had high user-ratings for usability and flexibility (Sobreira and Tchounikine, 2014) and an example of a computer-supported collaborative learning (CSCL) activity is given in table 1.

Activity	Group	Participant	Resource
Read the general text		S1 S2 S3 S4	General text (in)
Identify techniques	G1	S1 S2	Insulation text (in) Insulation list (out)
	G2	S3 S4	Heater text (in) Heater list (out)
Crossing groups	G1	S1 S4	Insulation questions (in) Insulation questions (out)
	G2	S2 S3	Heater questions (in) Heater questions (out)

TABLE 1: CSCL REPRESENTATION IN A TABLE

(Sobreira and Tchounikine, 2014)

This method has the benefit of utilising a table format that is accessible to tutors and enables the representation of straightforward designs that can be shared with others, but does not include any pedagogic guidance.

One solution to the challenge of representing the complexities of learning designs is to use a combination of approaches. Warburton and Mor (2015) developed the SNaP! framework which includes three elements: design narratives (personal written descriptions of the learning design process), design patterns (abstracted problem/ solution ideas (see Appendix 1b page 178 for an example) and design scenarios (proposed future applications). They argue that each type of representation is needed (Warburton and Mor, 2015).

Conole argues that learning designs draw on sociocultural thinking and that representations are 'mediating artefacts' that are context specific and that the preferences and beliefs of the tutor will influence the use of a particular representation (Conole, 2016b). The importance of personal meaning-making is highlighted by Dobozy and Dalziel who argue that metaphors aid understanding, and suggest that learning designs can be represented using a variety of metaphors including:

- The "play/act" metaphor
- The music notation
- The lesson plan
- Unified Modelling Language
- Business Process Modelling
- Patterns

(Dobozy and Dalziel, 2016a, p.64)

Although no one metaphor can captures all aspects of a learning design, they note that the lesson plan metaphor is widely understood by educators and, with adaptation, lesson plans could be transferred to a library for sharing (Dobozy and Dalziel, 2016a).

2.3.4 Learning Design pedagogic guides

The examples above appear to pedagogically 'neutral' in that they can be used to represent any type, even poor, learning designs. However, Dobozy and Dalziel argue that pedagogically neutral learning designs are not possible as all tutors (and students) have personal beliefs about teaching and learning (Dobozy and Dalziel, 2016b). The combination of pedagogic guidance with learning designs has resulted in new frameworks and models being developed and tested. For example, Shulman's concept of pedagogical content knowledge (PCK) (Shulman, 1987) has been combined with technological knowledge to form TPACK (Koehler *et al.*, 2013). This combination has proved useful when lessons are analysed to highlight the TPACK balance, whereby designers are reminded to integrate technology and content knowledge fully into a design (Dobozy and Campbell, 2016). There are concerns, however, that the TPACK framework does not "make explicit the connections among content, pedagogy, and

technology" (Angeli and Valanides, 2009, p.157). A variety of ideas for teaching presented as design patterns based on Alexander's (1979) architectural ideas have been developed for a range of purposes (Mor *et al.*, 2014), and an example can be seen in Appendix 1b page 178. Despite their integration of structure and pedagogic advice, they are not well used by tutors (Laurillard and Ljubojevic, 2011).

A set of transdisciplinary pedagogical templates to represent learning designs based on three learning theory approaches: instructionist, cognitivist and social constructivist/ connectivist has been developed to embed good quality principles (Dobozy and Dalziel, 2016b). An illustration of the resulting representation of one lesson using the Learning Activity Management System (LAMS) (Dalziel, 2008) is in figure 1.

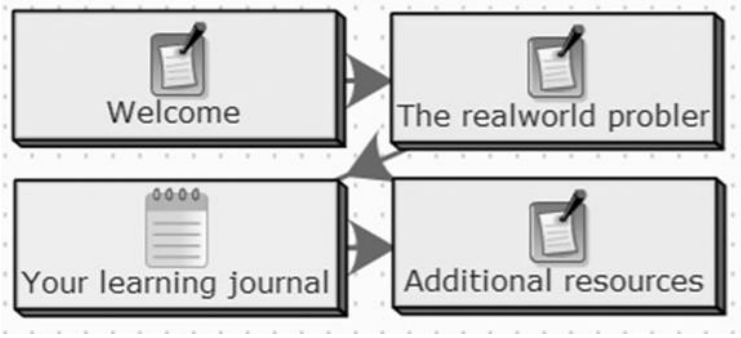


FIGURE 1: TRANSDISCIPLINARY PEDAGOGICAL TEMPLATE IN LAMS

(Dobozy and Dalziel, 2016b)

These templates embed evidence-based practice for online learning and are therefore useful pedagogic guides for tutors, but do require the use of the LAMS software. A similar framework aimed at improving the use of web-conferencing activities included guidance on adapting the learning design and the layout of the web-conferencing tool to deliver different knowledge types i.e. teacher-centred – receptive; teacher led – directive or student-centred (Bower, 2016).

In Teaching as a Design Science, Laurillard (2012) illustrates an example of adapting a traditional face-to-face lesson to utilise an online simulation tool to teach a dentistry skill (figure 2). The final version is in a tabular format, and includes contextual information for potential reuse. The codes to the left in figure 2 are the design elements and indicate the relevant part of the Conversational Framework included for pedagogic guidance (discussed further on page 45).

However, the ‘cycles’ key used to define the different types of activity in the lower section of figure 2 may make this too complex and difficult to apply consistently for different learning designs.

Title	*Drilling a decayed tooth*		
Origins	School of Dentistry.		
Summary	Students are introduced to the goal of *a well-prepared tooth*, heuristic principles of how to achieve it, then practice the skill of *drilling a decayed tooth* using a *virtual drill microworld*, and revise their approach in the light of feedback.		
Learning outcome	To be practiced in the skill of *drilling a decayed tooth*, and able to improve their own performance in achieving the goal of *a well-prepared tooth*.		
Rationale	*Constructionism*; learning through practice.		
Learners	Students of dentistry.		
Setting	*Classroom or IT Lab.*		
Resources and tools	*Handouts* with detailed instructions on the practice of *drilling a decayed tooth*; the *virtual drill microworld*, *questionnaire.*		
Learning cycles	*Sequence of teaching–learning activities*	*Group size*	*Time mins*
TCC1	The tutor introduces students to the principles and practice of *drilling a decayed tooth*. Talks through the *Handouts* giving instructions on how to achieve the best result. Explains how they will be advised and evaluated.	70	20
TMC1, 2	Students individually practice *drilling a decayed tooth* using the *virtual drill microworld*, and *Handouts*.	1	120
PCC1, 2, 3	The tutor chairs a class discussion, asking for reflections on experiences, and consolidating the lessons learned.	1	30
TCC2	Students complete *a questionnaire* assessing what they have learned.	1	10
Designer's reflection	*The first and second tries in the two one-hour sessions in the Lab have been replaced with the virtual drill microworld that offers independent practice with intrinsic feedback over two-hours.*		

Cycles	Design elements for activities in the Conversational Framework
TCC1	Access to the teacher's concepts
TCC2	The means to articulate their concepts and reflections on practice
TCC3A	Extrinsic feedback on questions or articulations of their concepts
TPC1	A practice environment that facilitates their actions
TPC2A	Extrinsic feedback on their articulations of their actions
TMC1	modeling environment that elicits their actions
TMC2	Intrinsic feedback on their actions from the model
PCC1	Access to peers' concepts
PCC2	The means to articulate their concepts and reflections on practice
PCC3	Extrinsic feedback from peers on articulations of their concepts
PMC1	Sharing practice outputs with peers
PMC2	Access to peers' outputs as a model for their practice

FIGURE 2: LEARNING DESIGN REPRESENTATION 'DRILLING A DECAYED TOOTH'

(Laurillard, 2012 table 12.3 no pagination)

The e-Design Template, a pedagogic guide for learning design, was created by the researcher to enable easier creation and reflection on online learning activities (Walmsley, 2015). The e-Design template incorporates a range of pedagogic guidance presented in the following principles:

- E-Learning is designed in timed chunks that emphasises time on task and expectations
- E-Learning is assessed using a range of types (self/peer/tutor) and options/choices
- E-Learning includes a variety of interactions between student/ tutors/ peers/ externals
- E-Learning is accessible, activity-led, collaborative and designed in phases that support, scaffolds and increases learner independence

(Walmsley, 2017)

These principles are expressed together in the e-Design Template as a pedagogic model incorporating the principles and the four phases (see figure 3).

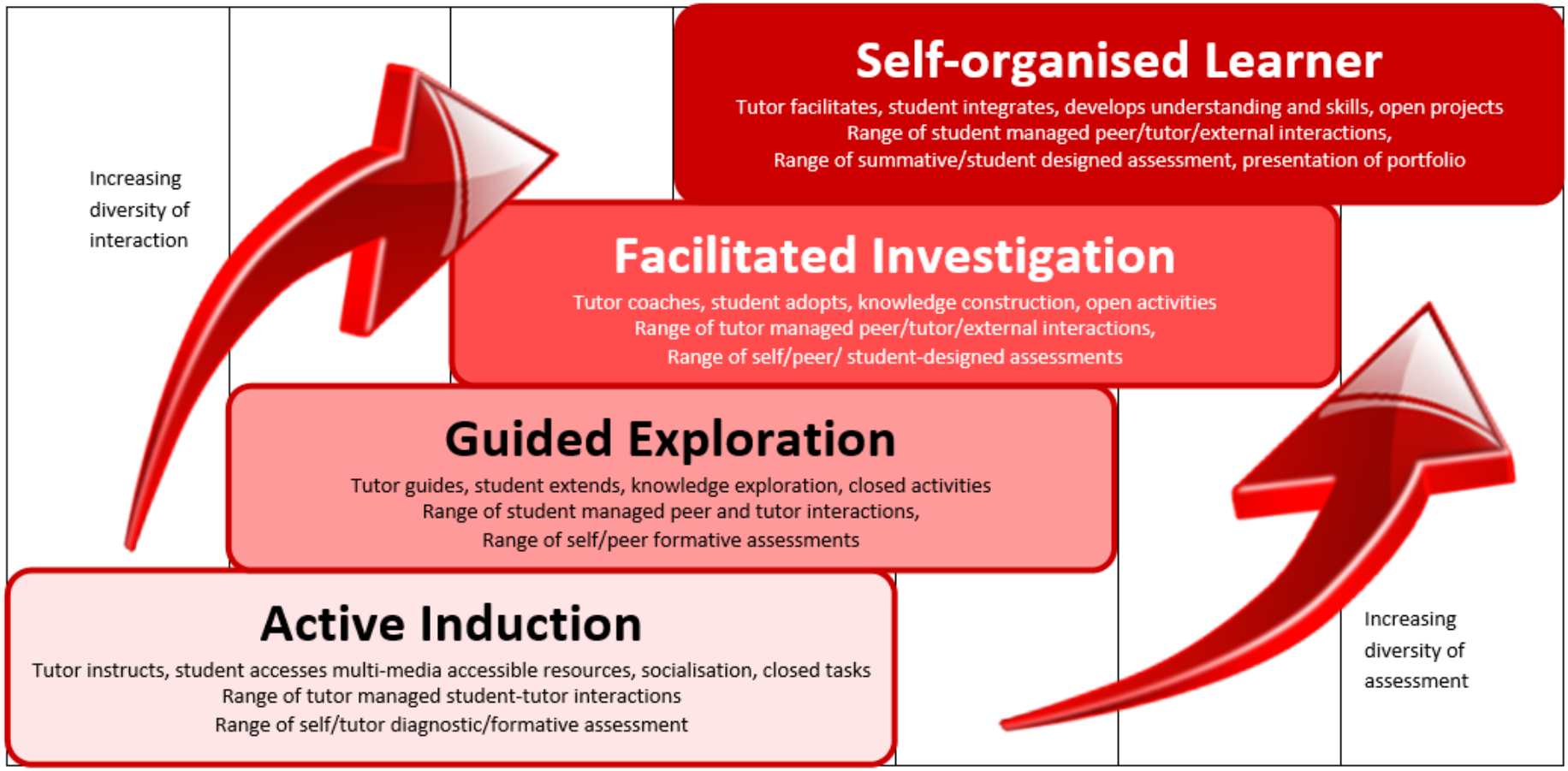


FIGURE 3: E-DESIGN TEMPLATE

(Walmsley, 2017)

The four phases are adapted from Stephenson and Coomey (2001) who suggested that learning activities could be viewed along two dimensions:

- student-managed vs tutor-managed
- open vs closed tasks

Viewing activities along these dimensions creates four quadrants as illustrated in figure 4.

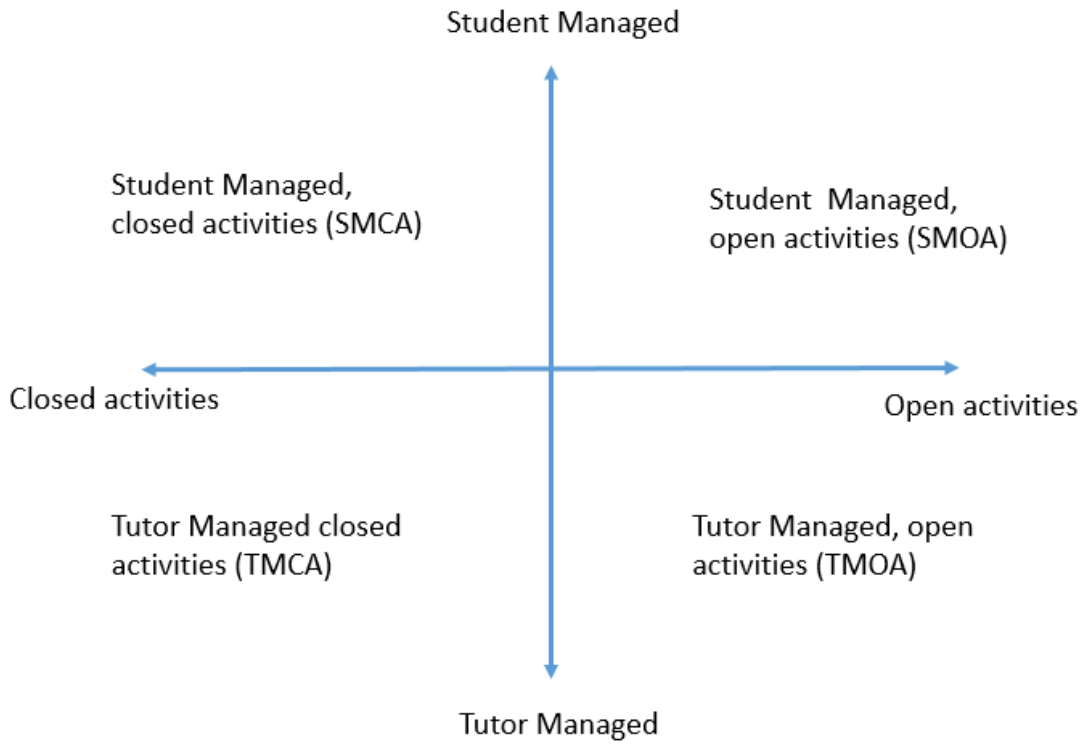


FIGURE 4: ACTIVITY QUADRANTS AND PHASES

(adapted from Stephenson and Coomey, 2001)

Each quadrant represents activities that reflect the different dimensions and these are used as the four phases in the e-Design Template in figure 3. The four phases are presented sequentially in the e-Design Template, guiding tutors and designers to create activities that are 'tutor managed/closed task' at the beginning of the learning sequence, and 'student managed/open tasks' towards the end of the sequence.

To accompany the e-Design Template, a number of examples are provided for different learning technologies (Walmsley, 2017). An example of a learning design representation is in table 2. Each of the columns includes an activity (in this case, using Twitter) that maps to one of the phases and includes suggestions for timings, interactions and feedback opportunities.

The lesson plan style format uses a simple table and highlights the e-Design principles to guide the tutor.

The e-Design Template embeds a wide range of pedagogic guidance for tutors and designers in an easy to use format and has been used successfully to support the development of online learning activities (Walmsley, 2015). However, it is not clear if the template can be used to design both short learning units and longer courses. The template seems to suggest that every learning sequence incorporates each of the phases, even a very short series of activities, when this may not always be appropriate.

Principles	Active Induction	Guided Exploration	Facilitated Investigation	Self-organised Learner
Add 1-4 activities (one for each phase)	1: Students read tutor's Tweets	2: Students read other recommended Twitter accounts	3: Students search for, evaluate, and recommend Twitter accounts	4: Students develop own set of Twitter followers
Which learning outcomes will it achieve?	Understanding of xx content	Understanding of xx content	Understanding of xx content	Application of xx skills
How long will this activity take?	15 mins	15 mins	30 mins	1 hour
Who will the students be interacting with?	Tutor	Tutor and externals	Tutor, externals and peers	Tutor, externals and peers
How will this activity be assessed?	Formative feedback from tutor	Formative feedback from tutor	Peer feedback on recommended Twitter accounts	Self and tutor feedback on effective use of personal learning network

TABLE 2: E-DESIGN TEMPLATE DESIGN FOR TWITTER ACTIVITIES

The Learning Designer (2016) is an online tool that enables the user to create a lesson representation that includes specification of the activity types in a design, timings, group size and allows teaching resources and tutor notes to be added (see figure 5). Tutors can explore the Learning Designer's 'microworld' and make informed use of the suggested pedagogic activity types: read, watch, listen; collaborate; discuss; investigate; practice and produce (Laurillard *et al.*, 2013). Consistent use of the activity types by different users may, however, be difficult (Charlton *et al.*, 2012).

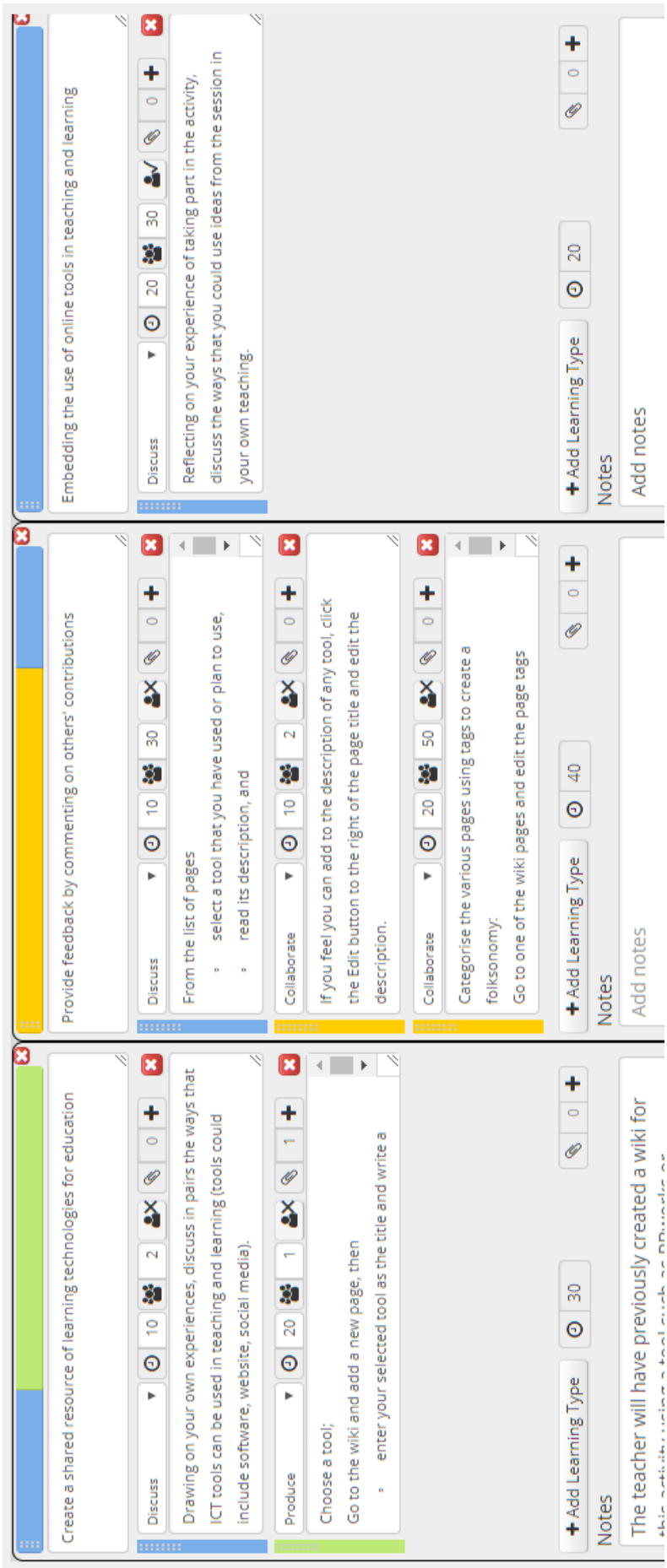


FIGURE 5: THE LEARNING DESIGNER

2.3.5 Learning Design sharing and reuse

It is argued that sharing and reuse of learning designs is efficient and will save time for tutors (Wills and Pegler, 2016). If learning designs are to be effectively shared, they need scientific rigor and should be easy to implement (Mor, 2013b). However, there are challenges with sharing learning designs (Beetham, 2008). Wills and Pegler (2016) reviewed the reuse of learning designs and highlighted concerns about intellectual rights. Successfully shared designs were those deemed to be interesting, able to be embedded into the curriculum and which included helpful tutor guidance. They also noted that most sharing occurred within small communities of tutors, often working together (Wills and Pegler, 2016), although most tools for learning design focus on individual users (Martinez-Maldonado *et al.*, 2017).

Adoption of new learning designs is complex and involves a range of influences including tutor perspectives and social factors. Badilescu-Buga's (2016) model suggests:

> innovation advances to the next level of adoption when the ideas are diffused within the adopters' social structures typical to the current adoption level, the use of information has the appropriate cognitive structures (information organization, processing and conversion into knowledge), and the innovation is implemented using adequate professional standards (training, professional accreditation).
>
> (Badilescu-Buga, 2016, p.209)

Badilescu-Buga's model suggests that sharing of learning designs can be supported by consideration of the appropriate social network, cognitive supports and professional recognition. However, the discussion below suggests that tutor perspectives about teaching and learning also influence sharing of learning designs.

2.3.6 Learning Design and learning analytics

The use of student data generated by online activity, for example, login and forum postings, can be cross-referenced with data about learning designs, resulting in a powerful tool to address retention (Bakharia *et al.*, 2016). For example, regular login activity by students can suggest that they are active in their course, whereas no logins may suggest they are at risk of withdrawal. Student time spent using VLE tools can be analysed to identify broad types of course design (Whitmer, 2016). When used effectively, such learning analytics can transform learning design from a craft into a mature research area that supports tutors in evaluating learning processes (Persico and Pozzi, 2015). For example, orchestration of the design and delivery of online computer-supported collaborative learning (CSCL) scenarios using analytics

was found to be very helpful for tutors (Rodríguez-Triana *et al.*, 2014). A focus on 'teachers as designers' engaged in inquiry (Kali *et al.*, 2015) led to the combined use of learning analytics, tutor inquiry and learning design, which provides a set of powerful tools for improving learning (Mor *et al.*, 2015). This agrees with Vescio *et al's.*, (2008) review of professional learning communities that found tutor performance improved after engagement with structured reflective activities that included a focus on learner data. The UK's Open University has, increasingly, used learning analytics and 'big data' to provide tutors, designers and managers with 'actionable insights' based on near real-time data and visualisations from a wide variety of data sets. However, there are concerns that there is a lack of evidence of what works in terms of learning analytics (Rienties *et al.*, 2017).

How useful learning analytics are for tutors depends on the relationship between the data and what tutors intend (Bakharia *et al.*, 2016). For example, data about dates and times students 'clicked' on a video lecture will reveal little about what they are learning from it. Similarly, data about the dates and number of times that students post in a forum will have limited use unless analysed with respect to student engagement. Bakharia *et al.*, (2016) argue that there is a gap between tutors' pedagogic enactments of activities and the data provided by learning analytics systems, and they propose a conceptual framework that identifies the analytics required to support tutors based on how they actually teach. Their framework consists of five dimensions: temporal analytics, tool-specific analytics, cohort dynamics, comparative analytics and contingency, illustrated in figure 6. The tutor's role is to use the analytics to identify relevant interventions.

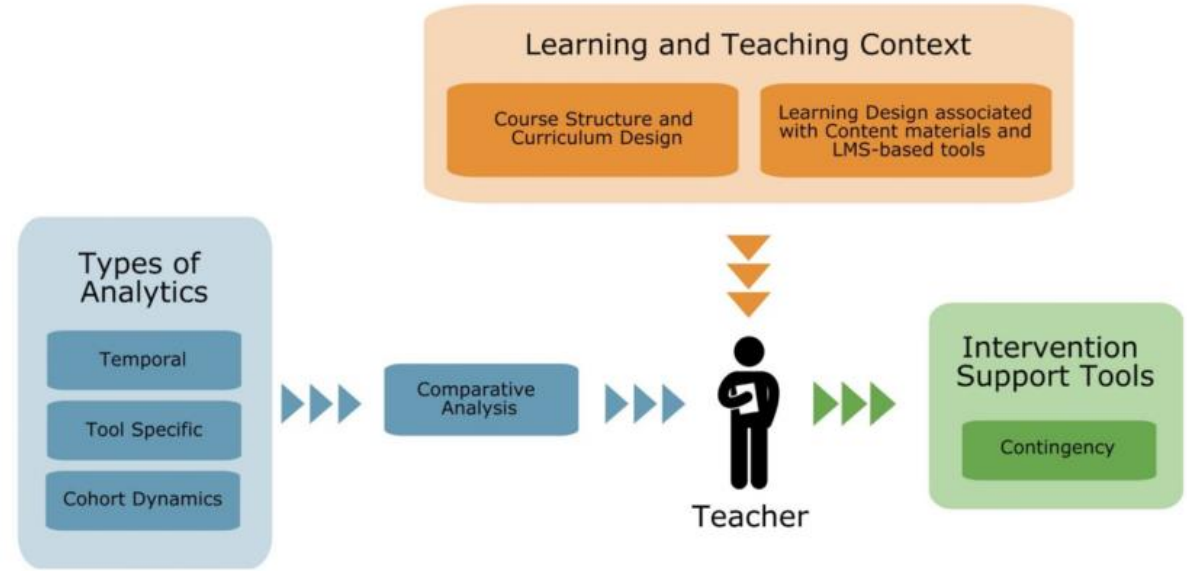


FIGURE 6: LEARNING ANALYTICS FOR LEARNING DESIGN CONCEPTUAL FRAMEWORK

(Bakharia *et al.*, 2016)

Examples of the effective use of learning analytics include a study which analysed access to discussion forums to provide data about students who may be at risk of dropping out (Shelton *et al.*, 2017). A review also analysed the impact of both staff and student engagement on performance (Wells *et al.*, 2016). An example of the use of large scale pedagogic course data to advise prospective students in the UK is the Key Information System (KIS) (Unistats, 2017). A report concluded that institutions had difficulties in interpreting the KIS definitions of learning and teaching and applying them to their courses. It was also noted that the extent to which pedagogic information was desired or useful to prospective students was not known (Barefoot *et al.*, 2016). As part of the report, a case study was conducted to review how Laurillard's (2012) learning activity taxonomy (see page 91) could be used as an alternative way to represent the pedagogy of a course, but it was found difficult to apply. However, the taxonomy seemed easier to apply to courses where technology was used, in comparison to the existing KIS categories that were not able to describe technology use well (Barefoot *et al.*, 2016). Therefore, using large scale data to describe pedagogic features of courses depends on using common terminology both by those describing courses and those wishing to use the descriptions about those courses.

Therefore, a critical approach to learning analytics and 'big data' is needed. There are also issues about privacy, surveillance, the nature of evidence in education and concerns that learning analytics' 'bold and unproven' claims will not necessarily improve student success and retention (Prinsloo *et al.*, 2015).

2.3.7 Learning Design and the eDAT

Dalziel argues that Learning Design can be used in fine-grained comparisons in educational research, and that there is a need "to keep trying to develop a broadly accepted representational framework(s)" (Dalziel, Wills, et al., 2016, p.256). Laurillard agrees, saying that:

> Perhaps the attempt is doomed. But without it there is no basis for the comparative analysis of the range of conventional and digital teaching methods that will tell us how they may best be used to support student learning. That is an imperative for our education systems now, so we have to try.
>
> (Laurillard, 2012, Chapter 5 no pagination)

Without such a representational framework, it is difficult to explore the increasing importance and impact of learning design on retention in ODL. Bakharia *et al's.*, (2016) learning analytic framework above suggests that benefits from data will only be achieved if there is a clear relationship between learning that is designed and learning that is measured. Laurillard argues that a learning design can be used for analysis, "Since it [the Conversational Framework] describes what it takes to create an effective learning design, the Conversational Framework can also act as a design analysis tool" (Laurillard, 2012, Chapter 6 no pagination).

The examples of learning design tools above share a focus on activity mapping using a variety of terminology and vocabulary, however, they use different presentation formats and include variable levels of pedagogic guidance.

The development of the eDAT is intended to specifically address these issues and provide a learning design representation that offers guidance, is sharable and can be analysed effectively with analytics to improve ODL practice. The eDAT will build on previous design tools by providing consistent terminology, an easily readable table format and by providing clear pedagogic guidance.

As this literature review has noted, interaction and feedback activities are often cited as having an impact on retention in ODL, but learning designs used to express these kinds of activities are difficult to represent and share.

We also need to consider the role of the tutor and their approaches to learning when developing, representing and interpreting learning designs. The next section discusses the potential of PCP to understand tutors' perspectives about effective teaching and learning.

2.4 Personal construct psychology and tutor perspectives

This section of the literature review considers PCP approaches to understanding tutor perspectives about teaching and learning. The review aims to identify the ways that PCP has been used to explore tutors' perspectives about their learners, the use of technology in learning, and how they reflect on learning designs. A fuller account of the theory underpinning PCP is given in Chapter 3.

2.4.1 Tutor beliefs and perspectives

Several different approaches have attempted to understand the ways that tutors approach teaching including studies on tutor beliefs. A variety of terms used to describe tutor beliefs can be found in the literature and include:

> attitudes, values, judgments, axioms, opinions, ideology, perceptions, conceptions, conceptual systems, preconceptions, dispositions, implicit theories, explicit theories, personal theories, internal mental processes, action strategies, rules of practice, practical principles, perspectives, repertories of understanding, and social strategy.
>
> (Pajares, 1992, p.309)

Nespor identified some features of beliefs that distinguish them from cognitive knowledge:

- existential presumption – beliefs are always there
- alternativity – they can include wishful thinking
- affective and evaluative loading – they operate independently of the cognition associated with knowledge
- episodic structure – beliefs usually based on specific events

(adapted from Nespor, 1987, in Pajares, 1992, p.309)

Other work on tutor beliefs has been conducted from a range of approaches including interpretive and phenomenological theories. In many of these, tutor beliefs have been collated into inventories. For example, Apelgren (2010) used a phenomenological approach and identified four categories of teacher orientation. In addition, a series of detailed interviews were conducted to gather beliefs about computer-assisted learning (CAL) which identified five categories of belief/practice patterns. These included specific comments about the extent to which activities are tutor or student managed, the use of open tasks and the type of feedback (Bain and McNaught, 2006).

An online tool for teachers, The Teacher Perspectives Inventory, asks a series of questions and then shows the teacher's 'TPI' score. The teacher's score is then displayed on each of five possible perspectives or approaches to teaching: transmission, apprenticeship, developmental, nurturing and social reform (Pratt, 2014). The score shows the relative importance of each perspective to the teacher as well as highlighting any inconsistencies between their intentions and teaching actions. This is a useful scale, but was found to be too general to be helpful for learning designers (Donald *et al.*, 2009).

A proposal for the use of two metaphors for learning, the 'assimilative' and the 'participative' is suggested by Sfard (1998). This can also be understood as a way to differentiate between teaching approaches, whilst still viewing each of them as necessary.

Student perspectives and preferences also influence the way they experience learning activities of an ODL course. Koper's (2015) survey of student preferences for types of course

features demonstrated an influence on student success and retention. The five dimensions of student preferences identified were:

- collaboration versus self-study;
- pacing versus flexibility;
- practical orientation versus theoretical orientation;
- proactive versus reactive teaching;
- in-depth versus superficial learning.

The study found that student success was associated with a match between their preference and the course design (Koper, 2015).

What is significant about these studies is the underlying assumption that perspectives on teaching have a direct impact on practice and on student learning (Trigwell *et al.*, 2005; Postareff *et al.*, 2008). It is sometimes assumed that teachers with constructivist approaches are more likely to use technology in class, but the literature is ambiguous, suggesting a more complex relation between belief and practice (Admiraal *et al.*, 2017).

The examples above illustrate the difficulties that arise when researching tutor beliefs. It is challenging due to the variety of definitions for belief, and there are concerns that tutors may not accurately express their views through surveys and interviews (Higgins and Moseley, 2001). However, Schaap *et al.* (2011) found that structured approaches to exploring student teachers' personal professional theories was more revealing than less structured approaches.

Such a structured approach to researching tutor belief is Kelly's (1963) PCP and repertory grids. This offers an effective way to understand tutor perspectives through the concept of personal constructs and the use of the repertory grid method to explore them (see Chapter 3 for a more detailed discussion of the theoretical underpinnings of PCP). The next section reviews ways that PCP and repertory grids have been used to explore tutor perspectives. In this study, the term 'perspective' is used to mean tutor beliefs about teaching and learning and incorporates Kelly's (1963) term 'construct'.

2.4.2 PCP and repertory grids

PCP theory focusses on identifying and understanding the personal 'constructs' that are often used unthinkingly by people as they navigate and anticipate life events in order to understand them better (Kelly, 1963). Fransella and Bannister describe these constructs or underlying assumptions as part of "implicit theories" (Fransella *et al.*, 2004, p.2). Yorke (1987) suggests that three categories of tutor thinking can be explored with PCP:

- belief systems, for example, approaches to student autonomy;

- strategic planning which involves the teacher optimising outcomes based on their own and on their students', perhaps conflicting constructs;
- tactical adjustments which may need to be made when a lesson suddenly needs to be revised for external reasons.

(Yorke, 1987)

Thus, PCP can be applied to understanding tutor perspectives about teaching and learning. The PCP approach also makes a clear connection between underlying constructs and practice but allows dissonance and conflict to be identified and used in tutor reflection to improve practice. The discussion below includes a range of studies that have used PCP to explore the influence of tutor perspectives on practice.

Based in PCP, repertory grids were one of a number of methods originally devised by Kelly to assist a psychotherapist when trying to articulate the constructs being used by their clients (Kelly, 1963). A wide variety of repertory grid methods have since been developed (e.g, Fransella *et al.*, 2004 and Jankowicz, 2004). In essence, an interview takes place in which the interviewee is asked to talk about a topic and to articulate similarities and differences through a series of paired 'contrasts'. The methodology is a structured approach to gathering data for analysis about a person's constructs and to explore how they are used to anticipate and interpret events. For example, a tutor's personal constructs about learning will guide their teaching practice, often without their full awareness, leading to quite different teaching approaches. The methodology is regarded as effective and has been shown to reduce researcher bias particularly when all the data are generated by the interviewee and none is externally supplied (Whyte and Bytheway, 1996).

Some researchers have used Kelly's original formulation which focusses on participants' individual content and process, others have extended this to include external (supplied) content, for example Edwards *et al.,* (2009). However, the basic process of how a repertory grid can be used to elicit the individual's personal constructs remains essentially the same.

2.4.3 PCP and tutor development

PCP and repertory grids have been used in several studies of tutors' professional development. For example, a series of workshops was created specifically for tutors that used repertory grids to identify their own implicit theories about teaching before exploring how they could be applied in practice (Hunt, 1987). However, this can be a challenging process. Jankowicz (2001) found that some participants in a workshop to explore tacit knowledge experienced

discomfort, although he argues that despite this it was a disciplined and precise procedure for describing tacit knowledge.

Repertory grids were used as an introductory pair exercise at the beginning of staff development sessions on general teaching topics. This was intended to engage participants in discussions about their teaching beliefs, and to assist them in applying their learning to their practice (Donaghue, 2003). In contrast, Nicholls (2005) used a repertory grid with supplied elements to explore the constructs of new lecturers in higher education. The results showed that the context and environment of HE influenced the lecturers' constructs about teaching and research, and this lead to an increased emphasis on research.

Some longitudinal studies have explored change in tutor perspectives over time. A study using a repertory grid with supplied constructs and elements tracked science teachers' approaches to the use of modelling in lessons over time and identified changes (Henze *et al.*, 2007). Changes in trainee teacher beliefs over the period of a course were observed using a 'snake' interview technique adapted from a repertory grid, in which participants sketched out critical incidents that might have affected the development of their constructs (Cabaroglu and Denicolo, 2008). A longitudinal study illustrated how beliefs and practice influenced each other and changed over a four-year period of a teacher training course (Caudle and Moran, 2012). Teachers' constructs across career phases were explored with grids and the study found there was variation depending on the teachers' career phases in terms of how they construed effective teaching (Kington *et al.*, 2014). Some repertory grid studies showed that constructs were stable and consistently shared by a group of participants. For example, a grid was used in a study of school principals' constructs which identified a common construct around the notion of stewardship and the study made recommendations for further school principal development based on this construct (Farrell and Road, 2010).

Repertory grids have been used as part of mixed methods studies to explore tutor effectiveness. One study combined repertory grid interviews, questionnaire surveys and observations of classroom practice and found this an effective way to explore classroom effectiveness (Kington *et al.*, 2011). Others have used grid methodology on its own to explore one aspect of teaching and learning in depth, as in the study of the concept of 'authenticity'. In this study, a mixture of elicited and supplied constructs were used and the results from the grids were compared to the philosophical literature on the concept of authenticity. The results showed that the concept of authenticity is "variegated" and used differently by different tutors and students (Kreber and Klampfleitner, 2013, p.465).

As well as using repertory grids with groups of tutors, they have been used to explore individual tutor's practice to aid reflection and development. A vocational tutor's view of their practice as revealed through discussion of a grid led to the development of an intervention to change the way the tutor used scaffolding (Greyling and Lingard, 2015). Biology teachers' views about underpinning knowledge needed for effective teaching was explored with grids. But, in an unexpected finding, their constructs suggested that subject content was separate from pedagogic content knowledge. This highlighted the importance of including subject knowledge alongside pedagogic knowledge in professional development programmes (Rozenszajn and Yarden, 2015). A Maori teacher's pedagogical constructs were explored through the statistical analysis of a grid and this identified areas of conflict between constructs and practice that led to further reflection (Greyling and Waitai, 2016). Two teachers' strategies for teaching argumentation in science were explored with a grid which found that the experienced teacher had more varied and better organised 'clusters' of constructs, again suggesting areas for further training and development (Lin *et al.*, 2017).

It seems crucial that there is congruence between perspective and practice for tutors to feel comfortable in their educational context (Phillips *et al.*, 2012). For example, Ackland (2013) used grids to explore the meanings practitioners had of a literacy policy and found that their constructions were rather different to their espoused theoretical approach and thus led to conflicts in practice.

2.4.4 PCP and tutor constructs of their learners

Some studies have used repertory grids specifically to understand the constructs tutors have of their learners. For example, grids were used to compare specialist music teachers and novice teachers' constructs of music students' compositions. They noted the specialists used more technical constructs as compared to novices, who used more holistic and expressive constructs (Mellor, 1999). A study using repertory grids to explore tutors' assessments of their counselling trainees produced results that were consistent with research using other methods (Wheeler, 2000). Teachers' constructs about the ability of music students were elicited with repertory grids and led to discussions about the influence of those constructs on their teaching (Hewitt, 2005). Teachers' constructs of a whole class were elicited with grids and analysis revealed the most common category related to beliefs about the way students think and act, rather than constructs about students' intellectual development as might have been expected (Touw *et al.*, 2015). In addition, this study included a collation activity to categorise the constructs for further analysis using the 'Classification System for Personal Constructs' (Feixas and Villecas,

1991). The classification of constructs helps, for example, to compare different groups of respondents (Touw *et al.*, 2015).

2.4.5 PCP and technology

Primary school teachers' constructs about teaching using information and communication technology (ICT) were explored with the use of grids and results were compared with pupil outcomes. This suggested a link existed between constructs and outcomes, but that the link is complex and related to year groups. This finding has implications for teacher development as it may be important to link teacher constructs and attainment data when making recommendations for further ICT implementation (Higgins and Moseley, 2001). A study examining school principals' views of technology used a variant of the repertory grid, a 'decision making' grid, and showed that there were anxieties about the use of technology that should be considered when implementing technology in the classroom (Bekta, 2014).

2.4.6 PCP and Learning Design

PCP has been used to both create learning designs and to review instructional designs. An approach to teaching science based on PCP was developed that included a focus on individual constructions and the sharing of meaning, thus making conversation and group work an essential part of the model (Fetherston, 1997). A study used repertory grids to identify instructional design activities and compared them to an instructional systems design (ISD) approach. ISD approaches consider lesson design holistically within the total curriculum 'system'. The findings suggested an imbalance and that certain key elements of an ISD approach were missing in the repertory grid analysis. The tutors did not seem to consider problem analysis and evaluation and this provided opportunities for further development (Hoogveld *et al.*, 2002).

2.5 Research questions leading from the literature reviews

The literature reviewed in this chapter and Appendix 1 (page 153) had a dual purpose. The reviews considered factors impacting on ODL retention as well as the use of PCP to explore tutor perspectives about teaching and learning. The literature revealed a wide range of factors that impact on retention in ODL including student demographics, course level, and design features including interaction and feedback. However, the literature is not conclusive and a variety of definitions and methodologies are used, making comparisons across courses and institutions difficult. Learning Design enables representation of learning activities, provision of guidance and opportunities for sharing quality learning activities. However, no agreed method for representing designs has yet been developed and this hampers efforts to evaluate the

impact of learning design on retention. Learning analytics shows promise in enabling the use of large scale data to explain and understand retention, but there needs to be a closer connection made between the learning design and the data used for this to be effective.

The literature shows that PCP and repertory grids are a useful way to explore tutor perspectives about teaching and learning, and how this impacts on their teaching. The studies revealed a rich set of constructs used by tutors and illustrated several ways that PCP and repertory grids could be used to support professional development. In addition, the studies noted examples where there was conflict between tutor's constructs and their own and institutional practice. This suggests that there are opportunities for using grids to improve practice.

From the literature reviews conducted for this study, the following research questions have been developed. They include questions concerning both parts of this study, that is, how to explore the specific impact of learning design on retention and to explore the impact of tutor perspectives on describing learning design. The research questions have been formulated to facilitate either quantitative analysis, interpretive narratives or those that can be explored by both (Yin, 2006) (see Chapter 4 for more details about the mixed methods strategy used in this study). Questions that will be answered by quantitative data analysis include a hypothesis, whereas questions that will be explored by qualitative data do not. In combination, they will lead to a mixed methods study and a richer understanding of the impact of tutor perspectives and learning design on ODL.

A. Research questions for quantitative research

A1) How can ODL activities be categorised?

A2) To what extent do raters agree with one another in their categorisations? What is the inter-rater reliability?

Hypothesis: Learning activities can be categorised using the eDAT to an acceptable level of inter-rater reliability, that is above .667 (Krippendorff, 2004).

B. Research questions for qualitative research

B1) What beliefs, perspectives and personal constructs do learning designers and tutors have about effective learning and teaching activities?

B2) How do the different beliefs, perspectives and personal constructs of learning designers and tutors impact on how ODL activities are categorised?

C. Research questions for mixed research

C1) How effective is the eDAT as a Learning Design tool?

C2) How can the eDAT improve practice in ODL?

The approach to gathering data relating to these questions is discussed in Chapter 5.

This chapter has discussed the literature exploring the impact of learning design on ODL retention as well as considering how tutor perspectives impact on how learning designs are described and used. The next chapter reviews some of the underpinning theories that have been used to develop learning activities for ODL and discusses in more detail the theory of PCP.

CHAPTER 3: THEORETICAL APPROACHES TO ONLINE DISTANCE LEARNING AND PERSONAL CONSTRUCT PSYCHOLOGY

3.1 Overview

The aims of this study are to create the eDAT to represent learning designs and to better understand the impact of tutor perspectives on Learning Design. The previous chapter, and Appendix 1, identified issues in describing and evaluating learning activities and designs. This chapter considers learning theories used to develop student activities and makes a case for focussing on two key activity types that support effective ODL. In addition, this chapter considers PCP as an approach to understanding the impact of tutor perspectives on designing effective teaching and learning activities. This chapter discusses in detail objectives *b* and *c* of the study as stated in Chapter 1:

b. To review PCP and the impact of tutor beliefs, perspectives and personal constructs on approaches to designing and supporting ODL

c. To review a range of learning theories used to develop ODL courses and establish a set of key learning activities.

3.2 What is theory?

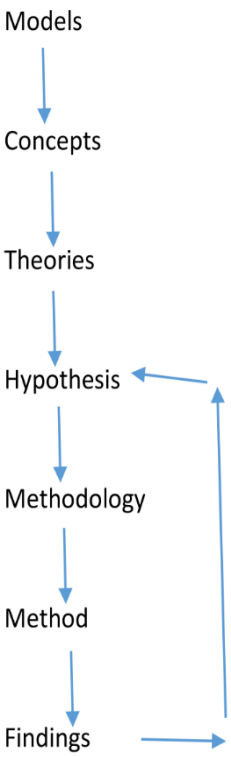


FIGURE 7: MODELS AND THEORIES

The concept of theory has different meanings and is used in different ways in educational research. Bryman refers to a variety of types of theory including 'middle' and 'grand' theories, suggesting that the limited domain of the middle theories can offer "an explanation of observed regularities" (Merton, 1967, in Bryman, 2012, p.21). Cohen *et al.*, (2011) say that the term 'model' can be used interchangeably with theory, although others propose a hierarchy with 'model' overarching 'concepts' then 'theories' followed by 'hypothesis', 'methodology', 'method' and finally 'findings' as illustrated in figure 7 (Silverman, 2013, p.114).

In this study, educational theory is needed because effective constructive alignment of learning outcomes requires an understanding of the underlying assumptions about learning (Biggs, 1999). In contrast, Thomas proposes a focus on teaching 'practice' rather than theory (Thomas, 2007). Hattie is also cautious about theory, arguing that too often teachers believe that theory dictates action even when the evidence does not support this (Hattie, 2012). This focus on 'practice',

though, still leaves difficulties of definition and a variety of unfounded assumptions about the differences between theory and practice (Saugstad, 2002). Some even argue for an end to educational theory (Carr, 2006). However, Suppes (1974) argues that theory has a place in educational research in the same way that other disciplines use theory, that it allows us to re-think our experience, recognise complexity, focusses on Deweyean problem solving and thus allows research to escape from "the triviality of bare empiricism" (Suppes, 1974, p.4).

The meaning and use of theory in educational research depends on the philosophical approach taken by the researcher, their subject discipline and chosen methodology (Silverman, 2013). This study uses a critical realist mixed methods approach that includes both postpositivist and interpretive methodologies (discussed further in Chapter 4).

Positivism's scientific approach usually starts with a theory, develops a hypothesis and then designs a study to test the theory, leading to theory 'verification' (Robson, 2011). This approach follows Kerlinger's definition of theory:

> a set of interrelated constructs [concepts], definitions, and propositions that presents a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting the phenomena.
>
> (Kerlinger, 1970, in Cohen *et al.*, 2011, p.9)

Or, as part of an experimental approach, as:

> a coherent group of propositions used as principles for the explanation of some phenomenon. It is stronger than a hypothesis which is a conjecture still to be tested whereas a theory has more weight in terms of its credibility.
>
> (Gillies, 2015, no pagination)

By contrast, in interpretive research, an inductive approach is often taken which starts with observations in order to develop theories and then makes wider generalisations from the observations (Silverman, 2013). Theory can support understanding of social and behavioural phenomena where "theorising consists of an interplay among ideas, evidence and inference" (Chaffee, 1991, p.14). Theory can be used to 'explain' and as a 'lens' for understanding in qualitative research (Creswell, 2015). However, theory can also be a barrier to qualitative research (Thomas, 2002). Blumer writes about the symbolic interactionist approach to theory and argues that "posing, clarifying and addressing a scientific problem constitute theoretical

action in its own right" (Blumer, 1973, p.797). In this mixed methods study, both approaches to theory are used as discussed below.

ODL and repertory grids are discussed below in relation to learning theory and PCP. As the discussion shows, there are a number of theories that can be applied and pragmatic combinations are usually required. Schön (1992) argues that Dewey's notion of 'inquiry' combines mental reasoning and action in the world and can free researchers from the dualism of theory and practice. Making connections between theory and practice also supports improvements, as Schunk argues, "theories serve as bridges between research and educational practices and as tools to organize and translate research findings into recommendations for educational practice" (Schunk, 2013, p.27).

3.3 Online distance learning theories

This section will consider behaviourist and constructivist learning theories as well as some of the wider theories relevant to ODL, including socio-cultural, technology, Learning Design and specifically distance learning theories.

Although there are different ways to define learning, in this study it is defined as a "new ability to do something, and/or an understanding of something that was previously not understood" (Goodyear and Retalis, 2010, p.6). Several theories attempt to explain the conditions and processes that give rise to human learning, and each theory proposes a variety of pedagogical teaching approaches. In addition to general learning theories, specific theories and frameworks have been developed that focus on the way technology enables learning. This variety can be a positive benefit to research because it draws on a wide range of relevant and stimulating theories which can challenge our "taken for granted values" (Adams *et al.*, 2011, p.2). For example, Millwood's HoTEL project lists 24 individual learning theorists and as many key concepts and world views that have been associated with online learning (Millwood, 2013). Many more theories about learning and technology exist, for example Wheeler (2013) includes more on his blog, and these are being added to all the time. These learning theories come from a variety of disciplines including education, organisation studies, social anthropology, philosophy, linguistics, theology, psychology, design and cybernetics. This reflects the contested place that education and the use of technology has in society, their differing aims and the sometimes conflicting outcomes they claim to provide (Millwood, 2013). This complex field is sometimes oversimplified, and there is often confusion when epistemological or philosophical world views are associated with a specific teaching activity when no such simple correlation exists.

Because of the wide variety of discipline traditions, epistemological and philosophical positions, these many theories have been organised into different groupings and taxonomies by different writers. For example, they have been sorted into behaviourist, cognitive, constructivist and connectivist learning theories (Ally, 2008). Also grouped into associationist/ empiricist, cognitive and situative perspectives (Mayes and de Freitas, 2013). In addition, constructivist theories have been grouped into four dimensions (Kanuka and Anderson, 1999) and three types (Schunk, 2013). In this study, behaviourist and constructivist learning theories are considered below.

3.3.1 Behaviourist learning theories

Behaviourist psychology emphasises a scientific approach to the study of human behaviour, focusses on observed behaviour and aims to control and predict it. It is an empirical approach where knowledge is said to be derived from objective observation of real external, sensory experience, and is rooted in the positivist philosophy (Harasim, 2012). Learning theories that draw on behaviourism include associative, connectionist and cognitive approaches. Associative and connectionist theories state that learning occurs through associations being made between sensory experiences and resulting behaviour, as in learning by trial and error. Conditioning strengthens these associations, just as Pavlov's dogs who heard a bell when food appeared, 'learned' to salivate when the bell was heard even when there was no food (Schunk, 2013). Subsequent research showed that this classical conditioning did not describe the majority of human learning well and so Skinner developed 'operant' conditioning. This included positive and negative reinforcement, 'learning by doing' and 'shaping' the learning by including immediate corrective feedback. By 'chaining' a series of linked operants Skinner claimed that students could be led to learn twice as much in half the time (Skinner, 1984).

Cognitive theories suggest a similar process of learning by association, but now the brain is regarded as a processor of stimuli and an organiser of knowledge into schemas to structure the associations and knowledge. Learning is thus largely an internal process that involves memory, thinking, reflection, abstraction, motivation, and metacognition. This is essentially an information processing perspective (Ally, 2008). Associative and cognitive theories formed the basis of a range of pedagogies often called 'instructional design' including the use of rote learning, reward and punishment and the use of taxonomies. Examples include Bloom's taxonomy of educational outcomes (1956); Skinner's Programmed Instruction machines that included questions and immediate automated feedback (Skinner, 1984), and computer-assisted learning. Gagné developed a systematic approach to instructional design that included a series of nine precise, hierarchical steps widely used to plan online learning that includes

practice and feedback (Gagné *et al.*, 1992). Similarly, Mayer developed a set of multimedia learning principles to guide designers of online instructional materials that precisely described optimum relationships of text, image and audio (Mayer, 2005).

These pedagogies have been used widely as guides for the creation of ODL courses. There are many other current examples of pedagogies that demonstrate an underlying behaviourist approach. For example, a classroom teaching approach that has been well-researched and found to be effective is the 'worked example' (Kirschner *et al.*, 2006) and this model is replicated in the very popular online Khan Academy (2017). This includes a large number of maths video tutorials and has been shown to increase student engagement and learning (Light and Pierson, 2014). In addition, a schema to support note-taking was embedded in an adapted 'copy and paste' function and found to increase cognitive processing skills (Morgan *et al.*, 2008).

The role of feedback is a key part of all these approaches. For example, Skinner proposed that teaching be designed with a series of small steps so that learners progress with continuous 'correct' feedback. The aim was to reduce errors to a minimum as these were seen to reduce motivation (Schunk, 2013).

However, there are critiques of behaviourist learning theory that challenge many of its assumptions. Cognitive approaches, partly based on behaviourist theory, have led to the development of online instructional materials that might be called 'read and click'. Here the aim is to help the learner to memorise material by presenting it in short 'chunks', followed by a test to repeat and reinforce the associations. This is intended to result in storage of the information in short and then long-term memory. Similarly, instructional designers also use interactivities such as 'fill the gap' or 'drag and drop' tasks that seem to offer a variety of online activities. Learners who have successfully read, clicked, and completed the tests, are then said to have 'learnt' the material. However, it is very difficult to see how these methods could result in higher level skills, for example Bloom's analysis or evaluation outcomes (Bloom, 1956).

The behaviourist view also ignores the ambiguous, complex, changing world in which learning takes place (Kanuka and Anderson, 1999). Skinner's detailed conditioning experiments were difficult to repeat outside of the laboratory, and Chomsky argued that Skinner was unable to substantiate all he claimed by such data (Chomsky, 1967). The philosophical epistemology of behaviourism is challenged by the so-called 'Plato's problem'. This questions the notion that knowledge is formed solely from experience by proposing that we know far more than we can

possibly have experienced (Schunk, 2013). Engeström argues that Gagné's view that advanced creative problem solving can be developed by practice is fundamentally false (Engeström, 1987).

3.3.2 Constructivist learning theories

Constructivism involves more than one philosophical epistemology and a set of pedagogies, and this sometimes causes confusion. Whilst behaviourist approaches are drawn from positivist philosophy in which reality and knowledge are said to exist *a priori* to the individual, constructivist epistemologies argue that reality and knowledge are 'constructed' in the mind of the person. Such construction is based on their sensory experiences, interactions with others and interpretation of those experiences and interactions (Harasim, 2012). Constructivist philosophy is described as a "powerful folk-tale" about the origins of human knowledge with many sects (Phillips, 1995, p.5) and was originally met with suspicion because it "intends to undermine too large a part of the traditional view of the world" (von Glasersfeld, 1984, no pagination). There are many constructivist approaches to learning, and therefore, of course, no 'real' constructivist theory. Schunk (2013) organises constructivism into three types: the 'exogenous' in which knowledge represents a reconstruction of the external world; 'endogenous' in which knowledge develops through cognitive abstraction; and 'dialectical' in which knowledge derives from the interactions and contradictions between persons and their environment. Mayes and de Freitas, on whose work much of the JISC pedagogic guidance has been based, include constructivism only as a subset of cognitive approaches (Mayes and de Freitas, 2013).

An alternative way to view different types of constructivist approaches to learning, to create "order out of the chaos" is by considering the extent to which they lie on two philosophical dimensions (see figure 8) (Kanuka and Anderson, 1999). The first dimension is the extent to which an approach sees reality as objectively existing outside the person, or as one of multiple realities created by their construction. The other dimension is the extent to which knowledge construction takes place either in the individual, or through the social environment. These two dimensions can then be used to create quadrants representing four domains of constructivism, each discussed below.

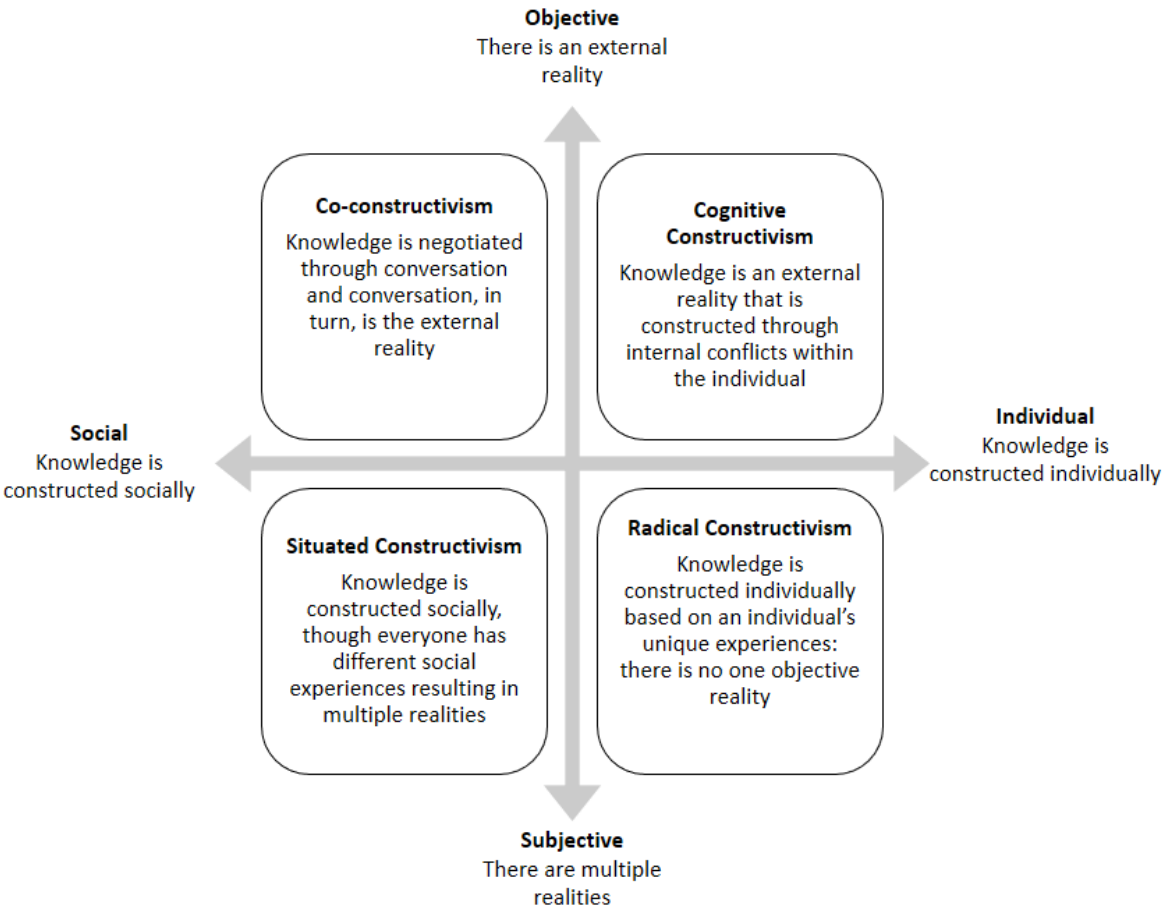


FIGURE 8: FOUR DOMAINS OF CONSTRUCTIVISM

(adapted from Kanuka and Anderson, 1999, no pagination)

3.3.3 Co-constructivist learning theories

In the co-constructivist quadrant, sometimes called social constructivist, writers take the realist view that an external reality exists, and that learners construct knowledge and meaning through interactions with others in the social environment. Individuals can share a common construction of knowledge and "knowledge is constructed through conversation and conversation, in turn, is the reality" (Kanuka and Anderson, 1999, no pagination). One of the main writers illustrating this approach is Vygotsky (Vygotsky and Cole, 1978), whose social constructivism includes a focus on the importance of the social environment of the person as they construct meaning. He argues that all learning depends on interactions with more knowledgeable others (Daniels, 1996). Vygotsky's zone of proximal development (ZPD) is the distance between what a student knows and what they can potentially learn from others and this has been used to develop pedagogies that include carefully scaffolded activities (Mayes and de Freitas, 2013). The ZPD has been used as a framework to design online learning activities that incorporate structured interactions between participants, guidance by experts

and the gradual move of locus of control to the learner (Peal and Wilson, 2001). However, Vygotsky's view that all learning depends on interactions seems to be somewhat overstated, as children can learn independently without interaction (Schunk, 2013).

Online learning activities based on a co-constructivist approach include, for example, small discussion groups, brainstorming, categorizing, cooperative learning and Socratic dialogue. For example, Salmon developed the Five Stage Model and the notion of e-tivities to provide a way to guide online tutors in supporting learning through discussion forums (Salmon, 2002). The model is now well-known and adapted by many online learning designers as it facilitates knowledge construction through a series of scaffolded activities including access and motivation; socialisation; information exchange; knowledge construction and development. However, this model has been criticized as being too prescriptive as it does not support a range of delivery patterns (Moule, 2007), and is sometimes used uncritically as an 'objectified model' (Lisewski and Joyce, 2002, p.59).

Bruner held that individuals construct their own knowledge by organising and categorizing it through 'discovery learning' and that teachers can support this with scaffolding (Schunk, 2013). However, the effectiveness of discovery learning has been challenged by a number of studies that demonstrate that high cognitive load of minimally guided learning prevents knowledge being processed into long-term memory (Kirschner *et al.*, 2006). Others contend that discovery learning and problem-based learning approaches are not as unstructured as Kirschner claims and that they can scaffold higher cognitive learning (Hmelo-Silver *et al.*, 2007). The type of scaffolding provided for a group task impacts on the student experience, for example, a template was more effective than a detailed worked example when students collaborated on a wiki (Jung and Suzuki, 2014). The quality of interactions in co-constructivist approaches is highlighted by Barnard who recommends a range of student-student interaction activities including cooperative problem-based learning and guided discovery (Bernard *et al.*, 2009).

3.3.4 Cognitive constructivist learning theories

In this quadrant, reality is viewed as existing objectively, a realist view. In contrast to the co-constructivists, it is the individual who constructs their own reality by becoming aware of contradictions and problems, and by reflecting and assimilating new knowledge. Piaget describes the stages of intellectual development children progress through as they become able to understand and assimilate new knowledge into their pre-existing knowledge. For Piaget, as they experience cognitive conflict, they move through sensorimotor, preoperational,

concrete operational and formal operational stages (Piaget and Inhelder, 1969). Despite the view that Piaget is regarded as a significant figure in constructivist learning theory, Thomas (2007) argues that many of his ideas have since been refuted. Piaget's view of learning development as a series of linear steps, for example, does not reflect the now more accepted view of the flexible nature of the brain (Thomas, 2007). Some of Piaget's ideas have been applied to online learning, including the notion that online activities should be initiated by a 'triggering event' that is cognitively challenging (Garrison and Vaughan, 2008). Similarly, the theory of transformative learning suggests that students' perspectives should be challenged through a variety of activities including critical incidents (Mezirow, 1997).

An interesting example of cognitive constructivist pedagogy is one that uses PCP as an approach to teaching science. This approach has a focus on individual constructions, conversation and group work and incorporates five learning activity phases (Fetherston, 1997).

A key framework for designing online learning activities based on a cognitive constructivist approach is the 'conversational framework' (Laurillard, 2002). This framework supports the development of structured activities that enable learners to construct their own learning with the support of tutors. The framework includes a series of dialogues using four types of communication: discussion, adaptation, interaction and reflection between learners and tutors. There are five main types of online technologies that support these dialogues:

- Narrative media tell or show the learner something (e.g. text, image);
- Interactive media respond in a limited way to what the learner does (e.g. search engines, multiple choice tests, simple models);
- Communicative media facilitate exchanges between people (e.g. email, discussion forum);
- Adaptive media are changed by what the learner does (e.g. some simulations, virtual worlds);
- Productive media allow the learner to produce something (e.g. word processor, spreadsheet).

(Fill and Conole, 2005, p.10)

The conversational framework includes elements of Kolb's learning cycle in which learning is viewed as a repeating series of experiences, feedback and reflections (Kolb, 1984). It also draws on Pask's (1976) Conversation Theory that suggests structured interactions lead to the construction of knowledge. The conversational framework has been used as the basis for the Learning Designer, a sophisticated system to aid tutors when designing online learning (London Knowledge Lab, 2016). However, the conversational framework does not seem to be

able to accommodate the increasing use of collaborative group work in online learning and appears to focus mainly on one-to-one relationships between tutor and student (Michaelson, 2002, in Bird, 2007). Phillips and Luca (2000) developed an adapted version to incorporate student-student interaction to use for their project.

Bandura's social cognitive theory, in contrast, demonstrated that it was not necessary for people to actually carry out actions or receive feedback in order to learn. They were able to learn by observing both the action and the responses that the action generated in others (Bandura, 1971).

3.3.5 Situated constructivist learning theories

In this quadrant are writers who suggest that knowledge is constructed in the social environment, and that there is no reality separate from this. We are said to live in a multiple-reality universe, that is, an idealist perspective. Our constructions are the real world, based on our collaborative social interactions. Educational experiences should therefore present knowledge as ill-structured and with a variety of points of view (Kanuka and Anderson, 1999). For example, the use of 'random access instruction' in which students are presented with a variety of cases, and use collaborative problem solving techniques to help develop cognitive flexibility (Spiro *et al.*, 1991). An approach to learning that focusses on the development of community knowledge through interaction is Knowledge Building discourse (Scardamalia and Bereiter, 2006). They propose a schema of discourse 'moves' that enable knowledge building including meta-dialogue and critical discourse (Bereiter and Scardamalia, 2016).

3.3.6 Radical constructivist learning theories

In this quadrant, writers take the view that each individual constructs their own knowledge and understanding based on their individual experience, and that there exists no shared reality (Kanuka and Anderson, 1999). This is an idealist perspective that states we cannot know each other's understanding (von Glasersfeld, 1984). One model for learning activities is a 'cognitive apprentice' approach in which the tutor supports learners as they plan and organise their own learning, and then provides a range of problem-based learning activities to develop students' metacognition skills (Kanuka and Anderson, 1999). Von Glasersfeld suggests that students both set and solve authentic (i.e., real-world), messy problems in collaborative groups (von Glasersfeld, 1984).

In summary, in both the situated and radical constructivist quadrants, the philosophical stance is idealist. This stance takes the view that there exists no objective reality, and that what we conceive of as reality is in fact our own construction. This view, in which individuals construct

many different realities is a challenging perspective because common knowledge cannot be assumed. Matthews (1993) argues that this may not lead to effective pedagogies.

Although these four quadrants offer a way to make sense of the many approaches to constructivist learning theory, there remain difficulties in using a generic 'constructivist' approach to designing learning as some of the pedagogic implications conflict with one another. For example, social learning versus individual, and structured cognitive activities versus messy 'real-world' activities. Section 3.3.11 below considers a way to combine constructivism with other theoretical approaches in the eDAT.

3.3.7 Cultural Historical Activity Theory (CHAT)

In addition to the psychological theories of learning discussed above, cultural historical activity theory (CHAT) also explores the use of technology in learning.

Conole (2013) argues that sociocultural perspectives including CHAT are dominant in the e-learning research field. CHAT has been called "Vygotsky's neglected legacy" (Roth and Lee, 2007, p.186) who emphasise its usefulness as an approach that uses human 'activity' as the fundamental unit of analysis, and because it enables a dialectical synthesis of cultural and historical aspects of learning.

Activity theory (on which CHAT is based) was developed by Vygotsky in the 1920s as an approach to understanding the human mind (Vygotsky and Cole, 1978). It is a social theory in which a person's everyday interactions and artefacts together create consciousness, and it is through this unity that we develop as people (Kaptelinin and Nardi, 2006). Higher cognitive learning requires the mediated use of tools such as language and signs (Bozalek *et al.*, 2015). CHAT is a framework that focusses on learning as part of a whole activity system that includes the subject (the individual), the object (i.e. the learning) and tools (e.g. language, signs, technology etc.) in addition to psychological learning processes. Engeström's development of Vygotsky's theory adds rules, community and division of labour to the activity system, as in figure 9.

This approach enables a more critical consideration of the use of technologies as 'mediating artefacts' because of the inclusion of cultural, historical and social aspects (Conole, 2013). This may answer challenges that technological determinism is dominant in e-learning research (Oliver, 2011).

CHAT has been shown to be a useful approach that integrates subjects, objects and tools in authentic settings. For example, Zurita and Nussbaum (2007) used an activity theory

framework to assist with the development of a model for using mobile devices in junior maths classrooms to support collaborative group activities. It has also been used as a framework for designing work-based learning activities (Collis and Margaryan, 2004).

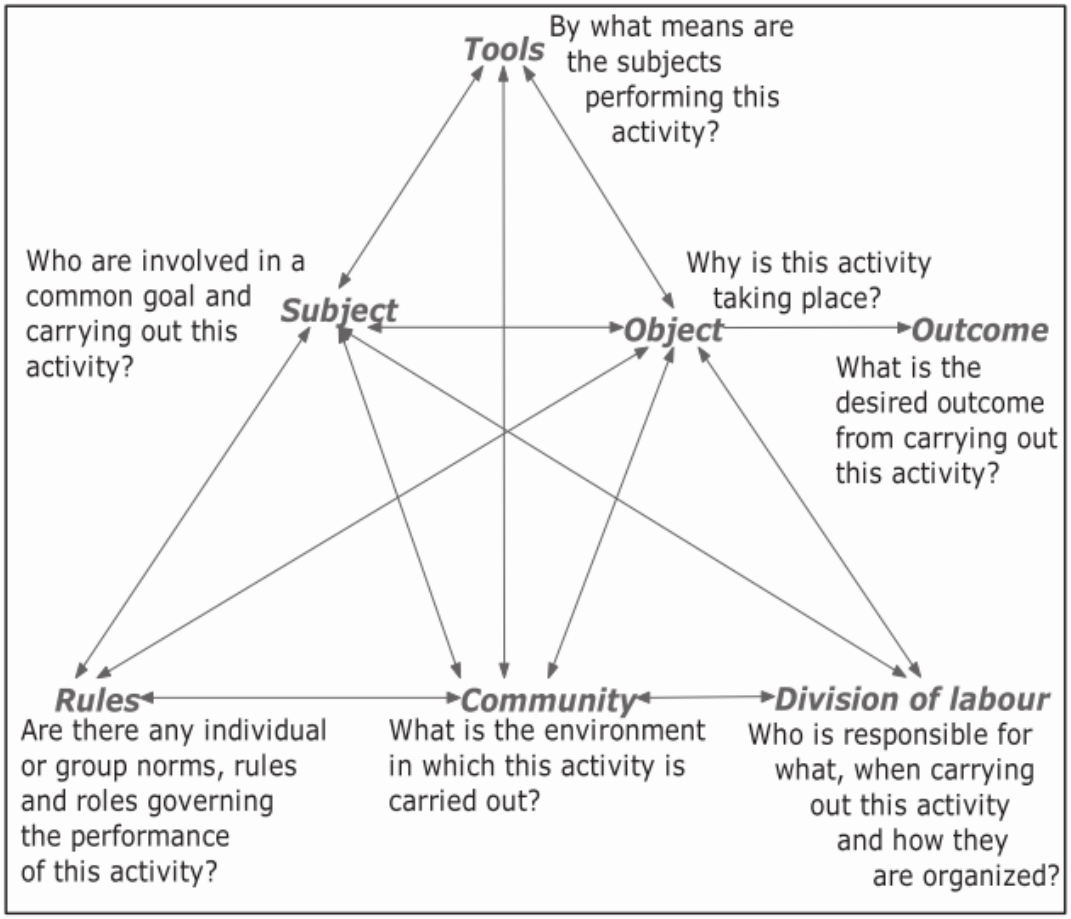


FIGURE 9: CHAT THEORY

(Zurita and Nussbaum, 2007)

As a further example, the activity system of ODL in the context of this study can be expressed using the model as:

- Tools = VLE, email, learning tasks, learning materials
- Subject = tutors and students
- Object = learning outcomes, retention
- Rules (explicit or implicit) = expectations of ODL, learning approaches, personal perspectives about online learning
- Community = other tutors/other learners
- Division of labour (explicit and implicit organisation of the community) = the roles of the tutors, course management teams, administrative staff, technology support staff, pedagogy support staff

The benefit of this analysis is that it shows the significance of integral parts of the system that might not always be visible in a discussion about online learning.

However, the concept of 'activity' is by no means clear, and there remains much that is uncertain in the notion of activity theory, as well as a tendency for oversimplification of the concepts involved (Bakhurst, 2009).

3.3.8 Transactional distance theory

Transactional distance theory has been developed to explore the particular features of distance learning. It uses the concept of transactional distance to describe the psychological distance between tutor and student (Moore, 1993). It is a pedagogic concept "describing the universe of teacher-learner relationships that exist when learners and instructors are separated by space and/or by time" (Moore, 1993, p.22). The approach suggests a number of ways to reduce transactional distance by the use of student-tutor interactions, structure and scaffolding to support student autonomy (Moore and Kearsley, 2011). Moore's work also takes a systems approach that includes many aspects of the wider distance education system. The literature review in Appendix 1 summarises examples of interventions aimed at reducing transactional distance.

3.3.9 Retention theory

Tinto's (1987) retention theory focusses on the extent to which students are socially and academically 'integrated' into the institution, and explores the effect of this integration on retention. Although Tinto's work focussed on campus-based undergraduates, his work has been applied to other contexts. A discussion of the ways that this theory has been applied to ODL retention is included in the literature review Appendix 1.

3.3.10 Learning Design theory

Given the diversity of approaches above, is there a way to combine these many learning theories, technology theories, distance learning theory and retention theory in a way that helps tutors design good quality ODL? Learning Design is a new and developing field, with much research done over the last 10 years (Mor, 2013a) that offers a useful framework. It is a way for developers to be more pedagogically informed and to make effective use of technologies (Conole, 2013). It is both a framework and a theory (Dalziel, Wills, *et al.*, 2016). E-learning is a 'design field', and design-based approaches to research are an effective and pragmatic way to combine approaches. Design-based research enables a focus on developing design principles from data rather than using theory to explain or predict (Phillips *et al.*, 2012).

The Larnaca Declaration is a statement of how the field of Learning Design can contribute to improving teaching and learning (Dalziel *et al.*, 2013). The Larnaca Learning Design Conceptual Map (LD-CM) illustrates how elements are combined as an approach to a 'challenge' in figure 10.

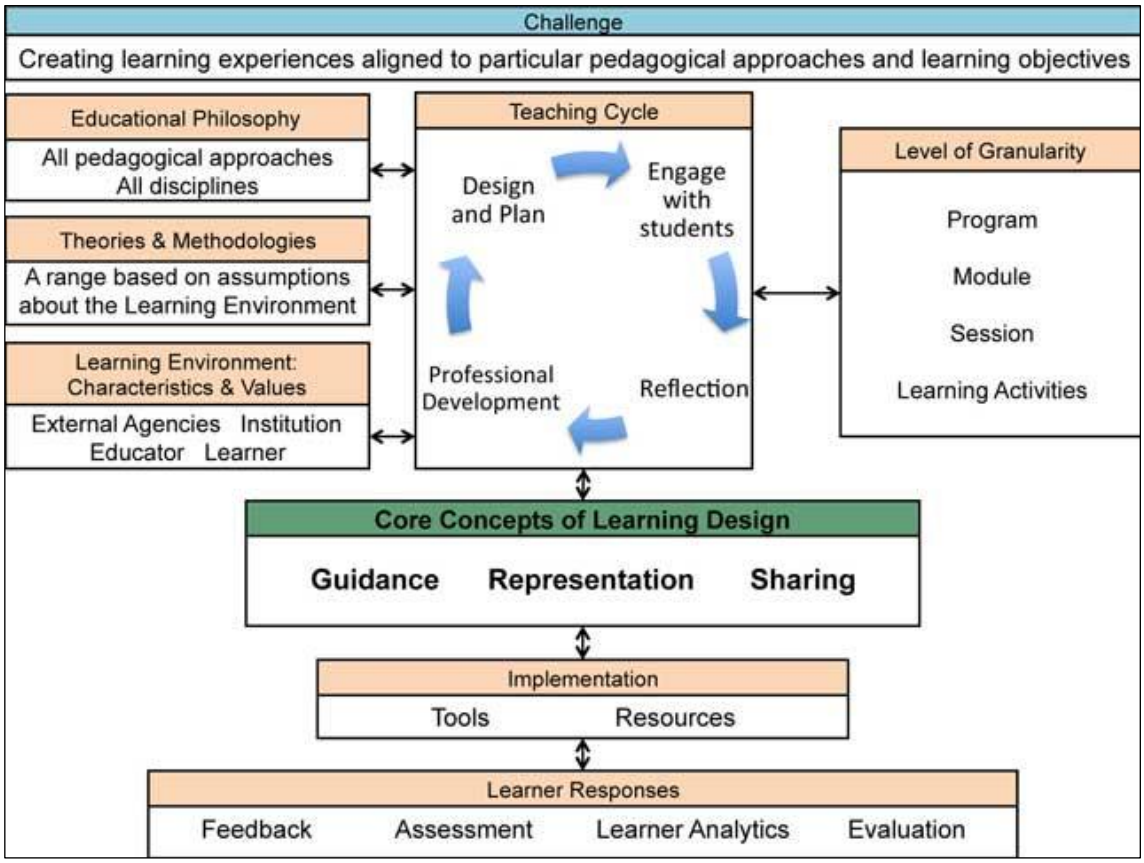


FIGURE 10: LARNACA LEARNING DESIGN CONCEPTUAL MAP (LD-CM)

(Dalziel *et al.*, 2013)

The LD-CM explicitly refers to learning theories, sociocultural approaches and specific distance learning and technological tools utilised in the 'Educational Philosophy', 'Theories' and 'Learning Environment' sections, the intention being to highlight these elements to the designer.

The core concepts of guidance, representation and sharing highlight a central intention of the Learning Design framework. Namely to allow tutors and designers to:

- See guidance on how a learning sequence has been used, and information on how to implement it
- See a representation of a learning sequence that is understandable
- Use the learning sequence and adapt it for their own use

- Share the adapted sequence, with new guidance in an adapted representation in the Learning Design community

(adapted from Dalziel, Conole, *et al.*, 2016)

The Learning Design framework is pedagogically neutral in that a learning design could potentially represent many learning activities including both high quality and poorer designs. However, it is acknowledged that learning designs could be compared to learner data in order to evaluate the effectiveness of a learning design (Dalziel *et al.*, 2013). Laurillard also argues for a less neutral use of Learning Design, suggesting that teaching is a 'design science' striving for change (Laurillard, 2012).

Learning Design, therefore, is a framework for creating learning experiences that considers educational philosophy, theories, learning environments and the core concepts of guidance, representation and sharing.

3.3.11 Combining learning theories with the eDAT

The pedagogic approaches suggested by behaviourist and constructivist philosophies are varied and the different philosophies, learning theories and pedagogic approaches often overlap. For example, most theories agree that learning occurs through association of one kind or another (Schunk, 2013). But some writers view behaviourist and constructivist philosophies as dichotomous, from incompatible, if evolving paradigms (Wilson and Myers, 2000). It is common for behaviourism to be used as a pejorative label (Nunes and McPherson, 2003), and it seems to have taken the blame for weakness of teacher-centred and didactic modes of delivery (Wilson and Myers, 2000). Constructivism, on the other hand is much more widely accepted (Jonassen and Land, 2000).

It can be argued this is a false dichotomy partly because of the tendency to use generalisations about behaviourist and constructivist approaches and to oversimplify them. For example, Kirschner *et al.'s* critique of constructivism (see page 45), specifically refers to 'constructivist' and 'discovery learning' as though they were identical, and implies that this is representative of all constructivist approaches, rather than being from a specifically radical constructivist approach (Kirschner *et al.*, 2006). Behaviourism's focus on active learning, individualised instruction that builds on what learners already know, together with continuous feedback, was actually proposed as an improvement on traditional didactic techniques (Wilson and Myers, 2000).

Ally (2008) suggests that learning designers avoid philosophical differences and differing world views of behaviourism and constructivism by simply using both approaches. Similarly, a 'cycle' of theories can be used depending on the type of learning. For instance, using associative theories to teach factual material, using cognitive and constructive theories for exploring new knowledge (Mayes and de Freitas, 2013), although it's unclear how these types of activities can be easily separated.

Instead of using a variety learning theories and pedagogical approaches, some writers have produced summaries of key aspects of theories as sets of principles to guide learning activity planning. For example, Kanuka and Anderson (1999) argue that all constructivist writers agree that:

- new knowledge is built upon the foundation of previous learning;
- learning is an active rather than passive process;
- language is an important element in the learning process,
- the learning environment should be learner-centred.

(Kanuka and Anderson, 1999, no pagination)

Taber (2011) combines different constructivist concepts into the single pedagogic principle of 'optimum guidance' where the tutor uses a mixture of presentation and group work activities based on their knowledge of students' needs. Similarly, Swan (2005) suggests the following constructivist principles for designing online learning: learner-centred, knowledge-centred, assessment-centred, and community-centred. Laurillard (2012) argues that effective learning encompasses three cycles of communication that combine instructivism and social constructivism: teacher communication, teacher practice and modelling, and the peer communication cycle.

In practice, many learning activities based on constructivist and behaviourist learning theories are rather similar. For example, the behaviourist learning activity examples given above (see page 41) that include trial and error, learning by doing, instruction with feedback, concept maps and online interactivities could all be thought of as constructivist activities. Similarly, apprenticeship, problem-solving and case-based learning could also be seen as behaviourist-style learning activities. Ravenscroft argues that behaviouristic and social constructionist approaches to online interaction can be reconciled through "considering the stimulation, motivation and reward for online behaviour as well as the need for educational discourse along Vygotskian lines" (Ravenscroft, 2003, p.14).

The literature review in Chapter 2 indicates that interaction and feedback are associated with higher student satisfaction and retention on ODL. Behaviourist learning theories suggest that a focus on feedback reinforces learning, whereas constructivist learning theories emphasise that learning occurs through interaction with others. Thus, it is concluded that learning activities that include both interaction and feedback are recommended as key activities in ODL.

The discussion above illustrates the variety of theoretical approaches to understanding learning that have been used to develop learning in general and ODL. In the next section, the theory of PCP is considered as an approach to understanding the tutor's individual perspectives about effective teaching and learning activities, and to consider how this might impact on practice.

3.4 Personal construct psychology

Personal construct psychology (PCP) can help understand how tutors' perspectives about learning impact on creating, interpreting and categorising ODL activities. In addition, it offers a methodology, the repertory grid, to gather qualitative and quantitative data about these perspectives. Kelly developed PCP in 1950s America and his principle intention was to help psychotherapists understand their clients, this being his 'focus of convenience' (Kelly, 1963, p.12). Kelly's theory is based on the assumption that people construct meaning out of life's experience and that this understanding is then used to anticipate events, "man looks at his world through transparent patterns or templates which he creates and then attempts to fit over the realities of which the world is composed" (Kelly, 1963, p.8). The literature review in Chapter 2 includes a summary of ways that PCP and repertory grids have been used in a variety of fields, including market research, organisational studies and education.

Kelly's philosophy of constructive alternativism states that there are always alternatives to the individual ways we construe or create meaning. This approach to knowledge is similar to co-constructivist learning theories (see page 44), but he based this on a positivist scientific framework (Shaw and Gaines, 1992). Kelly defines theory as "a tentative expression of what man has seen as a regular pattern in the surging events of life" (Kelly, 1963, p.19). There is a direct relationship between PCP philosophy, theory and practice (Fetherston, 1997). This contrasts with behaviourist and constructivist learning theories where the link between theory and practice is not always clear. For Kelly, theory and practice must be explicitly connected. His model is 'person as scientist', who is primarily concerned with prediction and control (Butt, 2004).

PCP is a reflexive theory in that we are all construing, including those who explore the theory and consider how it can be applied in practice. A commentary about the researcher's own perspective can be found in Chapter 6, page 134.

3.4.1 Constructs

Different terms have been used by Kelly and others to describe and explain what constructs are. Kelly uses the terms, 'transparent patterns or templates', 'representations' and 'channels' for constructs, and the individual process of using constructs is described both as 'placing an interpretation' and as 'choosing vestibules *through* which one passes during the course of [their] day' (Kelly, 1963, p.66 italics in original). Constructs are also called "implicit theories" (Fransella, Bannister and Bell, 2004, p.2) as 'tacit' knowledge (Hemmecke and Stary, 2004) and "essentially a discrimination which a person can make" (Bannister and Fransella, 1986, p.27). Constructs are concerned with contrasts and are relevant and specific to the individual, and limited to a specific 'range of convenience'. Constructs are similar to, but not the same as 'concepts', and they are not necessarily the same as a generally accepted definition (Blowers and O'Connor, 1995). They can be thought of as dimensions of psychological movement rather than an individual notion. In this study, the terms 'perspective' and personal constructs are used interchangeably.

Because constructs have a finite range of convenience they require a relevant context to be meaningful for the individual (Kelly, 1963). For example, tutors who are familiar with traditional didactic models of delivery may find it difficult to construe online learning as a form of 'contact time'. There are different styles of construing and constructs can be used in different modes. Pre-emptive constructs are used in an exclusive way, for example a person may construe 'online learning' simply as 'Googling' or plagiarising content from Wikipedia and nothing else. Constellatory constructs are evidence of stereotypical thinking, for example online learning may be assumed to be a combination of shallow learning, impersonal learning and only for 'geeks'. A third type is a propositional construct and this perhaps offers the greatest opportunity for flexibility in thinking. For example, online learning may be construed as resource-based learning, student-centred study, collaborative content creation including Wikipedia, social learning (through social media and personal learning networks) and so on. The mode in which a construct is used therefore indicates the extent to which the person can re-construe, elaborate their construct systems and so progress their learning. The modulation corollary described below, indicates ways that constructs can change, for example by dilation and constriction. Dilation refers to the process of widening the view of the world in order to re-structure and incorporate new constructs, whereas constriction is a process of focussing

and clarifying (Bannister and Fransella, 1986). Both processes describe ways that a person is learning through their reflections on their experience of life, that is, their 'experiments'. Movement between the two is essential if learning is to progress effectively.

Kelly describes constructs as dichotomous in the sense that in order to construe something, an individual needs an awareness of its contrast (Kelly, 1963). So, to construe 'interaction', an individual may contrast with, say, 'silence' or 'writing' or 'listening' and each of these pairings of dichotomous constructs suggests different meanings. Kelly does refer to 'shades of grey' and the possibility that constructs can be used in a relativistic manner (Kelly, 1963, p.66).

The words used to describe constructs are not the actual psychological entity, but are a verbal label for the construct that may not always be available to the individual. A person may not be able to articulate a construct, but may find themselves responding to an event with "speechless impulse" (Kelly, 1963, p.16). For example, during the repertory grid interviews in the current study some tutors commented on how few opportunities they had had in their professional career for describing their own constructs about learning, and how challenging they found this task. Nevertheless, they could create, deliver and evaluate learning in their professional contexts. The constructs are dimensions or ways of thinking that tutors held when creating learning activities, and the ways of thinking that raters used when categorising learning activities. Their different construct systems led to the difference in categories selected between raters. This is discussed further in Chapter 6.

Kelly's theory is a logical extension of his philosophy and is stated as a fundamental postulate and a series of corollaries (Kelly, 1963). The term 'postulate' is used as it emphasises that the statement is an assumption, a basis for reasoning on which the theory rests. The corollaries follow from the postulate and elaborate it as below. The discussion of some of the corollaries below includes comments on the relation of each corollary to the use of the eDAT, the repertory grids completed by tutors and, where possible, interaction and feedback activities.

3.4.2 Fundamental postulate

"A person's processes are psychologically channelized by the ways in which they anticipate events" (Kelly, 1963, p.46). This postulate is Kelly's attempt to state what drives an individual's behaviour. Unlike other psychological theories that say a person is responding to a stimulus or reward, or behaving instinctively, Kelly suggests that our behaviour is our continual experiment with life based on our own theory and expectations (Bannister and Fransella, 1986). This tells us that different choices made by raters in the eDAT pilot studies were based on constructs or interpretations that raters made and cannot simply be dismissed as errors.

The completed repertory grids give a glimpse into the range of theories and expectations that tutors held.

3.4.3 Construction corollary

"A person anticipates events by construing their replications" (Kelly, 1963, p.50). Constructs are 'interpretations' of events and are made up of a series of similarities and contrasts that enable them to be distinguished. The replications are repeated themes that people recognise, similar to the assumption made by behaviourists with their notion of the process of conditioning (Bannister and Fransella, 1986). However, as Kelly notes: "no-one ever yet responded to a stimulus. They respond to *what they interpret the stimulus to be*" (Bannister and Fransella, 1986, p.10 italics in original). The raters in this study were experienced educators and were familiar with learning activities in different contexts. This corollary tells us that raters will nevertheless have interpreted and categorised these activities in line with their constructs and expectations based on their previous experience of learning activities.

3.4.4 Individuality corollary

"Persons differ from each other in their construction of events" (Kelly, 1963, p.55). This is a key corollary in that it highlights differences between people even in similar contexts with similar backgrounds. Bannister states that: "Each of us lives in what is ultimately a unique world, because it is uniquely interpreted and thereby uniquely experienced" (Bannister and Fransella, 1986, p.10). The raters in this study, despite their professional similarities, had different constructs that made them see the same learning activities in the eDAT categorisation task through different 'goggles'.

3.4.5 Dichotomy corollary

"A person's construction system is composed of a finite number of dichotomous constructs" (Kelly, 1963, p.59). Kelly here is suggesting that constructs can be seen as having 'poles': an affirmative and a contrasting negative pole. As a minimum, a construct is a way in which a person can group two aspects (called elements) as similar and in contrast with a third (Kelly, 1963). The contrasts help us understand the way a construct is meaningful for an individual. For example, the eDAT categorisation category used in one of the pilot content analysis tasks used the terminology 'student-centred' which could be contrasted with 'tutor-centred', but for some, might have a different meaning and be contrasted for example, with 'assessment-centred'.

3.4.6 Range corollary

"A construct is convenient for the anticipation of a finite range of events only" (Kelly, 1963, p.68). This means that a construct is used by a person in a particular focus and range of convenience, and not in all cases. For example, the constructs of 'feedback' and 'interaction' have a particular meaning in an educational context and may be interpreted differently in a different context. In fact, an informal comment by one of the tutors expressed surprise that 'interaction' could be applied to online learning because he had assumed that it only related to face-to-face contexts.

3.4.7 Experience corollary

"A person's construction system varies as they successively construe the replication of events" (Kelly, 1963, p.72). In this corollary, Kelly states that personal development is made up of successive construing and re-construing of events, not just by the occurrence of a series of events. This learning process is synonymous with all psychological processes and is what makes a person an individual. Learning is therefore part of a process of making meaning, construing, validating predictions and anticipations rather than a separate process. PCP is essentially a dynamic theory because construct systems constantly change through experience (Bannister and Fransella, 1986). This notion of a person as continually changing and learning is key to PCP and of particular interest in the field of education and in the current study.

3.4.8 Fragmentation corollary

"A person may successively employ a variety of construction subsystems which are inferentially incompatible with each other" (Kelly, 1963, p.83). This corollary states that some constructs within a system do not connect with others, or are even in conflict with other constructs. Construct systems are not necessarily logical (Bannister and Fransella, 1986). Thus, we saw that tutors sometimes had constructs about learning that seemed to conflict with the way they actually taught. This became evident in discussions and to some extent in the repertory grids. It is interesting to note here that the Teacher Perspectives Inventory (Pratt, 2014) (an online survey to elicit teacher beliefs), includes questions to identify any differences between what a teacher thinks is important and what they actually do.

3.4.9 Commonality corollary

"*To the extent that one person employs a construction of experience which is similar to that employed by another, their processes are psychologically similar to those of the other person*" (Kelly, 1963, p.90). This corollary states that individuals, even with very different experiences,

may construe something in similar ways, even when we might not expect it. The similarity arises from their individual construing and not on their similar culture, experiences or context.

3.4.10 Sociality corollary

"*To the extent that one person construes the construction processes of another, they may play a role in a social process involving the other person*" (Kelly, 1963, p.95). This corollary contrasts with the commonality corollary in that the focus here is on an individual participating in social roles with others. They must therefore be able to construe the other person's outlook in order to achieve effective communication. Interpersonal interaction depends on understanding of the other and playing a role in a social process with them (Bannister and Fransella, 1986). This corollary is significant for this study as it focusses on the nature of the roles played by tutors and students and how their interactions can lead to greater understanding of the other. If a tutor can construe the personal construct system of a student, they may be better placed to find ways to inspire, teach and support them in their learning. Similarly, if students can understand a tutor's personal construct system they may be better able to communicate and learn from them. This corollary highlights the benefits of reflecting on one's own constructs, and discussing constructs and perspectives with students to improve teaching and learning.

3.4.11 Repertory grids

Kelly's (1963) PCP theory remains consistent through its philosophy, the fundamental postulate and corollaries which follow from it, right through to practical methodologies developed for exploring an individual's construct system. The organisation corollary states that a person's constructs are arranged in a structured system and this offers the opportunity to examine them using the repertory grid technique originally developed by Kelly. Different versions of repertory grids have been developed. The method used in this study involved tutors making a list of teaching and learning activities called 'elements', grouping the elements into triads and then discriminating between them to explore how two were similar and one different from the others. The contrasting poles which result from this process are constructs which can then be used to review and rate the remaining elements (Jankowicz, 2004). Grids can be statistically analysed to explore relationships between elements and constructs in order to describe the "geometry of psychological space" (Kelly, 1969, in Shaw and Gaines, 1992, p.24). This geometry supports the theoretical foundations of PCP (Shaw and Gaines, 1992).

The repertory grid method relies on constructs being dichotomous and is consistent with the corollaries. However, not all writers agree that constructs are necessarily dichotomous, some suggesting that bipolarity may be an important, but not essential aspect of personal constructs

(Riemann, 1990). Yorke critiques the use of binary constructs giving a number of examples of studies that illustrate the problematic nature of bipolarity, saying that bipolar constructs "might well not be simple gradations between opposing poles" (Yorke, 2001, p.172). He proposes a typology of 5 general types of bipolar scale including symmetrical, asymmetrical, unidirectional, cumulative and binary whilst also noting that individuals, during the elicitation of constructs for repertory grids, may use the scales ideographically (Yorke, 2001). Kelly introduced PCP by saying that "our view of constructs as dichotomous abstractions is in the nature of an assumption" (Kelly, 1963, p.106) but Yorke suggests that it is not necessarily helpful to treat construing as though it were bipolar and that researchers should specifically ask responders in repertory grid activities what the polar labels mean to them. They should establish the time-slice to which ratings refer; critically review the nature of the scales used and explore what the mid-point means to a respondent (Yorke, 2001). This suggests that the resulting repertory grid analysis based on constructs elicited may be unreliable unless care is taken by the interviewer to take these aspects into account during the repertory grid activity.

3.4.12 Personal construct psychology, learning and the eDAT

The theory of constructive alternativism that underpins PCP helps researchers to understand why different people may have different meanings or ways of thinking about the same thing. Tutors and learners have different perspectives about teaching and learning that will impact on their experience of education. If ODL tutors and raters have different meanings and understanding of teaching concepts, or different perspectives about learning then they are less likely to be able to categorise learning activities in the same way.

PCP takes a very different stance to understanding learning than the learning theories above. Kelly's approach is a specifically personal psychology and the person is taken to be the minimum unit of study. Individual behaviour, motivation, social roles etc. cannot be studied independently of the person but can only be understood as part of their personal constructs (Bannister and Fransella, 1986). Learning is a fundamental part of the theory, a universal experience that takes place as the person 'successively construes the replications of events' (Kelly, 1963, p.53). The theory of PCP and the use of repertory grids formed the basis for a structured reflective approach to learning, 'Self-organised Learning' and 'Learning Conversations' (Harri-Augstein and Thomas, 1985; Harri-Augstein and Thomas, 1991). A number of other writers have used these approaches, for example, in the development of critical thinking scaffolds (Chng and Coombs, 2004) in which a developing awareness of one's own constructs is part of a student's reflective learning. Carol Dweck's book, *Mindset* (2006)

proposes that specific ways of thinking about learning can have a significant impact on successful learning that seems to draw specifically on both Kelly's and Harri-Augstein's work.

Behaviourist approaches to learning aim to predict and control a person's behaviour and contain implicit values about students as the 'object' of teaching. In contrast, PCP is a constructivist approach to learning in which the learner constructs knowledge through interaction and reflection. This contrasts with the stance taken by Activity Theory that focusses on understanding the activity that the person carries out with tools and other persons rather than on the person themselves.

The variation in an individual's awareness of their own construing, including the possibility that a construct, or one of its poles, is hidden, and that the individual may have difficulty in separating their own constructions from 'tacit knowledge' shows the potential of PCP to understand such issues. Difficulties of this nature emerged when trying to understand the construct systems of participants in this study. This gives an insight into the reasons why the apparently straightforward eDAT categorisation task was challenging for participants.

The construct systems of raters affected the way they understood and applied the categories of, for example, 'student-managed' and 'interaction' (see Chapter 5, page 88). The individuality corollary proposes that raters would have different constructs, and the commonality corollary suggests that similar experiences may have led to different tutors having some similar constructs. PCP theory suggests that learning activity terminology that corresponded to existing constructs used by raters would be more meaningful and therefore rated more consistently. This is discussed further in Chapter 6, page 126.

3.5 Theory conclusion

Theory is essential for how tutors and learners come to understand learning. There are a range of theories that can help to understand ODL and these theories, based on varying epistemological stances, offer a variety of pedagogic approaches. Behaviourist theories focus on activities that provide feedback to the learner, constructivist theories focus, to different extents, on the use of interaction activities for learning, as do transactional distance and retention theory. Thus, together with the literature discussed in Chapter 2 and Appendix 1, a case is made for these two types of activity to be recommended as key for ODL. CHAT and Learning Design combine theories with a focus on the use of technology and tools to support activities for learning. PCP theory helps to understand how different perspectives and ways of thinking about teaching and learning impact on both the design and categorisation of learning

activities. Finally, the eDAT can combine behaviourist and constructivist learning theories with tutor perspectives in a Learning Design framework.

The next chapter builds the case for a mixed methods approach to this study that can combine two methods to explore how learning activities can be identified and categorised in ODL, and how tutor perspectives can be explored and their impact on ODL understood.

CHAPTER 4: MIXED METHODS METHODOLOGY

4.1 Overview

In Chapter 2 and Appendix 1 it was ascertained that there is no generally agreed method for describing learning designs to evaluate their impact on retention. It was also proposed that tutor perspectives impact on designing and evaluating learning designs. Chapter 3 established that a focus on learning activities incorporating interaction and feedback was supported by a combination of behaviourist and constructivist learning theories. Learning Design theory offered a framework for learning design representation and evaluation, and PCP was discussed as a useful way to understand tutor perspectives on learning designs. Prior to explaining the two methods chosen in detail, it is important to explain the methodological stance taken. This chapter therefore outlines the underlying philosophical approaches used in this study and discusses how they support both the content analysis and repertory grid methods used to create the eDAT.

Section 4.2 includes an introductory overview of the methodological approach and summarises the overall process for creation of the eDAT. Sections 4.3, 4.4 and 4.5 overview the key terms used in this study namely, paradigms, ontology and epistemology respectively. A discussion of the positivist paradigm is undertaken in section 4.6, with a focus on how this impacts on notions of reasoning, empiricism, causality, validity, and how it supports the content analysis method. The interpretive approach is discussed in section 4.7, and the different approaches to reasoning, empiricism, causality and validity are discussed in relation to the repertory grid method. Section 4.8 overviews the critical realist stance taken and in section 4.9 a case for a pragmatic, mixed methods approach is made. Ways that care has been taken to conduct an ethical study is in section 4.10.

4.2 Research strategy introduction

This section includes a summary of the mixed methods research approach used for this study following due consideration of the approaches discussed in more detail below.

This mixed methods research study takes a critical realist and pragmatic philosophical stance. The study makes the ontological assumption that an objective reality exists, that is, that learning activities are real, exist in the objective world and can be categorized. However, this objective world cannot be accessed directly as experiential perceptions are interpreted, and meanings about learning activities are constructed subjectively. This constructivist epistemology is located within the context of a realist ontology, where there may be multiple

perspectives and constructs about learning activities, not all of which can be fully known. Thus, knowledge can only ever be approximate.

This study uses a postpositivist epistemology to support the use of a quantitative content analysis, in addition to an interpretivist epistemology to support the use of repertory grid methodology. Whilst the learning activities exist and can be categorized, there are likely to be multiple interpretations by different tutors. The repertory grid content is ideographic, based as it is on constructive alternativism (Kelly, 1963).

A 'critical multiplism' of theories are used in this study to explain and understand ODL, including learning theories, distance learning, learning design and PCP theory. They are approximate representations that acknowledge that alternative interpretations may be possible.

The critical realist stance takes a process or generative view of causality that recognises the explanatory importance of meaning and context. PCP is used to explore ways that individual tutors construe learning and teaching. It is concerned with how this may 'channelize' or cause their social behaviour as they interpret and categorize learning activities.

A pragmatic approach focuses on practical problem solving and this study will enable the comparison of quantitative content analysis data with interpretive repertory grid elicitation to more fully understand and explain the way that learning activities can be categorized. It is recognised that the tool developed, the eDAT, is a pragmatic approach to representing and quantifying learning designs and can only be an approximation.

The methodologies selected for this study were content analysis and repertory grid. The research questions (see page 35) have been constructed to include mixed methods research elements in an adapted explanatory sequential design (Creswell, 2015) that will include:

1. Quantitative content analysis of the learning activities through several pilots
2. Review of content analysis results (categories, types of learning activities and inter-rater agreement)
3. Determination of quantitative results that require explanation
4. Qualitative repertory grid elicitation
5. Repertory grid results
6. Interpretation of how qualitative results relate to quantitative data

The overall aim of this study, stated in Chapter 1, is 'to create an effective tool, the e-Design Assessment Tool (eDAT), to categorise and represent learning designs for online distance learning (ODL) to improve practice'. This is in part a political aim in that successful completion

of studies has a beneficial impact on human lives, whereas early withdrawal may have a negative impact (Bynner and Egerton, 2001). The use of technology to support learning is a contested area in educational research and, as suggested above, does not always utilise critical approaches. In this study, CHAT (see page 48) has been used as a tool to contextualize learning activities as part of a whole distance learning system, and learning design is presented as a critical theory (Conole, 2013). Pragmatism can be critiqued for evading socio-political contexts (Mertens, 2003), and this study enables discussion and contribution to the creation of the eDAT by the potential users as part of their role as raters and repertory grid participants.

4.2.1 Structure of the study: evolution and creation of the eDAT

- The initial eDAT is prepared based on previous learning design tools as described in Chapter 2. This includes a set of learning activity terminology as used in the e-Design Template (Walmsley, 2015), pedagogic guidance and is presented in a table format.
- Phase one of the study will use an objective, empirical, postpositivist content analysis methodology to categorise the learning activities from four ODL courses using trial versions of the eDAT. Statistical tools will be used to analyse the IRR of each set of trial terminology in the eDAT. Subsequent versions of the eDAT will be modified based on the IRR and participant feedback.
- Phase two of the study will use a subjective, interpretive repertory grid methodology to elicit personal constructs about learning and teaching used by a small number of tutors and raters.
- Phase three of the study will explore and discuss how raters and tutors' perspectives may have influenced the way ODL activities were categorised, and how perspectives may impact on sharing of learning designs.
- The final version of the eDAT is produced that incorporates the most consistently applied vocabulary as identified by the content analysis; a tutor perspectives checklist as suggested by the repertory grid findings and builds on design features from other learning design tools (see literature review page 28).

The overall structure of the evolution of the eDAT through this study is illustrated in figure 11.

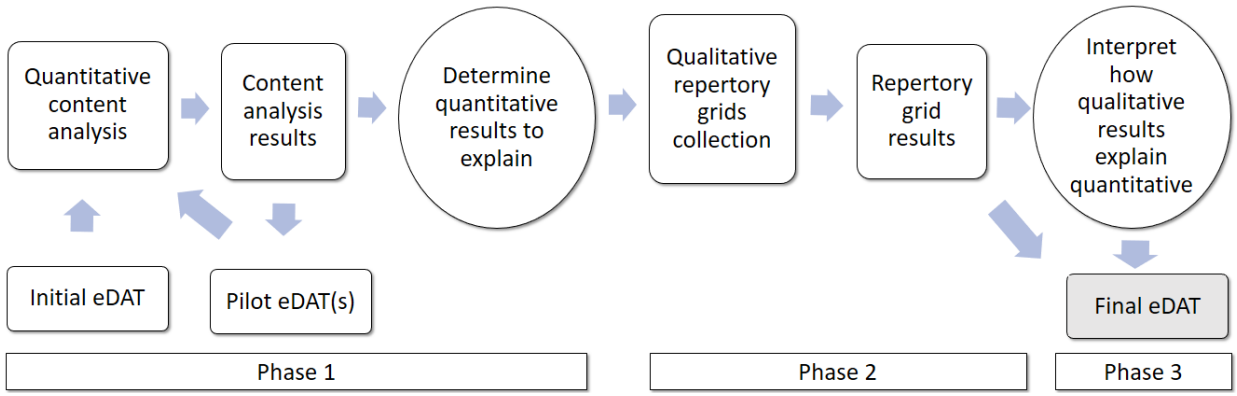


FIGURE 11: MIXED METHOD EXPLANATORY SEQUENTIAL DESIGN WITH EVOLUTION OF EDAT

4.3 Philosophical paradigms

The concept of a philosophical 'paradigm' is taken from Kuhn's (1970) work on revolutions in science, and is typically used to mean a world-view that embodies a cluster of beliefs that scientists hold (Mertens, 2012). However, Kuhn used the word in a number of different ways, Masterman (1970) noting 21 different uses, and other writers also use the term differently. For example, a paradigm can also be thought of as a "theoretical structure or framework of thought that acts as a template or example to be followed" (Miller and Brewer, 2003, p.220). In contrast, Freshwater and Cahill (2013) see the concept of paradigms as ''elusive'' and describe four types of paradigms: paradigms as worldviews; as epistemological stances, as shared beliefs and as model examples. Figure 11 illustrates how each subsumes the other:

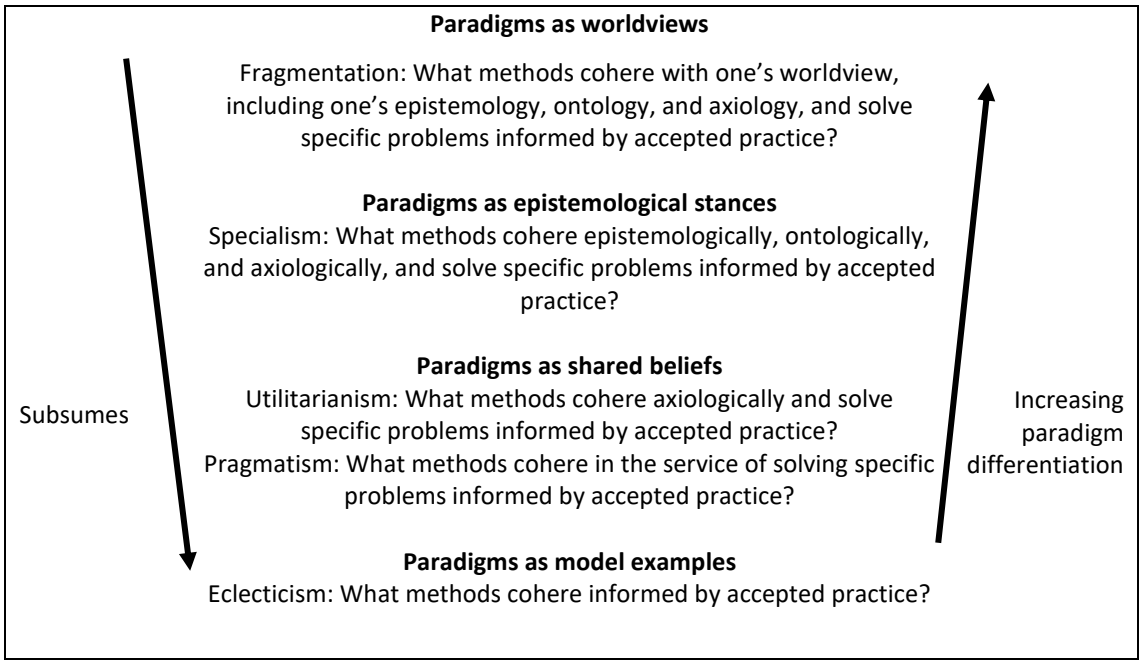


FIGURE 12: PARADIGMATIC FRAME

(adapted from Freshwater and Cahill, 2013, p.5)

In this study, the concept of paradigm is taken to mean a worldview that includes an approach to, and beliefs about, ontology, epistemology, and methodology.

Educational, pedagogic and teaching research draw on a range of philosophical concepts taken from diverse fields. These include social science, defined as: "the study of human society and social relationships" (Oxford English Dictionary, 2016). Behavioural science is also drawn on and defined as: "the scientific study of human and animal behaviour" (Oxford English Dictionary, 2016). Pedagogy is "guidance-to-learn: learning in the context of teaching, and teaching that has learning as its goal" (Beetham and Sharpe, 2013, p.43), or the "art, science and practice of teaching" (Hickman, 2013, p.74). Whereas teaching "encompasses not only the practical application of teaching, or pedagogic, skills, but also curriculum issues and the body of theory relating to how and why learning takes place" (Wallace, 2009, p.219). This diverse educational research field incorporates a range of typologies of philosophical paradigms and approaches to methodology which can lead to confusion and inaccuracy if not clarified (Hammersley, 2012). There is no single way to distinguish between the paradigms, and different typologies and terms are used for different purposes, which has led to "paradigm proliferation" (Donmoyer, 2006, p.11). Thus, different paradigms have over time, begun to blur and shift (Lincoln *et al.*, 2011). However, this study will use the research paradigm typology described by Cohen *et al.*, (2011) that includes positivist, interpretive, critical and mixed methods. This typology is commonly used in educational research and provides a useful paradigmatic structure that is discussed below.

This study also uses PCP which, in contrast to the variety of paradigms used in education, sets out a very clear logical structure from a philosophical standpoint, and incorporates specific approaches to ontology, epistemology and theory (Kelly, 1963).

Not forgetting that "paradigms are human constructions" (Denzin, 2010, p.421), the personal paradigm worldview or philosophical standpoint of researchers influences choices of research questions, methods, values and the way outcomes are interpreted (Lincoln *et al.*, 2011). Cohen *et al.*, (2011) agree that each philosophical paradigm leads logically to a set of methods and tools for research, although others argue that there is not necessarily a logical inevitability between paradigm worldview and method, as there is so much variety in both (Bryman, 2012).

4.4 Ontology

Ontology can be defined as: "the study and understanding of what exists, or what there is" (Wallace, 2009, p.208). Ontology is thus concerned with what facts or social constructions exist and that can therefore be studied. Ontological perspectives range from objective realism,

where objects are said to have an independent existence and are not dependent for it on the knower, through to subjective nominalism where only thoughts exist (Cohen *et al.*, 2011).

There are several different 'realities' that are considered in this study. The ODL activities that have been written by tutors can be viewed as objective, physical items of written language, and this contrasts with the subjective reality of the individual tutor's personal constructs that underpins their learning designs. Different theories about learning are based on different ontological perspectives, for example the behaviourist approaches largely follow from an objective realist ontology in which learning is coming to understand an objective reality, whereas constructivist approaches follow on from a subjective ontology in which learning is understood as individual or social meaning-making.

Content analysis methodology, according to Neuendorf (2002) is based on the ontologically realist scientific method that includes objectivity*, a priori* design, reliability, validity, generalizability, replicability and hypothesis testing. This contrasts with the three types of content analysis described by Krippendorff (2013) in which each type is based on different ontological assumptions about the nature of texts. Thus, some types of content analysis focus on content taken to be contained in a text; some focus on properties of the source of the text and finally, some take content to emerge in the process of analysis itself (Krippendorff, 2013). Krippendorff's own definition of content analysis is based on the role of the content analyst's subjective meaning-making that makes use of 'inference': "content analysis is a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the context of their use" (Krippendorff, 2013, p.24). Neuendorf and Krippendorff, both widely read, are an example of a disparity between underlying philosophical perspective and approaches to the same methodology. In this study, content analysis is regarded as an objective, realist method.

The repertory grid method discussed and applied in this study is developed from PCP and based on a realist ontology, "we presume the universe is really existing and that man is gradually coming to understand it" (Kelly, 1963, p.6). Kelly includes a specific, very precise, commentary on his ontology, describing it as "*substantival* monism [that] is *neutral*" (Kelly, 1963, p.17 italics in original) meaning that reality exists as a single substance, but it is neither mental nor material but somewhere in between. However, Butt argues that Kelly was rather out of his philosophical depth here and that it is "not at all clear" what Kelly means (Butt, 2004, p.24). Despite this, Kelly's realism is clear as suggested by the concept of constructive alternativism.

Difficulties with different ontological viewpoints seem to occur when objective realism is applied to socially constructed concepts, for example, the purposes of education. Or alternatively, when subjectivity is applied to natural science, for example, attempts to explain physical phenomena as 'constructions' (Rorty, 1999). These ontological viewpoints both exclude, Mertens (2007) suggests, an awareness of power differentials and states that they do not always address the question about which groups in society have their reality privileged.

Taking the various philosophical positions into account this study, as described below, takes a realist approach to ontology.

4.5 Epistemology

Epistemology can be defined as "the study of the theory of knowledge" (Hickman, 2013, p.109). It concerns what counts as legitimate knowledge, and the ways knowledge is known (Schön, 1995). Epistemological perspectives range from those where knowledge is perceived as objective to those where knowledge is regarded as subjective. Cohen *et al.*, (2011) argue that ontological perspectives about reality (discussed above) lead to epistemological perspectives on types of knowledge and how it is acquired. Epistemological perspectives can be described in two different ways. Firstly, as either 'hard, objective and tangible' leading researchers to follow a natural scientific or positivist approach. Secondly, as 'personal, subjective and unique' knowledge that leads researchers to interpret, involving their participants in research and following an anti-positivist approach (Burrell and Morgan, 1979, in Cohen *et al.*, 2011, p.6).

For social science and education researchers this means consideration of the differences in approach taken between the natural scientist and social scientist is required. The natural scientist working in the physical field is more likely to align with an objective epistemology, whereas the social scientist, working with people, meanings, language and interpretations is more likely to take a subjective view of knowledge (Bryman, 2012). Mertens (2007) argues that dichotomy of epistemologies is not inevitable, as knowledge, and what is accepted as knowledge, is influenced by culture and context. A transformative philosophical paradigm includes a critical consideration of the impact of power differences and the relationship between researcher and those being researched. This can include knowledge gained from a mix of both objective and subjective data (Mertens, 2007).

The four epistemological positions of positivist, interpretive, critical and mixed methods, as identified by Cohen *et al.*, (2011) are each discussed below in relation to the methods selected for this study. The positivist approach provides a rationale for the use of quantitiative,

empirical content analysis methodology used to test and identify the most effective terminology for the eDAT; the interpretive approach supports the use of repertory grid methodology to explore tutor perspectives and the impact of those on categorising learning activities; whilst critical realism and mixed methods supports the use of a combination of these two seemingly contradictory approaches.

4.6 Positivist paradigm

Positivism makes the assumption that "human behaviour is determined by external stimuli and that it is possible to use the principles and methods traditionally employed by the natural scientist to observe and measure social phenomena" (Hickman, 2013, p.113). It is essentially the application of natural science methods and practice to the social sciences (Miller and Brewer, 2003). The term 'positivism' was coined by the early nineteenth-century French philosopher Comte and later came to stand for the scientific method, in which scientific laws are logically derived from empirical or sensory evidence (Hammersley, 2012). Positivism is sometimes rather confusingly called 'naturalism' (notably by Bhaskar, 1998) or 'normative', it is based on an objective realist ontology in which reality exists independently of the mind. The key characteristics of positivist approaches are that they prioritise observation, are verificatory, value-free and operationalist (Williams, 2003, in Jupp, 2006, p.231). A positivist approach claims that "science provides us with the clearest possible ideal of knowledge" (Cohen *et al.*, 2011, p.7). Positivism is associated with specific approaches to reasoning, empiricism, causation, methodology and validity, and each are discussed below together with comments about the content analysis method used in this study.

4.6.1 Positivist reasoning

A deductive reasoning process derived from Aristotle is usually associated with positivism in which a researcher will move from the general to the specific, that is, use theory to form a hypothesis and then use empirical evidence to confirm or refute the hypothesis (Bryman, 2012). This process is often termed a 'scientific' approach and both the term and the process are often used synonymously with positivism, although this is not necessarily the case (Bryman, 2012). In this study, content analysis of ODL activities is undertaken to quantify types of learning activities for comparison to other data. From this, the effectiveness of learning activity terminology can be deduced.

4.6.2 Positivist empiricism

Underlying each ontology and epistemology is an approach to empiricism. Empiricism can be defined as "an approach to the study of reality that suggests that only knowledge gained

through experience and the senses is acceptable" (Bryman, 2012, p.711). The term has been used in different ways, for instance, empirical knowledge is obtained by observation, non-interference and 'spectating' for Aristotle. But for Galileo, knowledge of theoretical objects can be obtained by abstract mathematical reasoning and knowledge of real objects can be obtained by sense information (Matthews, 1993). 'Strong' empiricism is the view that knowledge can only be based on experience, but a 'weaker' view suggests that both facts and experience are needed for justification (Miller and Brewer, 2003). The term is often used pejoratively to describe an emphasis on 'scientific' data in research that does not consider the role of speculative, abstract thought sufficiently (Hammersley, 2012). In this study, a 'strong' empirical approach to gathering data about ODL activities is taken. The learning activities in the selected online courses are categorised and analysed to identify their types using content analysis methodology designed to reduce subjective categorisation as much as possible.

4.6.3 Positivist causation

Etiology, the study of causality, is a challenging concept in the social sciences, particularly when applying the positivist scientific method to the social world (Goldthorpe, 2001). For positivists, there are two broad definitions of causation: a deterministic approach in which "causes necessitate certain effects" and a probabilistic approach in which "certain events raise the chance of occurrence of other events rather than actually causing them" (Miller and Brewer, 2003, p.24). The concept of causation has been used with varying levels of enthusiasm by social scientists (Goldthorpe, 2001), and is most strongly associated with deterministic positivist approaches in which events have causes and these causal links can be understood (Cohen *et al.*, 2011). Thinking about what 'causes' human behaviour suggests a behaviourist and mechanistic approach that can be contrasted with voluntarism (Burrell and Morgan, 1979).

Following on from the work of David Hume, positivism is said to take a Humean successionist approach to causation in that A is thought to cause B if the regular occurrence of A is followed by B (House, 1991). In his 'Treatise of Human Nature' originally published in 1740, Hume (1978), describes causation in terms of succession or association of events stating that causality is based on habit rather than logic for we can never actually perceive causality directly. Although Hume himself was sceptical about this principle of induction, a sufficient number of successive events make the probability not far short of certain for practical purposes (Russell, 1961). This approach to causality underpins the logic of experimental research designs used to investigate influences between independent and dependent variables, where a strong relationship between variables can seem to indicate causation. There

are a number of logical problems with this approach including the fact they cannot distinguish between accidental and causal correlations (Rogers, 2015) and many issues arise when studies use statistics incorrectly to show cause and correlation (Scheff, 2011). In addition, there are often multiple causes for phenomena and these "can interact and change each other" (Reisz, 2017).

The content analysis conducted for this study allows us to explore the underlying relationship, if any, between learning design and retention on ODL courses by data analysis.

4.6.4 Positivist methodology

Positivist approaches usually utilise quantitative methodologies. The quantitative approach is research based on "numerical measurement of specific aspects of phenomena" (Miller and Brewer, 2003, p.192). This contrasts with qualitative methods typically utilising narrative and descriptive approaches. Typically, these two methodologies are presented in the literature as two opposite if not incompatible approaches, and this can create the false impression that they are necessarily opposing approaches. Some suggest the use of the term 'confirmatory' for quantitative and 'exploratory' for qualitative (Onwuegbuzie and Leech, 2005, p.382).

Positivist approaches typically use quantitative data analysis and statistical tools and in this study, quantitative analysis of the type and number of learning activities was undertaken using content analysis methods and using Krippendorff's alpha (Krippendorff, 2011) to calculate inter-rater reliability (IRR).

4.6.5 Positivist validity

For positivist research to be considered valid, it needs to demonstrate that it does, in fact, measure or explain what it set out to measure (Winter, 2000, in Cohen *et al.*, 2011). There are a variety of types of validity, each relevant to different paradigms and methodologies. For example, external validity demonstrates the generalizability of quantitative data, whereas internal validity demonstrates that quantitative and/or qualitative data supports the causal or correlational relationship (Bryman, 2012). In positivist research, validity is typically an outcome of "controllability, replicability, predictability, generalizability, context-freedom, … randomization of samples, neutrality/ objectivity and observability" (Cohen *et al.*, 2011, p.180). By contrast, Krippendorff presents a typology of validation efforts that includes face validity, social validity, empirical validity, content validity, construct validity and criterion-related validity but also argues that using content analysis has substantive, conceptual and methodological obstacles to validity (Krippendorff, 2013).

In this study, the positivist approach to content analysis of learning activities was designed to maximise external validity by clarification of the relevant units of analysis, systematic piloting and development of a categorisation chart or 'coding book', training raters, running an independent analysis and statistical reporting on the IRR.

4.6.6 Critiques of positivism

Several critiques of positivism have been made. These include concerns about the limitations of the mechanistic and reductionist view of nature that is presented; lack of awareness of the significance of individual subjectivity; exclusion of other forms of knowledge including hermeneutic, aesthetic and moral; and the removal of human conscience from explanations about human behaviour (Cohen *et al.*, 2011). Positivism's objective realist ontology has been critiqued by many who argue that science is not value free and is inherently subjective (Johnson and Onwuegbuzie, 2004). Others agree, arguing that quantitative data from educational research can only be understood in the social context of the values, purposes and politics of education (Alexander, 2006). In fact, a large US experimental study called 'Project Follow-Through' (Stebbins, 1977) was abandoned before completion because the results were so "inconclusive and problematic" (Donmoyer, 2006, p.27).

In fact, the notion of natural science and the scientific method that Cohen *et al.*, (2011) present in their work as fundamental to positivism has been described as 'misconceived' and 'unrealistic and irrelevant'. In effect they have created a false dichotomy between science and non-science (Aiston and Rowbottom, 2006, p.138). They argue that this outdated view of science is divisive and detrimental to social science. A recent report on the reproducibility of many key social science studies has also thrown into doubt the reliability of many findings, thus calling into question one of the foundations of positivist approaches (Nosek, 2015).

Despite the many criticisms, "the rumors of positivism's death have been greatly exaggerated" (Howe, 2009, p.428). For example, the much criticised 2001 'No Child Left Behind' educational programme in the US "endorsed randomized controlled experimentation as the so-called 'gold standard' of research methodologies" (Alexander, 2006, p.207). In the UK, there has been a rise in interest in 'evidence-based' research and practice based on the experimental-focussed medical Cochran model (Oliver and Conole, 2003). The popular Visible Learning (Hattie, 2012) meta-analysis of educational interventions prioritises experimental evidence. However, Hattie's analysis suffers from statistical flaws that may make many of its conclusions meaningless (Higgins and Simpson, 2011).

4.6.7 Postpositivism

The term postpositivism has sometimes been used simply to describe the variety of paradigms that have been developed since positivism. But postpositivism has also been developed as a response to some of the criticisms of positivism whilst retaining a belief in the possibility of some forms of measurement and the need for controlled comparison (Hammersley, 2012). It is essentially a scientific approach that nevertheless is aware of bias (Robson, 2011). A postpositivist approach usually takes a realist ontology and an objective epistemology, but recognises that knowledge is imperfect and fallible, and that research is a process of repeated claims and experiments that are continuously reviewed in the light of evidence (Robson, 2011). Postpositivist approaches can be summed up by stating that our knowledge of the world is "conjectural, falsifiable, challengeable, changing" (Popper, 1968, in Cohen *et al.*, 2011, p.27).

The challenges to objectivity and validity that occurred in the content analysis pilots in this study heightened the researcher's awareness of the difficulties of carrying out scientific, positivist research in an educational context. The combination of the postpositivist method together with an interpretive methodology discussed below goes some way to resolving these challenges.

4.7 Interpretive paradigm

A subjective nominalist approach to ontology contradicts positivism's basic tenets. The view that we interpret sense-information, construct knowledge and interpret reality subjectively undermines an objective, realist scientific positivist epistemology. Confusingly, this epistemology has attracted a number of different terms, including anti-positivist, naturalistic, (except Bhaskar (1998) who uses 'naturalism' to mean positivism), hermeneutic (the study of interpretation), interpretive or constructivist. Interpretivism questions the very possibility of obtaining objective truth and began to become accepted in educational research following the so called 'paradigm wars' of the 1970s (Donmoyer, 2006).

Where positivist approaches can be said to focus on 'explanation', interpretivism focusses on 'understanding' (Bryman, 2012). Understanding is

> a complex term which is normally used to signify a depth of knowledge or learning which includes a perception of the nature or cause or use or significance of the object of learning. It goes beyond awareness or recognition, implying a much fuller appreciation of meaning.
>
> (Gillies, 2015, no pagination)

Thus understanding is a subjective interpretation of human behaviour rather than a study of forces that act on behaviour, described by Weber as the "science which attempts the interpretive understanding of social action in order to arrive at a causal explanation" (Weber, 1947, in Bryman, 2012, p.29). The use of a natural science approach to the socially-constructed world no longer seems tenable and the interpretive approach requires "the social scientist to grasp the subjective meaning of social action" (Bryman, 2012, p.30). It is essentially a humanistic approach that suggests we should, "for scientific purposes, treat people as if they were human beings" (Harré and Secord, 1976, in Cohen *et al.*, 2011, p.16).

There is no single interpretive approach and Cohen *et al.*, (2011) identify three types of interpretivist epistemology: phenomenology, ethnomethodology and symbolic interactionism, in which similarities can be seen with Kelly's PCP. For example, PCP "fits into that broad and complex tradition that is phenomenology" (Warren, 1998, p.6). Symbolic interactionism is based on the work of Mead (1934) who developed the idea that our notion of the self emerges through our experience of seeing how others see us (Bryman, 2012). Although symbolic interactionism is generally regarded as part of the interpretivist tradition, Mead was both a pragmatist and a social psychologist arguing that there was no difference between science and philosophy (Mead, 1934). His work follows a natural science epistemology with a focus on systematic observation and experimental investigation (McPhail and Rexroat, 1979) and this is similar to Kelly's pragmatism, ontology and scientific approach.

4.7.1 Interpretive reasoning

In the interpretive paradigm, reasoning is often inductive rather than deductive, in contrast to the positivist paradigm. This means that the researcher studies a number of individual cases, develops a hypothesis and then uses empirical evidence to draw generalisations (Cohen *et al.*, 2011).

The use of repertory grids based on Kelly's (1963) PCP for this study is an interpretive approach to the extent that the grids are idiographic. The grids were analysed empirically to explore the internal personal construct system, and some generalisations have been tentatively drawn from comparison of grids across tutors.

4.7.2 Interpretive empiricism

Interpretive research takes a 'weaker' approach to gathering empirical data that necessitates the inclusion of facts as well as subjective, intuitive data. In this study, the repertory grids gather subjective, idiographic data about tutors' personal constructs concerning teaching and learning.

4.7.3 Interpretive causation

An interpretive focus on the underlying mechanisms or processes that lead to causes is rather different from the 'verificationist' positivist approach discussed above. Causality is not necessarily an inherent part of the physical universe as the positivists imply. It may be a feature of our human perception as suggested by Michotte's (1963) animations of shapes moving on screens that were interpreted by viewers as causal narratives. Additionally, Hume's associative view of causality can be interpreted more as correlation (Cohen *et al.*, 2011; Russell, 1961). Interpretive approaches aim for understanding, whereas positivist approaches aim for explanation when identifying causation (Bryman, 2012). Interpretive views of causation differ depending on the approach taken. For example, symbolic interactionists assume that human behaviour is based on constantly changing individual constructions, and so it does not make sense to see these meanings as causes or variables (Donmoyer, 2006). However, the phenomenologist Schutz argues that it is a person's "thought objects … which determine their behaviour by motivating it" (Schutz, 1962, in Bryman, 2012, p.30).

Goldthorpe (2001) describes three types of causation: robust dependence, causation as consequential manipulation, and causation as generative process. He proposes that researchers initially use data to describe phenomena and its regularity. This is then followed by theory to hypothesise any generative processes that might be in place, and then the hypothesis is tested. The focus on generative process allows investigation of underlying mechanisms that might explain 'why' an effect is being caused, rather than merely reporting an association.

Kelly's (1963) PCP offers ways to both understand and explain the causes of human behaviour. It is a phenomenological approach in that it follows Husserl's (2001, p.xxiii) advice to return "to the things themselves!" by standing back, and looking at our habitual constructions afresh in order to understand human behaviour. PCP can be viewed as a positivist cognitive psychology in which constructs are the cause of behaviour and we are scientists aiming for prediction and control (Butt, 2004). Whilst Kelly saw determinism existing in the universe in terms of a "continuity … between antecedent and consequent events" (Kelly, 1963, p.20), this sense of determinism is rather different to the positivist approach, in that Kelly's philosophy of constructive alternativism means that there are many ways that we can construe or make choices. These constructions then 'channelize' or determine, our behaviour, but our free will means that we can re-construe and make different choices. Construing takes place within a context or field, and within this there are no fixed, common determinants for causes, but many causes and the same event in a different field may have a different cause (Warren, 1998).

Following this approach, the inter-rater reliability data gathered for this study is the first of Goldthorpe's stages, and the use of the repertory grids an investigation of the underlying mechanisms, the personal constructs, that may have led to the differences in terminology and interpretation.

4.7.4 Interpretive methodology

Interpretive epistemologies suggest an approach to methodology that focusses on developing understanding of social phenomena. This means the use of a range of qualitative or 'exploratory' research methods including subjective accounts, narratives and case studies. Qualitative research is based on an "intensive study of as many features as possible of one or a small number of phenomena … to build understanding by depth" (Miller and Brewer, 2003, pp.192-193). This study used the repertory grid method based on Kelly's (1963) PCP to enable the elicitation of tutors' subjective individual constructs about teaching and learning.

4.7.5 Interpretive validity

Validity in interpretive research has a different meaning than in positivist research. Valid interpretive studies aim for 'fidelity' by including a focus on the context of the study, research processes, and the role of the researcher in describing, interpreting and coming to understanding (Cohen *et al.*, 2011). Kelly set out a design specification for PCP and defines validity in terms of a scientific theory that can "yield a succession of hypotheses which, in the light of experimentation, do turn out to be palpably true" (Kelly, 1963, p.25). Kelly's language would seem to suggest a positivist or postpositivist approach, but his underpinning philosophy of constructive alternativism suggests an interpretive approach. The validity of repertory grids used in this study depends on the grids' ability to allow investigation of patterns and interrelationships between constructs (Fransella *et al.*, 2004). The grids' validity should be viewed in terms of their usefulness for increasing understanding and for the contribution they can make towards developing personal construct theory (Fransella *et al.*, 2004). There are many types of repertory grid and there are decisions to be made about various aspects of the format including the source of the elements (eg, elicited or provided), construct labels, rating scheme and so on. Each of these decisions will affect the ability of a grid to show an individual's constructs and construct interrelationships, and therefore validity.

4.7.6 Critiques of interpretivism

The aim of interpretivist approaches is greater understanding of subjective experience. However, this may be overstating the human ability to perceive accurately and to understand itself. Intuitions can deceive and perceptions are notoriously incomplete (Chabris and Simons,

2011). There are concerns that researchers (and their subjects) may not be fully aware of cultural and power influences on their experience, and that the interpretive perspective is narrow, incomplete and misleading (Cohen *et al.*, 2011). There are difficulties in replicating and generalising from many interpretive studies as well as issues of transparency (Bryman, 2012). Therefore, it may be that the interpretivist approach alone does not enable full understanding of the research topic.

Harri-Augstein and Thomas's work on self-organised learning and learning conversations included a range of additional tools and activities as well as Kelly's repertory grid. They argue that repertory grids only partially capture constructs, suggesting that the 'power of the conversation' is needed because no-one can explain themselves unaided (Harri-Augstein and Thomas, 1991). Butt argues that the "danger with all PCT [personal construct theory] methods is that they might be used in a mechanistic way" (Butt, 2008, p.41). And there may be false consciousness in grids in the same way as in ordinary experience (Solas, 1992).

These critiques of the positivist and interpretivist approaches led the researcher to consider critical realism, reviewed below.

4.8 Critical realism paradigm

Critical realism considers the social forces that impact on behaviour in social contexts. It embodies a constructivist epistemology, but is contextualised in a realist ontology where reality exists outside of perception (Shannon-Baker, 2015). Critical realism allows researchers to move away from philosophical paradigms and their dialectical oppositions, and towards answering real-world research questions. Critical realists argue that:

- there is no foundation for science;
- facts are theory-laden;
- the task of science is to invent and test theories (which are incomplete and fallible);
- explanation is concerned with how underlying mechanisms produce events;
- laws are patterns of activity or a tendency of a mechanism;
- the real world is complex and stratified into levels;
- causation is a function of the basic structure of entities;
- explanation is showing how some event has occurred in a particular case.

(adapted from Robson, 2011, p.31)

Critical realism is a stance that incorporates features of other critical approaches including emancipatory, those that involve the perspectives of participants and social justice approaches (Robson, 2011).

4.8.1 Critical realism reasoning

Critical realism uses a replicable, hypothetico-deductive approach whereby a hypothesis is formed based on empirical observation and then tested (Bisman, 2010). One form of realism, fallibilistic realism, reminds us that our experiences of getting knowledge wrong suggests that there is an objective reality: if our knowledge was all a subjective construction then surely our knowledge would be infallible (Sayer, 2000). In this study, a postpositivist approach to content analysis is taken and the data is viewed from a critical perspective and explored together with data from the repertory grid analysis.

4.8.2 Critical realism empiricism

Critical realism takes a scientific, postpositivist approach to the study of empirical data (Robson, 2011). Cobern and Loving (2008) defend critical realist empiricism and argue for a pluralistic, albeit imperfect, incomplete and fallible epistemology. Content analysis, although most often regarded as an empirical, quantitative methodology, has many subjective and interpretive elements (Krippendorff, 2013). The repertory grid methodology generates empirical, qualitative data in the form of elements and constructs that are then analysed using both quantitative and qualitative approaches.

4.8.3 Critical realism causation

A significant idea in critical realism is that research is the discovery of alethic truth, that is the underlying generative mechanisms which stratify and differentiate the world (Bhaskar, 1993, in Bisman, 2010). This process-orientated approach recognises the importance of meaning in explaining phenomena (Maxwell, 2004). This approach to causation is distinct from both positivist succession or associationist causality, and from an interpretivist search for meaning. This will be borne in mind when discussing personal constructs as underlying mechanisms that can explain the inter-rater differences when categorising ODL activities.

4.8.4 Critical realism methodology

Bisman (2010) suggests that critical realist approaches are in the ‘middle ground’ between quantitative and qualitative methods and can therefore utilise several methods including case studies, depth interviews and surveys. The approach supports collaboration between researchers and, as discussed below, enables a mixed methods research approach. The current study employs two methods, one that specifically analyses data, the other uses subjectively elicited repertory grid content.

4.8.5 Critical realism validity

Critical realism emphasises the fundamental importance of validity for both quantitative and qualitative research and this means that critical realism is "scientific in the full sense of the term, providing explicitly developed, testable explanations for the phenomena studied" (Maxwell, 2004, p.9). Validity is developed using critical multiplism, trustworthiness and analytical generalisation as well as through coherence and consensus (Bisman, 2010). In this study, quantitative content analysis is conducted under scientific conditions to produce valid data, but consideration is taken of its limited objectivity. Repertory grid validity is based on the usefulness of the individuals' own constructs to the topic under discussion.

4.8.6 Critiques of critical realism

Critical realism is different to both positivist and interpretive perspectives. It is set on fundamentally different ontological ground than interpretivism, arguing for a real world that is beyond our full perception rather than a world constructed from our individual and social meaning-making. Critical realism's falliblistic approach to reality is also fundamentally different to positivist, empirical and objective ontology. Critical realism can be regarded as without a philosophical foundation, merely a critical exercise that offers a range of explanations, some correct and some incorrect (Robson, 2011).

Nevertheless, the focus on critical, socio-political approaches is important for online learning particularly as the research field has been:

> marked by studies that reaffirm assumptions about the nature of technology, of human activity, and the interaction of humans and technology that have long been cast into doubt in other fields of research.
>
> (Friesen, 2008, p.1)

Similarly, a lack of critical approaches is evident in the "compulsive enthusiasm" about e-learning that can sometimes be seen in studies (Njenga and Fourie, 2010, p.199) and in the lack of a scholarly approach to research about the use of technology to enhance university teaching (Kirkwood and Price, 2013).

4.9 Mixed methods paradigm

In the discussion above, it is apparent that neither of the methodologies used in this study sit comfortably in either the positivist or interpretive epistemologies. For example, the positivist approach to content analysis of the learning activities included subjective elements, and Krippendorff argues that there are many similarities between quantitative and qualitative

content analysis (Krippendorff, 2013). The repertory grids, albeit ideographic and subjective include an element of determinism and can be analysed with quantitative statistical tools. An approach that offers a more eclectic and less dichotomous view of research, mixed methods research, is considered below as a way to integrate the separate methodologies used in this study.

The difficulties of applying positivist approaches to social and behavioural phenomena, and a concern about the lack of objectivity and generalisability in interpretive approaches led to the development of multiple and mixed research designs (Alexander, 2006). Multiple methods are often used by researchers when they consider more than one data source, however mixed methods involves a specific focus on the integration of qualitative and quantitative data (Creswell, 2015). The term 'mixed' research (as opposed to 'mixed methods') is sometimes used as it incorporates wider philosophical and methodological aspects (Onwuegbuzie, 2012).

Mixed methods research has three main approaches. The first focusses on ontology, epistemology and other philosophical assumptions. In this approach, mixed methods is called a third major paradigm alongside quantitative and qualitative (Johnson et al., 2007) which are portrayed not as incompatible, but on a continuum (Teddlie and Tashakkori, 2009). Mixed methods can be seen as the 'radical middle' (Onwuegbuzie, 2012). Secondly, some focus on mixed methods' position in a transformative and social justice perspective that highlights differences in social and cultural power, feminism and disability theory, and pragmatism (Mertens, 2007; Shannon-Baker, 2015). A third approach focusses on methodology, data collection analysis, integration and interpretation and is defined as:

> An approach to research ... in which the investigator gathers both quantitative (closed-ended) and qualitative (open-ended) data, integrates the two, and then draws interpretations based on the combined strengths of both sets of data.
>
> (Creswell, 2015, p.2)

Due to the mix of data, mixed methods can "provide the most informative, complete, balanced, and useful research results" (Johnson *et al.*, 2007, p.12). Mixed methods is sometimes seen as postpositvist (Denzin, 2010), but Gorard and Taylor argue that combining approaches "accepts the theory-ladenness of facts, the fallibility of knowledge and the under-determination of theory by data" (Gorard and Taylor, 2004, p.4). This is more akin to a critical realist approach. Fundamental differences in the philosophical underpinning of positivism and interpretivism are sometimes seen as a barrier to mixed methods but, as Howe (2012) argues,

positivism has now largely been abandoned by natural science, and so the barrier no longer exists.

4.9.1 Pragmatism

Pragmatism attempts to side-step fundamental epistemological and ontological questions to focus on 'what works' (Robson, 2011). This key underpinning approach in mixed methods can be defined as, "the doctrine that an idea can be understood in terms of its practical consequences; hence, the assessment of the truth or validity of a concept or hypothesis according to the rightness or usefulness of its practical consequences" (Oxford English Dictionary, 2016). A pragmatic approach focusses on what is practical and useful, rather than philosophical differences which "just do not matter that much" (Rorty, 1999, no pagination). Pragmatism is sometimes used as a paradigm in its own right, one that advocates the use of a mix of methodologies and is increasingly seen as an appropriate approach for e-learning research. For example, it is used as the underpinning philosophy for the LEPO framework for evaluation of e-learning that includes the learning environment, learning processes, learning outcomes, learners and teachers illustrated in figure 12 (Phillips *et al.*, 2012). The learning processes element incorporates the learning activities that are completed by the learner. A pragmatic approach is taken to the use of different methodologies for each element to enable effective evaluation.

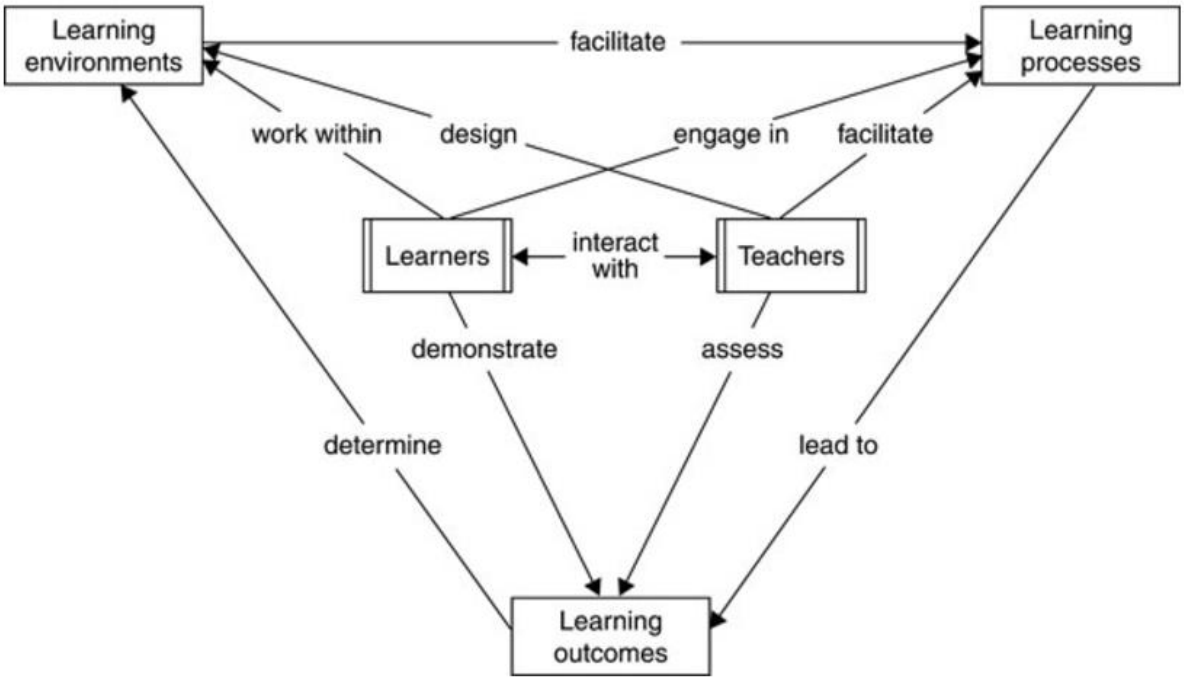


FIGURE 13: LEPO FRAMEWORK FOR EVALUATING E-LEARNING

(Phillips *et al.*, 2012)

A pragmatic focus is evident in several aspects of this study. For example, Dewey's pragmatism takes the view that our thinking and understanding are based on practical problems and requirements of life and living (Warren, 2010). For Dewey, education is a collaborative reconstruction of this practical experience (Garrison and Archer, 2000). Similarly, Mead's pragmatism "regards human knowledge and being as founded in social practice, in doing things with others" (Lachicotte, 2009, no pagination). Kelly's PCP is rooted in American pragmatism, for instance his comment that Dewey's pragmatist "philosophy and psychology can be read between many of the lines of the psychology of personal constructs" (Kelly, 1963, p.154). In addition, McWilliams notes many similarities between Kelly's PCP and the ideas of the pragmatist William James including the idea that "we create a rational world through personal and social processes" (McWilliams, 2009, p.110).

Biesta (2010) argues that a pragmatic approach to 'what works' needs to include the teleological nature of education, its purposes and values, and cannot rely purely on 'scientific' evidence. He argues that 'what works', 'evidence-based' or 'evidence-informed' practice urgently needs:

> to be rethought in ways that take into consideration the limits of knowledge, the nature of social interaction, the ways in which things can work, the processes of power that are involved in this and, most importantly, the values and normative orientations that constitute social practices such as education.
>
> (Biesta, 2010, p.501)

A pragmatic approach can therefore be criticized for focussing on practical research without specifying who or what it is practical for (Mertens, 2003). Also, it is not always clear what pragmatic knowledge looks like in practice, nor is it clear how it can be validated (Greene, 2008).

4.9.2 Mixed methods reasoning

Mixed methods offers the researcher the option to use a combination of both inductive and deductive reasoning types in a "back-and-forth cycle" (Cohen *et al.*, 2011, p.4). In addition, the concept of triangulation has been used to describe the way data or methods can be combined to enhance understanding. However, the attempt to use triangulation to obtain a 'true fix' on social phenomena is not compatible with a constructivist paradigm (Silverman, 2013). In this study, different types of data gathered from content analysis and repertory grids will be analysed separately. Content analysis data can be used to deduce the effectiveness of learning

activities by comparison to course data, and repertory grid data will be used to explore tutors' perspectives about effective learning activities. The two sets of data will be compared to each other to enable the richest level of explanation and understanding.

4.9.3 Mixed methods empiricism

Mixed methods approaches use a combination of empirical data. This can be different types of quantitative and/ or qualitative data. Despite the challenges, they can be integrated in different ways, for example, by data transformation, data comparison and warranted assertion analysis (Greene, 2008). However, this is a contested area in mixed methods, as the data being integrated is of different types, collected in different ways, and can be interpreted differently (Silverman, 2013). In this study the two data sets will be compared and discussed, rather than integrated, due to the different forms the data takes.

4.9.4 Mixed methods causation

As noted above, positivist approaches to research often focus on identifying causation, whereas interpretive approaches focus on understanding social phenomena. Causality has been a central topic of contention in the qualitative-quantitative 'paradigm wars' (Howe, 2012). A mixed method experimental approach, often used in education research, uses qualitative data and analysis to describe phenomena, and quantitative data and statistical analysis to investigate causal relationships within a study (Howe, 2012). Howe distinguishes between Mechanical causation which accounts for "ordered processes of human behavior on the model of the natural sciences" (Howe, 2012, p.90), and Agential causation which accounts for "ordered processes of human behavior in terms of norm-governed institutions and practices" (Howe, 2012, p.90). He argues that mixed methods can incorporate both types of causation if they are considered individually. However, in the case of mixed methods experimentalism, Mechanical causation can flag an underlying Agential causation. For example, reducing class size can appear to 'cause' improvements in academic achievement, but it is the increased time and attention given by the teacher that is the underlying Agential cause of improvement (Howe, 2012). In this study, data from the learning activity content analysis may provide Mechanical causation evidence of correlation to retention data, and repertory grid analysis may provide understanding of Agential causation.

4.9.5 Mixed methods methodology

Different approaches to mixed methods can be taken, including seeing them as a mid-way point between qualitative and quantitative paradigms (Johnson and Onwuegbuzie, 2004). Creswell (2015) highlights the need for mixed methods to be an 'integration' of data and

describes three basic and three advanced mixed method designs that illustrate ways to integrate data. In this study, an *explanatory sequential* design is used:

> *Explanatory* sequential designs in which quantitative methods are used first and qualitative methods are then used to explain the quantitative results in more detail.
>
> (Creswell, 2015, pp.6-7)

In this structure, content analysis is completed first, followed by repertory grid analysis. This enables understanding of the impact that tutors' personal constructs had on the content analysis.

4.9.6 Mixed methods validity

Validity in mixed methods applies to both quantitative and qualitative data elements as well as any integrated data. However, it should not be assumed that aggregating data leads to increased validity (Silverman, 2013). Challenges and threats to validity in mixed methods will vary depending on the design used. For example, the researcher needs to consider both quantitative and qualitative data in terms of its comparable sample size; whether units of analysis are parallel; how data is to be merged, and how divergent results are to be explained (Creswell, 2015).

Validity in mixed methods research is better termed *legitimation* because this is a "bilingual nomenclature" that implies both quantitative and qualitative approaches to validity (Onwuegbuzie and Johnson, 2006, p.55). They go on to consider types of legitimation to be considered that combine several quantitative and qualitative validity concerns. These types of concern include: sample integration, weakness minimization, paradigmatic mixing, commensurability, multiple validities and political. In particular, they argue that the issue of integration of data is problematic and suggest that it may be misleading to triangulate, consolidate or compare quantitative with qualitative data because issues of weighting may arise, and that one type of data may be presented as more important than another (Onwuegbuzie and Johnson, 2006).

4.9.7 Critiques of mixed methods

There remain many issues with mixed methods including difficulties with integration, measuring data in different ways and concerns about triangulation. Therefore pragmatic, multi-perspective practices have been proposed (Denzin, 2010). Denzin further argues that all methods are hybrids and that the researcher is consequently a 'bricoleur':

> the jack of all trades, [who] produces a bricolage based on the use of many different interpretive practices and methodological tools.
>
> (Denzin, 2010, p.423)

Ellingson proposes a similar approach called 'crystallization' to incorporate the richness of these approaches:

> Crystallization combines multiple forms of analysis and multiple genres of representation into a coherent text or series of related texts, building a rich and openly partial account of a phenomenon that problematizes its own construction, highlights researchers' vulnerabilities and positionality, makes claims about socially constructed meanings, and reveals the indeterminacy of knowledge claims even as it makes them.
>
> (Ellingson, 2009, p.4)

4.10 Ethics

Every aspect of research can be regarded as raising an ethical issue (Roth, 2004). Research using online sources in particular raises issues of participant consent, public versus private ownership, confidentiality and anonymity (Kanuka, 2007).

Care has been taken in this study to follow the researchers institution's ethical guidelines as well as those recommended by the Economic and Social Research Council (ESRC, 2015) and the British Educational Research Association (BERA, 2011). Appropriate institutional protocol with regards to research was adhered to and approval to carry out the study and collect data was given. Specific consent was obtained to extract learning activities from distance learning courses for analysis. Online learning activities in the VLE were regarded as private and so 'voluntary informed consent' (BERA) was obtained from participants prior to the start of the study through discussion and completion of a form (included in Appendix 6). The learning activities from the selected distance learning courses were shared with raters as this was necessary to complete the task. It was made clear to tutors that their courses could not be completely anonymous to raters, as some topic or content material would inevitably be included. The names of course tutors and raters have been anonymised in this study. Consent was not sought from students as no student data was reviewed in this study.

There were few ethical risks associated with this study. Participants completed a task that was similar to other educational activities and took place in an educational context. The benefits in terms of improving the quality of ODL courses was discussed with participants. Participants were kept involved throughout the study, raters were involved in evaluation of the tool during

the pilots, and were also engaged in discussions about their own practice following participation in the content analysis and repertory grid interviews.

4.11 Methodology summary

This chapter has discussed the philosophical paradigms used to underpin this study and considered how each supports the chosen methodologies. The postpositivist approach, whilst aiming to enable objective, empirical content analysis is not able to offer full understanding or explanation of learning design due to difficulties in obtaining acceptable IRR. The interpretive approach supports the repertory gird method to elicit constructs about teaching and learning that help to understand the relation between tutor perspectives and learning design. Finally, a pragmatic, mixed methods approach combines the postpositivist and interpretive paradigms in a research design intended to enable both explanation and understanding of learning designs in ways that consider the personal context of creating and interpreting them. The conclusion in Chapter 7 discusses the extent to which the different methodologies have been successful in answering the research questions stated in Chapter 1.

CHAPTER 5: DESIGN OF CONTENT ANALYSIS AND REPERTORY GRID METHODS

5.1 Overview of design of study

In order to improve ODL retention, Chapter 2 and Appendix 1 identified the need for an effective way to represent learning designs and suggested that tutor perspectives be considered. The theoretical approaches in Chapter 3 supported a specific focus on interaction and feedback activities together with a PCP approach to tutor perspectives. Chapter 4 set out the mixed methods approach that is the rationale for a 3-phased study that combines postpositivist and interpretive research methods to achieve the aim of improving ODL. This chapter outlines details of the two methods chosen to create the eDAT: phase one content analysis (section 5.2) and phase two repertory grids (section 5.3).

For phase one this chapter sets out how the research questions A1 and A2 will be answered:

> A1) How can ODL activities be categorised?
>
> A2) To what extent do raters agree with one another in their categorisations? What is the inter-rater reliability?
>
> **Hypothesis**: Learning activities can be categorised using the eDAT to an acceptable level of inter-rater reliability, that is above .667 (Krippendorff, 2004).

5.2 Creation of the eDAT

The aim of this part of the study is to compare the effectiveness of different types of terminology to describe learning activities. The content analysis method was selected to categorise a set of learning activities from four ODL courses by independent raters to explore the most effective learning activity terminology. Sets of terminology were developed for the eDAT and in addition two sets selected from the existing literature. This will allow comparison of how effectively each set of terminology could be used to describe learning activities as measured by IRR.

To carry out a valid and reliable content analysis, the following steps were taken. Each step is discussed in the following sections:

1. agreeing on a definition of the unit of analysis (the learning activities) (section 5.2.2)
2. developing the 'coding book' or categories of learning activity types (section 5.2.3)
3. training raters and running the content analysis activity (section 5.2.4)

4. checking the reliability of the raters by statistical calculation of the extent to which they agree with one another in their coding (section 5.2.5)

(adapted from Neuendorf, 2002, p.50)

Following this discussion of the content analysis method, sections 5.2.10 to 5.2.25 describe in detail the steps taken to complete the two pilot eDATs and the final eDAT which were:

A. Preparation
    a. Pre-pilot preparation and discussion with raters
B. Pilot eDAT 1
    a. Pilot eDAT 1 course unitisation
    b. Pilot eDAT 1 categorisation chart
    c. Pilot eDAT 1 raters and content analysis task
    d. Pilot eDAT 1 raters discussion
    e. Pilot eDAT 1 IRR data collected
C. Pilot eDAT 2
    a. Pilot eDAT 2 course unitisation
    b. Pilot eDAT 2 categorisation chart
    c. Pilot eDAT 2 raters and content analysis task
    d. Pilot eDAT 2 raters discussion
    e. Pilot eDAT 2 IRR data collected
D. Final eDAT
    a. Final eDAT course unitisation
    b. Final eDAT categorisation chart
    c. Final eDAT raters and content analysis task
    d. Final eDAT raters discussion
    e. Final IRR data collected
E. Alternative terminology trial

5.2.1 Content analysis

Content analysis is a method of quantifying text so that it can be analysed statistically. It can be defined as “the systematic, objective, quantitative analysis of message characteristics” (Neuendorf, 2002, p.1). It has been used extensively in communication studies to analyse a wide range of texts including advertisements, telephone conversations and literary texts. It has also been used in a variety of educational settings, for example in the analysis of an online forum to explore the effectiveness of the ‘starter-wrapper’ technique (Hara *et al.*, 2000). It was used to analyse the impact of tutors’ roles in online discussions (Dubuclet *et al.*, 2015), and to analyse trends in published research on distance education (Bozkurt *et al.*, 2015). Although it is a systematic process, it is not always carried out in a way that supports validity and reliability of the analysis. For example, a study examining a number of papers that had used content analysis for computer conference discussions found a lack of detail in the papers about how

content analysis was conducted, together with very low levels of IRR (Rattleff, 2007). Krippendorff's review of a number of papers also suggested that high IRR was only achieved post hoc, after 'discussion' between raters, which of course would indicate rather the opposite (Krippendorff, 2004).

5.2.2 Courses and units of analysis

Content analysis can be carried out on a range of texts and in this study the specific learning activities, or task descriptions, written by tutors and presented in the VLE for students were selected for analysis. Each of the four ODL courses used for the initial analysis included learning activities of different types and lengths, some open-ended and some structured tasks. They included optional tasks, and tasks with multiple parts. In addition, the modules included generic instructions for students, for instance on the expectations for participation in discussion forums.

Identification of the units of analysis is critical, but also challenging (Gorsky and Blau, 2009). For example, the units for content analysis can either be identified by the researcher or by individual raters when rules for segmentation of the text can be given. This can include the topic, sentence length, or paragraph limits (MacPhail *et al.*, 2015). However, where the text is complex or where the segments are not sufficiently well-defined, raters may be unable to do this reliably, thus reducing the overall reliability of the process (Neuendorf, 2002). If the unit of analysis is large it may be easy to categorise, but will offer little information, if the level of granularity is too small it may be difficult to categorise reliably. In this study, raters initially edited the units of analysis themselves, but this was changed in the final eDAT when the researcher prepared the units of analysis as discussed on page 98 below.

In a similar way to activities in the MOD4L project (Falconer *et al.*, 2007), it was noted that some general instructions to students were not included repeatedly, and were taken as read. In the present study, where this occurred, tutors' general information for students about, for example, the purpose of the discussion forum was also copied to the eDAT categorisation document to guide raters. In addition, some courses included 'optional activities', for example, extended reading or open forums. These were included as units of analysis because the impact of voluntary participation may be significant (So, 2009).

5.2.3 Learning activity categorisation terminology

This section discusses the development of the content analysis 'coding book' and the selection of terms used for the learning activity categories.

Several learning activity taxonomies have been developed that list types of classroom and online activities. For example, the University of Ulster developed the Hybrid Learning Model that proposes eight learning events: receives, debates, experiments, creates, explores, practices, imitates and meta-learns (University of Ulster, 2008). Laurillard's learning activity types include: acquisition, discussion, investigation, practice, collaboration and production (Laurillard, 2012). Conole also developed a taxonomy for a JISC project (Cross *et al.*, 2012) which includes: assimilative, finding and handling information, communication, productive, experiential, interactive/adaptive and assessment. This variety illustrates the different vocabulary used by educationalists to describe learning activity types. In fact, Currier *et al.,* (2006) noted in the JISC Pedagogical Vocabularies Project report that there is generally a "lack of common understanding of, and shared vocabularies for, pedagogical practice amongst teachers, system developers, learning technologists and e-learning researchers" (Currier *et al.*, 2006, section 2.2 no pagination).

Difficulties in agreeing the meaning of terms used to describe and classify learning activities also results in similar difficulties when describing sets of learning activities in a learning design. For instance, Falconer *et al.,* (2007) identified challenges when trying to represent learning designs for the JISC Models for Learning (Mod4L) project. These included differences in the purpose of a representation; the granularity and methods of sharing; as well as differences in vocabulary and difficulties in using activity taxonomies (Falconer *et al.*, 2007). This lack of an agreed vocabulary for learning activities makes both describing and mapping them to pedagogical approaches difficult. Some examples where researchers have used learning activity vocabularies to map or describe learning activities illustrate the challenges. For example, the Open University mapping project used Conole's taxonomy (Cross *et al.*, 2012) to create a learning activity map over many courses. However, the authors commented on the difficulty of applying these terms saying that the process was 'subjective' and that they held "regular meetings to improve consistency" (Rienties *et al.*, 2015, p.316). Swan edited and applied six of Reeves' fourteen pedagogical dimensions (Reeves, 1996) to her work on describing MOOC pedagogies and also commented that raters needed a number of discussions in order to agree their application (Swan *et al.*, 2015). Laurillard too observed that although tutors were able to map their own activities to a taxonomy, they were unable to agree on the type when asked to map another tutor's task (Charlton *et al.*, 2012). It is both important and significant that tutors working in a similar context should have such difficulties in describing learning activities. This raises fundamental issues about how best to develop common

understanding in education. How can tutors share experiences and measure the quality of learning if they do not have a common vocabulary or understanding?

The categories used for content analysis coding need to be sufficiently specific to allow for ease of use, yet not so general as to be all encompassing. A category, for example, that includes 'reading' could be used for several learning activities and so would not discriminate between them. Categorisation charts can include coding details if they are not too numerous, or they can separate the chart and the coding details for simplicity, although this may mean coders failing to refer to details sufficiently. There is some evidence that hard copy versions of text work better than online versions (Neuendorf, 2002). Garrison argues for 'negotiated coding' in which raters and researchers together develop the most effective coding or categorisation. Although this may lead to greater agreement between raters, it does not necessarily mean that the categorisation scheme can be used by other raters in the same way (Garrison *et al.*, 2006). In the initial stages of the current study, there were discussions between the researcher and raters to reflect on the terminology and categories. The eDAT pilot charts contained the coding details in a hard copy format. Several different eDAT categorisation charts were trialled in the pilots and changes made to coding details to guide raters as detailed below.

5.2.4 Raters and completing content analysis

In many studies, only two raters are used, when a larger number will mean that the analysis is more valid. Independent raters are likely to be unbiased but in many studies the raters are the researchers or the researchers' assistants (for example, Rienties and Toetenel, 2016). Raters need to be familiar with the language and context for analysis, but not too familiar with specialised vocabulary which may reduce the universality of their analysis (Krippendorff, 2013). The actual content analysis activity should be undertaken in suitable conditions to facilitate the collection of uncontaminated data. Training should be carried out to ensure that raters understand the process and coding or categorisation schema, and can practice and discuss any issues. In many cases raters participate in adjusting or refining the coding categories prior to the analysis (Krippendorff, 2013). Raters should work independently on the analysis without collaborating, but not for so long in one session that they become tired (Meagher-Lundberg and Brown, 2001). In this current study, four raters were academic colleagues at the researcher's institution who were familiar with educational terminology. Following training, raters completed the content analysis task independently.

5.2.5 Inter-rater reliability

Uncontaminated data needs to be gathered in order to have confidence that any analysis of the text is valid and that inter-rater reliability (IRR) is measured objectively (Krippendorff, 2004). Krippendorff argues that there are three conditions that must be met for valid IRR analysis: the data must be collected correctly; the units of analysis must be treated as separately describable and that consideration is taken of the extent to which one is willing to rely on imperfect data (Krippendorff, 2004). If raters all agree this increases confidence that the analysis is consistent and objective, and that other raters would most likely obtain the same result. If the IRR is low, this suggests weaknesses in the coding terminology (MacPhail *et al.*, 2015). However, even high reliability scores do not guarantee validity. For example, raters may all display the same prejudice or use the same concepts as others in a specialised community. High reliability may also indicate a loss of validity, for example, the categories may be oversimplified or superficial (Krippendorff, 2013). In addition, high agreement between raters may simply mean that a particular item is missing from the content being analysed, or that there is a high degree of similarity between the items being rated. IRR is measured using different statistical tools including percent agreement, Cohen's kappa and Krippendorff's alpha as discussed below.

5.2.6 Percent agreement

This calculation provides a percentage of observations in which the observers agree:

[number of times observers agree/ total number of observations] X 100

This calculation can only be used where there are two raters, and makes no allowance for agreements occurring by chance. It is often used, but largely agreed to be a misleading measure of IRR (Lombard *et al.*, 2002).

5.2.7 Cohen's kappa

Cohen's kappa accounts for agreement by chance by including a value for how much agreement over chance is observed and expresses this difference as a ratio (Cohen, 1960). It follows the format:

$$\kappa = \frac{Ao - Ae}{1 - Ae}$$

Where *Ao* is the observed difference and *Ae* is the amount of agreement expected by chance.

Cohen's kappa has been used extensively in education literature to measure IRR and can be calculated easily by hand, using Excel or specialist online statistical tools, for example ReCal (Freelon, 2010). It is normally used to calculate IRR between two raters, but can be adapted for multiple raters (see, for example, Clark-Carter, 2010, p.536) although this is rarely done. SPSS normally allows data for only two raters to calculate Cohen's kappa. Furthermore, it cannot allow for missing data, and this may invalidate results or mean that some data is eliminated from the analysis.

Cohen's kappa has been criticised as a measure of IRR as it encourages the use of just two raters when more raters and more ratings would provide more robust findings. Kappa also overestimates reliability in the case of raters systematically disagreeing with each other (Krippendorff, 2013).

5.2.8 Krippendorff's alpha

Krippendorff claims that kappa is "just about worthless as a reliability index in content analysis" (Krippendorff, 2004, p.418) and states that it is "simply incommensurate with situations in which the reliability of data is the issue" (Hayes and Krippendorff, 2007, p.80). He proposes the use of alpha because, unlike percent agreement and Cohen's kappa, alpha is a measure of the disagreements in a set of data which takes chance into account as well as the magnitude of any 'misses'. In addition, it can be applied to any number of observers, any number of categories, any metric or level of measurement, as well as to incomplete data and large and small sample sizes (Krippendorff, 2011). Alpha can be expressed as:

$$\alpha = 1 - \frac{D_o}{D_e}$$

Where D_o = observed disagreement and D_e = expected disagreement

Despite the benefits of Krippendorff's alpha it is not widely used. Neuendorf (2002) dismisses alpha saying it is "a highly attractive coefficient but has rarely been used because of the tedium of its calculation" (Neuendorf, 2002, p.151). However, a number of online tools and a macro for calculating alpha using SPSS have since been developed that makes the calculation straightforward (Hayes and Krippendorff, 2007; Freelon, 2010).

In this study, the online tool ReCal was used to calculate Cohen's kappa and Krippendorff's alpha. ReCal has been tested and verified by its creators (Freelon, 2010) and, in addition, by the researcher by comparing results from SPSS using the Krippendorff's alpha macro developed by Hayes (Hayes and Krippendorff, 2007).

5.2.9 Interpreting inter-rater reliability

There is no statistical rationale presented in the wide range of literature read for acceptable levels of agreement. Krippendorff suggests that where the analysis is critical, a level of $\alpha \geq$ .800 should be considered necessary, and in situations where conclusions may be more tentative, IRR of $\alpha \geq .667$ may be acceptable (Krippendorff, 2004). Similarly, acceptable levels of agreement using Cohen's kappa are 'largely arbitrary' but it is usually suggested that below 0.40 is poor, between 0.40 and 0.75 as fair to good, and above 0.75 as excellent agreement above chance (Banerjee *et al.*, 1999).

5.2.10 Pilot eDAT introduction

Five pilot studies were designed and run to test the approach. Prior to the first pilot, a discussion took place between raters and the researcher about the research, the proposed eDAT categorisation chart and the initial terms for categorising learning activities. There was agreement among raters that using these categories was a useful and interesting approach to analysing the learning design of a distance learning course. They were confident that the categories were both significant aspects of learning design, and clear and easy to identify. They also agreed that it would be useful to compare learning designs to retention and attainment to support ongoing development of courses. Some minor changes to the initial chart were made following this discussion. However, results and discussions following the initial pilot indicated that the categories being used were not as easy to apply as first thought, and so additional pilots using the same format, but different sets of categories, were conducted to refine them. Two of the pilots are outlined below.

5.2.11 Pilot eDAT 1 courses and units of analysis

Both pilots were conducted on a convenience sample of four ODL modules taught at the researcher's university, selected from a variety of subject areas. Courses were also selected to illustrate a variety of approaches to online learning design. The units of analysis were individual learning activities on the VLE. In the case of activities with multiple parts, raters were asked to identify the individual parts for analysis themselves following guidance from the researcher.

5.2.12 Pilot eDAT 1 categorisation chart

An initial approach to categorising the learning activities was based on the author's use of the e-Design Template as discussed on page 21. It was thought that a set of principles used to *design* a learning activity, could also be used to *describe* or *categorise* that activity (Laurillard, 2012). The e-Design principles were converted to categories and added to the Pilot eDAT 1

Categorisation Chart in table 3. In addition, based on the literature review that suggested the importance of interaction and feedback activities for ODL retention, these were also added as categories. Thus, the four categories included 'open/ closed task', 'learner/ teacher managed', 'feedback' and 'interaction'. Each category was given a 0-3 rating.

Act no	Activity detail	1 Open/closed				2 Management				3 Feedback				4 Interactions			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
	[student tasks here]																

1 Open/closed	2 Management	3 Feedback	4 Interactions
0 all closed	0 all tutor managed	0 no feedback	0 no interaction
1 some closed	1 some tutor managed	1 low stake	1 content
2 some open	2 some student managed	2 peer	2 tutor
3 all open	3 all student managed	3 high stake	3 peer

TABLE 3: PILOT 1 CATEGORISATION CHART AND CODING GUIDE

During discussion with raters following the content analysis it became clear that there were considerable difficulties in categorising each of the learning activities using this chart. The concepts of 'open/closed' and 'teacher/student managed' were particularly difficult for raters to describe and reach agreement on. There were also many activities in each course that contained multiple parts and raters were given the instruction to identify the individual units and categorise each part. This caused discrepancies as each rater was then rating different items (Neuendorf, 2002). It was noted that there was a greater level of agreement with the terms 'feedback' and 'interaction', although there was still considerable discussion about the terminology used to describe types of interaction and feedback. These terms were therefore reviewed and changed for the subsequent pilot.

5.2.13 Pilot eDAT 1 raters and content analysis task

The four raters were based in the School of Education at the researcher's institution and included those with substantial experience of delivering ODL and those with no direct experience of teaching ODL courses. In each of the pilots, raters completed content analysis of learning activities in the same way. Raters were presented with the pilot 1 eDAT categorisation chart that included the categories that were to be assigned to each of the learning activities, and details of how to apply them. Raters were trained in its use through discussion and practice using the categories before completing the rating task independently. Each rater rated all courses, that is, 100% duplication as recommended by Neuendorf (2002). The eDAT categorisation activity was completed independently in the raters' own time as it was thought that this would be less tiring for them. However, this led to some raters leaving a long gap

between their training and the categorisation activity. In one case a rater duplicated the task by mistake but did not replicate his own previous ratings, which clearly has implications for the consistency of findings.

5.2.14 Pilot eDAT 1 IRR data

Across the four courses there were a total of 139 activities. Each rater rated each of the courses independently and each activity was coded against the four categories giving a total of 556 decisions to calculate IRR. This was well in excess of the minimum sample size suggested by Krippendorff (2013) assuming a minimum acceptable level of $\alpha \geq .800$, and a significance level of *p* of .05.

5.2.15 Pilot eDAT 2 introduction

The pilot eDAT 2 was developed following the initial pilot and discussions, and the categories were edited to include feedback and interaction only, with specific examples of each type listed as described below. The complete process was repeated with the same courses and raters following the same format as for pilot 1.

5.2.16 Pilot eDAT 2 courses and units of analysis

The same courses and activities were used as in the previous pilot. Individual learning activities were copied to the eDAT and raters were asked, where an activity contained multiple parts, to categorise the 'do' part of the activity. However, this still caused disagreement as raters identified different 'do' parts.

5.2.17 Pilot eDAT 2 categorisation chart

The literature reviews in Chapter 2 and Appendix 1 include details about research suggesting that greater levels of interaction and feedback are related to higher attainment and retention on ODL courses. The terminology for types of interaction was adapted from those described by Hillman *et al.*, (1994), Moore (1989) and Xiao (2017); and the types of feedback were based on Black and Wiliam (2009) and Bennett, Dawson, *et al.*, (2016). The pilot eDAT 2 categorisation chart including the coding guide is in table 4.

Act No	Activity detail:	1: Add 1 tick here if interaction present in activity			2: Add 1 tick here if feedback indicated				3: Other
		ST	SS	SC	TF	PF	SF	AF	Y
	[student tasks here]								

1. Interaction:
   - ST = **Student-tutor interaction** e.g. online webinar/ lecture, 1-1 tutorial, coaching session, email, phone etc.
   - SS = **Student-student interaction** e.g. forum discussion (may include tutor), group work, peer assessment, adding comments to peer wikis/blogs etc.
   - SC = **Student-content interaction** e.g. computer simulation, multimedia interactions etc.
2. Feedback:
   - TF = **Tutor-feedback** e.g. formative or summative feedback or grades etc.
   - PF = **Peer-feedback** e.g. structured peer-assessment exercise, grading activity etc.
   - SF = **Self-feedback** e.g. using model answers, self-reflection, trial and error exercises etc.
   - AF = **Automatic-feedback** e.g. from computer simulation, computer-marked test etc.
3. Other:
   - Tick if reading/ watching, research, creating etc.

TABLE 4: PILOT 2 CATEGORISATION CHART AND CODING GUIDE

5.2.18 Pilot eDAT 2 raters and content analysis task

Staff changes at the university meant that one new rater was recruited. The researcher also completed the rating task, making a total of 5 raters. Raters were trained face-to-face, and completed the paper-based eDAT categorisation task independently in their own time following the training. During training and following completion of the categorisation task, raters were invited to offer comments and suggestions for improvements.

5.2.19 Pilot eDAT 2 IRR data

Across the four courses there was a total of 139 activities. Each of the five raters rated each of the four courses independently and each activity was coded against the four categories giving a total of 695 decisions to calculate IRR.

5.2.20 Final eDAT introduction

Having completed the pilots, feedback from raters and observations by the researcher were incorporated into the final version of the eDAT categorisation chart. A new set of courses and raters were recruited for the main study. Amendments were made to the final process of completing the analysis detailed below.

5.2.21 Final eDAT courses and units of analysis

A new set of courses for the main study was selected from a convenience sample at the researcher's institution. Distance learning course leaders were emailed and invited to participate in the study, and a group of courses was chosen that reflected a range of subjects

thought to represent varied learning designs. The four courses included undergraduate and post-graduate modules of different lengths that were running with active students during the period of the study.

Each course was analysed in the VLE to identify their different learning activities. In addition, course module handbooks were reviewed to identify any additional information about the learning design. The learning activities, plus any related information was then copied to the final eDAT categorisation chart for raters to use for the analysis task.

In many cases the learning activities consisted of a series of smaller tasks. For the final version of the eDAT, identification of the units of analysis was done by the researcher using an 'emic' or subjective review method (Neuendorf, 2002) of the learning activities. To create the 'etic' or scientifically generated unit of analysis, each of the learning activities was broken down into parts based on the learning activity 'verbs'. For example, a typical student activity was:

1. Read xx, answer the following [structured] question and then post your response to the forum.

This was divided into the following three parts for analysis:

1.1 **Read** xx,
1.2 **answer** the following [structured] question and then
1.3 **post** your response to the forum.

A consistent approach to unitising each learning activity enables the calculation of ratios of types of activity. The resulting units of analysis were then categorised by raters using the eDAT chart.

5.2.22 Final eDAT categorisation chart

Following feedback from participants and results from the pilots, the final eDAT categorisation chart was created as in table 5. It included a coding guide, with examples, for each of the categories and a simple numbering system. An additional type of feedback was included, automatic feedback (Alcoholado *et al.*, 2014).

No	Activity detail:	Interaction Type (1-3)	Feedback Type (1-4)	Other? Y
	[student tasks here]			

Categorise each of the learning activities in the course using the headings below, using **1 or 2 types** for each activity.

1. Is there **specific** reference to who the student will **interact/ communicate** with? Select one if present:
    1. With the **tutor,** e.g. online webinar/ lecture, 1-1 tutorial, coaching session, email, phone etc.
    2. With other **students,** e.g. forum discussion (may include tutor), group work, peer assessment, adding comments to peer wikis/blogs etc.
    3. With **interactive content,** e.g. computer simulation, multimedia interactions etc. **NB**, don't include interaction with text/video
2. Is there **specific** reference to how the student will get **feedback/ assessment/ a grade?** Select one if present:
    1. From the **tutor,** e.g. formative or summative feedback or grades etc. Assume feedback from specified assignment tasks
    2. from **peers,** e.g. structured peer-assessment exercise, grading activity etc.
    3. as **self-feedback,** e.g. using model answers, self-reflection, trial and error exercises etc.
    4. as **automatic feedback**, e.g. from computer simulation, computer-marked test etc.
3. **Other**: If no interaction or feedback - is the activity another type? Reading/watching, research, creating etc. Select other if no interaction or feedback

TABLE 5: FINAL EDAT CATEGORISATION CHART AND CODING GUIDE

5.2.23 Final eDAT raters and content analysis task

Raters for the main study were recruited by emailing existing education tutors, distance learning tutors, and award leaders inviting them to participate in the study. A selection of four were invited to participate that represented a range of experience of ODL and included those with extensive experience of designing and delivering ODL, some with a small amount of recent experience, and some with no experience. Thus, all raters were familiar with educational terminology and context, but not necessarily with ODL. The content analysis task was introduced as a learning design workshop in which raters would examine in detail the learning activities in four courses and then categorise each type of activity. It was explained that the analysis would explore to what extent raters agreed with one another without discussing or collaborating. Raters were given the eDAT categorisation chart and the coding details in hard copy and a discussion took place of the chart and how to use it. They completed the training activity to try out the chart with sample activities, and a few issues were discussed and clarified. Following training, raters completed the categorisation task independently without collaboration, using an online version of the eDAT categorisation chart. This ensured that the chart was completed immediately following the training. After the completion of the

categorisation activity, the raters discussed and reviewed the process, offered suggestions for improvements and commented on how the activity impacted on their own practice.

5.2.24 Final eDAT IRR data

Across the four courses there were a total of 215 activities. Each rater rated each course independently and each activity was coded against the 3 categories giving a total of 645 decisions to calculate IRR.

5.2.25 Additional taxonomies trial

In order to compare the final eDAT with other learning activity taxonomies, an additional content analysis was carried out on the data with the same raters using taxonomies developed by Laurillard (2012) and Conole (Fill and Conole, 2005). These had been previously used to categorize learning activities (Rienties *et al.*, 2015; Swan *et al.*, 2015; Charlton *et al.*, 2012). Laurillard's taxonomy includes the following: acquisition, discussion, investigation, practice, collaboration and production. Fill and Conole developed a taxonomy similar to Laurillard's that included: assimilative, finding and handling information, communication, productive, experiential, interactive/ adaptive and assessment (Fill and Conole, 2005). Full details of the activity types and the coding guide can be seen in Appendix 2.

Activity No	Tasks	Conole 1-7	Laurillard 1-6	Other Y/N
	[student tasks here]			

TABLE 6: ADDITIONAL TERMINOLOGY CATEGORISATION CHART

5.2.26 Content analysis and the eDAT

Typically, content analysis is used for systematic analysis of text using categorisation charts or coding guides. However, in this study, the categorisation chart and the coding guide itself has been developed into the eDAT that can be used by researchers, educational developers and tutors wishing to review and analyse their courses. The eDAT categories are a small number of simple, well-known terms intended to achieve a high level of agreement between independent raters, rather than a set of abstract terms that, despite also being commonly used, are difficult to apply consistently. The eDAT is thus an objective, simple way to categorise and therefore quantify learning activities, so that their impact on ODL retention can be effectively measured, and comparisons made between different learning designs.

5.3 Personal construct psychology and repertory grids

In phase two of this study the research questions B1 and B2 will be approached:

B1) What beliefs, perspectives and personal constructs do learning designers and tutors have about effective learning and teaching activities?

B2) How do the different beliefs, perspectives and personal constructs of learning designers and tutors impact on how ODL activities are categorised?

Following the literature review in Chapter 2 and the underpinning theory discussed in Chapter 3, the repertory grid method developed by Kelly (1963) was selected to identify tutor perspectives and explore the impact on categorising learning activities. The repertory grid method enables the elicitation of terminology and personal constructs that learning designers and raters draw on when writing or categorising online activities.

For this study, a set of trial repertory grids and peer discussions took place prior to the main elicitation activities to develop the researcher's skills in the use of repertory grids. Details of the pilot and main grid elicitation are given below.

5.3.1 What is a repertory grid?

As discussed in Chapter 3 (see page 59), a repertory grid consists of three items: elements, constructs and the ratings applied between them (Jankowicz, 2004). Elements are the things being discussed, for example, types of learning and teaching activities. Constructs are statements about how the interviewees think about the elements, which are elicited as pairs of contrasting ideas. Ratings are connections the person makes between the elements and the constructs on a given scale, usually 1-7. Since Kelly developed the repertory grid, there have been a number of adaptations and different methods used. The format of the repertory grid elicitation interview used for this study was recommended by Jankowicz (2004). This is outlined below.

5.3.2 Interview process

The interview starts with a friendly reassuring interaction, a summary of the context and aims of the interview (Jankowicz, 2004). For each interview a 'topic' sentence is used to help maintain the focus and increase consistency. In this study, the topic sentence was: "identify what you think about a selection of teaching and learning activities in terms of how helpful or otherwise they are for learning".

5.3.3 Elements

The teaching and learning activities that are going to be discussed are called the 'elements', and several options are available for their selection. The choice of elements is crucial as it lays the foundation for the repertory grid, however, the impact of alternative ways to select

elements has been under-researched (Bell, 2005). In Kelly's original work (Kelly, 1991), the interviewee is presented with a range of people 'roles' to populate, for example, 'a person you like', 'a caring person' and so on. For some purposes, roles or elements can be prescribed by the interviewer and presented to interviewees, thus allowing comparison of constructs over a number of interviewees. Alternatively, the interviewee can be invited to freely propose elements they would like to use (Jankowicz, 2004). For this study an approach was selected that allowed for some control over the elements by the researcher, as well as the opportunity for free choice by the interviewee. Elements were elicited by using a series of eight cards with prompts on them, for example, 'a teaching and learning method you like…'; 'a teaching and learning method your students don't like..' and so on (see Appendix 5). The interviewee was invited to complete the prompt cards as above using their own words. In addition, they were also given the option to use blank cards and populate them, or to use elements provided by the interviewer. This method helped interviewees to suggest a range of activities that incorporated ideas from the whole of their repertoire, and in their own words, to gather the full variety of terminology that tutors use to describe learning and teaching activities. Elements were then added to the blank repertory grid chart at the top of the columns.

5.3.4 Constructs

Constructs are the statements that reflect, in Kelly's terms, the "ways that he anticipates events" (Kelly, 1963, p.46) and are gathered as a series of dichotomies or opposites. Constructs can be selected by the interviewer, or can be elicited from the interviewee. If repertory grid data is to be used across a group a set of common constructs are required. In the present study grids are being used to understand each individual's way of thinking and so it was necessary to allow them to draw out their own constructs. To elicit constructs, interviewees can be asked to review a triad of elements and consider what two of them have in common in terms of the topic of the session as 'opposed to' the other element in the triad. There are various methods for the selection of triads. For instance, Jankowicz suggests the interviewer prepares a series of triad groupings in advance (Jankowicz, 2004). However, this does not allow the interviewee the opportunity to select the elements groupings they are most interested in. Other options include the creation of a matrix in which each element is used the same number of times, but this can lead to a large unmanageable grid (Jankowicz, 2004). Other options include pre-selecting a pair of elements to elicit what they have in common and then ask the interviewee to select another element that is different (Kington *et al.*, 2014) or to use triads that include two new elements each time (Yorke, 1978). In this study, for the interviewee to have as much opportunity to use their own language, they were asked to choose their own

sets of three elements. The topic sentence, 'identify what you think about a selection of teaching and learning activities in terms of how helpful or otherwise they are for learning' was repeated to focus the interviewee's thinking whilst they considered what their constructs might be. These were stated as pairs of contrasts about teaching and learning, for example, 'tutor-focussed' vs 'student-focussed'. When the interviewee suggested a construct the interviewer asked which part of the construct was regarded as most helpful for learning. This was the preferred construct 'pole'. Discussion continued until both are satisfied they are clear about the meaning, and that the pole preference is unambiguous. If constructs are ambiguous or seem too generalised or clichéd, the interviewer can ask further questions to encourage clarification using methods discussed by Jankowicz (2004). Once constructs have been clarified, they are written as a pair on the blank chart with the 'preferred' pole (the one most helpful for learning) in the left column. See page 116 for an example of a completed repertory grid.

The interviewee was then asked to rate each of the elements (learning activities) on a scale according to how like each end of the construct pairs they were. Kelly's (1991) original outline for the repertory grid included only two ratings for each element, however, most grid designs now use a five or seven-point scale (Jankowicz, 2004). A wider point scale may be too difficult for users who struggle to differentiate finer gradations and so result in the over-use of the 'middle' rating. In addition, a review of articles that used repertory grid methodology demonstrated that a variety of rating scales are in use, and this makes it more difficult for comparisons to be made between grids in different research settings (Johnson and Nádas, 2012). A five-point scale was used for this study as it was regarded as manageable for the interviewees.

5.3.5 Repertory grid analysis

There is no single way to analyse a grid and much depends on the purpose of the grid and the analytical requirements (Yorke, 1978). Grids can be analysed using both quantitative and qualitative approaches (Jankowicz, 2004), for example quantitative methods include standard deviations to show the distribution of elements across constructs, and correlations can be used to measure the relationships between constructs. This enables a better understanding of the relationships between elements and constructs; the relative importance of each to the grid creator, and to each other (Bell, 2005). In addition, regression analysis can show where there are strong similarities between constructs and/or elements, suggesting overlap of meaning. An online analysis tool, WebGrid5 (Shaw and Gaines, 2010) can be used for focus cluster analysis to show where elements and constructs are similar, and for cross-plots that show the elements

in relation to the most important constructs. In addition, principal components analysis (PCA), can be used to display a weighted set of components presented as a map. It is normally recommended that grids contain more than six elements and six pairs of constructs for satisfactory analysis, and so some grids in this study could not be analysed using WebGrid5 as they did not include sufficient data (Jankowicz, 2004).

Grids can also be analysed using qualitative narrative approaches including reviews of the element titles (Fransella *et al.*, 2004), process analysis of the grid interview and construct characterisation (Jankowicz, 2004). At the simplest level, an intra-participant analysis of the variety of terms used for teaching and learning activities can be categorised and counted, as can the terms used for each of the constructs (Hewitt, 2005).

Repertory grids generated during this study were analysed using narratives to understand more fully the elements and underlying constructs that each participant had about teaching and learning and to compare them with each other. In addition, the process of eliciting the grids was reviewed and some construct characterisation conducted. A small number of grids were analysed using the WebGrid5 tool.

5.3.6 Repertory grid pilot

Four repertory grid pilot interviews were conducted to test the process and for the researcher to practice the method. Interviewees were colleagues at the researcher's institution who were asked to volunteer to participate in a 'practice' interview about their teaching and learning perspectives. The repertory grid process was designed to enable interviewees to use their own language to talk about what they thought made teaching and learning activities more or less helpful. In addition, the process was designed to ensure construct validity by following a set of standards to allow for further use and comparison of the grids (Johnson and Nádas, 2012). The process was set up as described above following a reflective review with peers about the process which highlighted the need for good preparation and interviewing skills. The use of a carefully worded script ensured that the topic sentence was repeated using the same format, and that the discussion to elicit constructs used a similar set of prompts, for example, 'what are the advantages/ disadvantages of that approach….?' Elements were elicited mainly by the interviewee completing the prompt cards, although in some cases the blank cards were used. None of the interviewees selected any of the elements suggested by the interviewer. No changes to the repertory grid method were subsequently made prior to the main study.

5.3.7 Repertory grid main study

The ODL courses analysed using the eDAT had primarily been developed by the tutors teaching on them. These tutors were invited to participate in the repertory grid interviews. One tutor was unable to participate due to time constraints, and so one of the eDAT raters was invited to participate. A total of 8 repertory grids were completed, four in the pilot (described above) and four in the main study. Participants were invited to use the element prompt cards to suggest a range of teaching and learning activities both face-to-face and online.

5.3.8 Repertory grid conclusion

Despite the varied uses of repertory grids illustrated in the literature review in Chapter 2, there remain some concerns with the methodology. Yorke identifies three problems with grids: the context for construing is not always explicit; it is not always clear if the relationship between element and construct takes place in the past, present or future and that the rating system can be seen as a positivist approach discordant with Kelly's constructivist epistemology (Yorke, 1987). Kington notes that repertory grids can reveal only a partial picture of tutors' thinking, are based on a complex theory and need careful designing if there are not to be issues with validity (Kington *et al.*, 2014). In the present study, care has been taken to clarify the context, that is, teaching and learning in the interviewees current practice.

5.4 Design of study summary

The two phases of data collection described above, content analysis and repertory grids, were intended to complement one other. In phase one, content analysis by independent raters using different learning activities terminology was conducted on the ODL courses. The extent to which the raters agreed with each other, measured by IRR, was intended to reveal the most consistently used learning activity terminology. This could then be used in the eDAT to evaluate ODL courses. In phase two, repertory grids were used to elicit a range of learning activity terminology that tutors used, and to explore their underlying perspectives about teaching and learning that might affect their use of terminology used in the eDAT. Together these methods provide a rich set of data to both support the development and promote the use of the eDAT categorisation chart to quantify learning activities and designs. In the next chapter the results of the content analysis and repertory grids are presented and discussed.

CHAPTER 6: FINDINGS, ANALYSIS AND APPLICATION OF THE E-DAT

6.1 Overview

This chapter presents the findings from each phase of the study. Each set of findings is analysed separately and then comparisons are made between the data. Section 6.2 includes the findings from the phase 1 content analysis IRR, and section 6.3 includes the phase 2 repertory grid analysis. The findings are compared in section 6.4 and a final version of the eDAT with examples of its application is presented in section 6.5. The impact of the researcher's own perspectives on this study is examined in section 6.6.

6.2 Content analysis findings

6.2.1 Pilot 1 IRR results

The eDAT categories and coding guide used for the first pilot are above on page 96. During discussions with raters following the first pilot, it quickly became apparent that, despite raters agreeing that the terminology used on the eDAT categorisation chart was clear, there was nevertheless considerable disagreement when categorising the sample learning activities. Following the categorisation task, data from each of the completed eDAT charts was collated and the IRR for each of the categories calculated using Cohen's kappa (Cohen, 1960) as discussed on page 93. The ReCal online tool was used for the calculations (Freelon, 2010) discussed on page 94. As highlighted in Chapter 5 (page 95), acceptable levels of agreement using Cohen's kappa are largely arbitrary but it is usually suggested that below 0.40 is poor, between 0.40 and 0.75 as fair to good, and above 0.75 as excellent agreement above chance (Banerjee *et al.*, 1999).

		Closed/Open	**Managed**	**Feedback**	**Interactions**
Course A	Cohen's kappa	0.176	0.092	0.466	0.225
Course B	Cohen's kappa	0.258	0.162	0.637	0.504
Course C	Cohen's kappa	0.248	0.474	0.691	0.643
Course D	Cohen's kappa	0.164	0.223	0.282	0.060
Average		**0.210**	**0.240**	**0.520**	**0.360**

TABLE 7: PILOT 1 IRR RESULTS

The data in table 7 indicates a poor level of agreement on the 'closed/ open' and 'managed' categories, and a fair level of agreement on the 'feedback' category. The IRR for Course D interaction category was particularly low. If this course is excluded, the overall average is 0.457, fair.

6.2.2 Pilot 1 commentary

Several issues became apparent when looking at the raw data and during discussions with the raters. Course learning activities that included the instruction to 'post', 'discuss' and or 'comment' on an online forum appeared particularly difficult to categorise. Some raters categorised such activities as 'interaction' but some did not. Others categorised these as including 'peer feedback', but some did not. This suggests both a lack of clarity in the task instructions and a high level of rater difference about what this type of activity included.

Some activity types were not represented very highly. For example, in Course B there were few activities that specifically referred to feedback and so this may account for the higher level of agreement between raters.

In the discussions with raters before the eDAT categorisation task (see page 95), they expressed confidence that the categories of 'open/closed' and 'tutor/student managed' were clear and that they understood them. However, the low IRR illustrates that they had difficulty in categorising activities using this terminology.

6.2.3 Pilot 2 IRR results

The eDAT categories and coding guide used for the second pilot are above on page 98. The categorisations from each of the completed eDAT charts were collated and the IRR for each of the categories was calculated using both Cohen's kappa and Krippendorff's alpha, see table 7.

		Interaction	Feedback
Course A	Cohen's kappa Krippendorff's alpha	0.882 0.882	0.332 0.345
Course B	Cohen's kappa Krippendorff's alpha	0.823 0.824	0.859 0.858
Course C	Cohen's kappa Krippendorff's alpha	0.639 0.617	0.786 0.786
Course D	Cohen's kappa Krippendorff's alpha	Un 0.451	0.717 0.716
Combined courses	**Cohen's kappa** **Krippendorff's alpha**	**0.828** **0.828**	**0.716** **0.716**

TABLE 8: PILOT 2 IRR RESULTS

Both kappa and alpha were used to calculate the IRR as discussed in Chapter 5 to provide a more robust IRR index as shown by the similar results produced by each. The 'undefined' rating (indicated as 'Un' above for interaction in course D) was due to the data being insufficient to calculate kappa.

The IRR shows an excellent level of agreement for Course B. Course A 'feedback' was poor, as was course C and D for the 'interaction' category.

6.2.4 Pilot 2 commentary

After this pilot a discussion took place with each rater to review their eDAT charts and identify and discuss any issues where differences were noted from other raters. Similar issues with interpretation of the learning activities were noticed. For activities that included 'post to the forum', one tutor argued that only a two-way conversation could be interpreted as 'interaction' but other raters categorised this as including 'peer feedback'. Another activity asked students to provide tutor feedback on the module in the forum, and this was interpreted (incorrectly) by some raters as being a 'feedback' activity.

6.2.5 Final eDAT IRR results

The eDAT categories and coding guide used for the final eDAT are above on page 99.

		Interaction	**Feedback**
Course E	Cohen's kappa Krippendorff's alpha	0.780 0.782	0.496 0.458
Course F	Cohen's kappa Krippendorff's alpha	0.765 0.774	0.525 0.512
Course G	Cohen's kappa Krippendorff's alpha	0.862 0.860	0.817 0.815
Course H	Cohen's kappa Krippendorff's alpha	0.806 0.812	0.493 0.496
Combined results	**Cohen's kappa** **Krippendorff's alpha**	**0.814** **0.815**	**0.619** **0.612**

TABLE 9: FINAL EDAT IRR RESULTS

The IRR data in table 9 shows an excellent level of agreement for all courses on the 'interaction' category, excellent agreement on the 'feedback' category in course G and fair to good for courses E, F and H on the 'feedback' category.

6.2.6 Final eDAT commentary

Despite the changes made to the eDAT following the pilots, similar issues of interpretation persisted in the final eDAT categorisation task. The IRR figures showed a greater level of disagreement in the feedback category. A significant issue was the way the discussion forum activities were written, for example 'discussion' type activities included five terms: 'discuss', 'post', 'comment', 'post/comment' and 'post/discuss'. The total of each type is given in table 10. In total, of the 308 possible discussion type activities, 285 were categorised as peer interaction and 197 as peer feedback.

Discussion-type Activity	Count x 4 raters	Number categorised as interaction 2 (peer)	Number categorised as feedback 2 (peer)
Discuss	12 x 4 = 48	45	16
Post	29 x 4 = 116	107	46
Comment	10 x 4 = 40	27	33
Post/comment and Post/discuss	27 x 4 = 108	106	102
All discussion activities	**77 x 4 = 308**	**285**	**197**

TABLE 10: RATINGS FOR DISCUSSION ACTIVITIES

It is interesting to note that raters categorised both 'discuss' and 'post' activities as including feedback when this was not indicated in the task. There were 16 'discussions' rated as 'peer feedback', suggesting that about a third of raters perceived that an online student-student discussion activity involved feedback on their learning from students. However, would students think that discussions with peers comprise 'feedback'? In addition, on some occasions, discussion activities were categorised as 'other', perhaps, as mentioned by a rater in the pilots because merely posting on a forum does not comprise interaction. Within this variety of categorisations there was also noted a lack of consistency within raters. Activities using alternative vocabulary caused similar issues. For example, an activity included the instruction to 'post to a comment wall' and some raters categorised this as 'other', perhaps indicating that they did not realise that a comment wall is a similar tool to a forum and so could have been categorised in a similar way to the discussion forum activities. The highest level of agreement was for activities that specified 'post/comment' and 'post/discuss' suggesting a greater clarity in the task. This reveals the varieties of ways that tutors use the term 'discuss' and how it might reflect different tutor perspectives about how learning takes place during peer discussion.

Assessment activities were not consistently categorised as including tutor-feedback, presumably because this was not specified in the activity. However, the instruction to 'assume' tutor feedback from assessment tasks was included in the training and guidance to raters.

On closer examination, some of the courses included far fewer learning activities than appearances would suggest. Out of a total of 215 activities across the four courses, 98 were categorised as 'other' by all 4 raters. These mainly included instructions to 'read xx text' without any specific learning outcome being specified. Some learning activities were not at all clear about what the student activity was, for example 'think about…' or 'learn…'. Similarly, out of the total activities, 104 were categorised as 'no feedback' illustrating that students were not

given clear guidance about feedback, or that regular feedback was not provided for students in these courses.

Optional tasks were also included in the eDAT categorisation process, although it was often unclear how these activities were part of the overall learning outcomes of the course.

The total 'score' for each rater was calculated to review any overall differences between them. Table 11 includes the total activity score (see the scoring chart above on page 99) for all courses. Had the raters categorised the activities in the same way, the figures would have been similar.

Interaction			
R1	R2	R3	R4
147	155	138	162

Feedback			
R1	R2	R3	R4
156	194	109	110

TABLE 11: TOTAL ACTIVITY SCORE GIVEN BY EACH RATER

The table shows that there are noticeable differences in the 'feedback' category between raters. Rater R1 feedback categorisations included 8 instances where the activity: "Students access Blackboard for topic lecture notes, videos etc. Try to apply these techniques to your own work" had been categorised as 'self-feedback' when no other rater had categorised it as such.

Rater R2's much higher figure for feedback is due to categorising the activity "Please post … on the discussion board" as 'peer feedback' 22 times when the other raters did not.

It is noted that some issues with categorisation were due to the way the ODL tutor had written the learning activity that did not always seem clear to the rater, and may have been taken out of context, despite student information being provided for the raters (see page 90). Some learning activities did not conform to the good practice recommendations for interaction in the literature noted on page 10 or the recommendations for feedback on page 12. However, "Students post questions/comments in bulletin board for peer and tutor discussion" is an example of good practice because it is a clear activity that all raters categorised the same way.

6.2.7 Additional taxonomies IRR results

Additional learning activity types were used in a further categorisation task as they had been previously used in similar learning design studies, see page 101 above. The categories and coding guide are given on page 180. The IRR figures are in table 12.

		Conole	Laurillard
Course E	Cohen's kappa Krippendorff's alpha	0.430 0.438	0.445 0.444
Course F	Cohen's kappa Krippendorff's alpha	0.744 0.742	0.766 0.760
Course G	Cohen's kappa Krippendorff's alpha	0.514 0.510	0.396 0.384
Course H	Cohen's kappa Krippendorff's alpha	0.537 0.524	0.698 0.697
Combined results	**Cohen's kappa** **Krippendorff's alpha**	**0.581** **0.579**	**0.609** **0.608**

TABLE 12: ADDITIONAL TAXONOMIES IRR RESULTS

6.2.8 Additional taxonomies commentary

It should be noted that there were a higher number of learning activity types used for this analysis and they are of a broader type, similar to the categories in Pilot 1 above. This means that it is less likely raters would agree with a categorisation. In fact, during the training and categorisation task, raters commented on the difficulty of using the alternative terminology activity types. Course G had a low IRR because many activities were rated differently by more than 2 raters. For example, the activity below was variously rated as 3, 4, 1 and 'un-ratable' ('Laurillard' taxonomy):

"Ensure that you understand how to achieve different materials based on these elements."

6.2.9 Content analysis findings summary

The content analysis findings demonstrated the difficulties raters had when categorising learning activities. The pilot analysis allowed opportunities to develop and improve the eDAT to enable greater ease of use and to increase IRR. Nevertheless, there were still difficulties in using the eDAT that suggested more than just a chart that needed minor adjustments. The surprise that raters expressed when they realised that the eDAT categorisation task was not as straightforward as they had expected, together with the wide variation in their responses, suggested that more fundamental issues existed. Difficulties of learning activity categorisation were reported in other research (Swan *et al.*, 2015; Rienties *et al.*, 2015; Charlton *et al.*, 2012) discussed in Chapter 5. The difficulties raters had in categorising learning activities may be due to differences in their underlying meanings about the categories, which appeared to persist despite careful explanation and discussion. In addition, the original designers of the learning activities may have had very different 'blueprints' in mind, and this could have led to differences in the learning activity types they created. Of course, learning designers would not have been aware of the eDAT categories, but may have had some other type of categorisation in mind during the design process. It may be that raters were overestimating their own ability

for explanatory understanding, a phenomenon sometimes called 'Folkscience' (Keil, 2003). Essentially this reflects, according to constructivist philosophy, the very nature of the world and the way we come to make meaning (Lincoln and Guba, 2016). The variety of vocabulary used for tasks in the course learning activities and differences in the way that raters interpreted these leads to the conclusion that a postpositivist, universal and objective tool to categorise learning activities which does not take account of tutor perspectives may not be possible.

6.3 Repertory grid findings

This section includes the findings from the phase 2 repertory grid analysis carried out as described in Chapter 5 (see page 101). The grid analysis below includes a review of the element titles, a process analysis of the interview and some construct characterisation (see page 105). In addition, the grid contents are compared to each other to explore common themes.

For the final study, four repertory grids were elicited, three from tutors and one from a rater. Each of the tutors were involved in the design and delivery of the courses analysed in the final study. An additional grid was elicited from one of the raters, also an experienced tutor, but not an ODL tutor. For these grids, 29 elements and 17 constructs were elicited.

6.3.1 Elements

Elements were elicited by asking participants to create a list of learning and teaching activities. They were asked to use 'prompt' cards that helped to generate a varied list from across their range of experience and were not restricted to ODL, but invited to include all types of activities (the prompt cards are included in Appendix 5). The resulting list of 29 elements from all four grids showed a wide variety of activities, with only 2 repetitions (highlighted) in table 13.

Grid 1F (ODL tutor course F)	Grid 3M (ODL tutor course G)
• Student presentations • Lecture • Supervised research • Group presentations • Seminars • Debate • Online seminar discussion • Groupwork	• Demonstrations • Problem-based • Directed reading • Lecture • Reading + video • Flipped
Grid 2C (ODL tutor course E)	**Grid 4R (rater)**
• Group discussion • Student presentations • Designing own assessment • Self-test + model answer • Twitter blogging • MCQ[6] in class • Online journal [for writing]	• Limited instructional guidance/ open-ended task • Student-centred 'recording of learning' • Critical self-reflection • Peer review • Uninterrupted presentation • Drawing on other experts to enhance learning • Cooperative learning structures (Kagan) • Appreciative Enquiry

TABLE 13: ALL ELEMENTS

Some elements were quite specific, e.g. 'student negotiated assessment', whereas others were very broad, e.g. 'flipped', and some referred to the type of tool rather the activity e.g., 'Twitter'. The most common activities mentioned were lecture and student presentations. Some of the elements were similar to the learning activity categories used in the content analysis, see section 6.4 below.

6.3.2 Constructs

To elicit constructs, participants were invited to select three of their learning and teaching elements as above and to consider how they were similar or different, to produce dichotomous constructs. Different sets of three elements were then compared in the same way to elicit as many constructs as possible. A total of 18 constructs were elicited from the four participants and are listed in table 14.

[6] Multiple-choice question

Grid 1F (ODL tutor course F)	Grid 3M (ODL tutor course G)
• Students engaging with lecturer VS students engaging with each other • Student choice in mode VS have to follow pre-determined structure • Stimulating VS foundational • Organised, linear structure, connections VS discrete topics, disorganised • Co-learning VS all-knowing don	• Practical VS Theoretical • Making students aware of what they already know VS feeding information • Creativity VS Knowledge
Grid 2C (ODL tutor course E)	**Grid 4R (rater)**
• Allows students to reflect and become deeper learners VS allows to self-test knowledge + surface learning • Students having choice in their learning VS teacher choice • Social learning in a network VS learning in isolation • Getting feedback VS just presenting information	• Encouraging deep, analytical self-analysis – a degree of self-imposed objectivity VS can ignore elements of learning that are not going so well. Exclusive focus on the positive • Student-centred, trust building, small group VS didactic, prevents interactivity, doesn't check effectiveness of learning • Interaction allows students to engage with a number of experts and benefit from specialist knowledge VS distant relationship with students, limited opportunity to interact to enhance teaching and learning as only coming into contact with a single specialist, limited to interaction with an expert • Engaging students in peer assessment/ feedback, promoting accurate recording of learning, VS process does not provide feedback/ reflection nor does it involve any assessment process • Collaborative learning/ interaction enabling benchmarking/ standardisation of quality of learning. possibly more objective process VS individual activity, not easy to benchmark, largely subjective analysis • Students encouraged to construct new knowledge through reflection VS students connect with existing knowledge, limited opportunity to influence that knowledge

TABLE 14: ALL CONSTRUCTS

Again, this represented a wide range of approaches to learning and teaching, but some similarities are noted for constructs about student choice, interaction and feedback. The 'preferred' pole of each construct was entered in the grid in the left-hand column (the left hand of the paired constructs above). Each element was then 'rated' to show how like each of the constructs it was from 1-5 with 1 being closest to the preferred pole. Elements with the lowest score are therefore 'preferred' and most effective for teaching. The resulting grids are displayed below with a commentary.

6.3.3 Grid analysis

During the grid process, participants were encouraged to spend time to reflect and carefully consider their constructs. However, this proved to be much more difficult than expected, despite the use of additional questioning and prompting by the researcher, resulting in grids with few constructs. Where possible, the WebGrid5 (Shaw and Gaines, 2010) online tool was used to produce Focus Cluster, Cross-plot and PrinGrid graphs and these are included below.

6.3.4 Repertory grid tutor 1F (course F)

Figure 14 is the completed grid for the tutor/learning designer on Course F. Five pairs of constructs were elicited, but the tutor felt unable to rate one pair against the elements as 'it did not seem to fit', suggesting that this was not a clearly developed construct.

LHP (Left-hand pole) = most effective rated 1

RHP (Right-hand pole) = least effective rated 5

	Student presentations	Lecture	Supervised research	Group presentations	Seminars	Debate	Online seminar discussion	Groupwork	
Students engaging with lecturer	2	1	2	4	3	4	2	5	students engaging with each other
Student choice in mode	1	5	3	1	4	5	5	5	have to follow pre-determined structure
Stimulating	3	3	4	2	3	1	3	3	foundational
Organised, linear structure, connections	No ratings								Discrete topics, disorganised
Co-learning	1	5	2	1	4	2	3	1	all-knowing don
TOTAL /20	7	14	11	8	14	12	13	14	

FIGURE 14: REPERTORY GRID 1F

6.3.5 Analysis of grid 1F

The column totals show overall ratings for each element, and this shows that the elements 'lecture', 'seminars' and 'groupwork' were rated very similarly across all constructs. 'Student presentations' and 'group presentations' were rated at 10 or below suggesting that these were regarded as most effective.

The cross-plot analysis (figure 15) shows the two most important constructs and displays elements in relation to them. The significant constructs 'students engaging with lecturer VS students engaging with each other' and 'have to follow pre-determined structure VS student choice in mode' are illustrated here with the elements that are most closely clustered in relation to them. It is interesting to note that the two 'most effective' activities are very close to the construct 'student choice'.

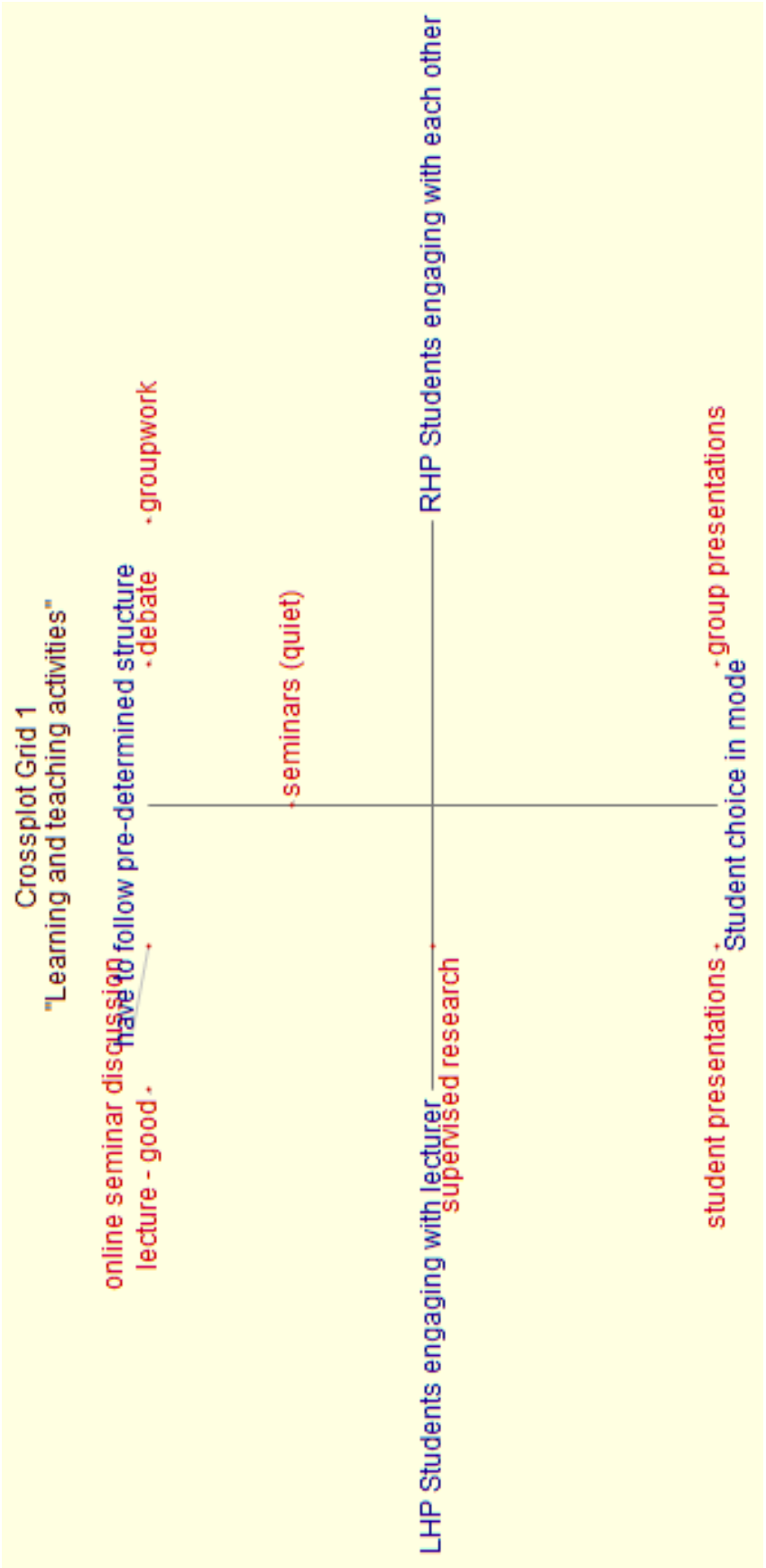


FIGURE 15: CROSS-PLOT GRAPH 1F

6.3.6 Repertory grid tutor 2C (course E)

Figure 16 is the completed grid for the tutor/learning designer on Course E. Only four constructs were elicited as below.

LHP (Left hand pole) = most effective rated 1

RHP (Right hand pole) = least effective rated 5

	Group discussion	Student presentations	Designing own assessment	Self-test + model answer	Twitter	blogging	MCQ in class	Online journal [for writing]	
Allows students to reflect and become deeper learners	2	2	1	3	1	2	5	1	allows to self-test knowledge + surface learning
Students having choice in their learning	2	1	1	3	2	2	5	2	teacher choice
Social learning in a network	1	1	5	5	1	1	3	5	learning in isolation
Getting feedback	5	5	5	1	5	5	1	5	just presenting information
Total /20	10	9	12	12	9	10	14	13	

FIGURE 16: REPERTORY GRID 2C

6.3.7 Analysis of grid 2C

Four elements were rated as 10 or below across all constructs, suggesting the activities 'group discussion', 'student presentations', 'Twitter' and 'blogging' were the most effective. However, ratings across each element were rather similar suggesting a lack of differentiation by the participant. Most of the elements are rated towards 'least effective' teaching and learning activity.

The cross-plot analysis (figure 17) shows the two most important constructs and displays elements in relation to them. The construct 'students having choice in their learning' has a cluster of elements that are close to it.

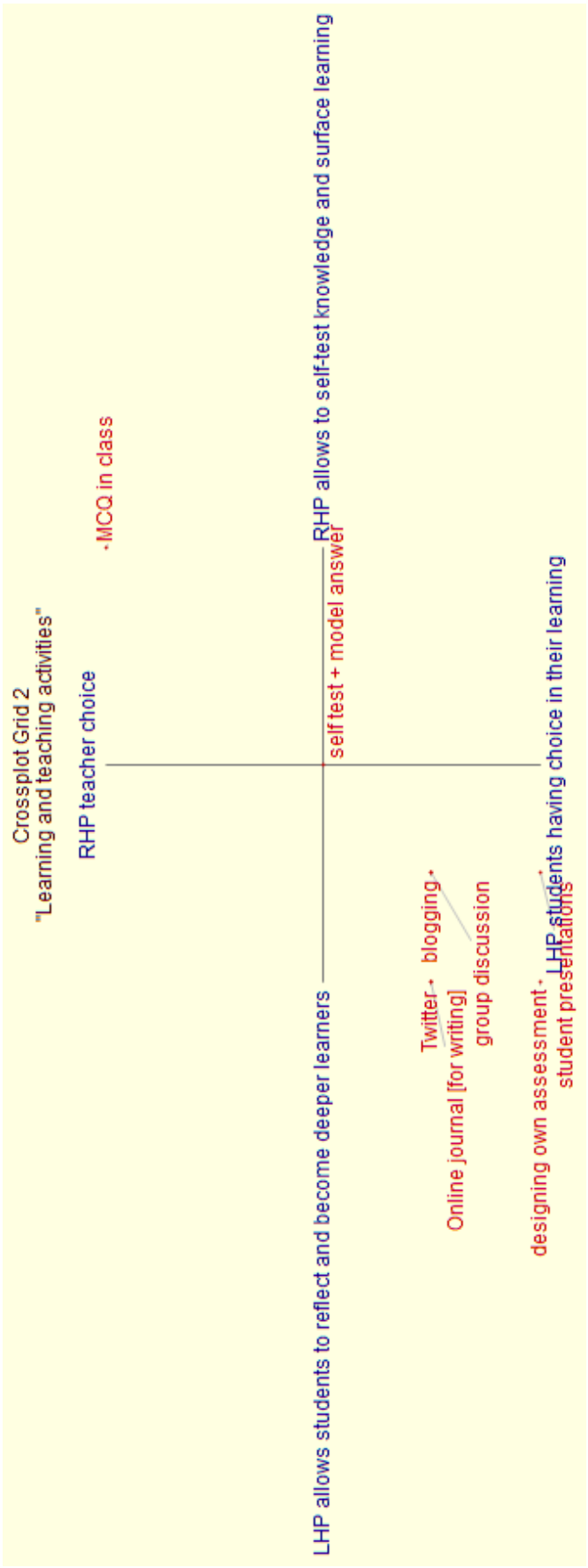


FIGURE 17: CROSS-PLOT GRAPH 2C

6.3.8 Repertory grid tutor 3M (course G)

Figure 18 shows the grid elicited from the tutor/learning designer from Course G. Even after extensive discussion, it was only possible to elicit 3 constructs. Similarly, only 6 elements were identified. During the interview, the participant had difficulty identifying which were the 'preferred' poles, in particular the creativity/practical constructs. This suggests that there was considerable internal conflict in the participant related to these constructs.

LHP (Left hand pole) = most effective rated 1

RHP (Right hand pole) = least effective rated 5

	Demonstrations	Problem-based	Directed reading	lecture	Reading + video	Flipped	
Practical	2	3	5	5	3	2	Theoretical
Making students aware of what they already know	3	1	5	3	5	5	feeding information
Creativity	5	3	5	5	5	3	Knowledge
Total /15	10	7	15	13	13	10	

FIGURE 18: REPERTORY GRID 3M

6.3.9 Analysis of grid 3M

The elements 'lecture' and 'reading + video' were very similar. Most elements rated towards the 'least effective' pole, but further analysis is difficult due to the small amount of data in the grid.

6.3.10 Repertory grid rater 4R

Figure 19 is the repertory grid elicited from one of the raters, an experienced educator but not an ODL tutor. The grid elicitation interview included an extensive and rich discussion about a range of teaching elements, a selection of which were chosen to use in the analysis below. The constructs were complex, with many overlapping ideas. Some areas of discordance were discussed, particularly around constructs related to individual/group work activities. Two elements were unable to be rated indicated by '?'.

LHP (Left hand pole) = most effective rated 1

RHP (Right hand pole) = least effective rated 5

	Limited instructional guidance/ open-ended task	Student-centered ' recording of learning'	Critical self-reflection	Peer review	Uninterrupted presentation	Drawing on other experts to enhance learning	Cooperative learning structures (Kagan)	Appreciative Enquiry	
Encouraging deep, analytical self-analysis – a degree of self-imposed objectivity	4	3	1	4	4	3	2	4	Can ignore elements of learning that are not going so well. Exclusive focus on the positive
Student-centred, trust building, small group	3	2	2	2	5	?	1	1	Didactic, prevents interactivity. Doesn't check effectiveness of learning
Interaction allows students to engage with a number of experts and benefit from specialist knowledge	4	?	3	4	5	1	3	3	Distant relationship with students. Limited opportunity to interact to enhance teaching and learning as only coming into contact with a single specialist. Limited to interaction with an expert
Engaging students in peer assessment/ feedback. Promoting accurate recording of learning,	3	1	1	2	5	3	2	3	Process does not provide feedback/ reflection nor does it involve any assessment process
collaborative learning/ interaction enabling benchmarking/ standardisation of quality of learning. possibly more objective process	3	2	5	1	4	3	2	2	Individual activity, not easy to benchmark. Largely subjective analysis
Students encouraged to construct new knowledge through reflection	2	1	1	2	5	3	2	3	Students connect with existing knowledge, limited opportunity to influence that knowledge
Total /30	19	9	13	15	28	13	12	16	

FIGURE 19: REPERTORY GRID 4R

6.3.11 Analysis of grid 4R

The element 'student-centred recording of learning' was, overall, most effective for teaching and learning (having an overall rating of 9), whereas, 'uninterrupted presentation' was indicated as the least effective (having an overall rating of 28).

The focus cluster analysis (figure 20) displays elements and constructs clustered together to show relationships. Similar elements and constructs are indicated with the > of the chart

nearest the 100 mark. The elements 'Limited instructional guidance/ open-ended task' and 'Peer review' are very similar, as indicated by the lines converging at approximately 80%, as are 'cooperative learning structures' and 'appreciative enquiry'. The constructs 'Students encouraged to construct new knowledge through reflection' and 'Engaging students in peer assessment/ feedback. Promoting accurate recording of learning' are also similar.

The cross-plot analysis (figure 21) shows the main constructs and the elements in relation to them. Elements are clustered in the quadrant between the constructs of 'can ignore elements of learning that are going well' and 'student-centred, trust building, small group'.

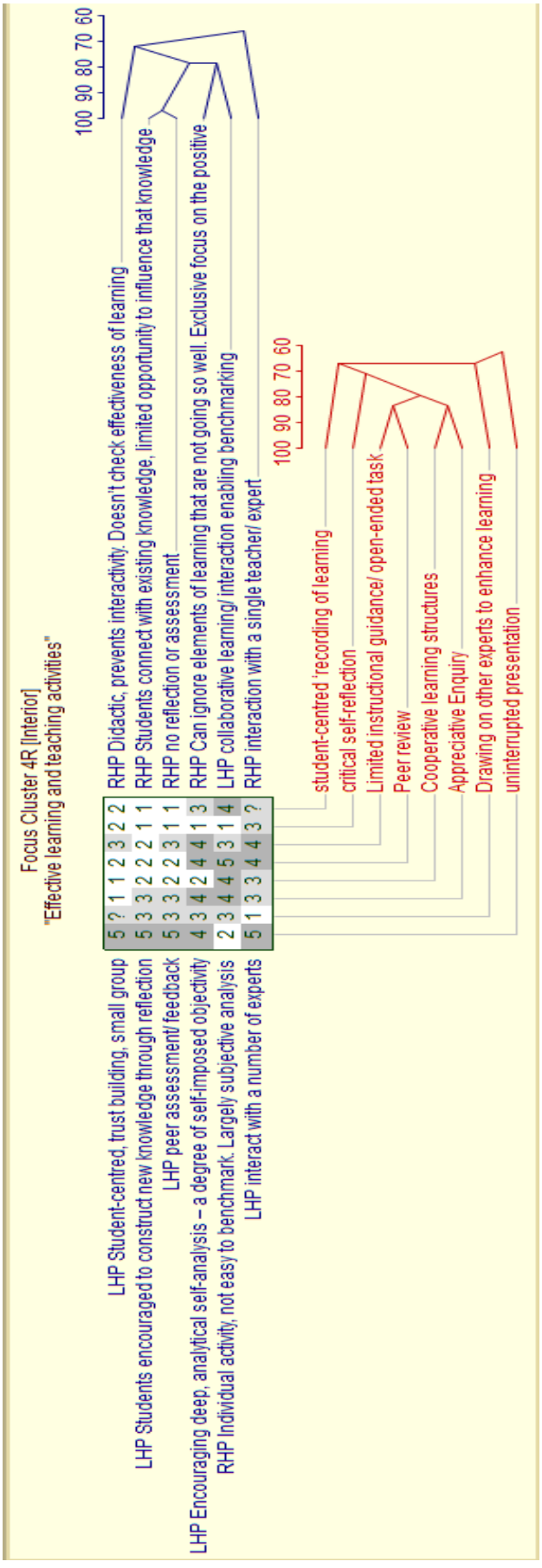


FIGURE 20: FOCUS CLUSTER ANALYSIS OF GRID 4R

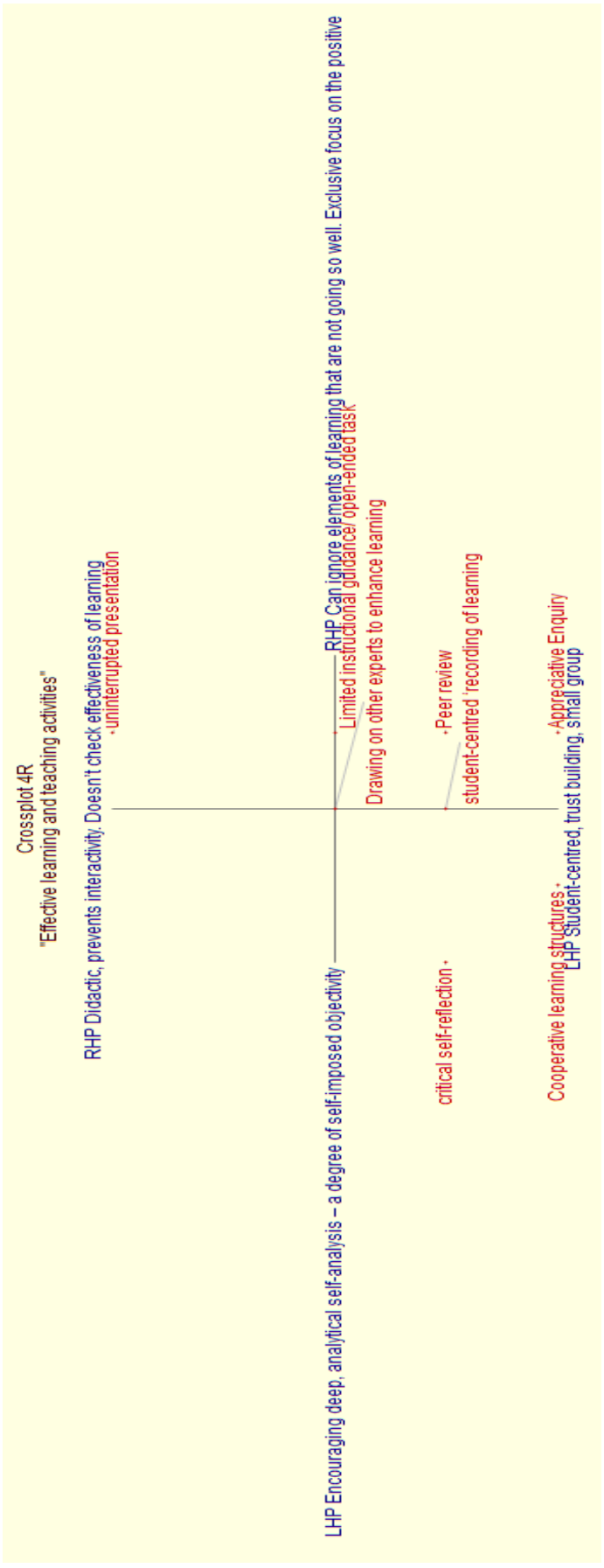


FIGURE 21: CROSS-PLOT ANALYSIS OF GRID 4R

6.3.12 Overall grid commentary

The grids were surprisingly difficult to elicit. The pilots completed before the main study had illustrated the careful planning and development needed by the researcher, as well as some of the challenges, but there were still fewer constructs elicited than had been hoped for. The elements elicited were largely as expected in that they included typical university learning activities, although across the four participants there were very few elements in common with only two elements used in more than one grid. This suggests a wide variety of experience and varied use of classroom and online activities. In all four grids most of the elements were rated towards the 'least effective' pole of the constructs. This is an interesting finding, and may be either due to the way elements were elicited or because the tutors may have been using teaching methods that they were uncomfortable with or were in conflict with their perspectives. The literature review had suggested that tutor perspectives do not always match practice, for example Acklands' study (discussed on page 34) highlighted how differences in teacher's personal constructs and a local policy led to conflicts in practice (Ackland, 2013). In addition, the Teacher Perspectives Inventory (Pratt, 2014) discussed in the literature review on page 29 specifically encourages teachers to identify and reflect on any inconsistencies between their intentions and actual teaching actions as these are often noted.

One participant commented that the grid 'did not allow him to say all he wanted to about teaching and learning' despite a detailed discussion taking an hour. This seems to be in agreement with Yorke's (1983) concern that grids on their own do not allow richness of meaning to be expressed (discussed on page 106). Or it may indicate weaknesses in the researcher's skills in conducting the repertory grid interview.

The repertory grid analysis also offers the opportunity for a greater understanding of the ways in which participants may have used constructs, for example in a pre-emptive or constellatory mode (see theory Chapter page 55) that restricted their ability to use and apply constructs to learning activities in the eDAT categorisation task. Unfortunately, there was insufficient data in the repertory grids elicited to make further analysis of this possible.

6.4 Combined findings and analysis

The repertory grids were intended to enable a greater level of understanding about why the content analysis categorisation task was difficult and why there was relatively low agreement between raters. Kelly's (1963) sociality corollary (see page 59) suggests that raters will be more able to categorise learning activities written by other tutors if they have constructs in

common. Therefore, in this section, categories and terms used for content analysis are compared to the elements and constructs from the repertory grids.

When comparing the constructs and elements with the learning activity categories used in the pilots (page 95) and final forms of the eDAT (page 99), some similarities are noted as in table 15.

Learning activity category	Similar Elements	Similar Constructs
Closed/ open	• Limited instructional guidance/ open-ended task	
Tutor/ student managed	• student negotiated assessment • student-centred recording of learning	• students having choice in their learning VS teacher choice • student choice in mode VS have to follow pre-determined structure
Interaction	• Debate • Discussion • Seminar • Peer review • Cooperative learning structures • Online seminar discussion • Groupwork • Group discussion	• Social learning in a network VS learning in isolation • Students engaging with lecturer VS students engaging with each other • Interaction allows students to engage with a number of experts and benefit from specialist knowledge VS Distant relationship with students. Limited opportunity to interact to enhance teaching and learning as only coming into contact with a single specialist. Limited to interaction with an expert • Student-centred, trust building, small group VS Didactic, prevents interactivity. Doesn't check effectiveness of learning
Feedback	• Self-assessment • Designing own assessment • Self-test + model answer • MCQ in class • Peer review	• Getting feedback VS just presenting information • Engaging students in peer assessment/ feedback. Promoting accurate recording of learning VS Process does not provide feedback/ reflection nor does it involve any assessment process

TABLE 15: COMPARISON OF ELEMENTS AND CONSTRUCTS WITH EDAT CATEGORIES

There are few elements or constructs similar to the content analysis categories of 'Closed/ open' and 'Tutor/ student managed' but more for the 'interaction' and 'feedback' categories. This aligns with the findings for the final eDAT that showed a greater level of agreement between raters with these categories (see page 109).

A similar comparison is made in table 16 between the additional taxonomies with any similar elements and constructs:

Activity	Similar elements	Similar constructs
Acquisition	• Uninterrupted presentation • Supervised research • Lecture • Demonstrations • Directed reading • Reading + video	
Discussion	• Group discussion • Online seminar discussion • Seminars • Debate	• Interaction allows students to engage with a number of experts and benefit from specialist knowledge VS distant relationship with students, limited opportunity to interact to enhance teaching and learning as only coming into contact with a single specialist, limited to interaction with an expert • Social learning in a network VS learning in isolation
Investigation	• Appreciative Enquiry • Supervised research • Problem-based	
Practice	• MCQ in class • Self-test + model answer	• Practical VS Theoretical
Collab-oration	• Cooperative learning structures (Kagan) • Groupwork	• Collaborative learning/ interaction enabling benchmarking/ standardisation of quality of learning. possibly more objective process VS individual activity, not easy to benchmark, largely subjective analysis
Production	• Online journal [for writing] • Student presentations • Group presentations	

Activity	Similar elements	Similar constructs
Assimilative	• Lecture • Demonstrations • Directed reading • Reading + video	
Finding and handling information	• Supervised research	
Commun-ication	• Student presentations • Group discussion	• Interaction allows students to engage with a number of experts and benefit from specialist knowledge VS distant relationship with

	• Seminars • Debate • Group presentations	students, limited opportunity to interact to enhance teaching and learning as only coming into contact with a single specialist, limited to interaction with an expert • Social learning in a network VS learning in isolation
Productive	• Online journal [for writing]	
Experiential		
Interactive/ adaptive and assessment	• Self-test + model answer	

TABLE 16: COMPARISON OF ELEMENTS AND CONSTRUCTS WITH ADDITIONAL TAXONOMIES

A small number of constructs and elements are similar to the additional taxonomies, again aligning with the lower IRR for these categories (see page 111).

Although it might have been expected that the four repertory grid participants, all educators at the same university, would share some elements and constructs, it was clear from the variety in each grid that the tutors understood and used learning activities in different ways. The two elements in common of two participants did show some similarities in use. For example, Grid 3M uses the element 'lecture' and rates it as least effective for teaching and learning towards the construct pole 'theoretical' and 'knowledge', whereas Grid 1F rates 'lecture' towards construct poles of 'have to follow pre-determined structure' and 'all-knowing don'. The element 'student presentations' is rated as most effective for teaching and learning towards the construct pole 'student choice in mode' and 'co-learning' and in Grid 1F, 'students having choice in their learning' and 'social learning'.

It is argued that the variety of constructs that underpin the raters, tutors and learning designers' approaches to teaching and learning influence their categorisation and interpretation of another tutor's learning activity. The effect of constructs on categorising learning activities is evident in the low IRR particularly for the terminology used in the eDAT pilots.

The next section reviews the final version of the eDAT that combines the use of the most commonly accepted terminology with tutor perspectives and considers its application in practice.

6.5 eDAT applications for learning design

The final version of the eDAT (Appendix 7) builds on previous learning design tools and was developed from a combination of the findings from the content analysis tasks, feedback from

participants and findings from the repertory grid analysis. It is presented in an accessible table format in a word-processed document that includes an invitation for tutors to categorise each learning activity to indicate 'interaction' and 'feedback' to highlight the pedagogy, and guidance for indicating the teaching perspective to support reflection and aid sharing. Two examples of this are below together with a discussion of how the eDAT embeds pedagogic guidance and, when combined with tutor perspectives, can be used to share effective designs.

6.5.1 Representation 1: Drilling a decayed tooth lesson

The 'drilling a decayed tooth' lesson (Laurillard, 2012) was introduced as a learning design representation on page 20 of this study, and is worthy of reiteration as it provides a useful demonstration of how the eDAT can be used to represent the same lesson in table 17.

Specific activity tasks (you may need to split activities that include separate parts)	**Interaction with…** A Tutor B Peers C (Interactive) Content	**Feedback from…** 1 Tutor 2 Peers 3 Self 4 Computer	**Other** ✓
Introduction to principles and practice. Explanation of how to get best result			y
Students practice drilling with virtual drill microworld using handouts		4 (computer)	
Class discussion and reflections	B (peers)		
Completion of [assessment] questionnaire		1 (tutor)	
Totals number of activity type:	1 x Interaction	2 x Feedback	1 x other

Total activities:	4	% Activities with interaction (interaction/total x100):	25%	% Activities with feedback (feedback/total x100):	50%	% Other activities (other/total x100):	25%

TABLE 17: EDAT REPRESENTATION OF DRILLING A DECAYED TOOTH LESSON

6.5.2 Representation 2: Course A

This second example (table 18) is Course A as used in the final eDAT content analysis task described on page 98. For this example, the activity category types have been edited where there was disagreement between raters to show best fit. The course included 37 activities over 5 weeks, but the example includes only the first and last week's activities.

Specific activity tasks (you may need to split activities that include separate parts)	**Interaction with…** A Tutor B Peers C (Interactive) Content	**Feedback from…** 1 Tutor 2 Peers 3 Self 4 Computer (Automatic)	**Other** ✓
Reading for seminar 1 from suggested textbooks			Y
Using the group forum discuss [structured questions]	B (peers)	2 (peers)	
Your firm has been consulted by Louise and Louis who wish to set up a partnership. Write a memo to your principal as follows [structured questions]			Y
Post your memo to the group forum and provide a critique on one other students work.	B (peers)	2 (peers)	
Using the comment wall in the group post your findings on the following [structured questions]	B (peers)	0	
A company's constitution can take the form of x. Using the group forum discuss [structured questions]	B (peers)	2 (peers)	
Using Lexis Nexis find the journal article x. Discuss the issue of "Opportunistic registrations" in the forum.	B (peers)	2 (peers)	
Using the group forum discuss [structured questions]	B (peers)	2 (peers)	
Reading for seminar 5 from suggested textbooks			Y
Discuss "bills of lading" by comparison to "waybills"	B (peers)	2 (peers)	
Discuss [structured questions] Use the group forum for your discussion.	B (peers)	2 (peers)	
X plc, … supplies ball-bearings [structured questions]. Discuss the above two situations. Use the group forum for your discussion.	B (peers)	2 (peers)	
Y plc, … and …. By reference to … discuss [structured questions]. Use the group forum for your discussion.	B (peers)	2 (peers)	
Using your personal blog tool make a log as to: What have I found useful so far; how have I contributed to the learning of others today? What would I do differently next time?	0	3 (self)	
Total number of activity type:	10 x Interaction	10 x Feedback	3 x other

Total sample activities:	14	% Activities with interaction (interaction/total x100):	71%	% Activities with feedback (feedback/total x100):	71%	% Other activities (other/total x100):	21%

TABLE 18: EDAT REPRESENTATION OF LAW ONLINE LESSONS

These two representations illustrate how the eDAT displays a learning design in a simple tabular format that highlights the activity types. This representation supports the designer by clarifying the proportion of different activities, prompting them to consider reviewing the design and to enable the use of data to review design quality. For example they may use the data to provide a total interactivity 'score' on the representation (Beetham, 2008). This eDAT data can be used together with other learning analytics data including retention. In addition, the eDAT embeds pedagogic guidance and can support sharing and reuse as discussed below.

6.5.3 Pedagogic guidance

Learning design representations cannot be pedagogically neutral (Dobozy and Dalziel, 2016b). They can facilitate the development of quality ODL activities by embedding pedagogic guidance for tutors, and the eDAT embeds this by focussing on the use of learning activities that include interaction and/or feedback. The pedagogic impact of focussing on these two activity types was noted by raters who commented that completion of the eDAT activity 'prompted' them to review their own learning designs (Conole, 2013). The eDAT therefore aids reliable evaluation of the pedagogic quality of ODL.

However, the presence of interaction and feedback activities alone may not be sufficient for the design of a quality course. Some learning activities in the courses reviewed in this study had ambiguous phrasing and were less likely to be categorised consistently. For example, some of the interaction activities were of a 'closed type' and included the student instruction to 'post' to a forum. These were less likely to be categorised as interaction (see page 109), even though it might be assumed that the use of a forum meant the tutor did intend some peer interaction to take place. It is possible that students would have similar difficulties in understanding and completing the activity. An activity that was rated consistently by all raters in the study was: "Students post questions/comments in bulletin board for peer and tutor discussion". This is consistent with the literature discussed in Chapter 2 and Appendix 1 that highlights the importance of good quality structured interaction activities for student retention. The process of categorising learning activities with the eDAT leads the designer or tutor to reflect on the activity and consider their clarity of expression. Editing the activity for categorisation may therefore improve the clarity and quality for students (Conole, 2013).

Feedback is closely associated with interaction (see discussion on page 12) and many activities in the study were categorised as both. However, some activities were ambiguous or did not clarify when or how students would get feedback. Often, the activity did not specify feedback at all, even when it might be assumed, for example, that participation in an online forum

would generate feedback in the form of replies or comments by the tutor. Many activities did not conform to best practice in the literature for feedback activities, as discussed on page 12. In the discussions with raters and the researcher following each of the categorisation tasks (see pages 98 and 100) several raters commented that the process of completing the task had prompted them to rethink and improve their own ODL and classroom activities. This suggests that use of the eDAT provides tutors with opportunities for clarification and reflection on activities, leading to improvements in practice. This provides further evidence of the eDAT improving ODL quality by embedding pedagogic guidance.

6.5.4 Sharing and reusing learning designs

As discussed in Chapter 2 (see page 24), learning design representations can improve ODL practice by sharing effective designs between practitioners (Wills and Pegler, 2016). However, despite the benefits, sharing is difficult and tutors rarely use each other's designs (see the discussion on page 24). This is due to the variety of types of representation, a lack of contextualisation or where designs are not developed and shared within a community of practitioners (Beetham, 2008).

However, the consideration of tutor perspectives in the eDAT can support sharing and reuse. PCP theory discussed in Chapter 3 (see page 54) states that people construct their own meanings and that these are unique to them, as expressed in the individuality corollary. However, the commonality corollary nevertheless suggests that individuals with similar constructs have similar psychological processes, and the sociality corollary suggests that similarities in construing are developed through effective communication between people. Therefore, PCP suggests that opportunities for tutors to discuss their perspectives about teaching and learning would enable a greater understanding of each other's constructs, further development of their own, enable a greater level of agreement about the content of learning activities and therefore enable reuse of each other's learning designs. The final version of the eDAT (page 225) therefore includes a table to be completed by the tutor that enables reflection on their perspectives about interaction and feedback activities.

The eDAT can be used as one of a suite of representation tools that tutors can call on to develop ODL, including design narratives, design patterns and design scenarios (Warburton and Mor, 2015). The eDAT representation captures the essential elements of effective learning design, includes evidence from practice in the form of data and offers a commentary on the tutor perspectives that underpin the design. It is therefore an effective learning design that

enables reuse. As such, the representation will incorporate both scientific rigor and be a practical solution (Mor, 2013b).

6.5.5 Evaluation of the eDAT

The aim of the eDAT is to effectively represent ODL learning designs to enable evaluation. The eDAT builds on other learning design representation tools discussed in the literature review. For example, the eDAT includes a similar focus on activity seen in the 7Cs framework and the AUTC swimlanes, and embeds pedagogic guidance similar to the pedagogic templates, the e-Design Template and the Learning Designer. However, eDAT terminology used is based on the most reliable terms as suggested by the content analysis, and the pedagogic guidance is simplified. The eDAT utilises a simple table format as suggested in several other tools. However, the use of a restricted set of terminology and simplified pedagogic guidance may make eDAT appear overly simple. The need to unitise activities into sufficiently small parts for analysis may also make its use in more narrative based ODL courses challenging.

6.6 Reflexivity

This section includes a brief, personal commentary on my professional role, and how my perspectives as an e-learning developer were transformed as a result of this study.

Reflexivity can be defined in several ways, but Jupp defines it as “the process of monitoring and reflecting on all aspects of a research project from the formulation of research ideas through to the publication of findings” (Jupp, 2006, p.258).

Schön (1992) describes educational research that takes place in universities as sitting on ‘high cliffs of research’ where manageable problems can be solved, and contrasts this with ‘messy, swampy lowlands of practice’ where problems are confusing and resistant to technical solutions, but where teachers are actually situated. This is his dilemma of ‘rigor or relevance’ between which the researcher must choose, and he claims that researchers feel this dilemma particularly strongly when they reach the age of about 45 (Schön, 1995). Strangely, this was true of me when I moved to a university around that age to work on an e-learning research project after years of practice. This represented, for me, a choice for rigor.

6.6.1 Reflection in action

Reflection-in-action includes an awareness that, as a competent professional, I make sense of ‘surprises’ in practice and respond to resolve them, often without awareness (Schön, 1992).

Peshkin alerts researchers to be open about their own inevitable subjectivity at all stages of research and to consider their different ‘selves’ and how this influences their study (Peshkin,

1988). My professional role as a university e-learning developer involves me in training and supporting teaching staff in the use of technology for ODL. In addition, I have been an ODL student and tutor. Aspects of my professional role often necessitate the presentation of technology in a positive light, whereas Oliver argues for a more critical perspective on the use of educational technology (Oliver, 2011). This created personal dissonance and I responded to this by choosing to begin this formal study of learning design in ODL.

Greenbank (2003) suggests that research cannot be value free and therefore it is inevitable that my personal values about educational technology and teaching have influenced this study. I feel that it is important to improve the learning of both my professional teaching colleagues and their students. If we are to use technology for online learning, then we must use it in a way that empowers learners. This value has driven the research aim of the study, namely to identify the impact learning design has on ODL retention. This study is based on an initial idea to attempt to critically and empirically evaluate the effectiveness of an e-learning framework that I had developed during my work to provide scholarly evidence for 'what works'. This reflection heightened my awareness that in order to evaluate my work I needed feedback and empirical data from my practice.

This interdisciplinary approach, combining elements of education, technology and psychology can be defined as critical reflexivity in that it challenges values, assumptions and socio-political context (Popa and Guillermin, 2017). The mixed methods approach is politically transformative (Mertens, 2007) in that the inclusion of the personal constructs of tutors is in part an acknowledgment of the impact of social reality.

6.6.2 Reflecting on reflection in action

During my work and during the course of this study, I considered my reflections-in-action (Schön, 1992). Initially, I held the idea that learning design analysis was a straightforward practical application of learning theory to ODL activities. However, creating and using the initial eDAT categorisation charts demonstrated the 'messy' nature of practice. This was particularly evident when other users, the raters, did not use them in the way I had anticipated and did not agree on the meanings of terminology. This led me to reflect on, and change the categorisation terminology used during the pilots, and also involved a number of conversations with my peers about the messy evidence before us. I was here faced with the need for relevance, rather than rigor.

Essentially, this demonstrated the limitations of a postpositivist methodology. I was personally troubled by this and wondered why tutors found it so difficult to use a shared vocabulary for

teaching and learning, given the advantages for sharing and reuse of effective teaching ideas. Further discussions with raters, distance learning tutors and colleagues led to the decision to include an interpretive methodology, repertory grids, that would enable understanding of the impact of tutors and raters' perspectives, both in designing and interpreting learning activities. It was hoped that this would provide relevance. In addition, there is an empirical element to repertory grid methodology that enables statistical analysis and this seemed to satisfy my need for both quantitative and qualitative data.

6.6.3 Reflective conversation with situation

The 'rigor or relevance' dilemma is partly resolved by Deweyan 'Inquiry' which combines mental reasoning and action in the world, involving a reflective 'conversation with situation', that is, reflection on 'reflecting in action' (Schön, 1992).

My 'conversations with the situation' led to an increased awareness of how the emerging eDAT categories of interaction and feedback were being reified in my professional work. The research literature had indicated the significance of these type of activities, and the greater ease with which they could be identified and categorised in the content analysis rating seemed to increase their importance. These two 'key' types of activity are now an important part of discussions with colleagues about online learning activities.

My experience of using repertory grids to elicit perspectives about teaching and learning activities with my peers led to a reflective conversation about "what kinds of knowing are already embedded in competent practice" (Schön, 1995, no pagination). The elements and constructs expressed included tacit knowledge, a way of knowing about teaching, and I began to explore how this knowledge was being expressed in raters' categorisation of learning activities.

Mertens (2007) argues that mixed methods is a transformative paradigm. It challenges ontological perspectives by providing alternative realities and by questioning epistemological assumptions about the way knowledge is constructed by both researchers and participants (Mertens, 2007). My professional roles as e-learning developer and researcher may have implied an objective, positivist epistemology to the raters and so influenced their activity categorisation selections. Raters may also have been, in this context, less likely to challenge this perceived positivist approach. In addition, the power differential implicit in our different professional roles may have made participants compliant and more accepting of my perspectives. The informal discussions throughout the process attempted to alleviate this, as well as the clear inclusion of participants' feedback in the evolving eDAT. The interpretive

repertory grid method, in contrast to the positivist content analysis, implies a subjective epistemology and aims to elicit the participants' constructs in their own language, thus valuing their voice. This research took place in my own place of work, focussing on ODL modules developed to be delivered using a specific VLE that conformed to the institution's quality requirements, typically requiring a weekly structured approach of reading and activity. ODL modules designed on different principles, for example, project-based or co-constructed with students may not be as effectively represented or evaluated by the eDAT.

My personal constructs about effective learning and teaching activities are illustrated in my own repertory grid (figure 22), elicited during the course of this study using the WebGrid5 online tool (Shaw and Gaines, 2010). The left and right statements are my personal constructs about effective learning activities. Not surprisingly they include constructs about interaction, who directs the learning, open and closed tasks and feedback. The content analysis of the eDAT utilises very similar categories to these. My personal perspectives are therefore writ large in this study.

The dilemma of 'rigor or relevance' for me has been partly resolved through this study by my reflections on the impossibility of a purely scientific approach to the inherent messiness of people and teaching and learning. However, the use of a combination of methods together with a critical, pragmatic approach addresses the rigor and relevance dilemma, which is never finally resolved.

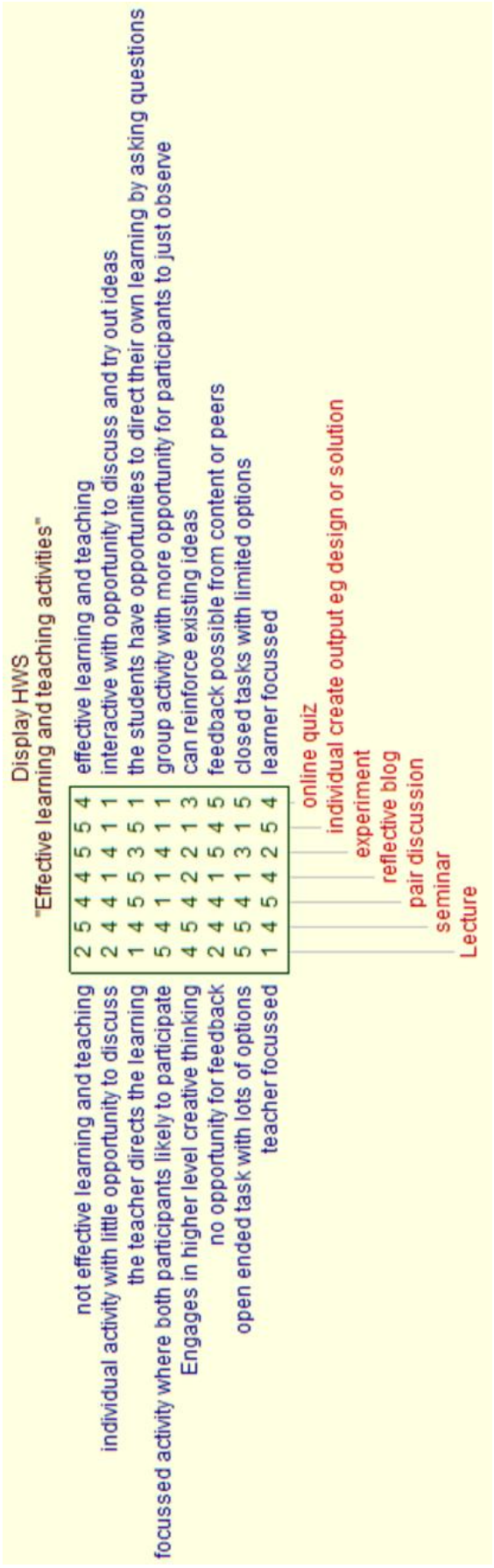


FIGURE 22: RESEARCHER'S REPERTORY GRID

6.7 Findings, analysis and applications summary

The findings have highlighted issues with the ways that learning activities can be categorised and differences in tutors' underlying perspectives about them. The development of the eDAT was based on several pilots that aimed to increase IRR by improving the terminology used for learning activities. The variety of constructs revealed in the repertory grids illustrated that difficulties when categorising learning activities were related to differences in tutor perspectives and not just an issue of poor communication. A reflection on the researcher's own perspectives discusses their impact on this study. Finally, the eDAT is presented as a learning design representation that embeds pedagogic guidance, and supports sharing and reuse.

CHAPTER 7: CONCLUSION: USING THE E-DAT TO REPRESENT, EVALUATE AND DEVELOP ONLINE DISTANCE LEARNING

This chapter draws conclusions about how the study contributes to knowledge and presents the eDAT as an effective tool to represent, evaluate and develop ODL designs. Section 7.1 includes a summary of the main findings, 7.2 reviews the extent to which the research questions, and therefore the aims and objectives, have been addressed. Section 7.3 reviews the effectiveness of the approaches to theory taken in the study, and section 7.4 evaluates the mixed methods methodology. Emergent themes are discussed in section 7.5 together with implications for practice. Limitations of the study are noted in section 7.6, and section 7.7 makes recommendations for using the eDAT to represent and evaluate ODL designs to improve practice. Section 7.8 concludes the study with some final remarks.

7.1 Main findings summary

The findings show that the eDAT contributes to knowledge and achieves the core concepts specified in the Learning Design framework of representation, guidance and sharing (Dalziel *et al.*, 2013). Significantly, the eDAT provides a way for tutors to develop a common terminology and enables reflection on tutor perspectives that influence learning design. Each of the main findings are considered below in relation to the Learning Design framework.

7.1.1 E-DAT as an effective learning design representation

The findings show that the eDAT can effectively represent key activities in a learning design. This study utilised several raters, a systematic, objective process and Krippendorff's alpha (Krippendorff, 2011) to calculate the reliability of the 'interaction' and 'feedback' terminology to categorise learning activities. This terminology was used with an acceptable level of IRR to categorise 'interaction' and slightly less for 'feedback' learning activities in the sample courses.

The eDAT examples given in section 6.6 illustrate how the eDAT builds on previous representations, clearly displays the key learning activities in a standard 'lesson plan' table format, permits quantification of these design elements that can be compared to other data, and that is 'understandable' (Dalziel, Conole, *et al.*, 2016) to other tutors.

The terminology used in the eDAT pilots, despite being commonly used in education, was not easy to apply consistently. The terminology used in the eDesign Template (see page 21) that was found to be effective when designing learning activities, was not, however, able to be easily used to describe those activities (see Laurillard, 2012, Chapter 6 no pagination).

The additional taxonomies tested (see page 101) were also difficult to use consistently as noted by other researchers (Swan *et al.*, 2015; Rienties *et al.*, 2015; Jaggars and Xu, 2016).

7.1.2 E-DAT as an effective pedagogic guide

The eDAT embeds quality pedagogic guidance in the form of the learning activity categories 'interaction' and 'feedback'. The use of these key learning activities in ODL has a significant impact on retention (see Chapter 2 and Appendix 1), and they are supported by both behaviourist and social constructivist learning theories (see page 52 for discussion). These terms are widely understood and used in similar ways by tutors as suggested by the higher level of IRR for these categories in contrast to the terminology in the pilots.

The eDAT enables quantitative data about the proportion of interaction and feedback activities in a learning design to be gathered. This learning design 'score' (Beetham, 2008) can be compared to a range of other learning analytics including attainment and retention. It provides the necessary "feedback loop" (Mor *et al.*, 2015, p.224) to the tutor about learning design quality.

Discussions with raters provided evidence that using the learning activity categorisations for the content analysis task encouraged reflection on their own practice and 'prompted' them to improve their online and face-to-face learning designs (Conole, 2013).

7.1.3 E-DAT as an effective tool for sharing

The findings from the repertory grids in Chapter 6 illustrate the variety of ways that tutors and raters both describe and understand effective teaching and learning activities. This variety of terminology and perspective impacted on the way that tutors and raters described and categorised learning activities. This is supported by the literature discussed in Chapter 3 that highlighted the impact that tutor perspectives have on practice.

These findings are significant in that they highlight barriers to both sharing effective designs and using other tutors' designs. The final eDAT (page 225) includes opportunities for reflection on tutor perspectives as part of the learning design to support sharing and reuse.

There is significant potential for using the eDAT with learning analytics to provide quantitative data about key features of a learning design to provide a "feedback loop" (Mor *et al.*, 2015, p.224). This provides evidence of the effectiveness of the eDAT representation, the quality of the pedagogic guidance and supports sharing and reuse of best practice in ODL.

7.2 Review of research questions

This section reviews each of the research questions, and therefore the aims and objectives, to explore the extent to which they have been addressed.

A1) How can ODL activities be categorised?

The literature reviewed in Chapter 2 and Appendix 1 highlighted the variety of learning activity terminology used in education and therefore the difficulties which result when categorising learning activities. This study demonstrated that ODL activities can be categorised effectively using two commonly used terms, 'interaction' and 'feedback', when following a systematic process carried out by independent raters. The acceptable level of IRR for 'interaction' and slightly less for 'feedback' suggest that this could be achieved by other users using the same terminology and a similar process.

A2) To what extent do raters agree with one another in their categorisations? What is the inter-rater reliability?

Categorising learning activities remained a challenge as discussed in Chapter 6. The findings illustrated that raters did not always agree with each other, for example the difference in the way that forum post type activities were categorised (see Chapter 6 page 109). This is consistent with findings from other research using learning activity categorisations discussed in Chapter 5 (see page 88). Categories of learning activity used in the pilots had lower levels of IRR, as did the additional taxonomies.

***Hypothesis**: Learning activities can be categorised using the eDAT to an acceptable level of inter-rater reliability, that is above .667 (Krippendorff, 2004).*

The hypothesis stated that an acceptable level of IRR was possible when categorising learning activities. The findings show that the final eDAT IRR for the interaction category was .81 and for feedback was .61. Therefore, an acceptable IRR was exceeded for interaction, but not quite achieved for feedback.

B1) What perspectives and personal constructs do learning designers and tutors have about effective learning and teaching activities?

The elements and constructs elicited during the repertory grid activity based on PCP (Kelly, 1963), revealed a wide range of terminology to describe teaching and learning activities and tutor perspectives (see Chapter 6 page 113). There were 29 different elements, i.e. teaching and learning activities, discussed by the four raters, and only two of these were used more than once. In addition, there were 18 constructs elicited and these included a small number of

similarities across constructs about student choice, interaction and feedback. Overall, elements and constructs were extremely varied and hinted at the many 'channels' and 'patterns' that exist in the participants (Kelly, 1963). This variety is similar to, and supported by examples in the literature review (Chapter 2).

B2) How do the different perspectives and personal constructs of learning designers and tutors impact on how ODL activities are categorised?

Kelly's (1963) sociality corollary suggests that raters will be more able to categorise learning activities written by other tutors if they have constructs in common. In this study, it was noted that there were few elements and constructs in common between the tutors and the eDAT terminology. This impacted on the way that learning activities were categorised using the eDAT, resulting in lower IRR. The repertory grids did however, include four constructs that were similar to the 'interaction' category and this term produced the most consistent IRR (see page 126). The participants did not seem aware of the impact of their own perspectives as suggested by their confidence that they understood and felt able to apply the learning activity categories consistently. The low levels of IRR discussed in the initial pilot findings in Chapter 6 (page 107) suggested otherwise.

C1) How effective is the eDAT as a Learning Design tool?

Effective learning design representations include the three elements of representation, guidance and sharing (Dalziel, Conole, et al., 2016). The literature reviews in Chapter 2 and Appendix 1 included examples of learning design representations and patterns (see pages 31 and 195), but none satisfactorily included all three elements. In addition, an educational 'notation' to describe learning activities has not yet been developed (Dalziel, 2015). The findings summarised above show that the eDAT contributes to knowledge for each of these by providing a tool to represent learning designs using a 'lesson plan' format (see page 14), using terms that are reproducible (as suggested by the IRR), embedding pedagogic guidance by the focus on the two key learning activities of interaction and feedback, and by facilitating reflection on tutor's perspectives to aid sharing and reuse.

C2) How can the eDAT improve practice in ODL?

A significant finding of the study is that the eDAT can improve ODL practice through the use of a consistently applied terminology of learning activity categories, by embedding pedagogic guidance on good practice in ODL design, and by including reflection on tutor perspectives. The eDAT enables the calculation of the number of interaction and feedback activity types as

compared to the total number of activities. This eDAT data enables further learning analytics including retention data that will provide feedback on the effectiveness of the learning design.

Despite the potential benefits of sharing and reuse of effective learning designs, a lack of sharing has been noted in the literature (see page 24). The variety of tutors' perspectives about effective learning and teaching activities impacts on their choices when considering whether or not to use another tutor's design. A group of tutors working collaboratively, discussing and reflecting on learning designs may develop similar perspectives and be more likely to share and reuse learning activities as noted by Wills and Pegler (2016). Therefore, the eDAT can be used as a professional development activity to explore tutors' perspectives and support the reuse of learning designs created by different tutors.

7.3 Using learning theory and PCP to develop ODL

Several approaches to theory were taken in this mixed methods study, and this section reviews the effectiveness of each. In Chapter 3 the impact of philosophical and methodological approaches on the implementation of theory in educational research was discussed. From this, three approaches to theory were taken, postpositivist, interpretive and critical realism. Postpositivism uses theory to explain and predict phenomena (Kerlinger, 1970, in Cohen *et al.*, 2011). This approach was taken in the quantitative content analysis of learning activities in this study and as the rational for the identification of behaviourist learning activities that incorporated feedback as key for ODL. An interpretive approach, in contrast, used theory to blend ideas, evidence and inference (Chaffee, 1991). This approach was taken in the interpretive repertory grid elicitation and as the rationale for the identification of constructivist learning activities that incorporated interaction as key for ODL. A critical realist approach supports the use of a "critical multiplism" of theories in order to understand phenomena more fully (Bisman, 2010). This combination of approaches to theory has enabled both explanation and understanding. The final version of the eDAT was based on the use of the key categories of interaction and feedback that can also be regarded as design principles that emerged from the study (see page 50).

Researching ODL necessarily requires crossing research disciplines between education, psychology and technology. Cultural Historical Activity Theory (CHAT), (discussed on page 48) emphasises a holistic systems approach to ODL that brings together these disparate parts. In this study, all aspects of the system including the tools (learning tasks), object (retention), and rules (tutor perspectives) have been considered in the development of the eDAT. This focus helps to ensure that wider aspects of ODL are considered in the eDAT representation and

evaluation. Transactional distance theory (Moore and Kearsley, 2011) and Tinto's (1987) retention theory highlighted the significance of interaction and integration in supporting the development of learning communities and encouraging students to persist with their studies. This study implemented these theories by embedding a pedagogic focus on activities that include interaction in the eDAT.

Learning Design theory, discussed in Chapter 3 (see page 50) provided a framework for effective representation of learning designs that embed pedagogic guidance and are shareable. The eDAT categories of interaction and feedback are proposed as part of a possible educational 'notation' (Dalziel, 2015). It is suggested that the eDAT might be a "broadly accepted representational framework" (Dalziel, Wills, et al., 2016, p.256). Effective learning designs based on an agreed educational notation can therefore be represented, shared and reused by tutors and designers.

PCP (Kelly, 1963) was discussed in Chapter 3 (see page 54) as an approach that might enable greater understanding of the psychological processes underpinning tutor perspectives that impact on both design and categorisation of learning activities. In contrast to the wide-ranging theories used to design and develop ODL, PCP was found to be a coherent theory that provided a robust rationale and supported the repertory grid methodology. PCP also offers a way to understand how tutors' constructs about teaching are developed and how they are challenged and altered through the process of reflection and dialogue with other tutors. PCP is a robust approach that underpins several of the recommended approaches to professional development for improving ODL in section 7.7 below.

7.4 Review of mixed methods methodology

This section reviews and evaluates the mixed methods approach used in this study. The study had two aims, the first to:

1. *create the eDAT to improve quality and retention rates of ODL by representing and evaluating key elements of learning designs.*

Initially, a postpositivist content analysis methodology was selected to achieve this aim. However, during the pilot content analysis categorisation task it became evident that quantifying learning activities was challenging and there were many differences in categorisation noted between raters. Discussions with raters revealed differences in terminology use, but also differences in teaching perspectives and it was suggested that this was impacting on the categorisation of learning activities. A second aim was therefore identified:

2. *develop a fuller understanding of the impact of tutor perspectives on ODL design, representation and evaluation*

PCP and repertory grids were identified as an additional method (see Chapters 2 and 3) to explore the varieties of terminology and meaning used by raters, and to understand the impact of different tutor perspectives on categorisation.

This study employed a 3-phase mixed methods approach to combine data from these multiple research activities to answer the research questions (page 63) and each phase is discussed below.

7.4.1 Phase 1: Quantitative content analysis

The postpositivist content analysis methodology for phase 1, described in Chapter 5 (page 88), aimed to systematically categorise learning activities. This study, unlike similar studies (for example, Swan *et al.*, 2015; Rienties *et al.*, 2015; Jaggars and Xu, 2016, discusssed on page 95), utilised several raters, an objective process and the use of Krippendorff's alpha to calculate IRR (Krippendorff, 2011).

Following a postpositivist approach to reasoning, it was deduced that higher levels of IRR were indicative of agreement between raters about the meaning and use of the interaction and feedback terminology. Postpositivism's approach to causation would indicate that this could be compared to retention, in that the existence of interaction and feedback activities would encourage students to persist. Similarly, these activities are supported by constructivist and behaviourist learning theories and therefore these theories could be verified by a comparison of the eDAT data to retention data. Postpositivist validity has been assured by the use of an external, objective procedure.

However, there remained difficulties in obtaining agreement between raters. Despite the possible risk to validity from a postpositivist perspective, the researcher discussed the results from one pilot with raters and identified a few instances where raters realised that they had made a mistake and where there were different understandings of terminology. This was beneficial to the study as it confirmed that adopting a postpositivist approach alone was not sufficient to develop the eDAT.

7.4.2 Phase 2: Interpretive repertory grids

Accordingly, in phase 2, an alternative range of literature was examined to provide a solution to the challenges in phase 1. An interpretive repertory grid methodology based on PCP (Kelly, 1963) was selected to conduct interviews with tutors and raters to explore their perspectives

about teaching and learning. This method provided rich data discussed in the findings Chapter 6 (page 113) that illustrated the wide range of terminology and perspectives used by tutors and raters. The findings also demonstrated how raters and tutors' perspectives had impacted on the categorisation of learning activities.

An interpretive approach to reasoning focusses on induction and generalising from the repertory grids. Rather than a postpositivist deterministic focus on causality, consideration of the ways that tutor perspectives are 'channels' that impact on behaviour is suggested by an interpretive approach. Kelly's (1963) theory of 'constructive alternativism' states that there are many possible ways to interpret experience. Validity was achieved through a consideration of the meaning of repertory grid content in the context of this study.

However, the elicitation of the grids was challenging for both participant and researcher. It was time-intensive and, in some cases, may not have elicited the fullest picture of tutors' perspectives about teaching and learning. This process also highlighted the relatively few opportunities that participants in this study had had to reflect on their perspectives and practice.

7.4.3 Phase 3: Mixed methods

In phase 3 the data from phases 1 and 2 was reviewed and discussed using a critical realist and pragmatic stance in a mixed methods approach.

Critical realism takes a hypothetico-deductive approach to reasoning and phase 1 of this study included testing a hypothesis. Causality in critical realism can be ascertained by exploration of the underlying generative mechanisms, and this study argued that PCP shows how personal constructs had an impact on learning activity categorisation through the different tutor perspectives observed. A critical realist methodology enables the combination of different kinds of data and in this study the quantitative content analysis data was discussed alongside the interpretive repertory grid data. Critical realism validity is therefore assured by using multiple theories, analytical generalisation, coherence and consensus (Bisman, 2010).

A pragmatic approach supports the development of practical solutions, and examples of applications of the eDAT are included on page 129. Pragmatism, however, does not account for tutor perspectives in that it focusses on 'what works' rather than 'why'. Pragmatism can also be criticised for a lack of consideration of the socio-political context and not being clear about 'who' it is practical for (Mertens, 2003). In this study, therefore, a critical approach was taken to the extent that participants were involved when creating the eDAT. Participants made

valuable comments about the process and about the potential use of the eDAT in their own context.

The mixed methods approach enabled the effective use of both postpositivist and interpretive paradigms and methodologies, and this has resulted in a better understanding of the representation and evaluation of learning activities.

7.5 Emergent themes and implications

The most significant themes that emerged from the data in this study were introduced in Chapter 1 (see page 6). Consideration of these themes has been pivotal to the development of the eDAT and they are summarised below together with implications for practice.

7.5.1 Communication

A variety of different terminology was noted in the discussion of distance learning and retention (Appendix 1 and Chapter 2.2), tutor perspectives and belief (Chapter 2.4), theory (Chapter 3) and philosophical paradigms (Chapter 4). The content analysis task used common educational terminology to categorise learning activities, but the low levels of IRR in the pilots demonstrated persistent difficulties in obtaining agreement between raters when using these terms. The discussions following the pilots with raters revealed that educational terminology was not consistently understood or used. For example, a course tutor stated that 'interaction' only applied to face-to-face learning and that he 'did not use' interaction in ODL. In fact, this tutor used online discussion forums extensively and when reflecting on this realised that others may use this term very differently. This has implications for practice by highlighting the importance for tutor perspectives to be identified and reflected on before agreement can be reached between tutors and designers about the use and meaning of educational terminology during design or ODL evaluation activities. Communication and educational terminology have wider implications, for example differences in the use of the term 'innovation' were noted in a study about the use of technology in higher education (Kopcha *et al.*, 2015).

7.5.2 Interaction and feedback

The literature reviews in Chapter 2 and Appendix 1 identified studies showing a positive correlation between interaction and feedback activities and ODL retention. However, differences in definition and difficulties in describing learning designs make detailed analysis of effective learning designs difficult. The pilot studies conducted to develop the eDAT described in Chapter 5 demonstrated the higher level of agreement between raters when categorising activities using interaction and feedback terminology as compared to other terminology. The final study, despite some remaining difficulties of categorisation, demonstrated that an

acceptable level of agreement could be achieved for 'interaction' activities, with slightly lower level of agreement for 'feedback' learning activity types. These two terms were the most readily and consistently categorised overall and are indicated as the most effective learning activities to support ODL. The focus on these two types of activity in the eDAT therefore ensures that the tool can be used consistently and supports pedagogic evidence for these activity types. The growing importance of the consistent use of these terms in practice is noted in the researcher's reflexive commentary on page 134. The focus on these two activity types has wider implications for learning design practice by simplifying the process of activity selection.

7.5.3 Tutor perspectives

The challenges encountered in the content analysis task led to consideration of the impact of underlying tutor perspectives on both designing and categorising learning activities. Different tutor perspectives were observed in the discussions with tutors following the eDAT pilots as well as in the repertory grid content.

Tutor perspectives have wider implications for ODL practice. As an example, the impact of differences between a learning design and a tutor's perspective can be seen by comparison of the sample 'decayed tooth' lesson (see page 20) with two repertory grids. The tutor's constructs elicited from Grid 2C (see page 114) suggest that this tutor may have felt uncomfortable (if not anxious) if they were required to use the 'decayed tooth' lesson, because students would be engaged in self-testing, would have little choice in their activity and would be learning in isolation. Each of these are least preferred activities for this tutor. Whereas tutor 3M, (page 121) whose constructs included a preference for 'practical' activities may have felt more comfortable engaging his students in such an online practical activity. These different tutor perspectives impact on many other aspects of ODL as identified through a CHAT viewpoint (discussed on page 48) including the choice of tool used, the overall objective or aims of the ODL programme, the pedagogic and learning approaches selected, the involvement of the wider distance learning or educational community, and the different roles of tutors and administrators.

In addition, tutor perspectives were noted in the literature review in Chapter 2 to impact on their views about learning design tools, and this has implications for professional development for ODL tutors, including, of course, implications for the use of the eDAT itself in supporting ODL. In addition, differences in tutor perspectives also influence tutors' choices when selecting and using educational research and evidence about the effectiveness of learning activities.

Different perspectives about teaching and learning are also held by students and their perspectives will impact on their experience of ODL. The discussion (page 169) of the student surveys used to evaluate the Community of Inquiry model reflects the students' own perspectives. This has implications for the use of student surveys and feedback processes designed to improve ODL. Discussion and reflection on differences between student and tutor perspectives will improve communication and reflection on teaching and learning.

7.6 Limitations

It is noted that this study specifically focussed on a type of distance learning course delivered at the researcher's HE institution using a formal VLE. The courses under study were modules from mainly postgraduate programmes linked to professional roles. Each of the modules was designed and delivered by tutors with the support and guidance of a learning technologist where requested, and complied with the institution's formal quality-assurance processes. Other distance learning models are available, including MOOCs and research-based modules and these may have different models of activity type. The eDAT may be difficult to apply to courses where there are few structured activities, for example in specifically constructivist approaches where students and tutors develop the course and curriculum by negotiation, or where learning is mainly by self-directed study.

The researcher's own role in this study is discussed in the Reflexivity section (page 134). The study is based on the researcher's professional work that aimed to produce a practical outcome, the eDAT. Therefore, a possible conflict of interest between the researcher's professional role and the aims of the study meant that negative outcomes were less likely to be noticed.

7.7 Recommendations for using the eDAT to improve ODL

Recommendations are proposed that will lead to a better understanding of the impact of tutors' perspectives on ODL learning design and teaching practice. These include suggestions for professional development activities to identify and reflect on tutor perspectives, proposals for the development of other LD tools, and the use of learning analytics to evaluate the impact of key learning activities on ODL retention.

7.7.1 Professional development

This study has highlighted the impact of tutor perspectives on the design and categorisation of learning activities. The eDAT can be used to evaluate a learning design, and to create a learning design by using the pedagogic guide embedded in the categories. Schön argues that "because

learning is essential to designing, there is potential for learning through designing" (Schön, 1992, p.131). It is therefore recommended that a PCP approach to professional development for creating and evaluating learning design is developed for ODL designers and tutors that includes, for example:

- discussion about tutors' perspectives on 'interaction' and 'feedback' activities using the eDAT
- the use of repertory grids to enable discussion of tutors' personal constructs about effective teaching and learning activities
- the use of the Teaching Perspective Inventory (Pratt, 2014) to identify teaching perspectives
- the use of Self-organised learning templates to structure reflection on the development and use of learning designs (Harri-Augstein and Thomas, 1991),
- the use of design narratives that tell the story of the development and implementation of a learning design from a personal perspective (Mor, 2013b),
- the application of Schön's reflection-in-action during the process of lesson design (Wieringa, 2011),
- the use of design-based approaches to creating learning activities for ODL (Phillips *et al.*, 2012)

These activities can lead to the inclusion of tutor perspectives in the contextual information for each eDAT representation which will facilitate sharing and reuse.

In addition, a 'forward-oriented design' approach would include a focus on what might happen after the design goes live (Dimitriadis and Goodyear, 2013).

7.7.2 Development of other Learning Design tools

As noted in the literature review, the eDAT builds on other Learning Design tools and some of these could be developed in the light of the findings in this study. For example, the vocabulary in several tools could be reviewed to ensure that the terminology is consistently understood by users. In addition, the inclusion of tutor perspectives in many tools will enable sharing of effective representations.

7.7.3 Learning analytics

How useful learning analytics are for tutors depends on the relationship between the data and what tutors intend (Bakharia *et al.*, 2016). The eDAT (see final version page 225) provides data about key learning activities by quantifying the proportion of each learning activity type in relation to the whole course.

This study initially aimed to compare learning activity data produced by the eDAT to retention data to explore any correlation between learning design and retention. However, the difficulties with learning activity categorisation that emerged during the study meant a shift in

focus towards investigating the impact of tutor perspectives. It is recommended that further work is undertaken to categorise learning activities in a series of courses using the eDAT, and then evaluate in relation to retention data. This eDAT data could be combined with other key data about ODL courses and provide an evidence base for effective learning designs.

7.8 Final remarks

What is needed for effective practice is a "feedback loop" (Mor *et al.*, 2015, p.224) for tutors on effective learning designs. It is argued that this can be provided by learning design data generated by the eDAT accompanied by a tutor perspective commentary.

The literature review and the data gathered during the course of this study clearly demonstrate the considerable potential of the eDAT for designing, categorising, representing and sharing learning activities. The initial difficulties in achieving inter-rater reliability were not simply differences of terminology, but indicative of the impact of tutor perspectives. This study has enabled a tool to be created that can aid tutors to express their ideas about learning activities sufficiently clearly to review, analyse, improve and share effective learning designs. The creation and application of the eDAT tool represents a significant step towards the attainment of an "educational notation" (Dalziel, 2015, p.4) to effectively represent, provide pedagogic guidance and share quality learning designs.

In conclusion, and as a significant contribution to knowledge, the key learning activities of interaction and feedback can be made visible in the eDAT with confidence that the learning design is an objective representation, embeds pedagogic guidance and, together with tutor perspectives is a shareable and reusable example of good practice.

The eDAT is therefore proposed as a learning design tool that might be "broadly accepted" by designers and tutors alike (Dalziel, Wills, et al., 2016, p.256).

Appendix 1: Literature review of factors impacting ODL retention

This is the full original section previously submitted[7]. A more recent update is in Chapter 2.

A1.1 Introduction

The demand for flexibility and choice by students has generated increasing demand both in the UK and internationally for ODL courses. These include both undergraduate studies and professional post graduate qualifications that learners take whilst in work. However, retention on ODL courses is widely stated to be a concern, as it is often much lower than the equivalent face-to face courses (Simpson, 2013). This impacts both on the teaching staff who deliver such courses, the faculty teams that support them, the institution's reputation and there are ethical concerns for the emotional impact on students who do not complete higher education as this can lead to higher levels of unemployment and depression than graduates (Bynner and Egerton, 2001).

The reasons why students leave ODL courses early has been researched using different methodologies and there are a variety of factors that are said to impact on retention. This research indicates that there is no single factor on its own that can be said to impact on retention, but a variety of factors in combination are significant, including learner characteristics and course learning design, in particular the level of interaction. However, whilst a range of student characteristics have been studied in a variety of combinations, it is less clear how the learning design of the course affects retention as there are a range of ways that learning design is reviewed and little consistency in approach. Several theories are used to understand and explore reasons for retention including Tinto's academic and social integration (Tinto, 1987), Moore's transactional distance (Moore, 1993) and motivation theories (Keller, 1987), but there is no fully developed theory that includes the full range of factors that impact on retention and this results in difficulties in using the research to guide the development and delivery of successful ODL courses that are equivalent in terms of attainment and retention as face-to-face courses.

Existing research methodologies on retention include student surveys which explore the reasons for withdrawal from a course, a range of case studies of successful courses and the use of student data in statistical analysis. However, there is little consistency between courses or

[7] The university regulations for the EdD stipulated that this initial literature review be submitted for assessment prior to the start of the main study. Regulations do not permit the inclusion of the review in the main body of the study but require it to be added here as an appendix. It is recommended that it is read before commencing Chapter 2.

institutions about data gathered, surveys used or even terminology, and this data is rarely shared between institutions (for obvious business reasons) and so difficult to build a consistent data set that could be applied when developing courses.

A wide range of possible factors that affect retention have been examined in the literature that range from learner-specific factors including age, gender, prior educational experience, levels of motivation and self-efficacy, to institution and course specific factors including support available, course structure, levels of interaction and the development of a learning community but some aspects of course design are not analysed in detail because of the difficulties of describing and comparing learning designs. Several tools to design distance learning and a variety of representations of online learning designs have been developed, but these are not widely used by tutors when developing ODL. This leads to a somewhat disjointed field where the results of research on ODL designs cannot easily be used to improve ODL courses in order to improve retention so that it is at least comparable to face-to-face equivalent courses.

A proposal is made for a definition of retention and for an approach to describing some of the significant elements of learning design that would enable comparisons to be made across courses and institutions. The resulting retention data together with learning design representation can then be shared between courses and institutions to support the effective development of ODL courses.

A1.2 Methodology

This literature review was conducted by completing a search of peer reviewed journals for research on factors affecting student retention on ODL courses. Searches were also conducted for articles that explored the impact that learning design had on retention. A wide range of synonyms was used for the search terms as many different terms are used in the literature to refer to ‘online’, ‘distance learning’, ‘retention’ and ‘learning design’ (see Appendix 1a). From this I created a complex Boolean search phrase to use to interrogate ERIC and Education Research Complete databases for the period 2004-2014. This produced a final reading list from which items were removed that did not focus on factors related to retention in ODL.

A1.2.1 Terminology

A recent review found 16 different definitions of the term ‘dropout’ in the literature (Grau-Valldosera and Minguillón, 2014) that makes a consistent approach to research and analysis difficult. Without a consistent approach across the literature, we cannot distinguish between students who are not satisfied with a course and choose to leave early, those who have

personal or family issues and are forced to terminate or delay their studies, or students who fail and are not permitted to continue by the institution. Indeed, we cannot easily distinguish between students who are forced to leave and those who choose to leave because they have achieved the learning they need at that point (Hoyt and Winn, 2004).

In addition to the many different terms and definitions, the research shows that a variety of different methods are used to measure and report on retention (Howell *et al.*, 2004; Hoyt and Winn, 2004; Park *et al.*, 2009). There is limited data available on retention across institutions and a variety in the ways retention is calculated (Simpson, 2013). Across the research it becomes clear that we use a variety of terms to define a range of early-leaving student behaviours, a range of terms to describe the unit of learning (if it is defined at all) whether it is a short course of a few weeks, a longer course that is part of another programme, or a full degree, the data is collected in different formats, used for different purposes and rarely shared across institutions. It is generally perceived that retention is a useful guide to the quality of a course and the level of student satisfaction with it, but these difficulties lead to the question of the extent to which we can regard retention data as a valid and reliable measure of course quality (Yorke, 1999).

As online learning options as part of wider programmes becomes more popular, we may see more students 'swirling' that is, students taking more than one online class at different institutions as a 'taster' (Boston and Ice, 2011). This could negatively affect the retention data at each of the institutions if they were to base their analysis on students who progress. Indeed, it is argued that a certain amount of drop-out is to be expected and that using the data to compare courses over several years with similar courses in other institutions as part of a benchmarking exercise is a more useful guide to course quality than actual retention data (Nichols, 2010).

A1.3 Theories

A range of theories and explanations for student withdrawals are presented and discussed in the literature, for example the impact of students' academic and social integration (Tinto, 1987); the 'transactional distance' between the student and the institution (Moore, 1993), and the motivation of the student (Keller, 1987).

A1.3.1 Social and Academic Integration

Tinto's concept of social and academic integration focusses on campus-based traditional student populations and has been widely used by researchers to try and understand why students withdraw from their studies. He distinguishes between the 'fixed' variables of student

characteristics and their experiences before college and the 'integration' variables that are created by institutions. Tinto argued that, ''the more central one's membership is to the mainstream of institutional life the more likely, other things being equal, is one to persist'' (Tinto, 1987, p.123). This theory has been critiqued for its focus on traditional, campus-based students and has been developed and adapted for specific uses, for example, Kember developed Tinto's model to apply to adult part-time students (Kember, 1995), Bean and Metzner developed a conceptual model for non-traditional students (Bean and Metzner, 1985) and Rovai adapted and integrated both of these theories to apply to online learning (Rovai, 2003). Rovai's composite model includes student characteristics, student skills and external factors in addition to internal factors such as integration, student needs and pedagogy to create a model that is more relevant for students taking ODL courses. Some writers have challenged the use of specific theories as being too limited and not useful when understanding retention in the wider context, for example, a review of the meaning of integration for non-traditional student populations (Davidson and Wilson, 2013).

A1.3.2 Transactional Distance

Transactional distance theory states that it is not so much the physical distance between student and tutor that is significant, but the 'psychological and communication space' (Moore, 1993). This space, of course, occurs in all human interactions, and is a 'space of potential misunderstanding between the inputs of instructor and those of the learner' (Moore, 1993). In distance learning, the distance between tutor and learner assumes more significance. The transactional distance is not a fixed quantity, but can be seen as running on a continuum from a course with a large transactional distance that has high levels of structure, low levels of interaction to a course that has more dialogue and lower transactional distance (Moore, 1993).

A1.3.3 Motivation

Keller developed the ARCS model to explore the impact that motivation has on learning. The model incorporates four elements of motivation: Attention, Relevance, Confidence and Satisfaction and each element needs to be met for students to remain motivated (Keller, 1987). The ARCS model has been applied by a number of researchers to develop interventions to improve motivation and retention, for example, to design and send motivational email messages (Huett, Moller, *et al.*, 2008; Huett, Kalinowski, *et al.*, 2008).

Each of these theories seems to tell only part of the story. The distance learning literature on retention suggests that a very wide range of factors impact in complex and intersecting ways on students' decisions to persist with their studies. Some factors that may be relevant are not

included due to difficulties in describing and analysing them, for instance the impact of learning design. The usefulness of theory generally to understanding and improving retention is challenged by some who suggests that context specific interventions may be more useful than a generalised theory-based approach (Woodley, 2004).

A1.4 Methodologies

A range of methodologies have been used for research into ODL retention including both quantitative surveys and qualitative case studies, and Hauser's study shows that research on distance learning has become more quantitative over the last decade (Hauser, 2013). This may reflect the difficulties in both running large student surveys and using the results of them to guide the development of ODL courses. Student surveys are a snapshot of student's reflections and may not be an accurate guide to their experience on the course. In addition, the lack of clear terminology for retention has led to difficulties in comparing research outputs.

A1.4.1 Student surveys

Some research on student retention has used data gathered from student surveys. These are designed using a wide range of questions that include demographic questions, satisfaction questions and a range of other measures. They range from large repeated surveys over several years to smaller single surveys, some use existing students and some have asked students who have left their studies to respond. Some significant themes emerge, particularly the significance of interaction and the building of a learning community between the students.

The American Public University System (APUS) has designed its online courses using the Community of Inquiry framework that identifies three significant aspects of the course – social presence, teacher presence and cognitive presence. They have run regular large surveys of students to measure their online students' satisfaction based on the Community of Inquiry framework and the results, in particular, demonstrate the impact of learner activity on retention (Boston *et al.*, 2011). The Community of Inquiry framework has been used by other researchers, for example a comparative survey of two groups of students to identify the impact of cohort learning on satisfaction found that a cohort-organised course led to greater levels of student satisfaction (Alman *et al.*, 2012). In addition, a survey of Korean students found a correlation between teacher presence, social presence, cognitive presence and retention (Joo *et al.*, 2011).

A number of other surveys have used a combination of other measures to explore the relationship between student psychological features and retention. For example, learning style, locus of control and computer experience was investigated and the results showed a link

between an auditory learning style, grade point average and basic computer skills with retention (Harrell II and Bower, 2011). A similar survey of locus of control, learning strategies, flow experience and satisfaction showed a link with locus of control and student retention (Lee and Choi, 2013). However, a survey of locus of control and satisfaction showed no impact of locus of control on student's decisions to drop out (Levy, 2007). A survey of Korean students found that a lack of feedback, heavy workload and difficulties in studying at a distance were attributed to high rates of attrition (Choi *et al.*, 2013).

A number of researchers have explored the impact of student motivation on retention and a survey of the effectiveness of sending motivational-based emails to students seemed to show an impact on their retention (Huett, Kalinowski, *et al.*, 2008).

The surveys above are conducted with students who have usually completed or nearly completed their course and so may not be representative of a student that withdraws. A telephone survey of South African students who withdrew identified a range of reasons given by the students including personal and financial problems, as well as difficulties in managing the academic demands of the programme (Van Schoor and Potgieter, 2011). A similar series of surveys of unsuccessful students was conducted and the main reason that student gave for non-completion was that they 'had got behind and couldn't catch up' (Fetzner, 2001). Rather than conduct a student survey, an analysis of existing student evaluations was completed to identify factors related to student failure and suggested that interaction and discipline were the strongest predictors of success (Moore, 2014).

The variety of survey instruments used and the range of combinations that they are used in present those interested in developing ODL with a wide number of possible factors that affect retention, but there are few validated instruments and no single instrument that is used across a range of courses and institutions for the purpose of comparison. The results from the surveys are therefore often of interest, but there are difficulties in applying them to ODL course development.

Some researchers have used qualitative methods to explore retention that includes case studies of successful institutions, successful courses and both unsuccessful and successful students. In addition, some have used Delphi discussions, focus groups and interviews.

A1.4.2 Case studies

A case study of a successful university model for online learning describes the impact faculty culture, student support and peer mentors have on their high student success rates (Boles *et*

al., 2010). A pair of case studies describe the successful use of the principles of asynchronous learning networks in creating successful courses. These principles include the use of asynchronous, highly interactive, instructor-led, resource-rich, cohort-based learning (Moore *et al.*, 2009). A case study of a successful Masters course described the levels of administrative support, student support, faculty preparedness, instruction delivery and so on as related to their high success rates (Aversa and MacCall, 2013). A similar case study of an MBA Program highlights the impact of feedback and interaction on success (Bocchi *et al.*, 2004). A case study of unsuccessful students used the Community of Inquiry framework and identified the effect of teaching presence and social presence as important for student success (Thompson *et al.*, 2013).

A series of focus groups and interviews with past students identified support, managing workload and personal factors as key to success (Bunn, 2004). An unusual approach used the Delphi method to engage a series of distance-learning experts in discussion about ways to improve retention, and the results of the discussion suggested that the experts regarded student self-discipline, instructor engagement and feedback as the most significant factors affecting retention (Heyman, 2010).

These case studies suffer from the same issues of lack of consistent terminology and difficulties in comparing data between courses and institutions as the survey methodologies, thus making use of the information to develop ODL courses not an easy task.

A1.4.3 Data analytics

Some research has explicitly used the data gathered by institutions at a range of points including initial inquiry, enrolment, withdrawal and/or progression. For example, insights into the demographics and educational background of students who withdraw can be used to review marketing campaigns, enrolment policies and admission processes. Data on the significance of academic and technical computing skills can be used to guide the development of induction activities and support programmes to develop essential skills. However, use of data on learner psychological features that are associated with withdrawal is more difficult to rationalise as these are often 'fixed' psychological features for example, locus of control and self-efficacy. The ethical issues of using data to identify students at risk, for example as part of educational triage, is discussed by Prinsloo and Slade (2014) who argue that great care should be taken when using data to identify students who are most at risk of withdrawing. A proposal to involve students in the analysis of their data and to engage them in a discussion about their likely success on a course is proposed by Simpson (2006), but again, this could lead to students

being refused entry to a course that data indicates that they have a low probability of succeeding, but who, in fact, may succeed.

Rather than ask students to report on their reasons for satisfaction or non-satisfaction, some writers have analysed existing student data available in record systems (Carnoy *et al.*, 2012; Howell *et al.*, 2004; Lillibridge, 2008; Roblyer *et al.*, 2008). Some have included data sets from several institutions including the UK Open University (Simpson, 2013) and (Ice *et al.*, 2012). As well as analysing existing data, some have used the data to predict dropouts (Roblyer *et al.*, 2008; Simpson, 2006; Yasmin, 2013), and some, in a pre-curser to the use of 'big data' for learning analytics have used visualisations (Essa and Ayad, 2012).

Some have discussed retention data in relation to the timing of students' withdrawal using event history modelling that indicates the most likely point in a course that students will withdraw so that appropriate interventions can be implemented (DesJardins *et al.*, 1999; Kember, 1989).

Whilst the analysis of existing data can reveal a range of factors that relate to student success and retention, the same issues of a lack of definition and terminology together with a lack of consistency in the data collected leads to difficulties in using the findings when considering the design of ODL courses and interventions that might support students.

A1.5 Student factors affecting retention

The surveys and case studies in the literature reveal a wide range of variables that seem to have an impact on retention. These are often overlapping and interrelated and include learner demographics, previous educational level and experience, the range of academic and emotional support available, course level and design, learner psychological factors including feelings of self-efficacy and ability to self-direct learning, levels of formal and informal interaction with tutors and other students and overall feelings of satisfaction with the course. These themes are supported by Hart's literature review of distance learning research on retention which found that:

> factors associated with student persistence in an online program include satisfaction with online learning, a sense of belonging to the learning community, motivation, peer, and family support, time management skills, and increased communication with the instructor.
>
> (Hart, 2012, p.19)

A1.5.1 Demographics

Student demographics including age and gender are often included in research surveys of student's satisfaction and reasons for withdrawal. Some research has suggested that older, married and employed students were more likely to withdraw (Yasmin, 2013). However, Aragon and Johnson found no significant difference in the age of students who withdrew, but did find that female students were more likely to complete than male students (Aragon and Johnson, 2008).

A1.5.2 Educational Background

A number of researchers have found a correlation with previous grades and success, for example Dupin-Bryant found that prior educational experience and prior computer training were associated with success (Dupin-Bryant, 2004) and Morris, Wu and Finnegan found an association with GPA and SAT maths score and retention (Morris, Wu, *et al.*, 2005). A similar analysis suggests that students' past ability is a significant predictor of success but that this must be considered alongside student cognitive features (Roblyer *et al.*, 2008). In large online programmes, it was found that the number of transfer credits (indicating previous levels of educational experience) had an impact on retention (Boston and Ice, 2011). GPA, prior educational experience, prior computer training and previous online courses completed were related to retention (Dupin-Bryant, 2004). GPA as well as auditory learning style and basic computer skills were significant in predicting success (Harrell II and Bower, 2011). The impact on learning of students' technical skills and confidence was suggested in an interesting experimental study in which technical difficulties, in the form of error messages, were generated for a group of online learners and it was found that they had reduced levels of learning and increased attrition than those who had no error messages (Sitzmann *et al.*, 2010).

A1.5.3 Student support

The learner's own environment and supports have been identified by many writers as having an impact on retention. For example, the institutional support available, individual academic tutorial support and emotional support that might come from the wider environment of family and friends. The consideration of the impact of a variety of institutional supports including advising, academic and technical support is recommended (Stevenson, 2013). A small scale, qualitative study of a group of students showed that timely supportive interventions by academic staff were significant in encouraging progression and reducing attrition in the study by Baxter (2012). Boles' work identified that a supporting faculty culture, individual support provided by online programme coordinators and the availability of peer mentors encouraged student retention in their online program (Boles *et al.*, 2010). Other studies have identified the

impact that emotional support and tutor interventions can have on student progression (Gravel, 2012; Holder, 2007; Park and Choi, 2009; Stevenson *et al.*, 2006; Tait, 2004).

A1.5.4 Course level, length and subject

Specific features of the course level, length, flexibility of delivery and subject discipline have also been identified as impacting on retention. Woodman's analysis of Open University courses identified that students entering on first year degree level were more likely to persist than those entering at second year (Woodman, 1999). Short courses were more likely to retain students (Diaz and Cartnal, 2006; Pomales-García and Liu, 2006), and a flexible course design that allowed students to take a break increased retention (Crooks, 2005). The course discipline was found to be significant factor in course completion, with maths courses in particular showing lower retention (Atchley *et al.*, 2013).

A1.5.5 Cognitive load

The concept of cognitive load refers to the difficulty of learning certain material. Some of the difficulty is intrinsic in the topic, but some is due to the way that the topic is presented. Cognitive load theory includes three levels of potential difficulty:

- Intrinsic load - inherent difficulty of the material
- Extraneous load – difficulty generated by the way the material is presented, for example in dense written material
- Germane load - the difficulty generated by the need to develop schemas for understanding

(Sweller, 1994)

The aim of the instructor is to reduce cognitive load where possible to enable effective learning (Sweller, 1994). Some research has explored the role of cognitive load in relation to retention and Tyler-Smith's research identified that some students suffered cognitive overload early on in their studies and suggested that this was related to early attrition (Tyler-Smith, 2006). Impelluso's case study of the re-design of his computer programming course to reduce cognitive load resulted in a large improvement in student assessment grade and a lower attrition rate (Impelluso, 2009).

A1.5.6 Feedback and assessment

Some suggestions for exploring teaching presence include the use of relevance measures and assessment design. Park's survey found that the relevance of the learning was a key factor in higher retention rates (Park and Choi, 2009) and Crooks found that re-design of the assessment to allow an extended essay instead of an exam meant that this course out-

performed other Arts faculty courses in terms of retention (Crooks, 2005). Giving feedback to student on their learning has been identified as one of the more effective interventions to support learning (Hattie, 2003). The use of a series of analytical writing assignments with feedback increased retention on a PhD programme by 39% (Sutton, 2014). A survey of students at Korea National Open University identified that a lack of feedback from tutors was a key reason for non re-enrollment (Choi *et al.*, 2013). A course re-designed to include regular tests with automatic feedback increased attainment and reduced withdrawal (Sancho-Vinuesa *et al.*, 2013).

A1.5.7 Locus of control

Locus of control is the student's feeling that their success in learning is based on their own behaviour and internal characteristics rather than on external factors (Rotter, 1966). A number of researchers have used Rotter's Internal-External locus of control scale (Rotter, 1966) and found an association with persistence (Lee and Choi, 2013; Morris, Finnegan, *et al.*, 2005; Parker, 1999) and Joo used both locus of control and self-efficacy scales and found they were a significant predictor of success (Joo *et al.*, 2013). Street's review of the attrition literature suggested that self-efficacy, self-determination, autonomy and time management were found to impact on retention (Street, 2010). However, Stanz compared conventional and online students and found that there was no difference with respect to locus of control (Stanz, 2004), and Levy found no relationship between student's locus of control and persistence (Levy, 2007).

A1.5.8 Motivation

Keller's ARCS framework was developed as a framework to identify and explore the impact of motivation on student's learning and persistence. The framework consists of four aspects of motivation that are needed to fully engage students: Attention, Relevance, Confidence and Satisfaction and each of these includes suggestions for a range of strategies to implement these in learning (Keller, 1987). A number of researchers have used Keller's ARCS framework to explore student motivation and have designed motivational interventions that have improved retention (Huett, Kalinowski, *et al.*, 2008; Pittenger and Doering, 2010; Visser *et al.*, 2002). Burt used the data from a large number of Open University courses and student questionnaires and identified motivation as a more significant factor in retention than workload (Burt, 2002). In addition, the impact of individual motivational tutorial contact is stressed by Simpson, who cites a number of studies that have trialled a range of motivational postcards, telephone calls and motivational emails that have had a significant impact on retention (Simpson, 2013).

ODL can be seen as more challenging in terms of students' need to manage their own time more effectively. The impact of students procrastinating has been explored and delays in online access and first posting are identified by McElroy as associated with lower grades (McElroy and Lubich, 2013) and Fetzner's survey of unsuccessful students found that a significant reason for withdrawing was that they had fallen behind and couldn't catch up (Fetzner, 2001).

A1.5.9 Self-direction

The terms self-directed, self-regulated, autonomous and independent learning describe a variety of similar concepts and there is little agreement and some confusion in the literature as to the precise meaning of each (Saks and Leijen, 2013). Most definitions include an element of process (students' ability to plan, organise and make choices about their learning) and as a personality construct (students' feelings of self-efficacy and intrinsic motivation for example) (Saks and Leijen, 2013).

As Heyman found in the Delphi discussion with experts, it was generally felt by those planning and delivering online learning that success is dependent on the student's own ability to be an independent learner (Heyman, 2010), and Zhao's study of self-regulated learning (SRL) demonstrated that the distance learning students surveyed had above average levels of SRL (Zhao *et al.*, 2014). With this in mind, many learning programmes are designed as though all their students are self-directed learners by including the following choices:

- path
- pace
- instructional approach
- choices at curriculum level (sequence of instructional materials)
- choice of how long to focus on a learning objective (pacing)
- ability to select and sequence a variety of review strategies

(Karich *et al.*, 2014)

However, Karich's meta-analysis of studies explored the impact of giving the learner control and found that there was very little support for the concept that giving learner's control over their learning increases their academic performance despite this being intuitively accepted by many teachers (Karich *et al.*, 2014). And in fact, Holder reported surprise with his finding that high scores of learner autonomy on his survey were associated with non-persistence (Holder, 2007).

A1.5.10 Interaction

Much of the research on retention has indicated that the level and quality of interactions has a positive effect on retention (Croxton, 2014). Formal and informal interactions with each other and the tutors are a significant way that students develop both a social presence and feelings of participating in a learning community. Liu's study identified social presence as a significant predictor of course retention and final grade (Liu *et al.*, 2009).

Moore's concept of 'transactional distance' (Moore and Kearsley, 2011) highlights the physical and psychological distance between tutor and student as the main difficulty of distance learning, and many distance learning tutors have searched for ways to reduce this distance by the use of formal and informal interactions in courses including, for example, the use of humour (Anderson, 2011). Moore identified a set of 3 types of interaction: student-student (SS), student-tutor (ST) and student-content (SC) (Moore, 1989), to which a 4th type of interaction between student-interface has been proposed (Hillman *et al.*, 1994). Anderson argues that there is a need for at least 2 of 3 interaction types to be effective in promoting social presence (Anderson, 2003). Within these types of interactions, a series of 9 types of student-student interaction has also been identified (Shackelford and Maxwell, 2012).

Student surveys show high satisfaction for courses that include high interaction rates (Fasse *et al.*, 2009; Moore *et al.*, 2009). The need to structure online discussion tasks is highlighted by Thorpe's (2008) study, and is an integral part of the widely used e-tivities model proposed by Salmon (2002). The impact of levels of interaction are highlighted in Dron's case study where a course was re-designed to include interaction, but when this failed, the course retention dropped (Dron *et al.*, 2004). A study of the same course over two years suggested that student-student interaction together with self-discipline were the strongest predictors of success (Moore, 2014).

However, despite the strong support for levels of interaction as an indicator of success and retention in ODL courses, there are some suggestions that interaction can have either no or a negative impact. A meta-analysis of 3 interaction types (student-student (SS), student- teacher (ST), and student-content (SC)) found that interaction affected achievement outcomes for asynchronous distance courses, but had a lower effect for synchronous interactions (Bernard *et al.*, 2009). A study of the quality of teacher-student interaction found that feedback, procedural interaction and social interaction had an impact on course completion, but not on grade (Hawkins *et al.*, 2013). Some studies hinted at the problem of trying to isolate an individual feature of an online course to assess the impact of retention, finding either no

significant difference in a range of courses with a variety of interaction patterns (Godwin *et al.*, 2008), or even a negative correlation with interaction and time spent on the course (Grandzol and Grandzol, 2010).

It is often assumed that online learning is naturally less interactive than face-to-face, but a case study comparing retention and success rates on a course run face-to-face and the same course run online suggested that the online experience had no significant impact on either success or retention, suggesting that the online learning experience was equivalent to the face-to-face experience (Knight, 2007).

Group work and peer collaboration are created as learning tasks that aim to increase interaction and develop social presence and a number of researchers have explored the impact on retention. Group work can be a challenge for online tutors to manage and for students to participate in successfully, and the most successful group tasks are those that are carefully designed to structure the activity and support learners. For example, collaborative group assignments using synchronous and asynchronous discussion as well as social media increased retention in the study by Fisher and Baird (2005) and the use of computer conferencing as well as a series of structured group tasks in a course achieved high retention (Thorpe, 2008). Evans and Moore developed a web-based peer-tutoring system called Online Peer-Assisted Learning (Opal) which enhances interaction by supporting students when tutoring each other and has resulted in improved retention (Evans and Moore, 2013). Online collaborative activities that were intentionally designed to increase student's collaborative skills were shown to have had the greatest effect on attainment (Borokhovski *et al.*, 2012).

However, the challenges of group work and peer collaboration seem, in some cases, to have a negative effect on retention. An analysis of peer collaboration and a comparison to a control group showed no positive impact on retention (Poellhuber *et al.*, 2008). A case study to explore the use of collaborative technology in a secondary school classroom found that it did not meet its pedagogical aims and had to be abandoned before the end of the activity (Baker *et al.*, 2011). The study by Poellhuber found no significant difference in retention between a group of students with peer interaction and a group without peer interaction (Poellhuber *et al.*, 2008). The concept of 'resonance' (Gill, 2008) was explored as a way to increase social presence by the use of video lectures and the study found that this increased retention in a financial theory course, but not attainment (Geri, 2012).

Much work has attempted to explore the link between student satisfaction and retention and studies by Levy and Sembiring who identified that student satisfaction was most related to

retention (Levy, 2007; Sembiring, 2014) and a recent three-year study confirmed the association (Cole *et al.*, 2014).

A1.6 ODL course design and retention

As we have seen, there are many factors that the research suggests may account for the lower retention rates on ODL courses, and many of these factors are overlapping and difficult to separate. There are also examples that illustrate differences in the significance of these factors. In addition, the variance in terminology and understanding of the data make the research difficult to use when developing ODL courses that will retain students. For institutions developing ODL, there are some factors that are difficult to manipulate, for example, intrinsic student characteristics, but there are significant areas where there are opportunities to construct effective ODL courses, for example in the learning design. Some aspects of the learning design of courses has been evaluated, but this is an area that warrants further research (Simpson, 2003). Constructivist learning theory has been used by a number of developers to create ODL courses, and researchers have used this theory to evaluate the learning designs and explore any relationship with retention, but this theory is too broad to be a guide to developing learning designs. In addition, the Community of Inquiry framework has been used to both create ODL courses and to evaluate the effectiveness and retention on the course, but the framework is very generic and the evaluation tools include subjective student surveys that make comparative use difficult.

A1.6.1 Constructivist online learning

Many ODL courses are designed along 'constructivist' principles. Constructivist learning theory, in short, is the idea that knowledge is 'constructed' by the learner, rather than being 'transmitted' by the tutor. It is used as the rationale for a range of online learning environments, activities and tools. It is by far the most common theory used to rationalize online learning: its use is almost ubiquitous. Jonassen and Land state that:

> At no time in the history of learning psychology has there been so much fundamental agreement about the epistemology, ontology, and phenomenology of learning.
>
> (Jonassen and Land, 2000a, p.viii)

However, the concept of constructivism is far from clear. There are many writers with differing definitions of constructivism and no agreed understanding of the types of teaching and learning activities that support a constructivist approach. In fact, there are fundamental differences in the approaches taken by different writer that are incompatible with each other.

Kanuka and Anderson (1999) illustrate this by considering the extent to which an approach has an 'objective' or a 'subjective' view of the external world and comparing it with the extent to which an approach supports the view that knowledge is constructed socially or individually. Figure 23 summarises the range of types of constructivism that demonstrates the incompatibility of the approaches.

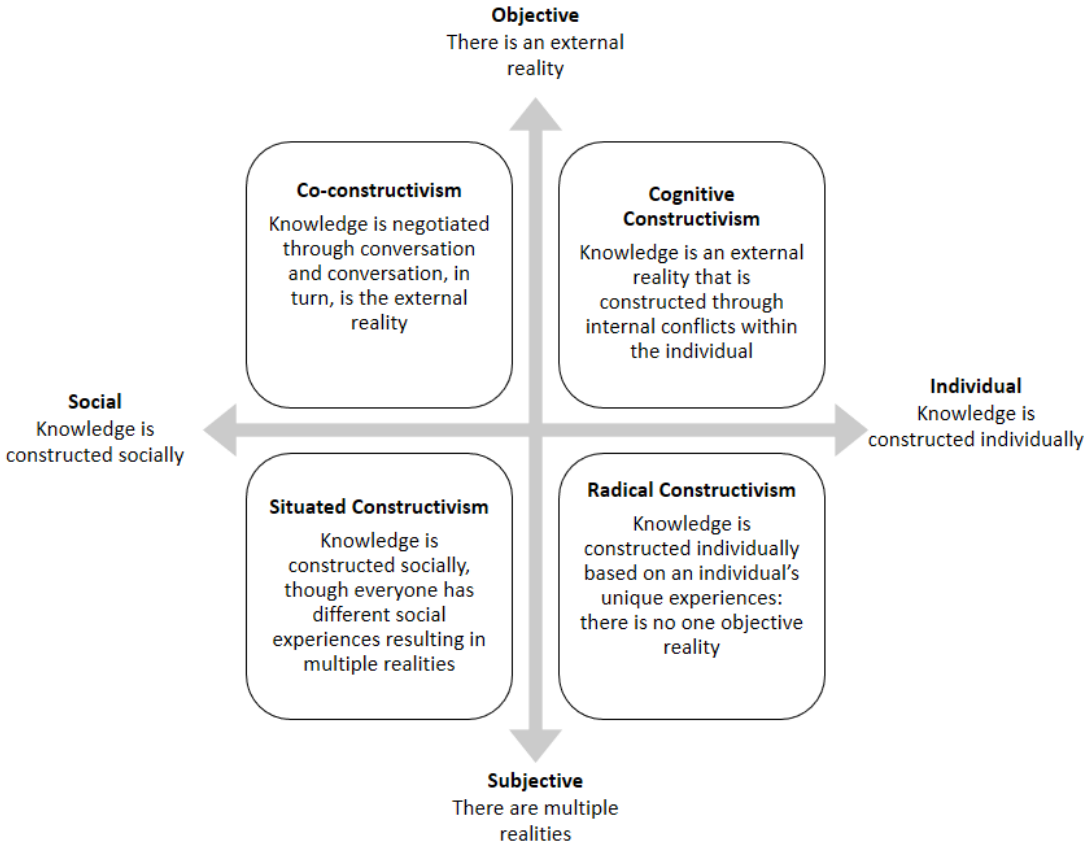


FIGURE 23: TYPES OF CONSTRUCTIVISM

(Kanuka and Anderson, 1999)

These many theoretical approaches to learning start to lose their effectiveness and usefulness for tutors because they promote the use of a wide range of approaches, where none is more effective than others. In addition, it is difficult to find empirical evidence that supports some of these constructivist approaches. This is significant if we consider the many online courses that are, apparently, designed on 'constructivist' lines. But despite this widespread so-called use of constructivism, many ODL courses are not using it but demonstrate more traditional 'transmissive' modes of teaching (Tenenbaum *et al.*, 2001). Lentell's (2012) study of distance learning in the UK refers to the typical use of the distance learning VLE as an:

> expensive filing cabinet for lecture notes and an environment for some kind of unmoderated student forum.
>
> (Lentell, 2012, p.27)

This dichotomy between what some courses claim is their underlying pedagogical approach and what is actually designed suggests the inherent challenge in planning learning designs for ODL courses.

A1.6.2 Learning metaphors

An approach that explores the underlying metaphors that we use about learning and offers a potential solution to this dichotomy is Sfard's (1998). She identifies two key metaphors that are widely used about learning, the assimilative and the participatory. The assimilative approach is based on the broad view that knowledge is learned by adding to, or constructing new learning based on what one knows. But philosophically, this view can be challenged by considering the difficulty of learning when one does not know what is not known. The participatory approach takes the view that learning is the process of 'becoming' in a learning community, but this view does not account for the seeming effectiveness of direct instruction in the assimilative metaphor. Sfard's proposed solution is to suggest that both metaphors for learning be taken into account when designing and evaluating learning. This approach incorporates the wide range of 'constructivist' approaches, but also the more traditional transmissive approaches and offers a more holistic approach for learning designers that also maps to our underlying meanings about how learning happens.

A1.6.3 Community of Inquiry Learning Design

One of the most widely used models for designing asynchronous online discussions as part of distance learning is the Community of Inquiry approach (Garrison *et al.*, 2000). This model, based on constructivist learning theory and some elements of an assimilative approach, proposes that online courses comprise three overlapping concepts: social presence; cognitive presence; and teacher presence as in figure 24.

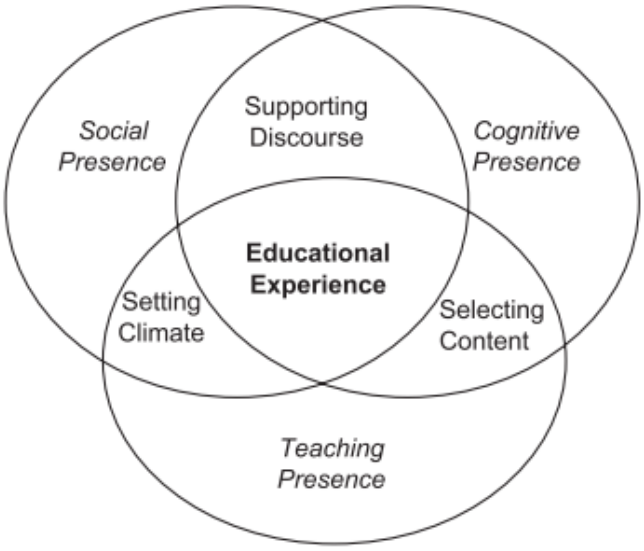


FIGURE 24: COMMUNITY OF INQUIRY MODEL

In particular, this model has been widely used in the development of the online learning experience for the American Public University, and has been used as the basis of a number of large scale surveys to explore the connection between elements of the model, learner satisfaction and retention amongst other measures (Ice *et al.*, 2011). These three concepts have also been used by other writers to examine retention in a variety of ways. This approach has been validated by Meyer and Arbaugh when used alongside a number of other measures (Meyer *et al.*, 2009; Arbaugh *et al.*, 2008). Below I explore each of the concepts together with a discussion of how each contributes to retention.

Teaching presence is defined as the "design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educational worthwhile learning outcomes" (Garrison, 2011). Shea's work presented an instrument to assess teaching presence and used it to study a range of students and courses. He found a significant link between effective instructional design in the form of directed facilitation and the success of students (Shea *et al.*, 2006).

Social presence is defined as the "ability of participants in a community of inquiry to project themselves socially and emotionally as 'real' people (i.e., their full personality) through the medium of communication being used" (Garrison, 2011). Content analysis of discussion forum postings were conducted in order to identify the level of social presence found that it was possible to identify social presence in the forum (Rourke *et al.*, 1999). Social presence is particularly developed through interactions between tutors and peers and high levels of interaction are show to be related to higher retention (Croxton, 2014).

Cognitive presence is defined as the "extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry" (Garrison, 2011). Cognitive load theory has been used to adapt learning designs to create an effective cognitive presence and increase retention (Impelluso, 2009), and a range of specific design features to support effective assessment are shown to increase cognitive presence and retention (Sutton, 2014) and the impact of feedback is also highlighted (Sancho-Vinuesa *et al.*, 2013).

The Community of Inquiry model and instrument has been used across a range of courses (Arbaugh *et al.*, 2008; Boston *et al.*, 2009; Ice *et al.*, 2011) but is a student perception survey and only tells us what the student 'thinks' was in the overall course. These courses could be many weeks long and include a wide range of resources, interaction and activities etc., but how is the student expected to differentiate between them? These tools are used by the researcher after the course has been designed and delivered and often include student feedback that is a snapshot of their perception of the course. The survey instruments are limited by this unknown level of student subjectivity. Some examples of survey questions that relate to each of the presences include:

- (Teaching presence) The instructor helped to keep course participants engaged and participating in productive dialogue.
- (Teacher presence) The instructor encouraged course participants to explore new concepts in this course.
- (Social presence) Online or web-based communication is an excellent medium for social interaction
- (Social presence) Online discussions help me to develop a sense of collaboration.
- (Cognitive presence) Combining new information helped me answer questions raised in course activities.
- (Cognitive presence) Learning activities helped me construct explanations/solutions.

(adapted from Arbaugh et al., 2008, p.135)

These examples illustrate the difficulty of using the survey instrument in identifying the actual aspects of the course that are effective, as the terms are fairly generic and could be interpreted by students in different ways and at different levels. The actual learning activities that could generate student experience are not identified and it is difficult to use the responses to develop or evaluate a learning design that is effective in retaining students. Indeed, despite wide use of the Community of Inquiry framework in the ten years of its use, Xin's critique argues that online discussion is "more subtle, complex and messy than the coherent pattern presented in CoI" (Xin, 2012, p.3).

Some writers have used the broader concept of a learning community to explore its impact on satisfaction, success and retention. Shea *et al*.'s study identified that a sense of teaching presence was a valid way to develop the sense of a learning community (Shea *et al.*, 2006) and Wegerif's ethnographic study found that success on an online course depended on the student's perception of themselves as 'insiders' in a learning community (Wegerif, 1998). Rovai's work explored the connection between alienation and sense of community and found that there was a relationship between the two concepts (Rovai and Wighting, 2005). A case study of the SERPS model showed that retention was linked to the quality of the learning and social support networks and the creation of a collegial culture (Alston *et al.*, 2005). Ice studied the impact of audio feedback on measures of a sense of community and teaching presence and found significantly greater levels of student satisfaction linked to sense of community and teacher caring (Ice *et al.*, 2007). However, Drouin's evaluation found that although sense of community was related to satisfaction, it was not related to grade or retention (Drouin, 2008).

The example of the use of the Community of Inquiry framework illustrates the difficulty of using a learning design framework to evaluate the effectiveness of a course developed using it. The framework is too generic and the resulting analysis are broad guides to how the design impacts on retention, but it is not easy to use the data to support the development of new online learning course designs. It is also difficult to use the instrument to review and evaluate other courses at other institutions.

A1.6.4 Representing online learning

In face-to face teaching, the approach to learning and the activities we engage students in (lectures, seminars, practical demonstrations etc.) are the basis of the curriculum design. A course is made up of these learning activities and it is these that we reflect on and review when evaluating face-to face delivery. The origin of ODL in correspondence courses and the latter use of technology to organise the learning into largely a set of resources has meant a focus on the 'delivery' of the materials to students rather than a structure based around a series of learning activities. In face-to-face delivery, the learning design is 'hidden' and only available to the tutor and gradually to the students as they experience it. Online learning has the capability of being pre-planned and arranged and the learning activities are visible to the tutor and the students, but there is no common or consistent approach to the way these learning activities are represented, unlike the ease with which students and tutors can 'see' traditional activities. Numerous attempts have been made to find a tool for representing a learning design, but these attempts are plagued by tutor's perceptions that the tools are either too complicated to learn and use, or so simple that they can't reflect the complexity of the

teaching and learning process (Falconer *et al.*, 2011). Beetham's work to explore if models of e-learning could be used to represent practice found that:

> An effective representation for sharing and reuse has not, so far, been developed, even in FE [UK Further Education] where sharing and reuse are institutional norms.
>
> (Falconer et al., 2007, p.3)

What seems to be needed is a single tool that can be used to represent or describe the essential learning design elements of an ODL course so that an evaluation of the course can be made against retention data. A number of different attempts have been made to describe the learning design of a course in order to compare it to course data and these include a range of frameworks, rubrics, online tools and design patterns.

A1.6.5 Learning frameworks

A range of frameworks have been developed that aim to guide the learning designer when creating learning activities, and many of these have been adapted and used for the development of ODL courses. These include Bloom's taxonomy adapted for digital learning (Churches, 2016), the nine steps of instruction (Gagné *et al.*, 1992), The seven principles for good practice in undergraduate education including suggestions for the use of technology (Chickering and Ehrmann, 1996), the conversational framework (Laurillard, 2002), principles for multimedia learning (Mayer, 2005), the Read, Reflect, Display and Do (R2D2) model (Bonk and Zhang, 2008), the Community of Inquiry model (Garrison, 2011), The Student-Owned Learning-Engagement (SOLE) model (Atkinson, 2011) and the Technological Pedagogical Content Knowledge (TPACK) framework (Koehler and Rosenberg, 2016). A popular model, the Five Stage Model for online discussions (Salmon, 2002), is, like many of the models above, designed along constructivist principles. However, despite its wide use, it has been challenged as too simplistic (Moule, 2007) and there have been calls for a more reflective and contested use of the model (Lisewski and Joyce, 2002).

A range of rubrics and quality guides have been developed as instruments to evaluate online instruction, some, for example, to examine the interactions in a course (Roblyer and Wiencke, 2003), and some more general guides that guide the user to review all aspects of a course including the Quality Matters guide (Dietz-Uhler *et al.*, 2007) and the rubric for online instruction developed by California State University (California State University, 2014). But these rubrics are intended to be used to review whole courses and include a range of highly subjective measures, again making them difficult to use when designing learning. Other than

the Community of Inquiry framework, there is no single tool to describe the learning design in such a way that it could be used across a number of modules, courses and institutions in order to compare attainment and retention data.

A range of online and offline tools and toolkits have been developed to support the development of learning activities for online learning. These include a tool for creating learning designs that follow international standards for interoperable learning activities using Reload (Bailey *et al.*, 2006), CompendiumLD, a mind-mapping tool for planning learning (Thorpe, 2008), tools that help designers both design and deliver learning to learners for example CADMOS (Katsamani and Retalis, 2013) and LAMS (Dalziel, 2008) and the Integrated Learning Design Environment that includes tools for designing learning and evaluating online learning activities (ILDE, 2015). In addition, there are a wide range of virtual learning environments including Blackboard, Moodle and Canvas that allow tutors to create and deliver online learning to students. Generally speaking, these tools do not (unlike some of the frameworks) include a pedagogic element, allowing tutors to create learning without a guide to the underpinning pedagogic principles. These tools vary in the level of sophistication and complexity, but are rarely used by tutors when designing learning as the development time and cognitive load of the tool is often assumed to outweigh the benefit of using it.

A1.6.6 Design patterns

Design patterns are a concept adapted from the architectural work by Christopher Alexander (Alexander, 1979) in which it is proposed that generic solutions are developed for a range of similar problems. These solutions are based on a set of underlying principles that guide the designer when planning rooms, buildings, streets and cities. Learning design patterns can be elicited from practice and used in similar learning contexts, for example, the design pattern in Appendix 1b illustrates the problem and suggested solution for designing an online discussion that has been developed with reference to research and good practice (Goodyear, 2005). The format of the design pattern is simple and transferrable to a range of different learning contexts. However, despite their apparent simplicity and usefulness in creating effective learning designs, design patterns are not widely used by tutors as they are too specific and seen as too difficult to generate new learning activities from (Laurillard and Ljubojevic, 2011).

A1.6.7 Learning Design

A more recent approach to creating online learning activities is to approach designing learning as a 'design science' in which the process of designing learning is highlighted and made more visible. Learning design is the term usually given to tutors who are designing learning for their

own students, as opposed to instructional design that is usually done by technical or instructional support staff (Bennett *et al.*, 2014). There are three definitions of learning design:

1. Learning Design (capital "L" and "D") as is implemented in the IMS-LD specification
2. Learning design as a broad general concept (the process)
3. Learning designs as a product of designing learning.

(Cameron, 2009, p.20)

Latour (2008) describes the five ''advantages'' of design: humility, attentiveness to detail, semiotic skills, remedial intent and an ethical dimension. These aspects of the design process are not normally considered when planning online learning, but bring a new dimension to the process. A detailed analysis of the design process taken by teaching staff was conducted and the most significant factor that influenced the design process was an understanding of the student characteristics (Bennett *et al.*, 2014). However, detailed information about actual student characteristics is rarely gathered or shared with tutors when designing learning and impressions created by previous experience are mostly used. The data gathered by institutions when enrolling and admitting students is not easily accessed by some tutors, despite some obvious benefits for the learning and teaching design and delivery process.

It is proposed that a method for easily describing and representing the learning design of a course is developed with the aim of allowing easy comparison with other learning designs, evaluation against retention data, and the opportunity to share and disseminate the learning design within the learning design community. This representation could be based on an existing pedagogic framework that makes clear the underpinning learning theory, and is able to describe the actual learning activities in an objective manner. A systematic and simple approach should be developed that does not rely on the use of complex online tools, but is structured around the actual learning design process. This approach needs to be adaptable for a range of learning contexts and subjects rather than a generic tool, and that is also not too detailed to make adaptation an onerous task for the learning designer. One possible approach is suggested that attempts to map the learning design to the conversational framework (Laurillard and Ljubojevic, 2011) but this is as yet, untried.

A1.7 Conclusion

In conclusion, this literature review has illustrated some of the difficulties of using retention data to develop or evaluate the quality of ODL courses. The literature includes a variety of definitions for many aspects of retention (including the word 'retention'!) as well as a complex set of methodologies to understand and explore the retention phenomena that makes

comparative studies difficult. Despite a very wide range of sophisticated and detailed analyses of student surveys, case studies and student data, we can't definitively describe the most effective courses that will engage and retain the most students in a range of contexts. Widely used learning theories and frameworks for designing ODL are too generic and broad-based to be an effective guide to developing ODL courses, and the range of tools and design patterns vary in their usefulness. In fact, it is suggested that theories and frameworks are too generic, and patterns are too specific to be seen as useful design guides for learning designers (Laurillard and Ljubojevic, 2011). A learning as a design science approach is proposed in which the process of design is highlighted and shared with the community of learning designers, but this requires the use of a single, or small group, of shared approaches. A shared design approach would enable the resulting designs to be compared to a range of data including student characteristics and retention.

The literature review has highlighted the following research questions that are still to be answered:

1. What factors are known to affect online distance learning retention at university?

    a. What theories and research methodologies are most effective when exploring online distance learning retention at university?
    b. What evidence is there for the impact of student characteristics on online distance learning retention at university?
    c. How can information about factors affecting retention support the development of online distance learning courses?

2. How do aspects of learning design impact on retention on online distance learning courses?

    a) How can constructivist learning theories be applied to online distance learning?
    b) How can we represent the learning design of effective online distance learning courses to enable comparison to other courses and to evaluate against retention data?

Appendix 1a: Search terms

These are the synonyms used for the literature review in Appendix 1.

Online, Computer aided/ assisted/ based/ managed/ mediated/ supported, CMC (Computer Mediated Communication), CSCL (Computer-supported Collaborative Learning), Cyber, DLE (Distributed learning environment), Digital, Distributed, e-Learning, Electronic, ICT (Information Communication Technology), Internet-based, Internet-Supported Learning Environments (ISLE), Mobile, Multimedia, Multimodal, Networked, Online, Technology mediated, TAL (Technology Assisted Learning), TEL (Technology enhanced/ enabled/ Learning), Virtual, VLE (Virtual Learning Environment), Web-based

Distance, Asynchronous, Blended, Correspondence, Distance, Flexible, Open, Synchronous

Learning, Award, Course, Education, Instruction, Learning, Module, Programme, Training, Tuition, University

Design, Authentic, Collaborative, Community of Inquiry, Constructivist, Convergent, Design, Discussion, Divergent, Feedback, Group, Interaction, Learning Community, Student-centred, Student-managed

Retention, Attrition, Completion rates, Departure, Drop-out, Disenrollment, Early leaving, Loyalty, Non-completion rates, Persistence, Retention, Successful, Unsuccessful, Withdrawal

Appendix 1b: Example of a design pattern for discussion groups

Discussion Groups

This pattern is mainly concerned with the establishment of appropriate organisational forms for knowledge sharing, questioning and critique. It is a way of helping implement the patterns LEARNING THROUGH DISCUSSION, COLLABORATIVE LEARNING and NETWORKED LEARNING PROGRAMME.

♦♦♦

Discussion groups are the most common way of organising activity in networked learning environments. The degree to which a discussion is structured, and the choice of structure, are key in determining how successfully the discussion will promote learning for the participants.

Discussions can be relatively structured or relatively unstructured, and they may also change their character over a period of time. It is not uncommon for a teacher to set up a discussion in quite a formal or structured way, and for the structure then to soften as time goes by – for example, as the participants take hold of the conversation, opening up and following new lines of interest.

The structure of a discussion should be such that it increases the likelihood of:

a) an active and substantial discussion, with plenty of on task contributions
b) the students coming away from the discussion with a good understanding of the contributions made
c) contributions being made by all members of the group and 'listened' to by all other members of the group.

Unstructured discussions run the risks of (for example)

- not getting going properly within the time available
- dissipating into a number of loosely related strands that fail to engage effectively with subject being studied
- dissolving into monologues or two way conversations that fail to involve the whole group (Wertsch, 2002).

Pilkington and Walker (2003) have demonstrated the value of assigning explicit group roles in online discussion groups. Some writers, for example, McConnell (2000) are not sure about the validity of the teacher setting specific structuring devices, preferring to make the group itself responsible for determining how it wants to discuss things, or carry out its work more generally.

Therefore:

Start any online discussion by establishing its structure. Make the rules and timetable for this structure explicit to all the members of the group. Where there is little time available to the group for the discussion, and/or the members of the group are inexperienced at holding online discussions, the teacher/facilitator should set the structure. Where the students are to set their own structure, the teacher/facilitator should give them support and ideas about how to do this, and encourage them to do so in a fair and timely way.

♦♦♦

Patterns needed to complete this pattern include: DISCUSSION ROLE, FACILITATOR, DISCURSIVE TASK

(Goodyear, 2005)

Appendix 2: Additional taxonomies

Additional taxonomies categorisation chart used in the trial:

Activity No	Tasks	Conole 1-7	Laurillard 1-6	Other Y/N
	[student tasks here]			

TABLE 19: ADDITIONAL TAXONOMIES CATEGORISATION CHART

Categories Conole

	Categorisation	Type of activity	Example
1	Assimilative	Attending to information	Read, watch, listen, think about, access
2	Finding and handling information	Searching for and processing information	List, analyse, collate, plot, find, discover, access, use, gather
3	Communication	Discussing module related content with at least one other person (student or tutor)	Communicate, debate, discuss, argue, share, report, collaborate, present, describe
4	Productive	Actively constructing an artefact	Create, build, make, design, construct, contribute, complete
5	Experiential	Applying learning in a real-world setting	Practice, apply, mimic experience, explore, investigate
6	Interactive/ adaptive	Applying learning in a simulated setting	Explore, experiment, trial, improve, model, simulate
7	Assessment	All forms of assessment (summative, formative and self-assessment)	Write, present, report, demonstrate, critique

TABLE 20: CODING GUIDE CONOLE

Adapted from Fill and Conole (2005)

Categories Laurillard

1. Acquisition: Learning through acquisition is what learners are doing when they are listening to a presentation or podcast, reading from books or websites, and watching demos or videos. This is probably still the most common type of learning in formal education. The student is playing a relatively passive role while the teacher uses the transmission mode of teaching… We cannot avoid learning through acquisition. Students need to learn what others have discovered, to hear about expert ways of thinking and practising, and what is known already about the subject. Enabling students to build on the work of others is fundamental to formal education and the progressive development of ideas.

2. Discussion: Learning through discussion requires the learner to express their ideas and questions, and to challenge and respond to the ideas and questions from the teacher, and/or

from other students. The discussion may or may not end with a consensual outcome. The pedagogic value is the reciprocal critique of ideas, and how this leads to the development of a more elaborated conceptual understanding.

3. Investigation: Learning through investigation guides the learner to explore, compare and critique the texts, documents and resources that reflect the concepts and ideas being taught. Rather than having to 'follow the storyline', as in learning through acquisition, they are in control of the sequence of information, and can 'follow their own line of inquiry', making them more active, and giving them a greater sense of ownership of their learning, taking a critical and analytical approach, and thereby coming to a fuller understanding of the ideas.

4. Practice: Learning through practice enables the learner to adapt their actions to the task goal, and use the feedback to improve their next action. Feedback may come from self-reflection, from other students, from the teacher, or from the activity itself - if it shows them how to improve the result of their action in relation to the goal of the activity. This helps them to develop, understand and use the knowledge and skills of a discipline. It is sometimes referred to as 'learning by doing', or 'learning through experience'.

5. Collaboration: Learning through collaboration embraces mainly discussion, practice, and production. Building on investigations and acquisition it is about taking part in the process of knowledge building itself. It is distinct from learning through practice because although it builds something this is necessarily done through participation and negotiation with peers. It is distinct from learning through production, because although it produces something this is through debate and sharing with others.

6. Production: Learning through production is the way the teacher motivates the learner to consolidate what they have learned by expressing their current conceptual understanding and how they used it in practice. Producing an output generates a representation of the learning enabled by the other types. In its simplest form it is the learner's expression of their current thinking, which enables the teacher to see how well they have learned, and to respond with feedback, guidance and further explanation.

Adapted from Laurillard (2002)

Appendix 3: Course learning activity final eDAT data

Course E Business Law final eDAT data

Level

Structure: 5 Seminar topics

		Rater 1			Rater 2			Rater 3			Rater 4		
Activity No	Tasks	INT	FEE	OTH	INT	FEE	OTH	INT	FEE	OTH	INT	FEE	OTH
Sem 1	Reading for seminar from suggested textbooks			Y			Y			Y			Y
1.1	Using the Business Law Group in Ning discuss [structured questions]	2			2	2		2			2		
1.2a	Your firm has been consulted by Louise and Louis who wish to set up a partnership. Write a memo to your principal as follows: [structured questions]			Y			Y			Y			Y
1.2b	Post your memo to the Business Law Group in Ning and provide a critique on one other students work.	2	2		2	2		2	2		2		
1.3	Using the comment wall in the Ning Business Law Group post your findings on the following: [structured questions]	2					Y			Y	2		
1.4	A company's constitution can take the form of … Using the Business Law Group in Ning discuss [structured questions]	2	2		2	2		2					Y
1.5	Using Lexis Nexis find the Journal Article … Discuss the issue of "Opportunistic registrations" in the Business Law Group in Ning.	2	2		2	2		2			2		
1.6	Using the Business Law Group Ning Forum discuss; [structured questions]	2	2		2	2		2			2		
1.7	Using your personal blog tool in Ning please make a log as to:-		3			3			3			3	

	What have I found useful so far? Etc…												
Sem 2	Reading from suggested text books			Y			Y			Y			y
2.1	For a company to run its business it needs to operate from business premises. With regard to a company acquiring premises answer the following self-assessment questions [4 questions with model answers provided]		3			3			3			3	
2.2a	You have been consulted by Paperweight Ltd which is about to commence business. ... Draft a letter to Paperweight stating: [structured questions]			Y			Y			Y			Y
2.2b	Your letter should be no more than 300 words, use case authority where appropriate and post your findings to the Business Law Group in Ning.	2			2	2		2					Y
2.3a	The National Minimum Wage Act 1998 (as amended) must be observed by employers. Open a browser window and search for information on [structured questions]			Y			Y			Y			Y
2.3b	Post your comments about these using the Business Law Group in Ning.	2	2		2	2		2			2		
2.4	A business will need employees …Using authority; post and discuss the answer to the following question in the Business Law Group in Ning: [structured questions]	2	2		2	2		2	2		2		
2.5	Using your personal blog tool in Ning please make a log as to:- What have I found useful so far How have I contributed to the learning of others today? Etc…			Y		3			3			3	
Sem 3	Reading from suggested textbooks			Y			Y			Y			y
3.1a	Tiles & Co Ltd has consulted you …[structured questions]			Y			Y			Y			Y
3.1b	Write a letter to the company and share this with your peers in the Business Law Group in Ning. Where appropriate your letter should refer to appropriate case law.	2			2	2				Y			Y
3.2a	Look at the Commercial Agents Regulation 17 and then: [structured questions]			Y			Y			Y			Y

3.2b	Compare and contrast your findings with your peers using the Business Law Group in Ning	2	2		2	2		2	2		2	3	
3.3a	In addition to having …[structured questions]			Y			Y			Y			
3.3b	Post and discuss the answer to the above questions in the Business Law Group in Ning .	2	2		2	2		2	2		2	3	
3.4	Using your personal blog tool in Ning please make a log as to:- What have I found useful so far How have I contributed to the learning of others today? Etc…		3			3			3			3	
Sem 4	Reading from suggested texts			Y			Y			Y			y
4.1	Using the comment wall in Ning state what you consider to be the general purpose of ss13 and 14 of the Sale of Goods Act 1979 (SGA).			Y	2	2				Y	2		
4.2	Slate & Co manufactures roof tiles for use by the building industry. One of its customers has now complained that some of the tiles used in one of its developments have started to show hairline fractures. Discuss the elements of s14 (2A-2C) SGA with regard to this complaint using relevant authority. For your discussion please use the Business Law Group in Ning.	2	2		2	2		2			2		
4.3	Slate & Co, manufactured a batch of tiles with a special plastic coating accordingly … Using two case authorities apply s14(3) SGA 1979 to the above problem. Discuss your findings in the Business Law Group in Ning.	2	2		2	2		2			2		
4.4	Your firm has been instrumental in incorporating a company by the name of WasteNot plc for your clients. [structured questions] Draft a memo (approximately 600 words) to your principal (for use at this meeting with WasteNot). Use authority where possible and post this to the Business Law Group in Ning.			Y	2	2		2			2		
4.5	The Australian Consumer Law came into force on 1st January 2011. Open a browser window and use the internet to search for information.	2	2		2	2		2			2		

	Then post at least two advantages by comparison to the laws in the UK to the Business Law Group in Ning.												
4.6	Using your personal blog tool in Ning please make a log as to:- What have I found useful so far How have I contributed to the learning of others today? Etc…		3			3			3			3	
Sem5	Reading suggested textbooks			Y			Y			Y			y
5.1	Discuss "bills of lading" by comparison to "waybills"			Y			Y	2			2		
5.2	Discuss: [structured questions] Use the Business Law Group in Ning for your discussion.	2	2		2	2		2			2		
5.3	Ire plc, incorporated and based in the UK, supplies ball-bearings [structured questions] discuss the above two situations. Use the Business Law Group in Ning for your discussion.	2	2		2	2		2			2		
5.4	Rend plc, incorporated and based in the UK manufactures scaffolding and …. By reference to … discuss [structured questions] Use the Business Law Group Ning Forum for your discussion.	2	2		2	2		2			2		
5.5	Using your personal blog tool in Ning please make a log as to:- What have I found useful so far How have I contributed to the learning of others today? What would I do differently next time? Etc…		3			3			3			3	

Course F Diplomacy final eDAT data

Level 7
Structure: 12 weeks each with suggested reading, study questions and discussion forum

[From module handbook] This course will be taught online, through a twelve week period, using a series of structured readings and activities, on the Blackboard learning environment.
The course will require you to engage with course material, through reading reflection and some written tasks on a weekly basis. The programme is tightly structured, and you will need to work in a regular and systematic way to complete each week's work. Each week you will be asked to do some reading, and think through certain issues. Then you will be asked to post work to the discussion board, and read other people's work and comment on it. This generates the **group discussion**, on the main theme of the week. This is the main arena for student-student interaction, and one of the avenues for staff-student interaction. You are all encouraged to participate in these interactions, and **a part of your final mark for the course is for participation**.

From week 3 onwards, every week as a way of kick starting the discussion, one student will do and post a virtual seminar presentation on the discussion board for the week. As these presentations ultimately form part of your assessment, more information about them can be found under assessment below.
Importance of participation in weekly discussions: You must make every effort to participate in the weekly discussions. It is the equivalent of attending classes, and is vital for your full engagement with and understanding of the course material. You will only get the best out of this course if you get involved with the material, the debates and the discussions. You also have a responsibility to others on the course, and your tutors to join the discussions and debate. Discussion and debate are group activities, and they require the enthusiastic participation of all members of the group to make them worthwhile. Your interactions with others on the course and sharing of others' experiences and viewpoints are a significant part of the learning process.

		Rater 1			Rater 2			Rater 3			Rater 4		
Act No	Tasks	INT	FEE	OTH	INT	FEE	OTH	INT	FEE	OTH	INT	FEE	OTH
1.1	You should have received three text books in the post. Read the Introduction to each and			Y			y			y			Y
1.1a	reflect on the meaning of the term diplomacy and why it is such a good subject to study.			y		3				y		3	
1.2	Access the course pack, do the reading below and			Y			Y			y			Y
1.2a	reflect on what aspects of the international system make diplomacy a necessity.			y		3				y		3	

1.3	Start your research ... by continuing to read from your textbooks:			Y			Y			Y			Y
1.4	drawing on all your reading consider these questions [structured questions]			y	2					y			m
1.4a	post your answers to the Discussion Board:	2			2	2		2			2		
1.5	Read and comment on other students' views.	2	2		2	2			2		2		
3.1	Start by reading from your course pack.			Y			Y			Y			Y
3.2	Start by reading from the textbooks:			Y			Y			Y			Y
3.3	Start by reading from …			Y			Y			Y			Y
3.4	read…			Y			Y			Y			Y
3.5	Drawing on all your reading above, undertake the following task in about 500 words, and			y			y			y			Y
3.5a	post your answer to the Discussion Board: [structured questions]	2			2	2		2			2		
3.6	Read and comment on other students' views.	2	2		2	2			2		2		
VS	Each student is required to do a seminar presentation on one of the seminar topics. The presentation should be submitted at the beginning of the week and is designed to start off that week's discussion. Virtual Seminar Presentation (20%) 1000 words	2	1		2	1			1		2	2	
4.1	– Read about and consider…			Y			Y			Y			Y
4.2	- Read about and consider			Y			Y			Y			Y
4.3	- Drawing on all your reading above, answer the following questions in about 300 words. [structured questions]			Y			y			y			Y
4.3a	Post your answers to the Discussion Board	2			2	2		2			2		
4.4	- Read and comment on other students' work.	2	2			2			2		2	2	
5.1	- Read the relevant sections from the textbooks and reflect on		3				Y			Y		2	

5.2	– Focus more tightly on			Y			Y			Y			Y
5.3	– Drawing on all your reading above, and possibly on further research, answer the following question in about 500 words. [structured questions]			Y			y			y		2	
5.3a	Post your answer to the Discussion Board:	2			2	2		2			2		
5.4	- Read and comment on other students' views.	2	2			2			2		2	2	
6.1	- Start by reading an account of…			Y			Y			Y			Y
6.2	- Read and reflect on		3				Y			Y			Y
6.3	: Gain some background information on			Y			Y			Y			Y
6.4:	then focus in more tightly on			Y			Y			Y			Y
6.5	Drawing on all your reading above, and possibly on further research, answer both of the following questions in about 300 words. [structured questions]			Y			y			y			Y
6.5a	Post your answers to the Discussion Board	2			2	2		2			2		
7.1	– Start with some general introductory reading on			Y			Y			Y			Y
7.2	– Consider the multiplication of			Y			Y			Y			Y
7.3	– Consider the multiplication of			Y			Y			Y			Y
7.4	– Think about the importance of diplomacy to global governance [reading]			Y			Y			Y			Y
7.5	- Drawing on all your reading above, and possibly on further research, answer one of the following questions in about 500 words. [structured questions]			Y			y			y			Y
7.5a	Post to the Board	2			2	2		2			2		
7.6	- Read and comment on other students' views.	2	2			2			2		2	2	
8.1	–To find out what are the key functions of [reading]			Y			Y			Y			Y
8.2	– Find out what actually happens in			Y			Y			Y			Y

8.3	– focus in on one diplomatic practice,			Y			Y			Y			Y
8.4	- Drawing on all the week's reading, plus any independent research, answer the following questions in about 300 words. [structured questions]			Y			y			y			Y
8.4a	Post to Discussion Board	2			2	2		2			2		
8.5	- Read and comment on other students' views.	2	2		2	2			2		2	2	
A1	Essay 1 (20%) 2000 words			Y		1			1				Y
9.1	– Start by reading about			Y			Y			Y			Y
9.2	Read about the			Y			Y			Y			Y
9.3	–Read about the impact of technological change on the diplomatic process.			Y			Y			Y			Y
9.4	- Drawing on all your reading above, and possibly on further research, answer one of the following questions in about 500 words. [structured questions]			Y			y			y			Y
9.4a	Post your answer to the Discussion Board:	2			2	2		2			2		
9.5	Read and Comment on other students' work	2	2		2	2			2		2	2	
10.1	Reading			Y			Y			Y			Y
10.2	Now choose a recent or well known summit, for example .. - and research the causes of its success or failure. Write up your research in a 500 word report analysing the reasons for the success or failure of the summit and			Y			y			y		2	
10.2a	post to the discussion board	2			2	2		2			2		
10.3	Read and comment on other students' reports.	2	2		2	2			2		2	2	
11.1	– To get an overview of economic diplomacy start your reading from			Y			Y			Y			Y
11.2	– read in more detail about			Y			Y			Y			Y

11.3	- read and reflect on		3				Y			Y			Y
11.4	- Drawing on all your reading above, answer both of the following questions in about 300 words. [structured questions]			Y			y			y			Y
11.4a	Post your answers to the Discussion Board:	2			2	2		2	2		2		
12.1	- Start by reading			Y			Y			Y			Y
12.2	- Focus in more tightly on			Y			Y			Y			Y
12.3	– For the final task of this module, think about the future of diplomacy. [reading]			Y			Y			Y			Y
12.4	- Drawing on all your reading above, and possibly on further research, answer both of the following questions in about 300 words. [structured questions]			Y			y			y			Y
12.4a	Post your answers to the Discussion Board:	2			2	2		2			2		
12.5	Read and Comment on other students' work	2	2		2	2			2		2	2	
	Essay 2 (50%) 3000 words			Y		1			1				Y

Course G Games final eDAT data

Level 5
Structure: Semester 1 has 12 teaching weeks and 1 support week. Semester 2 has 7 teaching weeks and 5 support weeks. Typical teaching week structure includes:

- Students access Blackboard for topic lecture notes, videos etc.
- Students work on own project to apply skills/tasks based on weekly topics
- (Optional) Students post questions/comments in bulletin board for peer and tutor discussion (outside Blackboard) (tutor informal involvement)

Typical support week structure includes:

- (Optional) Students post questions/comments in bulletin board for peer and tutor discussion (outside Blackboard) (tutor informal involvement)

In addition,

- Students post work in progress to bulletin board to meet 3 (required) milestones per semester. Feedback given from tutor

Assessment: students have 2 assignments, one per semester (each includes 3 milestone points)

		Rater 1			Rater 2			Rater 3			Rater 4		
Act No	Student Centred Learning Guidance	INT	FEE	OTH	INT	FEE	OTH	INT	FEE	OTH	INT	FEE	OTH
1.1a	Students access Blackboard for topic lecture notes, videos etc. Research the technical requirements for your character and start your unwrap.			Y			Y			Y			Y
1.1b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
1.2a	Students access Blackboard for topic lecture notes, videos etc. Research the visual design of your character and start your design work.			Y			Y			Y			Y
1.2b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	

1.3a	Students access Blackboard for topic lecture notes, videos etc. Continue your design work and attempt to paint purely with value.			Y			Y			Y			Y
1.3b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
1.4a	Students access Blackboard for topic lecture notes, videos etc. Continue your design work and attempt to paint with colour.			Y			Y			Y			Y
1.4b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
1.5a	This is a support session for the design submission. (Optional) Students post questions/comments in bulletin board for peer and tutor discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
1.5b	Tutor feedback	1				1			1		1	1	
1.6a	Students access Blackboard for topic lecture notes, videos etc. Make a start on your texture. At least attempt the head of the character.			Y			Y			Y			Y
1.6b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
1.7a	Students access Blackboard for topic lecture notes, videos etc. Try to apply these techniques to your own work.		3				Y			Y			Y

1.7b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
1.8a	Students access Blackboard for topic lecture notes, videos etc. Try to apply these techniques to your own work.		3				Y			Y			Y
1.8b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
1.9a	Students access Blackboard for topic lecture notes, videos etc. An introduction to 3d coat.			Y			Y			Y			Y
1.9b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
1.10	Students access Blackboard for topic lecture notes, videos etc. Continue with your texture. (Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
1.11a	Students access Blackboard for topic lecture notes, videos etc. Continue with your texture. (Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
1.11b	Tutor feedback		1			1			1		1	1	
1.12	Start to write the report.			Y			Y			Y			Y
1.13a	Support week for the report.			Y			Y			Y			Y
1.13b	Tutor feedback		1			1			1		1	1	

2.1a	Students access Blackboard for topic lecture notes, videos etc. Research the technical requirements for your environment and start your unwrap.			Y			Y			Y			Y
2.1b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
2.2a	Students access Blackboard for topic lecture notes, videos etc. Start to think about how your work will be produced.		3				Y			Y			Y
2.1b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
2.3a	Students access Blackboard for topic lecture notes, videos etc. Start to think about how your work will be produced.		3				Y			Y			Y
2.3b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
2.4a	We will be checking your preparation for the submission.			Y			Y		1				Y
2.4b	Tutor feedback	1				1			1		1	1	
2.5a	Students access Blackboard for topic lecture notes, videos etc. Ensure that you understand how to achieve different materials based on these elements.			Y			Y			Y			Y
2.5b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
2.6a	Students access Blackboard for topic lecture notes, videos etc. Consider your foliage implementation.		3				Y			Y			Y

2.6b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
2.7a	Students access Blackboard for topic lecture notes, videos etc. Learn the function of the core nodes.			Y			Y			Y			Y
2.7b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
2.8a	Students access Blackboard for topic lecture notes, videos etc. Ensure that you understand this basic technique for adding dirt and grime and blending materials.			Y			Y			Y			Y
2.8b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
2.9a	We will be checking your texture work for the submission.			Y			Y		1				Y
2.9b	Tutor feedback	1				1			1		1	1	
2.12a	Students access Blackboard for topic lecture notes, videos etc. Continue with your shader work.			Y			Y			Y			Y
2.12b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
2.13a	Students access Blackboard for topic lecture notes, videos etc. Continue with your shader work.			Y			Y			Y			Y
2.13b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	2	2		2	2		2	2		2	2	
2.14a	Students access Blackboard for topic lecture notes, videos etc. Continue with your shader work.			Y			Y			Y			Y
2.14b	Tutor feedback	1				1			1		1	1	

Course H Group Dynamics final eDAT data

Level 7
Structure: 15 Credits, 8 week guided study + Independent study

			Rater 1			Rater 2			Rater 3			Rater 4		
Wk	Act no		INT	FEE	OTH	INT	FEE	OTH	INT	FEE	OTH	INT	FEE	OTH
0	0	[watch] Voicethread video [read] PPT slides			Y			Y			Y			Y
1	1.1a	read Chapter 1 in the book…			Y			Y			Y			Y
	1.1b	Your task is to produce a response [notes] to the following questions: [1-6]			Y			Y			Y			Y
	1.1c	we would like students to post their summaries to the Discussion board. …. Fellow students can then offer comments on the contributions from the students who submit. [Forum instructions: Please submit your work here for formative feedback and comment from fellow students.]	2	2		2	2		2	2		2	2	
	1.2a	you are required to access the Voicethread Lecture (VL) and read the following two articles:…			y			y			Y			Y
	1.2b	Once you have accessed the Video Lecture and completed the reading please respond to the following questions. Please note that these questions are to structure your note taking and thinking			y			y			Y			Y
	1.2c	Drawing upon your learning from this activity we would like you to apply your knowledge and hence produce an educational leaflet outlining one psychological technique that could be used to help a team or individual athlete and or coach cope with audience effects.			y			y			Y			Y
	1.2d	we would like you to post your educational leaflets, as an attached file to the Discussion board.	2	2		2	2		2	2		2	2	

		Fellow students can then offer comments on the contributions from the students who submit. Forum instructions: Please submit your Audience Effects Education Leaflet for formative feedback and comment from fellow students.													
	1.3a	Task 3 (optional) This task requires you to find an article in the media that provides an example of social factors involved in sport or exercise settings.			Y			Y			Y				Y
	1.3b	(optional) Provide a summary of the example you have found and post this in the relevant Discussion Board thread.	2	2		2	2		2			2			
2	2	Introduction watch VT and read PPT			Y			Y			Y				Y
	2.1	Task 1 read online stories	m	m	m			Y			Y				Y
	2.2	Task 2 (optional) If you have any examples of 'extreme' fan behaviour we would be interested to hear them. This can be either personal or from the media. We have set up a thread on the discussion board.	2			2	2		2			2			
	2.3	Task 3 read the material below, the recommended articles, and summarise and make notes on the material [includes suggested questions and structure for notes]			Y			Y			Y				Y
	2.4	Task 4 read text, watch video lecture			Y			Y			Y				Y
3	3	Intro – watch video			Y			Y			Y				Y
	3.1a	Task 1 read material, make notes [includes suggested questions and structure for notes],			Y			Y			Y				Y
	3.1b	post summary on discussion board for Task			Y	2	2		2			2			
	3.2a	Task 2 listen to an audio interview and summarise and make notes on the material [includes suggested questions and structure for notes]			Y			Y			Y				Y
	3.2b	You are required to post your answer to question 3 only onto blackboard, please post in the Discussion Board titled "Activity 3, Task 2"			Y	2	2		2			2			

	3.3a	Task 3 read and make notes under headings			Y			Y			Y			Y
	3.3b	Please use the 'Activity 3: Task 3' thread within the Discussion Board (DB) to clarify any questions that you may have during this task.	2	2		2	2		2			2		
	3.4	Optional task 4 Using the knowledge that you have acquired in Task 3 we now require you to apply this to one of two hypothetical cohesion case studies. Whichever scenario you choose we wish you to take on the role of a sport and exercise psychologist and detail the procedures that you would adopt in order to facilitate cohesion in the given case study. Your selected case study should be no more than 250 words in length. … To start with we would like you to listen to a Q and A.	1					Y			Y			Y
4	4.1a	Drawing upon your learning from this task we would like you to apply your knowledge and hence produce an educational leaflet providing an overview of team building interventions that could be used to help a team. [suggested questions for notes provided]			Y			Y			Y			Y
	4.1b	Because it is good practice to help each other learn (reciprocal teaching!), we would like you to post your educational leaflets, as an attached file to the Discussion board. Fellow students can then offer comments on the contributions from the students who submit.	2	2		2	2		2	2		2	2	
	4.2a	Task 2 listen to the vl on pdms and read the associated material (one research article), summarise and make notes on the material Read + use questions to produce summary			Y			Y			Y			Y
	4.2b	Please post your summary on the Discussion Board titled "Activity 4: Task 2" on Blackboard. Forum instructions: Please post your summary notes here to share ideas and promote discussion amongst fellow students.	2	2		2	2		2	2		2	2	
	4.3	Optional task 3 develop a PDMS session for a selected case study in a sport and exercise setting	2	2		2	2		2	2		2	2	

		You are required to post your PDMS session onto blackboard for comments and discussion, please post in the Discussion Board titled “Activity 4, Task 3”.												
	4.4a	Task 4 listen to a Q+A on using PDMS in applied settings and relect on PDMS as an group functioning intervention [Structured questions]		3				Y			Y			Y
	4.4b	Please post your summary on the Discussion Board titled “Activity 4: Task 4” on Blackboard.			Y	2	2		2			2	2	
5	5.1	Task 1 recalling a personal experience of leadership in a sport or exercise setting. Use structured questions for refection You are not required to post your summary onto blackboard but please keep your work for your own records.		3			3				Y			Y
	5.2	Task 2 listen to the VL introducing leadership and the traditional approaches, summarise and make notes on the material			Y			Y			Y			Y
	5.3a	Task 3 read the associated material (core text), summarise and make notes on the material [Structured questions]			Y			Y			Y			Y
	5.3b	Please post your summary on the Discussion Board titled “Activity 5: Task 3” on Blackboard.	2	2		2	2		2			2		
	5.4a	Task 4 optional find and describe examples effective/ineffective communication and conflict relative to sport and exercise. [Structured questions]			Y			Y			Y			Y
	5.4b	Please post your summary on the discussion board	2	2		2	2		2			2		
	5.5	Task 5 optional reading			Y			Y			Y			Y
?		Masterclass webinars x2	m	m	m	1			2					Y
6	6.1	Task 1 – read ppt			Y			Y			Y			Y
	6.2	Task 2 read the associated material (core text), summarise and make notes on the material [Structured questions] Please keep this work for your own records.			Y			Y			Y			Y
	6.3	Task 3 optional read a research study exploring coaches transactional and transformational behaviours, summarise and make notes on the material. [Structured questions]			Y			Y			Y			Y

		Please keep this work for your own records.												
	6.4a	Task 4 read part of a review paper that critically examines the current psychology of leadership in sport and exercise summarise and make notes on the material [Structured questions]			Y			Y			Y			Y
	6.4b	Please post your work on the Discussion Board	2	2		2	2		2			2		
	6.5a	Task 5 applying leadership theory knowledge to two hypothetical case studies. Using the knowledge that you have acquired in Activity 6 we now require you to apply this to one of two hypothetical leadership case studies. Whichever scenario you choose we wish you to take on the role of a sport and exercise psychologist and detail the procedures that you would adopt in order to facilitate cohesion in the given case study. Your selected case study should be no more than 250 words in length.			Y			Y			Y			Y
	6.5b	Post your case studies to Activity 6, Task 5 Rugby Team Case Study or Activity 5, Task 5 Exercise Group Case Study on the discussion board	2	2		2	2		2			2		
7	7.1	Task 1 listen to a Q&A on the social identity approach to leadership and relect on social identity priniciples as a leadership framework [Structured questions] Please keep this work for your own records.			Y			Y			Y			Y
	7.2	Task 2 read the associated material (core text), summarise and make notes on the material [Structured questions] Please keep this work for your own records.			Y			Y			Y			Y
	7.3a	Task 3 read a review paper and a qualitative study, summarise and make notes on the material [Structured questions]			Y			Y			Y			Y
	7.3b	Please post your work on the Discussion Board			Y	2	2		2			2		
	7.3c	Optional task: read article, structured questions, keep for own records			Y			Y			Y			Y
	7.4a	Task 4 applying your knowledge of social identity leadership principles to design a sport or exercise poster.			Y			Y			Y			Y

		Using the knowledge that you have acquired in Activity 7 we now require you to design a one-page poster to explain the four principles of social identity leadership.													
	7.4b	Attach your poster to Activity 7, Task 4 on the discussion board			Y	2	2		2			2			
	7.5	Task 5 optional watch a TED talk delivered by Simon Sinek and use appropriate leadership theory/ies to explain the approach to leadership outlined Please keep this work for your own records.			Y			Y			Y				Y
8	8.1a	Task 1 listen to a q&a on applying the 3r's in practice and compile notes. Structured questions			Y			Y			Y				Y
	8.1b	Please post your work on the Discussion Board			Y	2	2		2			2			
	8.2	Task 2 read the associated material (core text), summarise and make notes on the material [Structured questions] Please keep this work for your own records.			Y			Y			Y				Y
	8.3	Task 3 optional read an applied research study, summarise and make notes on the material [Structured questions Please keep this work for your own records.			Y			Y			Y				Y
	8.4a	Task 4 research a leadership 'issue' in the media and develop a leadership intervention based on the 3R's This task requires you to find some examples of ineffective leadership in sport or exercise. Once you have found some examples, decide on one and we would like you to structure your case study intervention as follows: …			Y			Y			Y				Y
	8.4b	Please post your summary on the discussion board			Y	2	2		2			2			
	A1	Assignment 1 submit a 2000 word essay which critically examines the effectiveness of interventions to enhance group functioning in sport and exercise settings.			Y		1			1					Y
	A2	Assignment 2 submit a 20 minute presentation delivered via voice thread relating to a leadership case study in sport or exercise			Y		1			1					Y

Appendix 4: Course learning activity data for additional taxonomies

Course E data for additional taxonomies

Level
Structure: 5 Seminar topics

		Rater 1			Rater 2			Rater 3			Rater 4		
Act No	Tasks	C 1-7	L 1-6	OTH Y/N	C 1-7	L 1-6	OTH Y/N	C 1-7	L 1-6	OTH Y/N	C 1-7	L 1-6	OTH Y/N
Sem 1	Reading for seminar from suggested textbooks	1	1		1	1				Y			Y
1.1	Using the Business Law Group in Ning discuss [structured questions]	3	2		3	2		2			2		
1.2a	Your firm has been consulted by Louise and Louis who wish to set up a partnership. Write a memo to your principal as follows: [structured questions]	4	0		4	6				Y			Y
1.2b	Post your memo to the Business Law Group in Ning and provide a critique on one other students work.	3	4		3	2		2	2		2		
1.3	Using the comment wall in the Ning Business Law Group post your findings on the following: [structured questions]	3	2		3	2				Y	2		
1.4	A company's constitution can take the form of … Using the Business Law Group in Ning discuss [structured questions]	3	2		3	2		2					Y
1.5	Using Lexis Nexis find the Journal Article … Discuss the issue of "Opportunistic registrations" in the Business Law Group in Ning.	3	2		2	2		2			2		
1.6	Using the Business Law Group Ning Forum discuss; [structured questions]	3	2		3	2		2			2		
1.7	Using your personal blog tool in Ning please make a log as to:- What have I found useful so far? Etc…	1	4		1	6			3			3	

Sem 2	Reading from suggested text books	1	1		1	1				Y			y
2.1	For a company to run its business it needs to operate from business premises. With regard to a company acquiring premises answer the following self-assessment questions [4 questions with model answers provided]	0	0		7	4			3			3	
2.2a	You have been consulted by Paperweight Ltd which is about to commence business. ... Draft a letter to Paperweight stating: [structured questions]	4	6		4	6				Y			Y
2.2b	Your letter should be no more than 300 words, use case authority where appropriate and post your findings to the Business Law Group in Ning.	3	5		3	2		2					Y
2.3a	The National Minimum Wage Act 1998 (as amended) must be observed by employers. Open a browser window and search for information on [structured questions]	2	1		2	3				Y			Y
2.3b	Post your comments about these using the Business Law Group in Ning.	3	2		3	2		2			2		
2.4	A business will need employees …Using authority; post and discuss the answer to the following question in the Business Law Group in Ning: [structured questions]	3	2		3	6		2	2		2		
2.5	Using your personal blog tool in Ning please make a log as to:- What have I found useful so far How have I contributed to the learning of others today? Etc…	4	4		1	6			3			3	
Sem 3	Reading from suggested textbooks	1	1		1	1				Y			y
3.1a	Tiles & Co Ltd has consulted you … [structured questions]	0	0		2	6				Y			Y

3.1b	Write a letter to the company and share this with your peers in the Business Law Group in Ning. Where appropriate your letter should refer to appropriate case law.	6	0		4	6				Y			Y
3.2a	Look at the Commercial Agents Regulation 17 and then: [structured questions]	1	1		2	6				Y			Y
3.2b	Compare and contrast your findings with your peers using the Business Law Group in Ning	3	2		3	2		2	2		2	3	
3.3a	In addition to having … [structured questions]	0	0		2	6				Y			
3.3b	Post and discuss the answer to the above questions in the Business Law Group in Ning .	3	2		3	2		2	2		2	3	
3.4	Using your personal blog tool in Ning please make a log as to:- What have I found useful so far How have I contributed to the learning of others today? Etc…	4	4		1	6			3			3	
Sem 4	Reading from suggested texts	1	1		1	1				Y			y
4.1	Using the comment wall in Ning state what you consider to be the general purpose of ss13 and 14 of the Sale of Goods Act 1979 (SGA).	3	2		3	2				Y	2		
4.2	Slate & Co manufactures roof tiles for use by the building industry. One of its customers has now complained that some of the tiles used in one of its developments have started to show hairline fractures. Discuss the elements of s14 (2A-2C) SGA with regard to this complaint using relevant authority. For your discussion please use the Business Law Group in Ning.	3	2		3	2		2			2		
4.3	Slate & Co, manufactured a batch of tiles with a special plastic coating accordingly … Using two case authorities apply s14(3) SGA 1979 to the above problem. Discuss your findings in the Business Law Group in Ning.	3	2		3	2		2			2		

4.4	Your firm has been instrumental in incorporating a company by the name of WasteNot plc for your clients. [structured questions] Draft a memo (approximately 600 words) to your principal (for use at this meeting with WasteNot). Use authority where possible and post this to the Business Law Group in Ning.	5	6		4	6		2			2		
4.5	The Australian Consumer Law came into force on 1st January 2011. Open a browser window and use the internet to search for information. Then post at least two advantages by comparison to the laws in the UK to the Business Law Group in Ning.	3	2		2	2		2			2		
4.6	Using your personal blog tool in Ning please make a log as to:- What have I found useful so far How have I contributed to the learning of others today?	4	2		1	6			3			3	
S 5	Reading suggested textbooks	1	1		1	1				Y			y
5.1	Discuss "bills of lading" by comparison to "waybills"	3	2		3	2		2			2		
5.2	Discuss: [structured questions] Use the Business Law Group in Ning for your discussion.	3	2		3	2		2			2		
5.3	Ire plc, incorporated and based in the UK, supplies ball-bearings [structured questions]. discuss the above two situations. Use the Business Law Group in Ning for your discussion.	3	2		3	2		2			2		
5.4	Rend plc, incorporated and based in the UK manufactures scaffolding and …. By reference to … discuss [structured questions] Use the Business Law Group Ning Forum for your discussion.	3	2		3	2		2			2		
5.5	Using your personal blog tool in Ning please make a log as to:- What have I found useful so far How have I contributed to the learning of others today? What would I do differently next time? Etc…	4	4		1	6			3			3	

Course F data for additional taxonomies

Level 7
Structure: 12 weeks each with suggested reading, study questions and discussion forum
[From module handbook] This course will be taught online, through a twelve week period, using a series of structured readings and activities, on the Blackboard learning environment.

The course will require you to engage with course material, through reading reflection and some written tasks on a weekly basis. The programme is tightly structured, and you will need to work in a regular and systematic way to complete each week's work. Each week you will be asked to do some reading, and think through certain issues. Then you will be asked to post work to the discussion board, and read other people's work and comment on it. This generates the **group discussion**, on the main theme of the week. This is the main arena for student-student interaction, and one of the avenues for staff-student interaction. You are all encouraged to participate in these interactions, and **a part of your final mark for the course is for participation**.
From week 3 onwards, every week as a way of kick starting the discussion, one student will do and post a virtual seminar presentation on the discussion board for the week. As these presentations ultimately form part of your assessment, more information about them can be found under assessment below.
Importance of participation in weekly discussions: You must make every effort to participate in the weekly discussions. It is the equivalent of attending classes, and is vital for your full engagement with and understanding of the course material. You will only get the best out of this course if you get involved with the material, the debates and the discussions. You also have a responsibility to others on the course, and your tutors to join the discussions and debate. Discussion and debate are group activities, and they require the enthusiastic participation of all members of the group to make them worthwhile. Your interactions with others on the course and sharing of others' experiences and viewpoints are a significant part of the learning process.

		Rater 1			**Rater 2**			**Rater 3**			**Rater 4**		
ACT No	Tasks	C 1-7	L 1-6	OTH Y/N	C 1-7	L 1-6	OTH Y/N	C 1-7	L 1-6	OTH Y/N	C 1-7	L 1-6	OTH Y/N
1.1	You should have received three text books in the post. Read the Introduction to each and reflect on the meaning of the term diplomacy and why it is such a good subject to study.	1	1		1	1		1	1		1	1	
1.2	Access the course pack .. do the reading below and reflect on what aspects of the international system make diplomacy a necessity.	1	1		1	1		1	1		1	1	
1.3	Start your research ... by continuing to read from your textbooks:	1	1		1	1		1	1		1	1	

1.4	drawing on all your reading consider these questions [structured questions] post your answers to the Discussion Board:	3	2		3	2		3	2		3	2	
1.5	Read and comment on other students' views.	3	5		3	2		3	2		3	2	
3.1	Start by reading from your course pack.	1	1		1	1		1	1		1	1	
3.2	Start by reading from the textbooks:	1	1		1	1		1	1		1	1	
3.3	Start by reading from …	1	1		1	1		1	1		1	1	
3.4	read…	1	1		1	1		1	1		1	1	
3.5	Drawing on all your reading above, undertake the following task in about 500 words, and post your answer to the Discussion Board: [structured questions]	3	2		3	2		3	2		3	2	
3.6	Read and comment on other students' views.	3	2		3	2		3	2		3	2	
	Each student is required to do a seminar presentation on one of the seminar topics. The presentation, which is 1000 words, is a longer, more in-depth version of the weekly answers posted on the discussion board. The presentation should be submitted at the beginning of the week and is designed to start off that week's discussion. We will therefore be assessing not only the quality of the content, but the clarity and accessibility of the material and how well it is communicated to the group. The presentation, with any necessary additions/changes, is then later submitted for formal assessment. Virtual Seminar Presentation (20%) 1000 words	7	4		7	6		7	6		4	6	
4.1	– Read about and consider…	1	1		1	1		1	1		1	1	
4.2	- Read about and consider	1	1		1	1		1	1		1	1	
4.3	- Drawing on all your reading above, answer the following questions in about 300 words. [structured questions] Post your answers to the Discussion Board	3	2		3	2		3	2		3	2	
4.4	- Read and comment on other students' work.	3	2		3	2		3	2		3	2	
5.1	- Read the relevant sections from the textbooks and reflect on	2	1		1	1		1	1		1	1	
5.2	– Focus more tightly on	2	4		1	1		1	1		1	1	

5.3	– Drawing on all your reading above, and possibly on further research, answer the following question in about 500 words. [structured questions] Post your answer to the Discussion Board:	3	3		3	2		3	2		3	2	
5.4	- Read and comment on other students' views.	3	2		3	2		3	2		3	2	
6.1	- Start by reading an account of…	1	1		1	1		1	1		1	1	
6.2	- Read and reflect on	1	2		1	1		1	1		1	1	
6.3	: Gain some background information on	1	1		2	1		2	1		1	1	
6.4:	then focus in more tightly on	2	3		1	1		1	1		1	1	
6.5	Drawing on all your reading above, and possibly on further research, answer both of the following questions in about 300 words. [structured questions] Post your answers to the Discussion Board	3	2		3	2		3	2		3	2	
7.1	– Start with some general introductory reading on	1	1		1	1		2	1		1	1	
7.2	– Consider the multiplication of	1	1		1	1		1	1		1	1	
7.3	– Consider the multiplication of	1	1		1	1		1	1		1	1	
7.4	– Think about the importance of diplomacy to global governance [reading]	1	1		1	1		1	1		1	1	
7.5	- Drawing on all your reading above, and possibly on further research, answer one of the following questions in about 500 words. [structured questions] Post to the Board	3	2		3	2		3	2		3	2	
7.6	- Read and comment on other students' views.	3	2		3	2		3	2		3	2	
8.1	–To find out what are the key functions of [reading]	1	1		1	1		1	1		1	1	
8.2	– Find out what actually happens in	2	3		1	1		1	1		1	1	
8.3	– focus in on one diplomatic practice,	2	3		1	1		1	1		1	1	
8.4	- Drawing on all the week's reading, plus any independent research, answer the following questions in about 300 words. [structured questions]	3	2		3	2		3	2		3	1	
8.5	- Read and comment on other students' views.	3	2		3	2		3	2		3	2	
A1	Essay 1 (20%) 2000 words	7	6		7	6		7	6		3	6	
9.1	– Start by reading about	1	1		1	1		1	1		1	6	
9.2	Read about the	1	1		1	1		1	1		1	1	

9.3	–Read about the impact of technological change on the diplomatic process.	1	1		1	1		1	1		3	2	
9.4	- Drawing on all your reading above, and possibly on further research, answer *one* of the following questions in about 500 words. [structured questions] Post your answer to the Discussion Board:	3	2		3	2		7	6		0	0	
9.5	Read and Comment on other students' work	3	2		3	2		3	2		3	2	
10.1	Reading	1	1		1	1		1	1		1	1	
10.2	Now choose a recent or well known summit, for example .. - and research the causes of its success or failure. Write up your research in a 500 word report analysing the reasons for the success or failure of the summit and post to the discussion board	5	6		4	6		3	3		3	2	
10.3	Read and comment on other students' reports.	3	2		3	2		3	2		3	2	
11.1	– To get an overview of economic diplomacy start your reading from	1	1		1	1		1	1		1	1	
11.2	– read in more detail about	1	1		1	1		1	1		1	1	
11.3	- read and reflect on	2	1		1	1		1	1		1	1	
11.4	- Drawing on all your reading above, answer both of the following questions in about 300 words. [structured questions] Post your answers to the Discussion Board:	3	2		3	2		3	2		3	2	
12.1	- Start by reading	1	1		1	1		1	1		1	1	
12.2	- Focus in more tightly on	2	3		1	1		1	1		1	1	
12.3	– For the final task of this module, think about the future of diplomacy. [reading]	1	1		1	1		1	1		1	1	
12.4	- Drawing on all your reading above, and possibly on further research, answer both of the following questions in about 300 words. [structured questions] Post your answers to the Discussion Board:	3	2		3	2		3	2		3	2	
12.5	: Read and Comment on other students' work	3	2		3	2		3	2		3	2	
A2	Essay 2 (50%) 3000 words	7	6		7	6		7	6		3	6	

Course G data for additional taxonomies

Module: GS
Level 5
Structure: Semester 1 has 12 teaching weeks and 1 support week. Semester 2 has 7 teaching weeks and 5 support weeks
Typical teaching week structure includes:
Students access Blackboard for topic lecture notes, videos etc.
Students work on own project to apply skills/tasks based on weekly topics
(Optional) Students post questions/comments in bulletin board for peer and tutor discussion (outside Blackboard) (tutor informal involvement)
Typical support week structure includes:
(Optional) Students post questions/comments in bulletin board for peer and tutor discussion (outside Blackboard) (tutor informal involvement)
In addition,
Students post work in progress to bulletin board to meet 3 (required) milestones per semester. Feedback given from tutor
Assessment: students have 2 assignments, one per semester (each includes 3 milestone points)

		Rater 1			Rater 2			Rater 3			Rater 4		
Act No	Student Centred Learning Guidance	C 1-7	L 1-6	Oth Y/N	C 1-7	L 1-6	Oth Y/N	C 1-7	L 1-6	Oth Y/N	C 1-7	L 1-6	Oth Y/N
1.1a	Research the technical requirements for your character and start your unwrap.	2	3		1	1		2	3		1	1	
1.1b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
1.2a	Research the visual design of your character and start your design work.	2	3		4	4		2	3		1	1	
1.2b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
1.3a	Continue your design work and attempt to paint purely with value.	1	1		4	4		4	6		4	4	

1.3b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
1.4a	Continue your design work and attempt to paint with colour.	1	1		4	4		4	6		4	4	
1.4b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
1.5a	This is a support session for the design submission. (Optional) Students post questions/comments in bulletin board for peer and tutor discussion (outside Blackboard) (tutor informal involvement)	3	5		3	2		3	2		3	4	
1.5b	Tutor feedback	3	2		7	4		7	6		4	4	
1.6a	Make a start on your texture. At least attempt the head of the character.	1	1		4	4		4	6		4	4	
1.6b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
1.7a	Try to apply these techniques to your own work.	5	4		4	4		5	4		4	4	
1.7b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
1.8a	Try to apply these techniques to your own work.	5	6		4	4		5	4		4	4	
1.8b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
1.9a	An introduction to 3d coat.	1	1		0	0	Y	1	1		4	1	
1.9b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
1.10	Continue with your texture.	3	2		4	4		5	4		3	4	

	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)												
1.11a	Continue with your texture. (Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		4	4		5	4		3	4	
1.11b	Tutor feedback	3	2		7	4		7	6		7	4	
1.12	Start to write the report.	7	6		7	6		7	6		3	6	
1.13a	Support week for the report.	7	6		7	4		3	2		7	6	
1.13b	Tutor feedback	3	2		7	4		7	6		7	6	
2.1a	Research the technical requirements for your environment and start your unwrap.	2	3		1	1		2	1		1	1	
2.1b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
2.2a	Start to think about how your work will be produced.	1	6		1	1		2	3		1	1	
2.1b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
2.3a	Start to think about how your work will be produced.	1	6		1	1		2	3		1	1	
2.3b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
2.4a	We will be checking your preparation for the submission.	0	0		7	4		0	0	Y	7	6	
2.4b	Tutor feedback	3	2		7	4		7	6		7	6	
2.5a	Ensure that you understand how to achieve different materials based on these elements.	1	3		1	4		0	0	Y	1	1	

2.5b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
2.6a	Consider your foliage implementation.	1	1		1	1		1	4		1	1	
2.6b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
2.7a	Learn the function of the core nodes.	2	1		1	4		1	1		1	1	
2.7b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
2.8a	Ensure that you understand this basic technique for adding dirt and grime and blending materials.	2	3		1	4		0	0	Y	1	1	
2.8b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
2.9a	We will be checking your texture work for the submission.	0	0		7	4		0	0	Y	7	6	
2.9b	Tutor feedback	3	2		7	4		7	6		7	6	
2.12a	Continue with your shader work.	2	1		4	4		4	6		4	4	
2.12b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
2.13a	Continue with your shader work.	2	1		4	4		4	6		4	4	
2.13b	(Optional) Students post questions/comments in bulletin board for peer discussion (outside Blackboard) (tutor informal involvement)	3	2		3	2		3	2		3	2	
2.14a	Continue with your shader work.	2	1		4	4		4	6		4	4	
2.14b	Tutor feedback	3	2		7	4		7	6		7	6	

Course H data for additional taxonomies

Module: GD

Level 7

Structure: 15 Credits, 8 week guided study + Independent study

		Rater 1			Rater 2			Rater 3			Rater 4		
Act no		C 1-7	L 1-6	Oth Y/N	C 1-7	L 1-6	Oth Y/N	C 1-7	L 1-6	Oth Y/N	C 1-7	L 1-6	Oth Y/N
0	[watch] Voicethread video [read] PPT slides	1	1		1	1		1	1		1	1	
1.1a	read Chapter 1 in the book…	1	1		1	1		1	1		1	1	
1.1b	Your task is to produce a response [notes] to the following questions: [1-6]	4	3		4	6		7	6		2	0	
1.1c	we would like students to post their summaries to the Discussion board. …. Fellow students can then offer comments on the contributions from the students who submit. [Forum instructions: Please submit your work here for formative feedback and comment from fellow students.]	3	2		3	2		3	2		3	2	
1.2a	you are required to access the Voicethread Lecture (VL) and read the following two articles:…	1	1		1	1		1	1		1	1	
1.2b	Once you have accessed the Video Lecture and completed the reading please respond to the following questions. Please note that these questions are to structure your note taking and thinking	3	4		1	1		7	6		3	0	
1.2c	Drawing upon your learning from this activity we would like you to apply your knowledge and hence produce an educational leaflet outlining one psychological technique	4	6		4	6		4	6		3	6	

	that could be used to help a team or individual athlete and or coach cope with audience effects.												
1.2d	we would like you to post your educational leaflets, as an attached file to the Discussion board. Fellow students can then offer comments on the contributions from the students who submit. Forum instructions: Please submit your Audience Effects Education Leaflet for formative feedback and comment from fellow students.	3	2		3	2		3	2		3	6	
1.3a	Task 3 (optional) This task requires you to find an article in the media that provides an example of social factors involved in sport or exercise settings.	2	1		2	3		2	3		1	3	
1.3b	(optional) Provide a summary of the example you have found and post this in the relevant Discussion Board thread.	3	2		3	2		3	2		3	2	
2	Introduction watch VT and read PPT	1	1		1	1		1	1		1	1	
2.1	Task 1 read online stories	1	1		1	1		2	3		1	1	
2.2	Task 2 (optional) If you have any examples of 'extreme' fan behaviour we would be interested to hear them. This can be either personal or from the media. We have set up a thread on the discussion board.	3	2		3	2		3	2		3	2	
2.3	Task 3 read the material below, the recommended articles, and summarise and make notes on the material [includes suggested questions and structure for notes]	2	1		1	1		1	1		2	3	
2.4	Task 4 read text, watch video lecture	1	1		1	1		1	1		1	1	
3	Intro – watch video	1	1		1	1		1	1		1	1	
3.1a	Task 1 read material, make notes [includes suggested questions and structure for notes],	2	1		1	1		1	1		2	3	
3.1b	post summary on discussion board for Task	3	2		3	2		3	2		3	2	

3.2a	Task 2 listen to an audio interview and summarise and make notes on the material [includes suggested questions and structure for notes]	2	1		1	1		2	1		2	3	
3.2b	You are required to post your answer to question 3 only onto blackboard, please post in the Discussion Board titled “Activity 3, Task 2”	3	2		3	2		3	2		3	2	
3.3a	Task 3 read and make notes under headings	2	1		1	1		1	1		2	3	
3.3b	Please use the ‘Activity 3: Task 3’ thread within the Discussion Board (DB) to clarify any questions that you may have during this task.	3	2		3	2		3	2		3	2	
3.4	Optional task 4 Using the knowledge that you have acquired in Task 3 we now require you to apply this to one of two hypothetical cohesion case studies (i.e., either one from sport or one from exercise). Whichever scenario you choose we wish you to take on the role of a sport and exercise psychologist and detail the procedures that you would adopt in order to facilitate cohesion in the given case study. Your selected case study should be no more than 250 words in length. We have provided a list of sub-headings for you to structure your write-up. Your selected case study should aim to draw upon theory and research where applicable. To start with we would like you to listen to a QandA with Jamie Barker and Matthew Slater talking about doing applied ‘team building’ interventions and read an accompanying summary of an applied intervention delivered to a cricket team.	6	6		5	6		5	6		3	1	
4.1a	Drawing upon your learning from this task we would like you to apply your knowledge and hence produce an educational leaflet providing an overview of team building interventions that could be used to help a team. [suggested questions for notes provided]	4	6		4	6		5	6		4	6	
4.1b	Because it is good practice to help each other learn (reciprocal teaching!), we would like you to post your educational leaflets, as an attached file to the Discussion	3	5		3	2		3	2		3	2	

	board. Fellow students can then offer comments on the contributions from the students who submit.												
4.2a	Task 2 listen to the vl on pdms and read the associated material (one research article), summarise and make notes on the material Read + use questions to produce summary	2	1		1	1		1	1		2	1	
4.2b	Please post your summary on the Discussion Board titled "Activity 4: Task 2" on Blackboard. Forum instructions: Please post your summary notes here to share ideas and promote discussion amongst fellow students.	3	2		3	2		3	2		3	2	
4.3	Optional task 3 develop a PDMS session for a selected case study in a sport and exercise setting You are required to post your PDMS session onto blackboard for comments and discussion, please post in the Discussion Board titled "Activity 4, Task 3".	3	2		3	2		5	6		3	2	
4.4a	Task 4 listen to a Q+A on using PDMS in applied settings and relect on PDMS as an group functioning intervention Structured questions	3	2		1	1		7	4		2	1	
4.4b	Please post your summary on the Discussion Board titled "Activity 4: Task 4" on Blackboard.	3	2		3	2		3	2		3	2	
5.1	Task 1 recalling a personal experience of leadership in a sport or exercise setting. Use structured questions for refection You are not required to post your summary onto blackboard but please keep your work for your own records.	5	3		1	1		2	6		2	1	
5.2	Task 2 listen to the VL introducing leadership and the traditional approaches, summarise and make notes on the material	2	1		1	1		1	1		2	1	
5.3a	Task 3 read the associated material (core text), summarise and make notes on the material Structured questions	2	1		1	1		1	1		2	1	

5.3b	Please post your summary on the Discussion Board titled "Activity 5: Task 3" on Blackboard.	3	2		3	2		3	2		3	2	
5.4a	Task 4 optional find and describe examples effective/ineffective communication and conflict relative to sport and exercise. Structured questions	2	3		2	1		2	3		2	1	
5.4b	Please post your summary on the discussion board	3	2		3	2		3	2		3	2	
5.5	Task 5 optional reading	1	1		1	1		1	1		0	1	
	Masterclass webinars x2	1	1		1	1		3	5		0	0	
6.1	Task 1 – read ppt	1	1		1	1		1	1		1	1	
6.2	Task 2 read the associated material (core text), summarise and make notes on the material Structured questions Please keep this work for your own records.	2	1		1	1		1	1		2	1	
6.3	Task 3 optional read a research study exploring coaches transactional and transformational behaviours, summarise and make notes on the material Structured questions Please keep this work for your own records.	2	3		1	1		1	1		2	1	
6.4a	Task 4 read part of a review paper that critically examines the current psychology of leadership in sport and exercise summarise and make notes on the material Structured questions	2	1		1	1		1	1		2	1	
6.4b	Please post your work on the Discussion Board	3	2		3	2		3	2		3	2	
6.5a	Task 5 applying leadership theory knowledge to two hypothetical case studies. Using the knowledge that you have acquired in Activity 6 we now require you to apply this to one of two hypothetical leadership case studies (i.e., either one from sport or one from exercise). Whichever scenario you choose we wish you to take on the role of a sport and exercise psychologist and detail the procedures that you would adopt in order to facilitate cohesion in the given case study. Your selected case study should be no more	5	6		4	6		5	6		3	6	

	than 250 words in length. We have provided a list of sub-headings for you to structure your write-up. Your selected case study should aim to draw upon theory and research where applicable.												
6.5b	Post your case studies to Activity 6, Task 5 Rugby Team Case Study or Activity 5, Task 5 Exercise Group Case Study on the discussion board	3	5		3	2		3	2		3	2	
7.1	Task 1 listen to a Q&A on the social identity approach to leadership and relect on social identity priniciples as a leadership framework [Structured questions] Please keep this work for your own records.	2	1		1	1		1	1		2	1	
7.2	Task 2 read the associated material (core text), summarise and make notes on the material [Structured questions] Please keep this work for your own records.	2	1		1	1		1	1		2	1	
7.3a	Task 3 read a review paper and a qualitative study, summarise and make notes on the material [Structured questions]	2	1		1	1		1	1		2	1	
7.3b	Please post your work on the Discussion Board	3	2		3	2		3	2		3	2	
7.3c	Optional task: read article, structured questions, keep for own records	2	1		1	1		1	1		1	1	
7.4a	Task 4 applying your knowledge of social identity leadership principles to design a sport or exercise poster. Using the knowledge that you have acquired in Activity 7 we now require you to design a one-page poster to explain the four principles of social identity leadership.	4	6		4	6		4	6		3	6	
7.4b	Attach your poster to Activity 7, Task 4 on the discussion board	3	5		3	2		3	2		3	2	
7.5	Task 5 optional watch a TED talk delivered by Simon Sinek and use appropriate leadership theory/ies to explain the approach to leadership outlined Please keep this work for your own records.	1	1		1	1		4	6		1	1	
8.1a	Task 1 listen to a q&a on applying the 3r's in practice and compile notes [Structured questions]	2	1		1	1		1	1		2	1	

8.1b	Please post your work on the Discussion Board	3	2		3	2		3	2		3	2	
8.2	Task 2 read the associated material (core text), summarise and make notes on the material Structured questions] Please keep this work for your own records.	2	1		1	1		1	1		2	1	
8.3	Task 3 optional read an applied research study, summarise and make notes on the material [Structured questions] Please keep this work for your own records.	2	1		1	1		1	1		2	1	
8.4a	Task 4 research a leadership 'issue' in the media and develop a leadership intervention based on the 3R's This task requires you to find some examples of ineffective leadership in sport or exercise. Once you have found some examples, decide on one and we would like you to structure your case study intervention as follows: … This task should take approximately 2 hours to find some examples and write summaries.	2	3		4	3		2	3		2	1	
8.4b	Please post your summary on the discussion board	3	2		3	2		3	2		3	2	
	Assignment 1 submit a 2000 word essay which critically examines the effectiveness of interventions to enhance group functioning in sport and exercise settings.	7	6		7	6		7	6		7	6	
	Assignment 2 submit a 20 minute presentation delivered via voice thread relating to a leadership case study in sport or exercise	7	6		7	6		7	6		7	6	

Appendix 5: Repertory grid elements cards

A teaching method you like…	A teaching method you don't like…
A teaching method your students like…	A teaching method your students don't like…
A teaching method you would like to use…	A very challenging teaching method…

Additional elements cards to use if required by participants:

Online discussion forum for group discussion	Class blog to share news, updates and links
Reflective writing in personal diary/journal	Multiple choice quiz/test

Problem-based learning activity where group given 'messy' problem and work together to gather information and present proposed solution	Role-play activity
Case-based learning where students given case study and asked to investigate and share analysis	Group collaborative project with range of tasks including project planning, research, analysis, preparation of 'output' and sharing with peers.
Lecture from visiting expert speaker	Demonstration of skill-based task
Creation of artefact	Peer marking activity using assessment criteria

Appendix 6: Participant information and consent form

Project information sheet

This project aims to increase retention of students on online distance learning courses by developing a tool to categorise the types of learning activities that are in those courses. The learning activities will be categorised based on whether they include interaction and/or feedback using the eDAT (e-Design Assessment Tool) by 4 raters and the extent to which the raters agree on their categories will be analysed to establish the reliability of the tool. The eDAT for each course will be compared to student data to evaluate the impact of the types of learning activities on retention.

Pilot studies have shown that tutors use a wide range of vocabulary and have different ways of understanding online teaching and learning. Course tutors will be invited to participate in a semi-structured interview using a repertory grid that aims to elicit their own particular constructs of online teaching and learning. It is hoped that this will lead to a better understanding of ways to categorise learning designs.

What is required?

A. Award leaders/module leaders/tutors are asked for their permission for the researcher to access the relevant Blackboard site and extract the students' learning activities for categorisation using the eDAT.
B. Award leaders/module leaders/tutors are asked to participate in a semi-structured interview about the learning design of their course lasting approx. 1 hour.
C. Raters will be invited to attend a workshop where they will be trained in the use of the eDAT and will use it to analyse the courses. This workshop will last approx. 3 hours (including lunch)

Confidentiality

The raters will be given a codename to preserve their anonymity. The courses will be assigned a codename but as the learning activities in the course will be visible to the raters it will not be possible to offer complete anonymity. There will be no identifying details in the published work.

Participation

Participation in the project is voluntary and courses/raters may withdraw prior to the courses being analysed without consequence.

Contact information

Further details of the project and de-briefing are available from the researcher. The researcher is Helen Walmsley-Smith h.walmsley@staffs.ac.uk and the supervisor is Lynn Machin L.B.Machin@staffs.ac.uk

Consent form

Please tick the relevant sections:

- ☐ I have been informed of and understand the purposes of the study
- ☐ I have been given an opportunity to ask questions
- ☐ I understand I can withdraw at any time prior to the courses being analysed
- ☐ Any information which might potentially identify me will not be used in published material
- ☐ I agree that module can be included in the study
- ☐ I agree to participate in an interview
- ☐ I agree to participate in the rater training and complete the analysis task

Name Signature Date

Appendix 7: eDAT final version

e-DAT (e-Design Assessment Tool)

The eDAT is a tool to help tutors represent and evaluate effective blended or distance learning designs. The eDAT combines a simple analysis of the learning activities with reflections on the teaching and learning perspective that underpins the design.

Step 1: Represent your learning design activities:
See the interaction and feedback types below for examples of the categories. Add your activities here, or use the online eDAT.

No	**Specific learning activities/ tasks** (you may need to split activities that include separate parts)	**Interaction with…** A Tutor B Peers C (Interactive) Content	**Feedback from…** 1 Tutor 2 Peers 3 Self 4 Computer (Automatic)	**Other** content or activities ✓
	[Insert additional rows as required]			
	Totals:			

Step 2: Calculate your learning design activity ratios:
Add the relevant percentages of learning activity types here and/or add your chart from the online eDAT

Total number of activities:		% Activities with interaction (interaction/total x100):		% Activities with feedback (feedback/total x100):		% Other activities (other/total x100):	

Add % retention data (number of students enrolled/ those completed final assessment/) for module or course

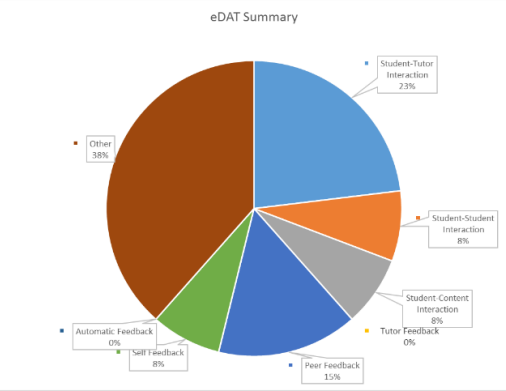
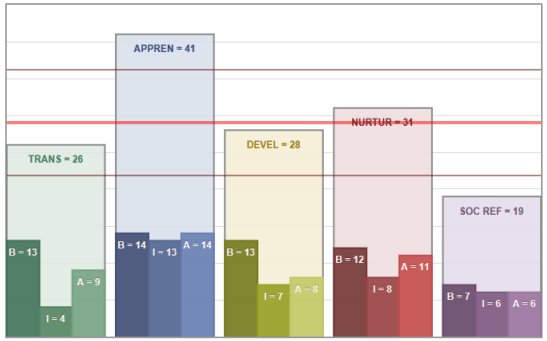


Chart from interactive eDAT (sample)

Step 3: Reflect on your teaching and learning perspective:

See how your perspectives have influenced your learning design by rating the importance of each of the following activities for effective teaching and learning from 1 (least effective) to 5 (most effective):	Least effective				Most effective
	1	2	3	4	5
Interaction with the tutor, e.g. online webinar/ lecture, 1-1 tutorial, coaching session, email, phone etc.					
Interaction with other students, e.g. forum discussion (may include tutor), group work, pair task, adding comments to wikis/blogs etc.					
Interaction with interactive content, e.g. computer simulation, multimedia interactions etc. NB, not reading text/video (mark as 'other')					
Feedback from the tutor, e.g. formative or summative feedback or grades etc.					
Feedback from peers, e.g. structured peer-assessment exercise, grading activity etc.					
Self-feedback e.g. using model answers, self-reflection, trial and error exercises etc.					
Computer feedback e.g. automatic feedback from computer simulation, computer-marked test etc.					
Other content and activities e.g. reading, watching recorded video, making notes, writing tasks, assessment preparation etc.					

Summarise your general approach to teaching and learning you have used for this module/course. The Teaching Perspectives Inventory can help by focussing on 5 perspectives: http://www.teachingperspectives.com/tpi/



Designer's Teaching Perspective (sample)

Step 4: Evaluate your learning design:

Does your design include a balance of content and activity? Does your design include sufficient interaction with tutor and peers? Does your design enable continuous feedback? How closely does your design match your perspectives in step 3? How does your design compare to retention data? Add your comments here:

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