“All work and no play”: Exploring gamified online Continuing Professional Development (CPD) as a driver for intrinsic motivation.

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Declaration

I declare that the work described in this Dissertation is,

except where otherwise stated, entirely my own work and has not been

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Abstract

Continuing Professional Development (CPD) involves maintaining, improving and broadening knowledge, skills and competencies (Friedman, 2012). It should assist learners in acquiring knowledge and skills and also focus on enhancing competence and performance by providing opportunities for learners to apply knowledge to real life situations (Gould, Papadopoulos, & Kelly, 2014). When delivered via asynchronous, linear, text based e-learning with limited interaction, CPD can overcome some problems relating to work conditions such as time, cost and geography, but for learners it becomes little more than a tick box exercise, resulting in a lack of engagement and motivation (Friedman, 2012; Gould et al., 2014).

Motivation is critical to learning because it is essential for initiating and maintaining effort (Schunk, 2008). Self determination theory (SDT) proposes that if the innate psychological needs of autonomy (control), competency (in relation to tasks) and relatedness (feeling affiliation) are satisfied, engagement and motivation will be initiated and sustained (Ryan & Deci, 2000b). The deprivation of these needs can, conversely, cause a lack of motivation. Self determination theory describes motivation in terms of extrinsic (relating to factors external to the individual) and intrinsic (drive by interest or enjoyment and existing within the individual) motivation. This differentiation allows for the identification of specific extrinsic factors that could be used to trigger intrinsic motivation.

A review of the literature on CPD, SDT and gamification reveals that there are significant possibilities for the positive use of extrinsic, gamification factors to trigger intrinsic motivation in those undertaking CPD e-learning. However, neither the literature on gamification or SDT proposes a framework for the design of activities.

Gamification is an approach that can facilitate learning and encourage motivation using game elements, mechanics and game based thinking (Kapp, 2014). Specific extrinsic gamification factors suited to meeting the needs of autonomy, competency and relatedness can be harnessed to explore the effect on learner motivation. Gamification can also assist in delivering CPD appropriately through allowing learners the freedom to learn and apply new skills and practice them in a safe environment, while encouraging exploration and providing realistic consequences for decisions (Kapp, 2012a; Weinstein, 2012).

An embedded, sequential, mixed methods QUAN/qual multiple case approach, involving three embedded cases was used to help ensure the accuracy of the case study when exploring the research question and sub question.

The study concludes that feelings of autonomy, competency and relatedness can be successfully realised in an entirely online environment for a majority of participants. However, for some, it can be difficult to balance the satisfaction of these needs. Some factors can very successfully support one need while negatively affecting another. Similarly, certain factors, such as rewards, can result in negative feelings of pressure and teamwork can cause frustration if some team members are not taking part. This study also concludes that gamified learning, if delivered using an appropriate structure, will have a positive impact on learner motivation and allows for opportunities for learners to apply their knowledge to real life situations.

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Abbreviations

CPD – Continuing Professional Development

IMI – Intrinsic Motivation Inventory

SDT – Self determination theory

VLE – Virtual Learning Environment

Chapter 1: Introduction

1.1 Background & Context

Continuing Professional Development (CPD) should consist of relevant learning activities that assist learners in acquiring knowledge and skills while enhancing competence and performance (Gould et al., 2014). If CPD is not delivered effectively, it becomes little more than a tick box exercise, which can result in a lack of interest, engagement and motivation (Friedman, 2012; Gould et al., 2014).

The purpose of this case study was to explore the application of game based thinking and mechanics to CPD e-learning as a means of challenging and engaging learners in a fun, safe, community environment with the aim of exploring how this will impact on learner motivation. The study also aimed to explore how gamified learning can be used to support feelings of autonomy, competency and relatedness in learners.

CPD is often a compulsory requirement for those who hold a professional qualification. It is commonly delivered via asynchronous, linear, text based e-learning with limited interaction. This delivery method overcomes some barriers such as compliance, time, cost and geography. However, the use of linear, non interactive text based e-learning does not address problems relating to the learner such as a lack of engagement and lack of motivation leading to a lack of motivating, satisfying, deep, long lasting learning.

If designed correctly, e-learning can meet business and learner needs, allowing for the application of professional skills in difficult and challenging situations, aiding the professional 9in applying technical competence to real life situations ("Consultation Paper On A Draft Report on Good Supervisory Practices regarding knowledge and ability requirements for distributors of insurance products," 2013).

Self determination theory, is concerned with supporting people's innate psychological needs that are the basis for self motivation and proposes three needs (autonomy, competency and relatedness) that, if satisfied, will foster the highest quality forms of motivation and engagement (Ryan & Deci, 2000b). Using learner needs as a basis for designing activities allows for the identification of specific extrinsic factors that can be used to trigger intrinsic motivation (Gagné & Deci, 2005).

Research has been conducted into the usefulness of gamification as a method for engaging and interesting learners. However, of the literature reviewed, none proposed the use of gamified learning as a potential solution to problems associated with CPD. While the

literature on gamification does not specifically suggest the use of gamification to improve online CPD, it does acknowledge the suitability of gamified learning for professionals, particularly in cases where the subject matter is not engaging or learner resistance is high (Leaman, 2014). This suggests that, while research may not have been conducted in this area, gamification could be a suitable method for enhancing the delivery of online CPD.

There is also some research into the use of gamification as an effective learning tool and some studies make the link between motivation and gamification. However, there is very little literature that discusses a coherent structure for developing gamified activities. This lack of structure could lead to gamification becoming little more than the facile adding of game elements, which will not necessarily lead to positive outcomes and would make it very difficult to effectively measure outcomes.

This research proposes a structure for gamifying learning using self determination theory as a structure for identifying suitable extrinsic factors to meet the learner needs of autonomy, competency and relatedness.

1.2 Research Questions

The primary research question informing and framing this research was to investigate:

How will gamified learning impact on learner motivation in an online CPD environment?

The study also had an underlying sub question:

How can gamified learning support learner autonomy, competency and relatedness in an entirely online environment?

1.3 Methodology Overview

For the purposes of this study, an embedded, sequential, mixed methods QUAN/qual multiple case approach, involving three embedded cases was used to explore the research question and sub question. Quantitative data was collected and analysed first. This informed the qualitative data approach.

Quantitative data was gathered through the use of two questionnaires and through the use of reporting tools in the Virtual Learning Environment (VLE). Qualitative data was gathered through questionnaire comments, informal discussions and a focus group interview. Each source of evidence has related strengths and weaknesses and thereby develop converging lines of inquiry, which helped to ensure the accuracy of the case study (Yin, 2014).

1.4 Findings

Analysis of the data showed that the use of choice, experimentation and feedback helped to create a supporting structure that provided participants with flexibility, yet avoided criticism, thereby promoting feelings of autonomy. Questionnaires, online activity, free text comments and focus group discussions all demonstrated that most participants had feelings of autonomy and did not feel pressured, controlled or criticised.

Challenge, rewards and feedback were used to create optimal challenges through multidimensional activities and positive feedback with the aim of promoting feelings of masterfulness in behaviour. There was evidence that the need for feelings of competency was satisfied for some learners. However, there is a delicate and difficult balance to strike between competency and autonomy, which, together with the use of points being too controlling for some and the overall experience being too much akin to a casual game for others, resulted in this need not being satisfied for some participants.

For most participants, feelings of relatedness were realised through the creation of a relational base using points, leaderboards, teamwork, competition and playing alone together. Feelings of relatedness may have been damaged though for some who may have felt frustrated by the inactivity of some of their fellow team members.

The overall analysis shows that the use of gamified learning in an online CPD environment had a positive impact on learner motivation with some participants showing evidence of feelings of intrinsic motivation. While not all participants showed evidence of intrinsic motivation, as the needs of autonomy, competency and relatedness were not satisfied for all, gamification still had a positive impact overall and provided a learning experience that allowed for CPD to be delivered in an effective, relevant manner allowing for the application of technical competence to real life situations.

1.5 Roadmap to Chapters

Chapter two presents a literature review of related research, critically analysing the relevant literature. CPD is examined to understand how it should be delivered, why it is not currently delivered in this fashion and what the negatives of this are. Learner motivation is explored and self determination theory in particular is discussed. Gamification and its relevance to CPD completes this chapter. Gamification and self determination theory form the basis for the design of the learning experience, which is described in chapter three. Chapter four explains why a case study was chosen as the methodology, comment on the limitations of this approach. Procedures undertaken in conducting the research, types of data collected and the methods used for collecting data are also described in this chapter. Chapter five

discusses the processes used for quantitative and qualitative data analysis, interpretation and triangulation. Chapter five also discusses what the research revealed. Chapter six proposes conclusions from this study with answers to the research questions and how the findings advance the current thinking on the topic. Chapter six also acknowledges the limitations of the study and proposes future directions for research in this area.

Chapter 2: Literature Review

2.1 Introduction

This chapter begins by defining what the purpose of Continuing Professional Development (CPD) should be and examines the barriers presented in the literature such as time, cost, geography and lack of motivation. It acknowledges that the current model of online CPD used in the insurance industry does overcome some barriers such as time, cost and geography but that it does not focus on learner motivation, as the current model does not address the learner needs of competency, autonomy, and relatedness. If these needs are not met, there can be a negative effect on motivation, which can lead to a lack of interest and engagement and poor learning outcomes.

This chapter goes on to explore motivation and how self determination theory (SDT) can be used as a means to identify and frame suitable game mechanics to use within activities to help overcome problems relating to motivation that are evident in CPD, namely the absence of suitable methods for meeting learner needs. Finally, this chapter defines gamification and proposes the use of gamification as a potential method, within the framework of SDT, for triggering intrinsic motivation in learners, while still meeting basic needs in providing online learning that is accessible at any time and that can be delivered at a relatively low cost to a geographically diverse audience.

2.2 Continuing Professional Development (CPD)

CPD is concerned with the maintenance, improvement and broadening of knowledge, skills and competencies (Friedman, 2012). If conducted correctly, CPD should provide a range of relevant learning activities that not only assist learners in acquiring knowledge and skills but should also focus on enhancing competence and performance by providing opportunities for learners to apply their knowledge to practical situations (Gould et al., 2014). CPD should also support any specific changes in practice, thereby bridging the gap between formal education and professional practice (Filipe, Silva, Stulting, & Golnik, 2014; Majid, 2004). If CPD is not delivered in an effective manner, with relevance for learners it becomes little more than a tick box exercise, resulting in a lack of engagement and motivation in learners (Friedman, 2012; Gould et al., 2014).

CPD is often a compulsory requirement for those who hold a professional qualification. It is commonly delivered via asynchronous, linear, text based e-learning with limited interaction. Delivering CPD in this format does overcome some barriers to completion of CPD that are widely reported in the literature, namely lack of time, high cost, and lack of access to courses

due to diverse geographical spread (Dent, Weiland, & Paltridge, 2008; Katsikitis et al., 2013; Mizuno-Lewis et al., 2014; Ross, Barr, & Stevens, 2013; Schostak et al., 2010).

Problems relating to work conditions such as compliance, time, cost and geography are the main considerations being addressed, while problems relating to the learner such as a lack of engagement and lack of motivation are problems not addressed through the use of e-learning that is asynchronous, linear and text based.

This focus on addressing issues of compliance, time, cost and geography rather than a focus on providing relevant, engaging learning that facilitates competency, autonomy and relatedness leads to a lack of motivating, satisfying, deep, long lasting learning. This in turn leads to online CPD becoming a tick box exercise, as learners see little relevance and value in exercises where there is little interaction and a lack of opportunity for learning how to apply knowledge to practical situations (Friedman, 2012; Gould et al., 2014).

In order to meet learner needs, CPD should focus not just on knowledge acquisition but also on the ability to apply professional skills in difficult and challenging situations, aiding the professional in applying technical competence to real life situations ("Consultation Paper On A Draft Report on Good Supervisory Practices regarding knowledge and ability requirements for distributors of insurance products," 2013). Professionals do need to keep their technical knowledge up to date, but CPD should above all allow for the application of that technical knowledge in the workplace. Professional practice often involves a variety of interactions with both members of the public and other professionals and therefore social and community elements should also be considered in the design of CPD activities.

Focusing on compliance, time, cost and geography alone can lead to problems with the design, delivery and outcomes of CPD e-learning as there is a lack of focus on relevant, motivating, engaging, satisfying learning. This results in a lack of motivation among learners. This is not to say that a focus on external factors is entirely wrong. As shall be discussed, external factors can be used effectively to trigger motivation if activities are designed appropriately.

A later section will describe and analyse the principle of gamification as a suitable method for enhancing CPD delivery that will harness specific design factors to trigger particular outcomes, namely an increased sense of motivation in learners through the satisfaction of the needs of autonomy, competency and relatedness. The focus on meeting these needs will aid in addressing the problems of motivating learners undertaking CPD.

2.3 Motivation

Motivation is a complex psychological attribute, often categorised as either extrinsic (factors external to the individual) or intrinsic (innate enjoyment in a task) (Beffa-Negrini, Cohen, & Miller, 2002). Motivation is critical to learning because it is essential for initiating and maintaining effort (Schunk, 2008). The next section explores self determination theory, which can be used to explain both extrinsic and intrinsic motivation and how they should not necessarily be considered opposite ends of a spectrum; they can in fact complement each other with extrinsic factors acting as triggers to support the development of intrinsic motivation when the needs of autonomy, competency and relatedness are satisfied.

2.3.1 Self determination theory

Self determination theory, initially proposed by Ryan and Deci (1985), is concerned with the supporting of people's innate psychological needs that are the basis for self motivation and proposes three needs (autonomy, competency and relatedness) that, if satisfied, will foster the highest quality forms of motivation and engagement (Ryan & Deci, 2000b). Self determination theory does not describe motivation as a singular construct but instead describes motivation in terms of extrinsic and intrinsic motivation. In the following sections, extrinsic and intrinsic motivations will be discussed and the needs of autonomy, competency and relatedness will be analysed.

2.3.2 Extrinsic Motivation

Extrinsic motivation relates to factors or reinforcement external to the individual (Gom, 2009). This dimension of motivation is often associated in the literature solely with reward. However, extrinsic motivation can occur whenever the cause of motivation exists externally to the individual (Cheng & Yeh, 2009). Factors such as compliance requirements, time pressures and cost can, for example, be referred to as extrinsic factors. The current focus on addressing these factors alone could lead to a negative effect on intrinsic motivation because some forms of extrinsic motivation can cause resentment or disinterest (Ryan & Deci, 2000a).

Self determination theory recognises that extrinsic factors are not necessarily negative, they can be both active and volitional (Ryan & Deci, 2000a). Autonomous motivation can support intrinsic motivation while controlled motivation can detract from these (Gagné & Deci, 2005). In effect, some types of extrinsic motivation can be said to represent active, volitional states where the value of a task is accepted, which in turn can lead to intrinsic motivation (Ryan & Deci, 2000a, 2000b).

2.3.3 Intrinsic Motivation

Intrinsic motivation is driven by interest or enjoyment in a task and exists within the individual, reflecting the innate human tendency to learn (Ryan & Deci, 2000a). It focuses on enjoyment, interest, perceived competence, effort, value and perceived choice during the process of pursuing or completing goals (Touré-Tillery & Fishbach, 2014). Intrinsically motivated learners should express greater satisfaction with learning as they should enjoy or find interest in the activity for its own sake, or in other words, learners will feel self determined (Ryan & Deci, 1985). Learners who feel intrinsically motivated are more likely to engage and persist in tasks, to think meaningfully about tasks and to achieve more when conditions confirm their self determination, thereby promoting successful learning, increased knowledge retention, more active involvement in activities and more productive behaviour (Cheng & Yeh, 2009).

Intrinsic motivation cannot be observed or recorded directly, making measuring motivation difficult. While it cannot be measured directly, it can be measured in terms of subjective experience or in relative terms through comparing previous levels of motivation to current levels (Touré-Tillery & Fishbach, 2014). It can also be measured through behavioural responses such as effort and persistence (Bekele, 2010; Eisenberger & Armeli, 1997; Muntean, 2011). Another method for measuring intrinsic motivation is through self reports relating to the activity itself using key adjectives (Iacovides, 2011; Przybylski, Rigby, & Ryan, 2006; Ryan & Deci, 2000a; Song, Kim, Tenzek, & Lee, 2013).

2.3.4 Self determination theory as framework for meeting learner needs

Self determination theory proposes that humans have three universal needs for optimal growth – autonomy (control), competency (in relation to tasks and activities) and relatedness (feeling included or affiliated with others) (Ryan & Deci, 2004). The deprivation of these needs can cause fragmentation, alienation and a lack of motivation (Chen & Jang, 2010). Conversely, the satisfaction of these needs can foster intrinsic motivation and lead to higher quality engagement and learning (Eseryel, Law, Ifenthaler, Xun Ge, & Miller, 2014). Each of these needs will now be discussed in order to fully understand how best to ensure these needs can be met.

2.3.5 Autonomy

Autonomy involves feelings of choice, independence and internal assent about one's behaviour, as opposed to feeling criticised, pressured or controlled (Sheldon & Filak, 2008). Without a supporting structure that provides choice, encourages experimentation, provides

feedback, gives answers less often, praises mastery and avoids criticism, some learners may feel that they lack autonomy (Ryan & Deci, 2004). Therefore, activities that provide variety in tasks and goals, opportunities for experimentation, informational feedback and non-controlling instructions should all enhance autonomy, which in turn should have a positive influence on intrinsic motivation (Przybylski et al., 2006).

Activities should provide a structure that allows choice, such as a choice of levels. Variety in tasks should also foster a sense of choice and flexibility, encouraging feelings of autonomy. Allowing freedom to fail should also be optimal in fostering autonomy as, rather than providing answers, it encourages experimentation and exploration of content and provides informational feedback in the form of tangible consequences.

2.3.6 Competency

Competency can be absent if tasks are not challenging, multidimensional and relevant (Beffa-Negrini et al., 2002). Activities that provide intuitive, yet challenging opportunities to acquire new skills or abilities will enhance feelings of competency and improve intrinsic motivation, as will optimally challenging activities, rewards and positive feedback (Gagné & Deci, 2005; Przybylski et al., 2006; Przybylski, Rigby, & Ryan, 2010). Consequently, in order to promote feelings of competency, activities should be challenging, balancing challenge with learner ability and should also provide rewards and positive performance feedback.

Factors such as levels with increasingly challenging material presented in a variety of mediums should therefore be effective in supporting feelings of competency. Other factors such as points, leaderboards and positive feedback should also support competency.

When activities are effectively designed, competency should promote feelings of efficiency and effectiveness or even masterfulness in one's behaviour (Sheldon & Filak, 2008). However, feelings of competency alone will not enhance intrinsic motivation. Feelings of competency must be accompanied by a sense of autonomy and relatedness to effectively motivate learners (Ryan & Deci, 2000b). Self determination theory requires that all three basic needs should be catered for to promote intrinsic motivation. Catering for one need alone may not result in enhanced motivation.

2.3.7 Relatedness

Social connectedness and the social environment in learning are important in fostering motivation (Lawlor, Marshall, & Tangney, 2014). SDT theorises that social factors can facilitate intrinsic motivation (Ryan & Deci, 2000a). Relatedness involves feelings of meaningful connection with others (Sheldon & Filak, 2008). Learners could feel deprived of

relatedness if some social element to learning is absent (Lehman, 2010). Relatedness can however occur for a learner in isolation, with a secure relational base being sufficient for enhancing intrinsic motivation (Ryan & Deci, 2000b).

One method for creating a relational base could be through dividing learners into teams and using points with team and individual leaderboards to add an element of competition, fostering a sense of relatedness through a combination of reward and accountability, underpinned by teamwork and competition.

Some of the literature reports that reward can undermine motivation in the long term as it can be seen as a means for controlling learners (Eisenberger & Armeli, 1997; Filsecker & Hickey, 2014; Kohn, 1999). However, it has also been acknowledged that when rewards are based on high quality performance in a supportive, rather than pressuring context, reward and incentives such as personal and team leaderboards can enhance intrinsic motivation (Eisenberger, Rhoades, & Cameron, 1999; Leaman, 2014; Ryan & Deci, 2000b).

Paradoxically, it could also be possible to allow learners to feel a sense of relatedness in the absence of direct contact with other learners. Video games provide a unique perspective on social interactions through the ability for players to "play alone together" (McGonigal, 2012; Morrill, Snow, & White, 2005). McGonigal (2012) explains this phenomenon by describing a study that showed that a majority of gamers in an online environment enjoyed sharing the virtual space together but preferred to spend most of their time pursuing individual goals rather than interacting with other players. A sense of social connectedness and a relational base was successfully created in an environment where participants were free to pursue individual goals in a shared virtual space but without any direct interaction with others (McGonigal, 2012).

2.3.8 Why Self Determination Theory?

Other theories in the literature may have provided a suitable choice for framing activities. Goal setting theory, for example, may have been a suitable choice because it discusses setting specific goals with high valence, an understanding of the behaviours that will lead to those goals and a feeling of competency to achieve those behaviours (Latham & Locke, 1979; Locke & Latham, 2009). However, as Gangné and Deci (2005) point out, goal setting theory does not differentiate kinds of motivation, which would not allow for the identification of specific extrinsic factors that could be used to trigger intrinsic motivation.

A review of the literature on CPD, SDT and gamification revealed that there were significant possibilities for the positive use of extrinsic, gamification factors to trigger intrinsic motivation in those undertaking CPD e-learning. However, neither the literature on gamification or SDT

proposes a framework for the design of activities. The next section will define gamification and explain why it is suitable for CPD activities.

2.4 Gamification

There are a variety of definitions for gamification in the literature. Some are reviewed here to give context and elements of each have been used to propose an alternative, more complete definition of the term.

Kapp has described gamificaction as the application of game thinking to encourage learning using appropriate elements of games (Kapp, 2012b). He also describes it as an approach that facilitates learning and encourages motivation using game elements, mechanics and game based thinking (Kapp, 2014) and using game mechanics, aesthetics and thinking to engage, motivate and promote learning (Kapp, 2012c).

Others such as McGonigal (2012), Weinstein (2012), Muntean (2011), Leaman (2014), Jagoda (2013), Kennnedy (2014) and Dominguez (2013) agree that gamification is a means of motivating learners to engage in desired behaviours or accomplish goals in a fun, safe environment.

A more complete definition of gamification could therefore be that: “Gamification is the application of game based thinking and mechanics to learning as a means of challenging, engaging and motivating learners to accomplish goals in a fun, safe, community environment.”

This definition encompasses elements of the design of learning activities – that is the application of game based thinking and mechanics to learning. Game mechanics broadly refers to the procedures and rules of a game (Bissell, 2010). It encompasses the desired outcomes – for learners to feel engaged and motivated and it addresses the need for learners to have a goal to strive for in an environment which is fun and where there is freedom to fail and a community of learners to support each other.

Gamification and games or serious games are not the same things. Game based learning and serious games use an actual game to teach knowledge and skills while gamification refers to the use of game mechanics or game based thinking within a more traditional learning context.

This section has provided some background and context to what gamification is and is not and has outlined some potential benefits of using gamification in learning. The next section will explain why gamification is a suitable method to use in the context of online CPD e-learning.

2.4.1 Gamification and CPD – an Unlikely Combination?

Games and professional development may not seem to be an obvious combination. Games and work appear to be opposite ends of a spectrum, which would make them mutually exclusive. Work is about rules, boundaries and necessities; games are about enjoyment, freedom and escape. However, like work, games adhere to strict rules, boundaries and ideas (Chatfield, 2011). A focus on gamification can increase engagement, relevance, and immersion and assists with the transfer of learning to the actual situation, which is critical for professionals (Kapp, 2012b). The next section will briefly explain how gamification can be used effectively to help ensure that these objectives are met.

2.4.2 Using Gamification Effectively

Linear e-learning with limited interaction does not provide an engaging and goal-oriented experience. Gamification allows learners the freedom to learn and apply new skills and practice them in a safe environment (Weinstein, 2012).

If used effectively, Gamification can enhance linear learning by helping to improve the retention of learning through techniques such as repetition, association and elaboration and can also be used to shift attitudes, values, and beliefs (Leaman, 2014).

However, gamification should not be about the superficial use of mechanics such as points, badges and leaderboards as an afterthought. Much of the literature on gamification proposes the use of these and other mechanics and they are certainly part of the picture but caution should be used to ensure that game mechanics are applied in a logical, effective way.

When applied correctly, gamification can meet the objectives of CPD in assisting learners to acquire knowledge and skills, while enhancing competence by providing opportunities for professionals to practice their skills in challenging situations. Most importantly, gamification can provide a motivating and engaging experience for learners if an effective, coherent structure is used.

2.5 Summary

This chapter has reviewed the current problems faced by learners engaged in CPD e-learning, with a lack of intrinsic motivation being of primary importance. The concept of motivation was described and self determination theory was proposed as a method for identifying the types of activities that could be used to help frame this study. Gamification was defined and the suitability of gamification as a means to motivate learners within a CPD context was reviewed. The chapter concluded by acknowledging that the literature does not currently provide an agreed framework for the development of gamified learning activities.

The next chapter will propose a framework that aims to meet the learner needs of autonomy, competency and relatedness. Specific game elements that support autonomy, competency and relatedness will be discussed and each will be mapped against these needs to provide a clear design for activities with clearly intended outcomes.

Chapter 3: Design of the Learning Experience

3.1 Introduction

The previous chapter reviewed the current problems faced by learners engaged in CPD e-learning, with a lack of intrinsic motivation being a key factor. Self determination theory was reviewed and used to identify how activities could be developed to meet the learner needs of autonomy, competency and relatedness. The literature review concluded that without the use of an effective, well thought out design, the use of gamification would be little more than the superficial addition of game elements to learning, which may not be effective in promoting motivation and would also make measuring motivation difficult, as there would be no structured attempt to satisfy the needs of autonomy, competency and relatedness.

This chapter proposes a framework based on the principles of autonomy, competency and relatedness. Specific game elements that support these principles are discussed and mapped against autonomy, competency or relatedness to provide a clear design for activities with clearly intended outcomes.

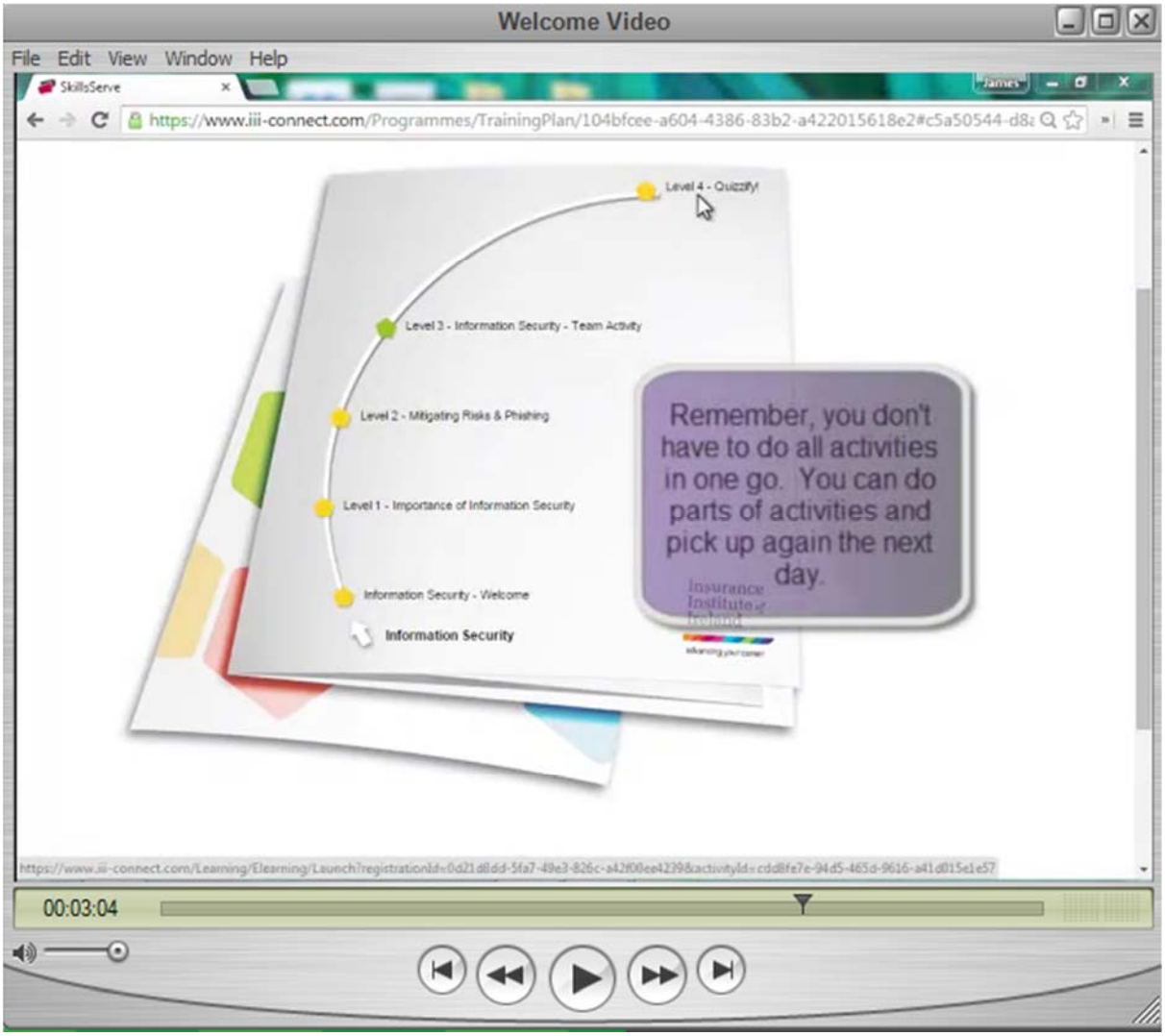
This next section of this chapter will describe the learning experience and how it was introduced to participants. The chapter will then propose a model for the use of extrinsic game elements arising from the literature review within learning activities to promote feelings of autonomy, competency and relatedness with the aim of fostering intrinsic motivation.

3.2 The Learning Experience

3.2.1 Questionnaire, Initial Presentation, Introduction

Before undertaking learning activities, all participants were asked to complete a questionnaire to measure their current attitude to CPD e-learning – see **Appendix G**. After questionnaire responses had been gathered, participants attended a presentation, which provided an explanation on how to access and use the Virtual Learning Environment (VLE) and learning activities. A video 'screencast' was created for those who could not attend and was shared with all participants through a Dropbox link on an email with login details for the VLE. This screencast recorded the researcher's screen with a voiceover and text callouts, demonstrating how to access and use the VLE and activities. The video was also placed within the VLE on the homepage for all participants so that they could refer back to it during the learning experience if required. **Figure 3.1** shows a screenshot from the screencast.

Figure 3.1 – Welcome Video Screencast



3.2.2 Login Details Introductory Info & Team Names Circulated

After the initial presentation, all participants were contacted by email and provided with login details for the VLE. Participants were divided into three teams and were advised of their team name and of the points they could earn for themselves and for their team for completion of activities. All were informed of points from the outset to ensure that the awarding of points was transparent and equitable. A breakdown of points awarded is shown in **Table 3.1**.

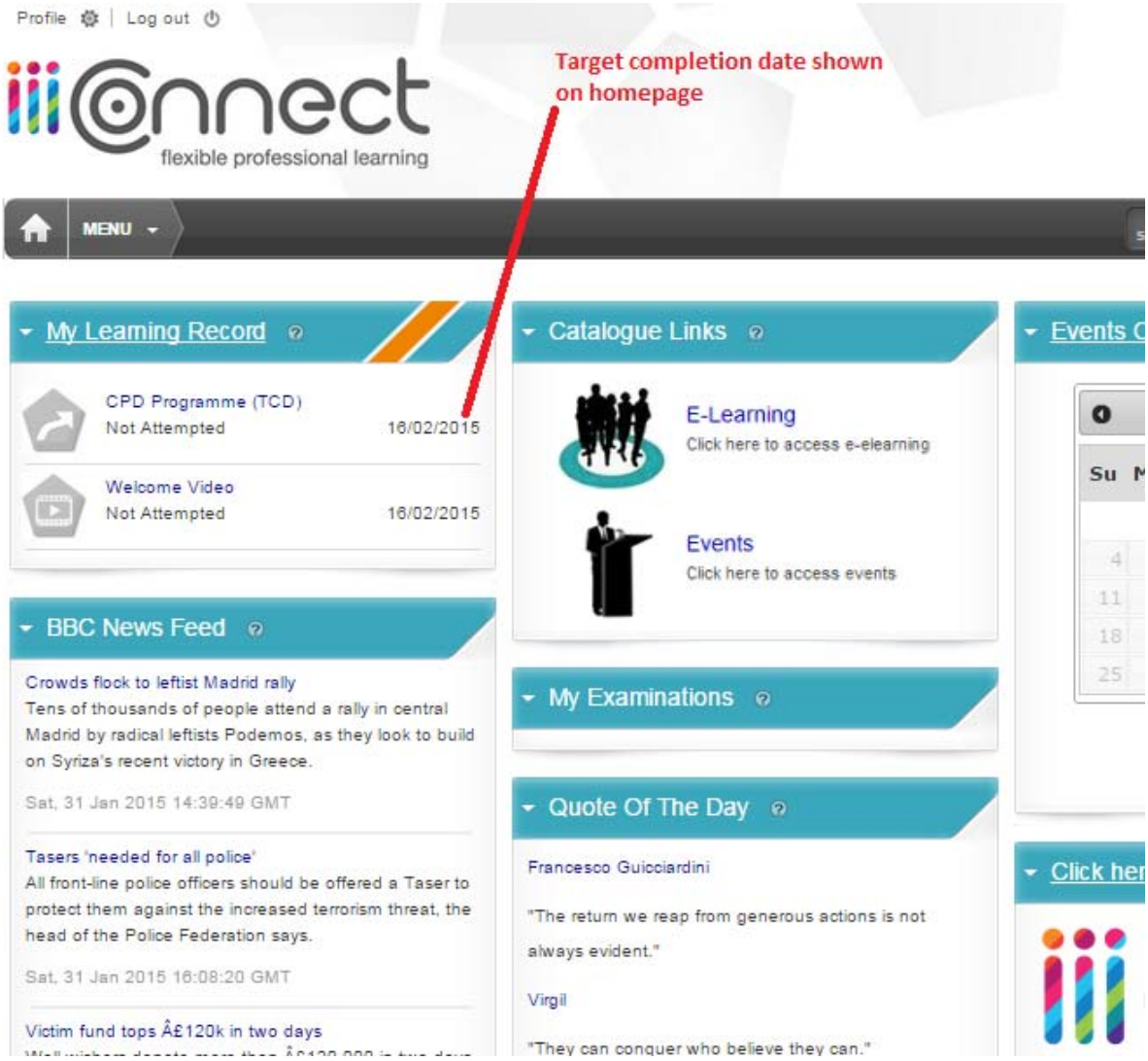
Table 3.1 – Points awarded for each activity

Module	Activity	Individual Points	Team Points
Insurance Concepts	Welcome	1	1
	Level 1	1	1
	Level 2	1	1
	Level 3	1	1
	Quiz	1	1
	Complete All Bonus	1	1
Information Security	Welcome	1	1
	Intro Video	1	1
	Level 1	1	2
	Level 2	2	2
	Level 3	3	5
	Quiz	3	3
	Complete All Bonus	1	1
Data Protection	Welcome	1	1
	Intro Video	1	1
	Level 1	1	2
	Level 2	2	2
	Level 3	3	5
	Level 4	3	3
	Quiz	3	3
	Complete All Bonus	1	1
Money Laundering	Welcome	1	1
	Intro Video	1	1
	Level 1	1	2
	Level 2	2	2
	Level 3	3	3
	Level 4	3	3
	Level 5	3	3
	Quiz	3	3
	Complete All Bonus	1	1

3.2.3 First Login

Upon logging in for the first time, participants were presented with a home page as shown in **Figure 3.2** below. Participants had the option to either view the welcome video if they had not already done so, or to proceed directly to the learning activities.

Figure 3.2 – Homepage with link to Welcome Video and Access to CPD Activities



Upon accessing the CPD Programme, participants were presented with a choice of four topics. Throughout the learning experience, participants could login to the system at any time to attempt activities. All activities "bookmarked" progress so that participants could complete part of a course and resume on their next login. **Table 3.2** provides an overview of all of the activities available.

Table 3.2 – Summary of all Learning Activities

Welcome	Video screencast demonstrating how to access & use system and activities
Insurance Concepts	
Welcome	Set out learning objectives, content of all levels and points available for each activity
Level 1	Interactive e-learning course explaining risk & how it relates to insurance. Includes interactive 'heads or tails' exercise & videos to explain chance and risk.
Level 2	Interactive e-learning course explains insurance concept of contribution & how to calculate. Interactive exercise demonstrates how to apply mathematical formula to a practical problem.
Level 3	Interactive e-learning describes the principle of proximate cause and uses scenario questions as practical examples.
Level 4	Where in the world quiz. Questions testing all preceding levels, presented in the form of a travel game.
Information Security	
Welcome	Set out learning objectives, content of all levels and points available for each activity. Shows a short "what's the worst that could happen?" video to demonstrate consequences of not following best practice.
Level 1	Interactive e-learning explains the importance of information security. Clean desk policy explained through interactive game-like exercise.
Level 2	E-learning course on mitigating risks & phishing. Uses real life examples of emails and users must identify phishing mails.
Level 3	Team activity – requires users to view video and add comments / answer questions relating to content.
Level 4	Interactive quiz presented in game show format with increasingly difficult questions and higher points available for more difficult questions.
Data Protection	
Welcome	Set out learning objectives, content of all levels and points available for each activity. Shows a short "what's the worst that could happen?" video to demonstrate consequences of not following best practice.
Level 1	Two interactive e-learning courses examining data protection laws and terms.
Level 2	Interactive e-learning dealing with data protection principles and data processing.
Level 3	Team activity – requires users to view video and add comments / answer questions relating to content.
Level 4	Individual rights and practical guidance provided through interactive e-learning with scenarios and quizzes used for context.

Level 5	Beat the clock quiz. MCQ quiz on all preceding content. Each question has a countdown timer requiring user to answer question before clock reaches zero.
Anti Money Laundering	
Welcome	Set out learning objectives, content of all levels and points available for each activity. Shows a short "what's the worst that could happen?" video to demonstrate consequences of not following best practice.
Level 1	Explains what money laundering is and uses video from tv show Breaking Bad to explain the basic principles of placement, layering and integration.
Level 2	Interactive e-learning dealing with the scope of legislation relating to money laundering and fraud.
Level 3	E-learning course explaining customer due diligence. Uses practical exercises and quizzes to help explain concepts in context
Level 4	Interactive e-learning course on record keeping and reporting using short scenarios and interactive quizzes to help explain concepts
Level 5	Deals with insurance fraud. Topic introduced through video talking about consumer sentiment & how perception of fraud can differ. Followed by interactive e-learning with scenarios and quizzes to explain concepts.
Level 6	World tour quiz. Interactive MCQ quiz based on all preceding content. Presented in the form of a global journey with examples from news of money laundering and fraud from around the world before each quiz section.

3.2.4 Presentation of Activities

All activities were presented using a graphical interface in the form of levels as shown in **Figure 3.3.** Participants were not forced to complete each level in turn and access to later levels was not dependent on the completion of earlier ones. Participants could choose to undertake activities multiple times to either improve their score, to view other areas of an activity or to refresh their memory.

Figure 3.3 – Graphical "Route Map" Interface

3.2.5 Leaderboards

Individual and team leaderboards were made available on all participant accounts and updated on a daily basis using reports generated from the VLE. The leaderboards showed the number of points held by each individual and each team. A sample leaderboard is shown in **Figure 3.4**. Names have been omitted to preserve the anonymity of participants.

Figure 3.4 – Sample Individual Leaderboard

Leaderboard 18/02/15

Position	Player Name	Total Points	Team Name
1	-	32	Risky Business
2	-	30	Queens of Torts
3	-	29	Risky Business
4	-	29	Dukes of Hazards
5	-	22	Dukes of Hazards
6	-	18	Dukes of Hazards
7	-	16	Dukes of Hazards
8	-	7	Risky Business
9	-	5	Dukes of Hazards
10	-	2	Queens of Torts

3.2.6 Email contact during learning experience

The learning experience was available to participants for a period of two and a half weeks. At the end of weeks 1 and 2, leaderboards were emailed to all participants with a message encouraging further participation and reminding them about any activities they have not yet attempted. A final email was sent during the last week as the end of the experience approached to further encourage participation.

3.2.7 Concluding questionnaire

At the end of the learning experience, participants were asked to complete an anonymous questionnaire again but this time relating to the activities they just completed. Finally, some participants were asked to participate in a focus group, while informal conversations were held with others.

This section has broadly described the learning experience. The next section will explain how autonomy, competency and relatedness were supported through extrinsic factors.

3.3 Structuring, Designing and Delivering Activities

The literature review informed the structure and design of learning activities. The literature on gamification and motivation were analysed to find crossover between methods for supporting autonomy, competency and relatedness and activities suitable for gamifying learning experiences. **Table 3.3** shows the design principles chosen to help develop and sustain feelings of autonomy, competency and relatedness among participants. These were implemented through the use of specific extrinsic factors shown in the design table -**Table 3.4**.

Table 3.3 – Design Principles Table

		Design Principles Used to Satisfy Needs					
		Challenge	**Choice**	**Experimentation**	**Reward**	**Feedback**	**Accountability**
Needs	**Autonomy**		X	X		X	
	Competency	X			X	X	
	Relatedness				X		X

A design table as shown in **Table 3.4** was created to help identify suitable methods for implementing the design principles. All of the extrinsic factors shown under the implementation heading were noted during the literature review as suitable methods both for supporting autonomy, competency and relatedness and were also noted as suitable mechanics for gamifying learning experiences.

Table 3.4 Design Table

Lit. Review Theme	Design Principle	Implementation	Anticipated Outcome
Autonomy	Use of choice, experimentation and feedback to create a supporting structure that provides flexibility and avoids criticism.	Levels Variety Freedom to fail Feedback messaging	Should promote feelings of choice, independence and internal assent. Should not feel pressured or controlled or criticised.
Competency	Use of challenge, rewards and feedback to create optimal challenges through multidimensional activities with positive feedback.	Levels Points, Leaderboards Emotional feedback Visual feedback	Should promote feelings of effectiveness or even masterfulness in behaviour.
Relatedness	Use of reward and accountability to create social connectedness, a social environment and a relational base.	Points Leaderboards Teamwork Competition Playing alone together	Learners should feel a sense of social connectedness and belonging

The next sections will describe in more detail how extrinsic game mechanics and principles were employed and will explain how each of them was intended to support feelings of autonomy, competency and relatedness. The satisfaction of autonomy, competency and relatedness involves a delicate balance. Some design principles can support more than one need and others can complement each other by balancing the satisfaction of learner needs.

3.4 Autonomy

The principles of choice, experimentation and feedback were used to support feelings of autonomy, with the intention of promoting feelings of choice and independence as opposed to pressure and control. Choice was implemented through the use of levels and variety, experimentation through freedom to fail and feedback through the use of feedback in messaging.

3.4.1 Choice

The use of levels is commonly reported in the literature as a means of supporting challenge. There is however another facet to levels that is ignored in the literature on gamification, which is a feature commonly found in video games that could be exploited to support feelings of autonomy – the ability to "cheat" by "skipping" levels. This ensures that the clear structure provided by levels remains in place but still allows learners to choose their own path through the learning. In this way, a clear structure and pathway can be provided without negatively affecting feelings of autonomy.

Learners should be allowed the choice and opportunity to learn at the right level for them, thereby cementing feelings of choice and independence while providing optimally challenging activities. In this way, the use of choice can support autonomy, while complementing competency by providing an open yet challenging environment that caters for learners with differing levels of ability (Egenfeldt-Nielsen, 2007).

Choice was supported not just in the structure of activities but within activities themselves through the use of variety. In some cases, branching was employed to allow learners a choice of paths through an activity. In other cases, participants had the option of viewing optional additional information as shown in **Figure 3.5**, where participants could choose to click on newspaper articles to see some real life examples of the topic.

Figure 3.5 – Example of Optional Additional Information

Content was presented using a variety of methods such as the use of video, quizzes, practical examples, scenarios, reading and interactions. To help ensure variety, some quizzes employed the use of a bank of questions so that participants would be presented with new questions if retaking the quiz. The aim was to support feelings of autonomy through the use of variety to promote feelings of choice and avoid participants feeling controlled. The use of variety served another purpose in that it encouraged participants to explore learning through trial and error, supporting the principle of experimentation, which is discussed in the next section.

3.4.2 Experimentation

CPD e-learning is often scored on a pass/fail basis, which does not encourage trial-and-error learning. Learners do not see tangible consequences of wrong answers other than being told that they are incorrect (Kapp, 2012a). Learners will, understandably, try to avoid failing rather than exploring through trial and error. Games, however, encourage players to fail and "see what happens". Games avoid frustration by including low penalties for failure and through promoting experimentation and repetition until mastery is achieved (Domínguez et al., 2013).

There is a delicate balance to be struck though. On the one hand, activities can be more engaging and enjoyable if they allow participants to succeed However, they also need to

pose meaningful challenges to support feelings of competence (Schmierbach, Chung, Wu, & Kim, 2014).

The key to engaging learners through experimentation is to support “freedom to fail”, which aims to encourage learners to take chances with decisions and be exposed to realistic consequences for making poor decisions (Kapp, 2012a). It is also aims to use failure feedback to demonstrate the learner’s agency in a positive way as it can reinforce a sense of control over outcomes (McGonigal, 2012). This feeling of a sense of control over outcomes should help to support feelings of autonomy.

Freedom to fail also supports learners in allowing them to take risks where real-world consequences are lowered, with a low cost for failure and high reward for success (Gee, 2007). This can be used to encourage persistence, risk taking and experimentation with content to test hypotheses (Gee, 2007). This transforms failure from a negative to new opportunities to progress and learn. This was especially relevant in relation to some topics, such as money laundering, where potential consequences for failure to apply proper procedures could, in a worst case scenario, result in a fine, or imprisonment, or both. These consequences were made clear from the start of topics through the use of a “what’s the worst that can happen?” video, which presented a scenario to illustrate the consequences of not applying the correct procedures. The aim of freedom to fail was to encourage exploration and experimentation so that participants could learn how to avoid these consequences in a safe environment.

During learning activities, participants were not punished for incorrect answers but were given supportive feedback encouraging them to try again to help encourage exploration by being supportive rather than critical. Feedback is discussed further in the next section.

3.4.3 Feedback Messaging

The structure and delivery methods of activities plays a key role in motivating learners and are consequently of critical importance (Bohonos, 2014). However, before learners undertake activities, they should be presented with some feedback in the form of information about those activities. This can provide an opportunity to support autonomy through messaging before learners begin each task. This concept of using messaging prior to activities to sustain motivation was adapted from Sheldon & Filak (2008) to ensure that messaging fit with the activities and environment.

Autonomy was supported through messaging around the welcome video and the introduction for each topic where participants were encouraged to ‘play around’ with the material and to undertake activities multiple times if they wished to do so in order to explore

new areas of content or to improve their score in quizzes. These were non controlling instructions, which focused on choice rather than rigid instruction.

3.5 Competency

The principles of challenge, reward and feedback were used to support feelings of competency with the intention of promoting feelings of effectiveness or even masterfulness. Challenge was implemented through the use of levels, reward was implemented through the use of points and leaderboards, feedback was implemented through the use of emotional and visual feedback.

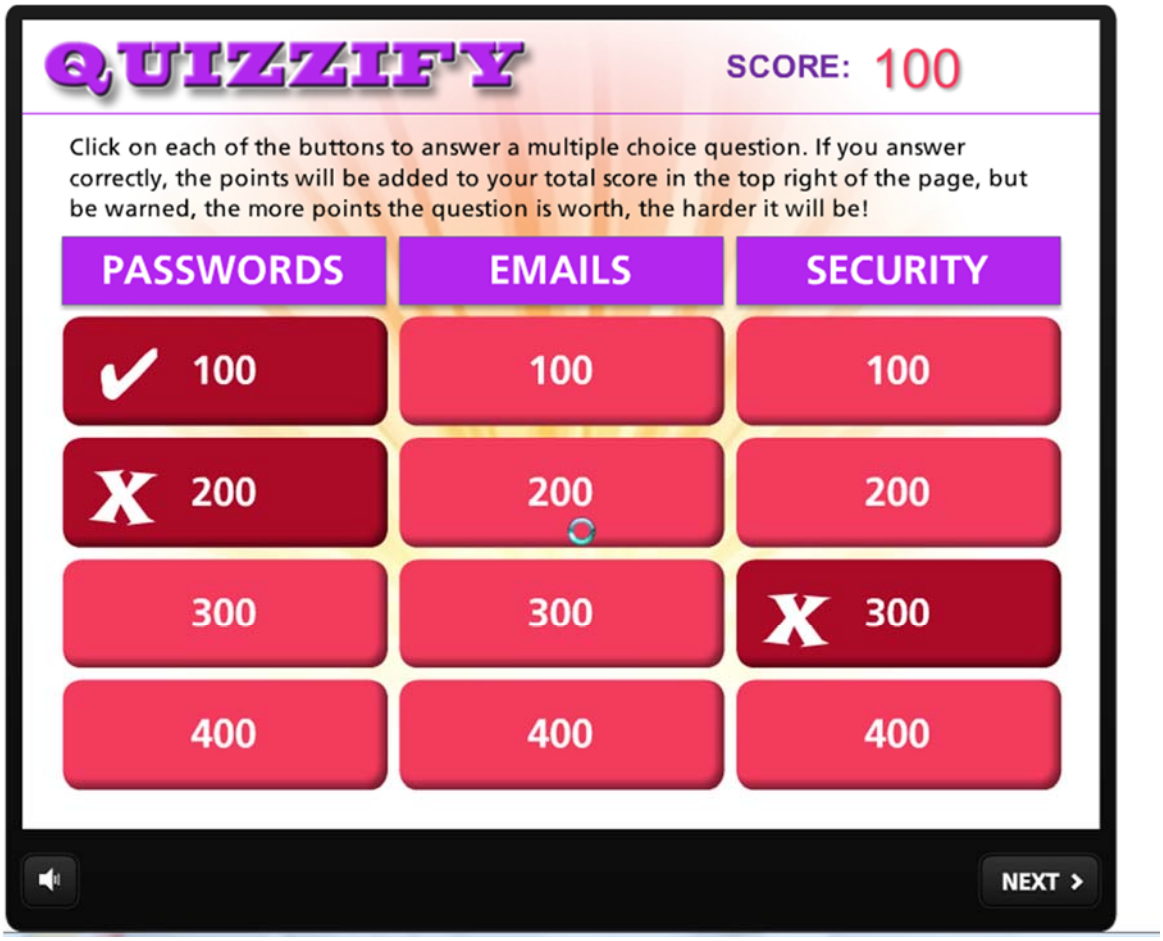
3.5.1 Challenge

Levels can help to ensure that activities are of an appropriate and increasing difficulty level, so that they are optimally challenging. Levels can also ensure that goals are clear, constructive and help to engender a sense of challenge (Egenfeldt-Nielsen, 2007).

Learning material increased in difficulty as learners progressed through levels to help stimulate a sense of challenge, which should support feelings of competency. At the start of each of the topics, a short video was presented to participants titled “What’s the worst that could happen?” The intention was to present realistic consequences as obstacles to be overcome through completion of the learning activities.

The same concept was employed in some of the quizzes used. In one example, shown in **Figure 3.6**, more points were available to participants for answering more difficult questions. The intention was to use levels to help to sustain feelings of competence throughout the learning experience rather than just in the presentation of material.

Figure 3.6 – Quiz with increasingly difficult questions



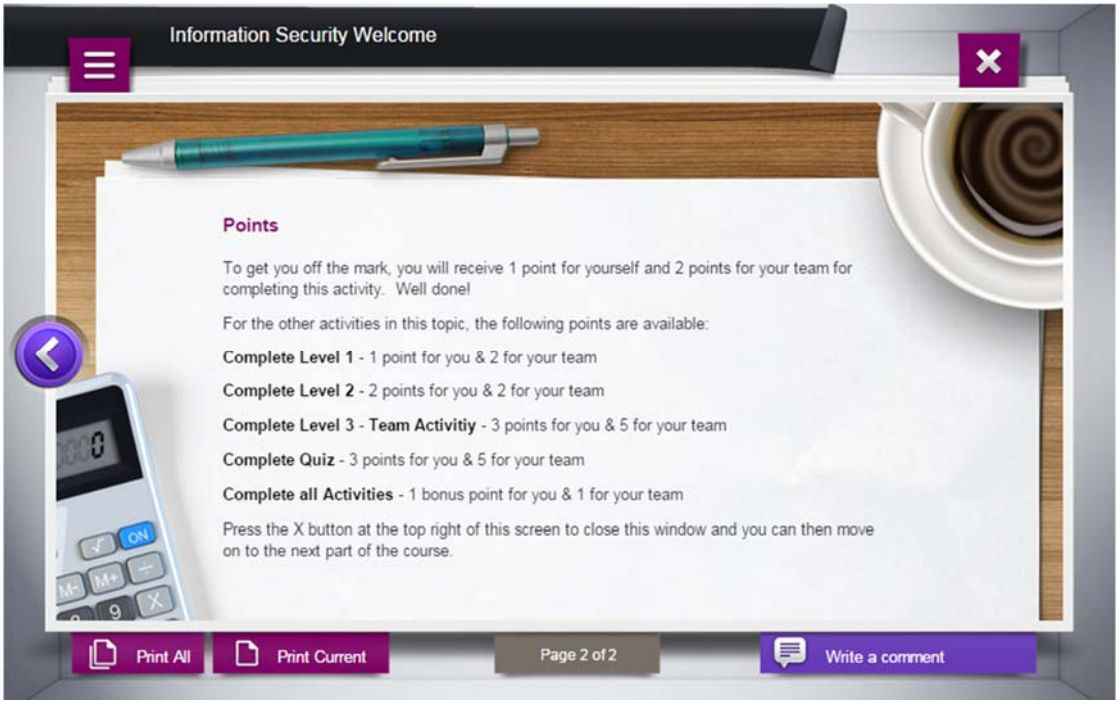
Having a rigid system of levels could constrain and limit choices, which could have a negative effect on learners' perceived autonomy (Eseryel et al., 2014). There is clearly a balance to be struck here between challenge and choice. This was addressed through allowing participants to choose to undertake levels in any order.

3.5.2 Rewards

The use of relevant, equitable rewards can help to support feelings of competency while using reward can be damaging to motivation if applied in an ad-hoc way (Gagné & Deci, 2005). Rewards motivate learners for implementing certain behaviours (Hsu, Chang, & Lee, 2013). Two forms of reward were used to sustain feelings of competency- points and leaderboards. More than one form of reward was used because it is important to include as many relevant incentives as possible to better support relatedness (Leaman, 2014).

Participants were informed from the very outset that points would be awarded and how many points would be awarded for each activity. They were informed again in the introduction for each topic as shown in the example in **Figure 3.7**. This transparency aimed to ensure equity and to reinforce that points were not being awarded on an ad-hoc basis.

Figure 3.7 – Example of Information on Points Shown in Welcome Message

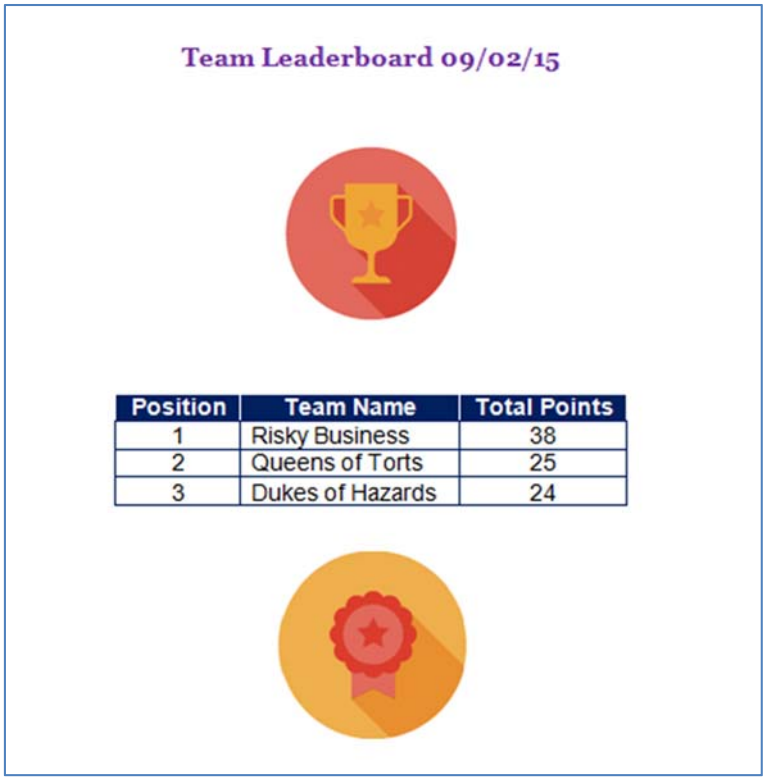


Individual and team leaderboards such as those shown in **Figure 3.8** were uploaded to participant's accounts on a daily basis and were emailed to participants at the end of week 1 and week 2, during week 3 and at the end of the learning experience.

Figure 3.8 – Sample Individual & Team Leaderboards

Leaderboard 18/02/15

Position	Player Name	Total Points	Team Name
1	-	32	Risky Business
2	-	30	Queens of Torts
3	-	29	Risky Business
4	-	29	Dukes of Hazards
5	-	22	Dukes of Hazards
6	-	18	Dukes of Hazards
7	-	16	Dukes of Hazards
8	-	7	Risky Business
9	-	5	Dukes of Hazards
10	-	2	Queens of Torts



Reports from the VLE were used to monitor the performance of participants and to track their completion of tasks so that points could be awarded and leaderboards could be updated daily. The leaderboards themselves supported feelings of competency by praising the mastery of high achievers while encouraging those who were lower down the leaderboard to improve their performance.

This section has shown that, if used in an equitable, structured way, reward may help to encourage and sustain feelings of competency. The next section will examine the use of different types of feedback as a means of supporting competency.

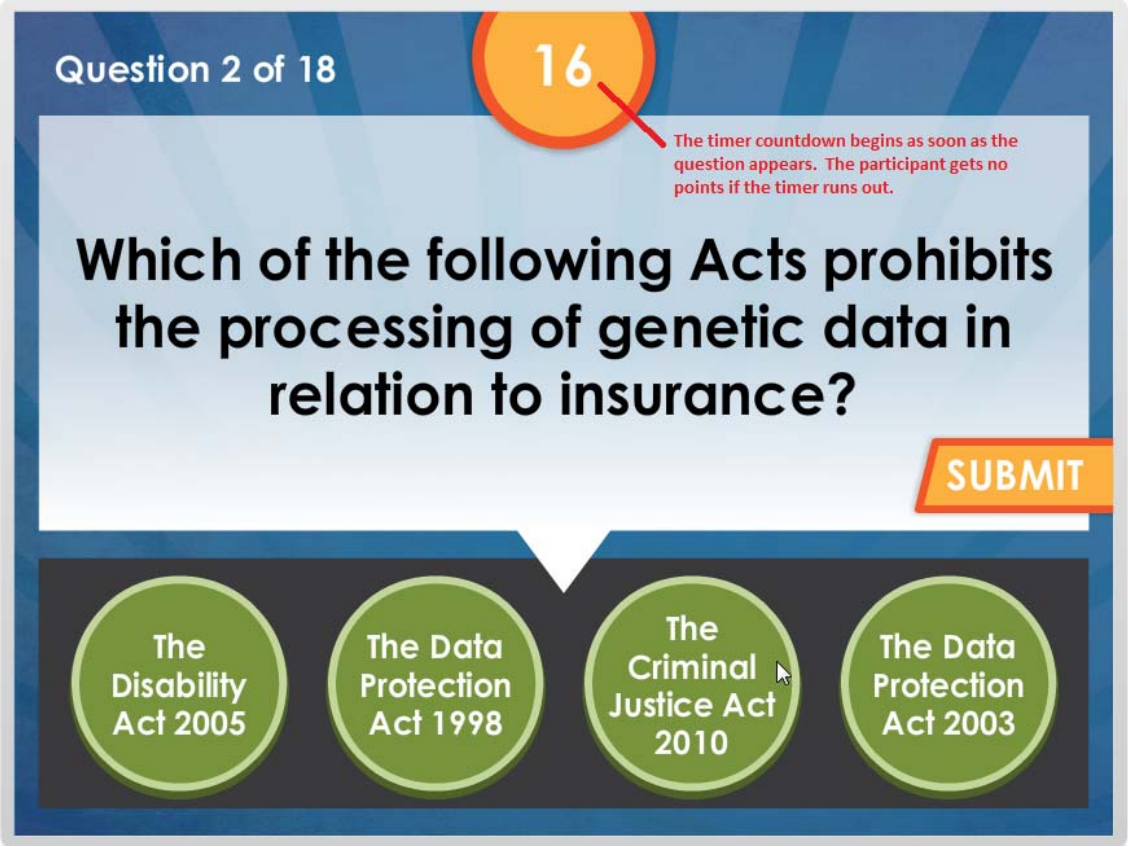
3.4.3 Visual & Emotional Feedback

If used effectively, feedback can foster feelings of competency (Sheldon & Filak, 2008). Feedback can be described as a form of intangible reward, similar to the tangible rewards of points and achievements, as it encourages learners to complete tasks (Domínguez et al., 2013).

Feedback does not just refer to a message given to a learner when they answer a question; it can be provided through less obvious means. For example, learners can be provided with a time limit to complete activities, raising emotional feedback and thereby encouraging greater participation (Hsu et al., 2013). A “due date” as shown earlier in **Figure 3.2** was added to the homepage of each user in the VLE to encourage participation. As the deadline approached, the date on the homepage changed in colour from black to red to create a

greater sense of urgency. A time limit was also used in one of the quizzes, as shown in **Figure 3.9.** In this case, the time limit was used to heighten emotions and to help encourage participation and completion of the activity. It was intended that this heightening of emotions should result in a sense of accomplishment and mastery when participants completed the activity, thereby supporting feelings of competency.

Figure 3.9 "Beat the Clock" Quiz with Timer



Games provide regular and relatively intense visual feedback when compared with traditional learning (Kapp, 2012a). The advantage of visual feedback is that specific, frequent and targeted feedback may provide more effective learning and can also help sustain feelings of competence (Kapp, 2012a).

In some instances in games, visual feedback is constantly available as the player is presented with progress meters, time remaining, lives and other real time cues. This mechanic was harnessed in the design of both the activity "routemap" that learners use to navigate through activities and within the activities themselves. A red, amber and green system in the "route map" provided instantly recognisable visual feedback to the learner as to whether a level is not started (red), is in progress (amber) or is completed (green) as shown earlier in **Figure 3.4**.

Visual feedback was also supplied through real time cues within activities such as progress meters and time remaining. Some examples of visual feedback are shown in **Figure 3.10**. This use of specific, regular, targeted visual feedback was intended to help sustain feelings of competence.

Figure 3.10 – Examples of Visual Feedback

3.6 Relatedness

The principles of reward and accountability were used to support feelings of relatedness to help participants feel a sense of social connectedness and belonging. Reward and accountability were closely linked because points and leaderboards were used to implement reward and also formed the basis for teamwork and competition, which were used to implement accountability. Reward and accountability were both delivered within an

environment of playing alone together. Reward and accountability are discussed together in the next section.

3.6.1 Reward and Accountability

Deci and Ryan (2000a) recognise that social and environmental factors can facilitate or undermine intrinsic motivation. They argue that self determination or autonomy must be present to maintain motivation. This would assume then that competition and teamwork could have a negative effect on intrinsic motivation because they could control behaviour rather than supporting self direction, requiring a careful balance to be maintained.

Competition and teamwork are closely linked with reward. Individual and team leaderboards can drive a sense of competition and social connectedness (Leaman, 2014). This in turn could lead to a stronger sense of relatedness. The use of leaderboards can also help to create a dependency among team members. Individual leaderboards showed which team each individual was in so that if a team members was not "pulling their weight", it would be clear that they were not only affecting themselves, but they were also potentially harming their teams' chances of coming out on top.

Some activities were team based activities. One activity type required teams to view a YouTube video embedded into the course using html coding see example in **Figure 3.11**.

Figure 3.11 – Team Activity Example

Participants had to use a comment button to identify principles discussed in the video. Points for these activities were weighted in favour of teams rather than individuals to encourage participants through the reward of points and the sense of accountability to the team for achieving higher points for their team.

The use of points, leaderboards and team activities created social connectedness without participants having direct contact with each other. This sense of social presence through playing alone together helped to overcome one of the limitations of the VLE. The VLE did not provide a means for participants to communicate with each other directly. Instead, the concept of playing alone together was harnessed by allowing participants to pursue goals and engage in the same activities as others in the same environment but without having to interact with each other directly (McGonigal, 2012). This sense of sharing the space with other learners was maintained through the use of individual and team leaderboards, which were updated on user accounts on a daily basis.

Playing alone and yet together also overcame a practical challenge associated with CPD. One of the reasons that e-learning is used as a means for delivering CPD is because learners do not have time to attend face to face learning and want access to learning on demand. Creating an online team based activity requiring participants to engage at a particular date and time would simply move this problem online. Therefore, it is important that learners can experience a sense of relatedness and yet learn on demand and on their own terms. This requires that relatedness should be supported in a novel, yet practical manner. One way of facilitating this is through using the principle of playing alone together to create a relational base.

3.7 Summary

This chapter has described the learning experience and has proposed a model for gamifying learning activities based on the satisfaction of the needs of autonomy, competency and relatedness. Extrinsic methods were used to implement design principles which aimed to satisfy these needs, with the overall intention to examine how gamified learning will impact on feelings of motivation among participants. The next chapter will describe the research methodology and data collection tools utilised during the study.

Chapter 4: Research Methodology

4.1 Introduction

The previous chapter described the design and implementation of the learning experience. This chapter will discuss the research method used in this study. The use of a mix of quantitative and qualitative methods will be justified and the instruments used to collect data as a means for answering the primary and secondary research questions will be described.

4.2 Research Question:

The primary research question informing and framing this research was to investigate:

How will gamified learning impact on learner motivation in an online CPD environment?

The study also had an underlying sub question:

How can gamified learning support learner autonomy, competency and relatedness in an entirely online environment?

4.3 Case Study

The primary aim of this study was to provide an in depth understanding of how gamified learning would impact on participant's motivation. As the research questions require an in depth description of the phenomenon of motivation as experienced by participants, a case study was chosen as a suitable research method (Yin, 2014). Case studies allow for the in depth exploration of a phenomenon bounded by time and activity (Creswell, 2013b; Yin, 2014).

For the purposes of this study, an embedded, sequential, mixed methods QUAN/qual multiple case approach consisting of three embedded cases was used. The use of three teams with an equal number of participants in each team provided an opportunity for the use of embedded cases. The advantage of using an embedded case study is that it allowed for an examination of the phenomenon of motivation in operational detail rather than at an abstract level (Yin, 2003).

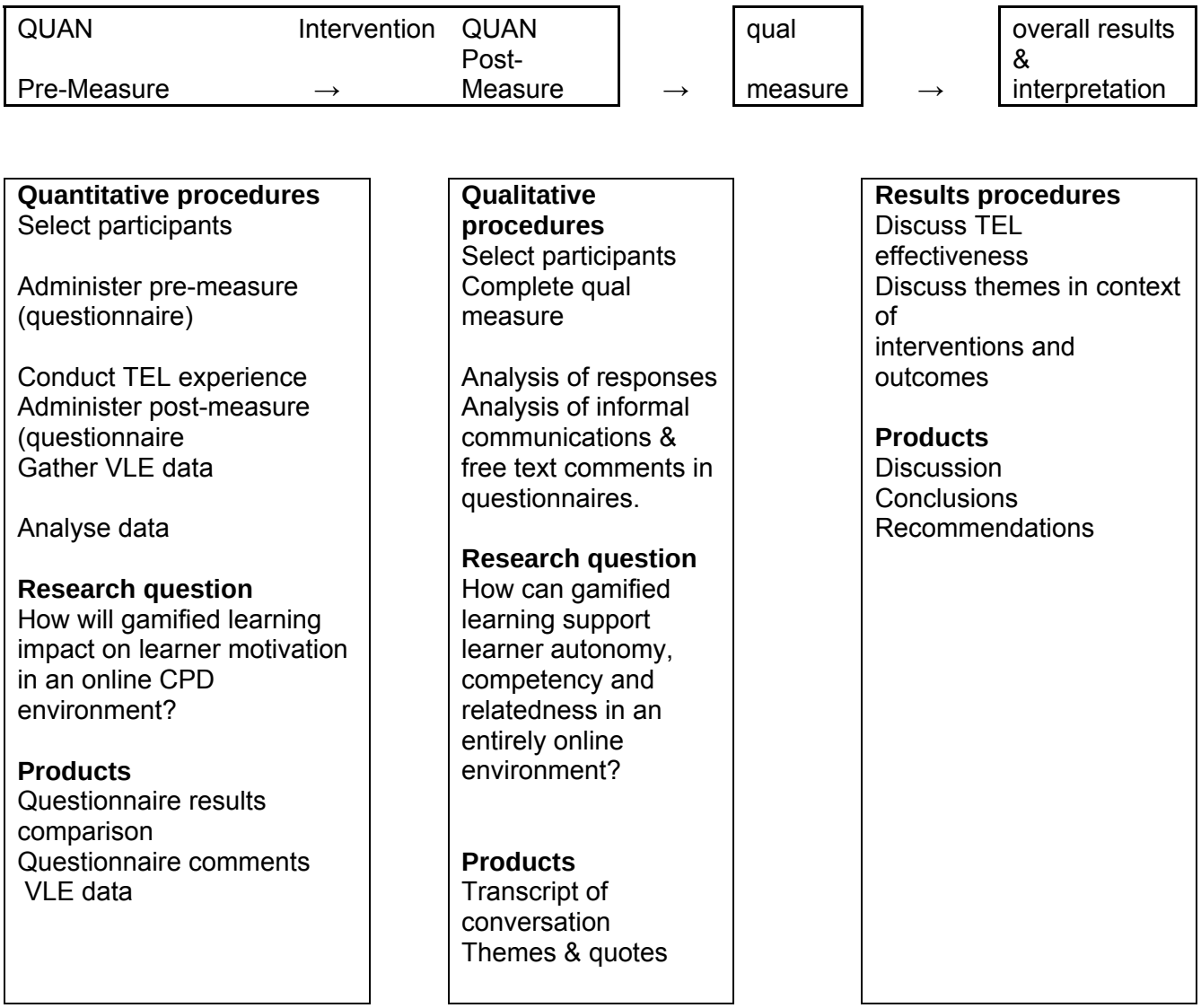
A mixed methods approach allowed for the use of a variety of data collection methods over a sustained period of time, using different sources of evidence for the development of converging lines of enquiry, helping to ensure the accuracy of the case study (Baxter & Jack, 2008; Creswell & Plano Clark, 2011; Yin, 2014). Further advantages of a mixed method approach are noted by Bryman (2006) who explains that qualitative and quantitative data

both have different strengths and weaknesses and the use of both allows the researcher to offset weaknesses and draw on strengths, providing a more complete line of inquiry.

Case studies can lack the rigour of other research methods such as a survey or experiment and can draw conclusions by generalising from findings (Kyburz-Graber, 2004; Yin, 2014). However, case studies can provide sound results if research questions are identified, extensive data is collected and data is analysed and triangulated through the use of multiple sources of data (Creswell, 2013b; Yin, 2009).

As shown in **Figure 4.1**, a two phase, sequential approach was adopted with the qualitative data providing a secondary, supportive role in the study based on the quantitative data.

Figure 4.1 Embedded, mixed methods QUAN/qual multiple case study



Source: Adapted from Creswell & Plano Clarke (2011)

4.4 Data Collection

Creswell (2011) points out that data collection in a case study should involve a wide array of procedures to allow the researcher to build an in depth picture of the case. Data was collected using the methods shown in **Table 4.1** below.

Table 4.1 – Data Collection Methods

Data Collection Tools	Data Sets	Purpose
Pre & post activity questionnaire	Responses gathered from individuals and measured using a likert scale with some reverse score items. Subscale scores used in analysis.	Relative measure of motivation before and after learning experience. Measures relative: interest/enjoyment, perceived competence, effort/importance, pressure/tension, perceived choice and relatedness
Daily activity reports and final overall report from VLE	Reports on the content that each participant viewed and / or completed each day and over the course of the entire learning experience, showing number of attempts & time spent.	Measure of behavioural responses of persistence and effort as indicators of motivation and used to identify activity preferences and patterns.
Informal communications	Informal discussions, online comments and researcher's notes from research diary.	Qualitative evidence to strengthen integrity of data.
Focus group	Researcher's notes following focus group discussions and transcript of focus group discussion.	Qualitative data to strengthen integrity of data, to confirm findings of quantitative questionnaires and establish whether design elements meet needs of autonomy, competency and relatedness.

4.4.1 Pre & Post Activity Questionnaire

Pre and post activity questionnaires were delivered to participants using Google Forms **(see Appendices G and H)**. Participants were not asked to provide their names in order to preserve anonymity and were advised that they did not have to answer all questions.

The questionnaires consisted of 28 questions with a free text box for additional comments. The questionnaire was adapted from an existing intrinsic motivation inventory (IMI) to measure participant's levels of interest and enjoyment, perceived competence, felt pressure and tension, perceived choice and perceived relatedness. The scale has been used in other studies relating to intrinsic motivation and self regulation (Deci, Eghrari, Patrick, & Leone, 1994; Plant & Ryan, 1985; Ryan, Connell, & Plant, 1990).

A different approach was taken to other studies, which used the questionnaire after the activities only. In this study a pre-activity questionnaire was used to measure current attitudes and some modifications were made to questions to fit the specifics of this study. The same questions were used in the post activity questionnaire with some slight changes for context **(see Appendix H)**. In this way, the pre activity and post activity questionnaires could be compared in order to measure changes in attitudes **(see Appendix I)**. The intention was to measure motivation in relative terms through comparing previous levels of motivation to current levels (Touré-Tillery & Fishbach, 2014).

Respondents could choose from 7 possible answers as shown in **Table 4.2.** These responses differ slightly to those used in other studies, which use the scoring method shown in **Table 4.3** (Deci et al., 1994; Plant & Ryan, 1985; Ryan et al., 1990). These other studies used a scoring method placing somewhat true, a positive response, as a midpoint. This means that there would be more positive choices available to respondents than negative, which could unfairly influence respondents. It is also of note that in other studies, some scores are not given corresponding values, which may affect respondent's ability to answer accurately.

This study provided a section for free text comments to allow participants to provide context to their choices if they wished as a common approach to measuring intrinsic motivation is the use of self-reports of interest and enjoyment of the activities per se (Ryan & Deci, 2000a).

Table 4.2 – Adapted Questionnaire Responses for this Study

1	2	3	4	5	6	7
Not at all true	Mostly untrue	Somewhat untrue	Neutral	Somewhat true	Mostly true	Very true

Table 4.3 – Questionnaire Responses from Original IMI

1	2	3	4	5	6	7
Not at all true	*(no label used)*	*(no label used)*	Somewhat true	*(no label used)*	*(no label used)*	Very true

Each response choice was given a value from 1 to 7. This allowed a score to be calculated by averaging across the items on each subscale to allow for pre and post questionnaires to be compared. Some questions required reverse scoring. In these cases, the item response was subtracted from 8 and the resulting number was used as the item score.

4.4.2 Daily and Overall Activity Reports

An activity report was pulled from the VLE on a daily basis. The report displayed participant engagement with learning activities measured by the number of attempts for each activity and the time spent on each activity. A final overall report was also pulled. This provided information under the same headings as the daily reports but gave an overall, final picture of participant engagement. A sample from a daily report is shown in **Table 4.4**, with names removed to preserve the anonymity of participants. A description of the data in each of the fields in the reports is shown in **Table 4.5**.

Table 4.4 Sample Report from VLE

User Nam	Last Activity Date	Last Login Date	Activity Name	Completion Date	Completi	Last Attempted
[redacted]	08/02/2015 15:56	08/02/2015 15:56	Level 2 - Scope of Legislation		Incomplet	08/02/2015 1
	08/02/2015 15:56	08/02/2015 15:56	Money Laundering & Fraud Welcome	08/02/2015	Complete	08/02/2015 1
	08/02/2015 15:56	08/02/2015 15:56	Money Laundering - What's the Worst That Could Happen?	08/02/2015	Complete	08/02/2015 1
	08/02/2015 15:56	08/02/2015 15:56	Placement, Layering & Integration Video	08/02/2015	Complete	08/02/2015 1
	08/02/2015 15:56	08/02/2015 15:56	What is Money Laundering?	08/02/2015	Complete	08/02/2015 1
	08/02/2015 14:44	08/02/2015 14:09	CPD Programme (TCD)		Incomplet	08/02/2015 1
	08/02/2015 14:44	08/02/2015 14:09	Level 1 - Importance of Information Security		Incomplet	08/02/2015 1
	08/02/2015 14:44	08/02/2015 14:09	Level 2 - Mitigating Risks & Phishing	08/02/2015	Complete	08/02/2015 1
	08/02/2015 14:19	08/02/2015 13:02	CPD Programme (TCD)		Incomplet	08/02/2015 1
	08/02/2015 14:19	08/02/2015 13:02	Level 1 - Importance of Information Security	08/02/2015	Complete	08/02/2015 1
	08/02/2015 14:44	08/02/2015 14:09	Information Security Welcome	08/02/2015	Complete	08/02/2015 1
	08/02/2015 14:19	08/02/2015 13:02	Level 2 - Mitigating Risks & Phishing	08/02/2015	Complete	08/02/2015 1
	08/02/2015 14:19	08/02/2015 13:02	Information Security - What's the Worst That Could Happen?	08/02/2015	Complete	08/02/2015 1
	08/02/2015 14:19	08/02/2015 13:02	Information Security Welcome	08/02/2015	Complete	08/02/2015 1
	08/02/2015 14:19	08/02/2015 13:02	Where in the World Quiz	08/02/2015	Complete	08/02/2015 1
	08/02/2015 14:19	08/02/2015 13:02	Level 3 - Proximate Cause	08/02/2015	Complete	08/02/2015 1
	08/02/2015 14:19	08/02/2015 13:02	Level 2 - Contribution	08/02/2015	Complete	08/02/2015 1

Table 4.5 – Data from Activity Reports

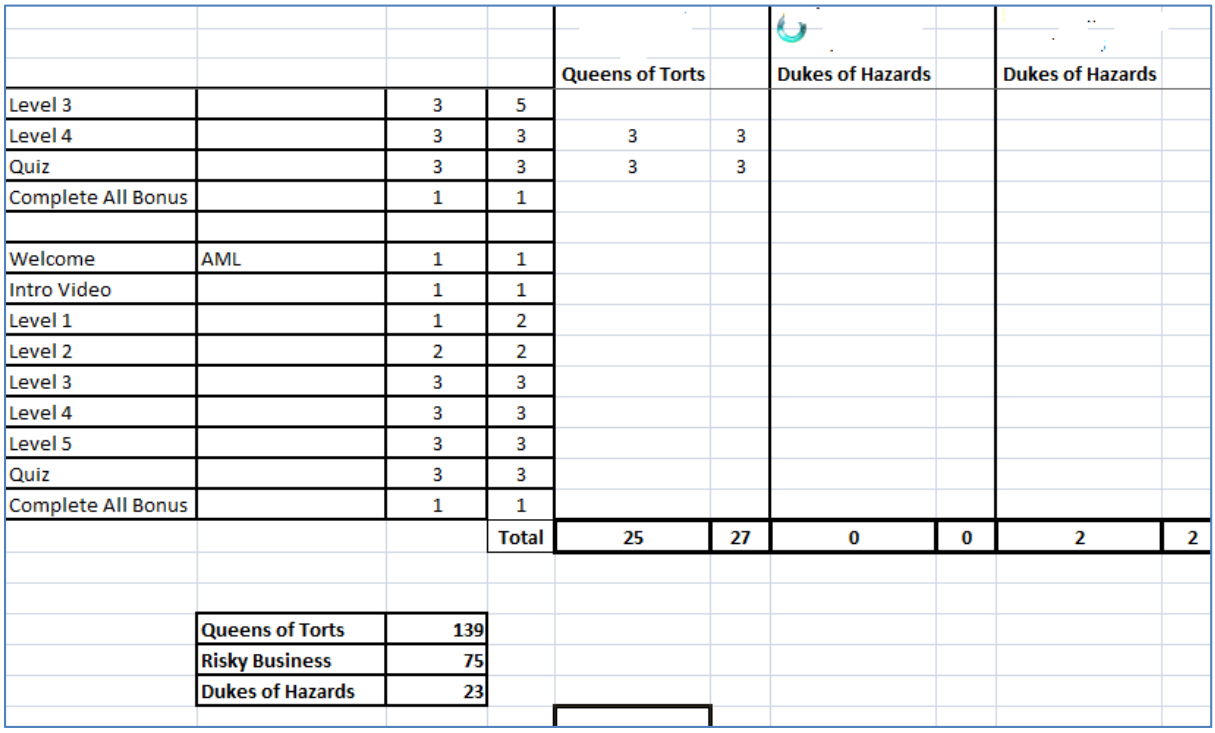
Data	Purpose
User Info	Participant's full name and user name
Last Activity	Provided the date and time that each participant last logged into the site and the date and time they last attempted an activity
Activity Name	Displayed the name of each activity for each participant
Score	Provided both average and best score for each participant for any activities that were scored e.g. quizzes.
Completion Status	Provided the status of each activity (completed, incomplete, not attempted). Showed completion date and time if completed. Showed percentage completed
Attempts	Showed the number of times participants attempted each activity.
Time Spent	Displayed the time spent by each participant on each activity

These reports provided a rich source of data, giving a view of participant engagement throughout the learning experience and also provided the data for the creation of leaderboards.

Motivation can be measured through behavioural responses such as effort and persistence, which can be represented as, time spent and number of attempts (Bekele, 2010; Eisenberger & Armeli, 1997; Muntean, 2011). The daily reports and the final report both contained data that could be used to measure this aspect of motivation.

In order to avoid being overwhelmed by the amount of data available, databases were used to organise and manage data, as recommended by Baxter & Jack (2008). Daily reports from the VLE were stored in Microsoft Excel, allowing for the management of data. A rolling points total for individuals and teams was maintained using Microsoft Excel formulae to calculate points to remove human error. A sample is shown in **Figure 4.2.** Participant's details have been removed from the screenshot to ensure anonymity.

Figure 4.2 Sample of Rolling Points Record



				Queens of Torts		Dukes of Hazards		Dukes of Hazards	
Level 3		3	5						
Level 4		3	3	3	3				
Quiz		3	3	3	3				
Complete All Bonus		1	1						
Welcome	AML	1	1						
Intro Video		1	1						
Level 1		1	2						
Level 2		2	2						
Level 3		3	3						
Level 4		3	3						
Level 5		3	3						
Quiz		3	3						
Complete All Bonus		1	1						
			Total	25	27	0	0	2	2

Queens of Torts	139
Risky Business	75
Dukes of Hazards	23

As mentioned in the previous section, the purpose of collecting this data from the VLE was to measure the behavioural responses of persistence and effort as an indicator of motivation.

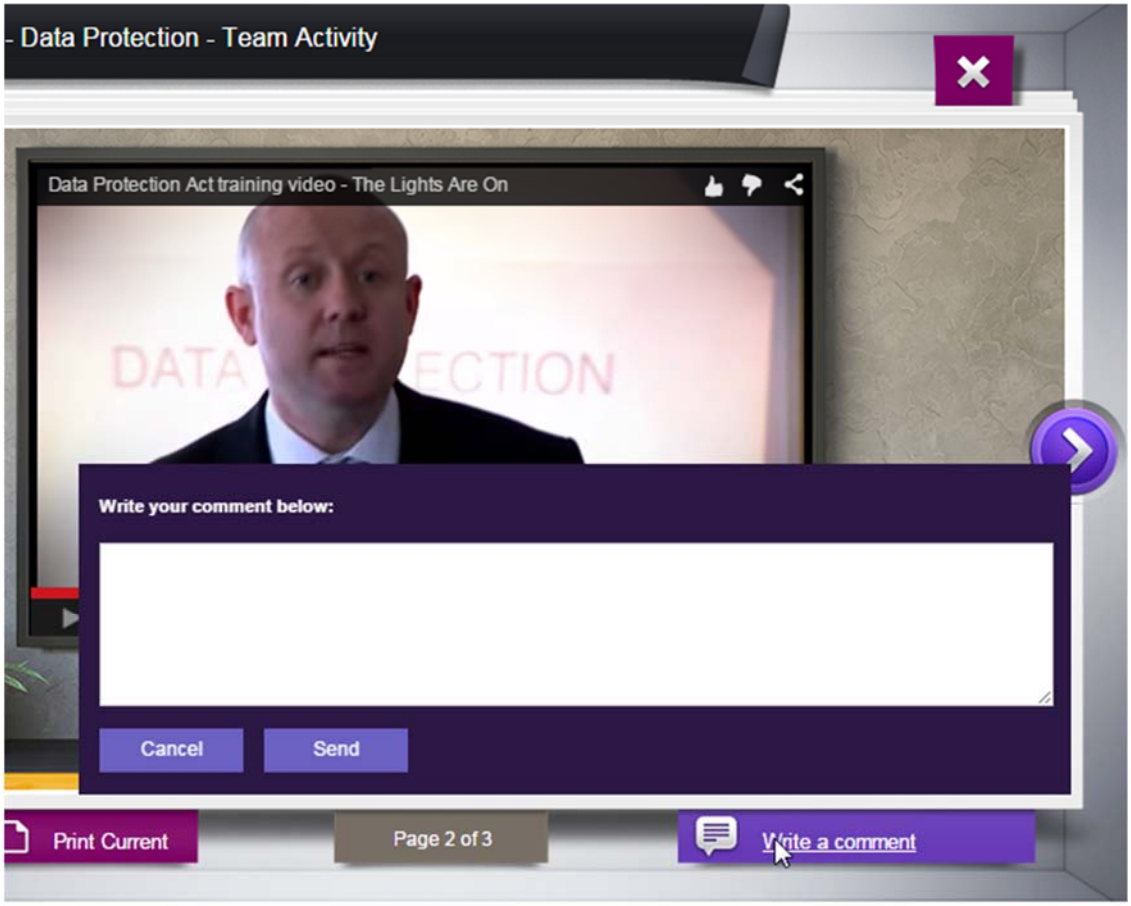
4.4.3 Informal Communications

As the researcher held a professional relationship with participants, informal discussions were unavoidable. Following informal discussions, notes on comments and observations were recorded in a research journal – see **Appendix M** for extract. Any time that a comment was recorded, the participant was asked for permission for their comment to be recorded.

After an initial analysis of quantitative data, informal discussions were sought with some participants who were identified as outliers in the data.

Some online activities provided participants with the ability to post comments to the researcher, as shown in **Figure 4.3**. The primary purpose of the comment function was to allow participants to answer questions relating to content. However, some participants chose to add additional comments that were not asked for. These can be seen in **Appendix N**. These comments were all recorded as they provided an additional source of data.

Figure 4.3 Example of Activity with Comment Function



4.4.4 Focus Group

A focus group interview was held with five participants to help triangulate data and get detailed information. Prior to holding the focus group, the quantitative data from pre and post questionnaires and VLE reports were analysed to identify potential gaps in the data that could be suitably filled through the use of qualitative measures.

Following review of the quantitative data, it was concluded that the focus group should help to triangulate the data from the quantitative methods and should also aim to assess whether the participants felt that the specific extrinsic gamification design elements used had a positive influence on motivation through meeting the needs of autonomy, competency and relatedness.

Participants were chosen to ensure some representation from each of the teams and also to ensure that participants with a wide variety of experience and qualification levels were represented.

An interview protocol with specific questions was used – see **Appendix J**. A conversational tone was used throughout the focus group in order to encourage an informal environment to encourage participants to engage in conversation (Krueger, 1994).

This section has detailed data collection methods, dealing first with quantitative and then qualitative methods. The next section will discuss the procedures used for this study.

4.5 Procedure

Participants were first contacted about this study in November 2014 and advised they could opt out at any stage if they wished to do so. System and activity testing was conducted during January 2015. Implementation began in late January 2015 with a face to face presentation. An initial questionnaire was circulated to participants followed by login details for access to activities.

Implementation concluded in February 2015 with a final questionnaire followed by a focus group. An interview protocol was used for the focus group (see **Appendix J**). A focus group transcript is included in **Appendix K**. Names have been removed to preserve participant anonymity.

4.5.1 Participants

Participants were 33 adult learners. Three participants contacted the researcher to advise that they were unable to take part with one citing personal reasons, one citing illness and one citing work pressures. The participants for this study all had prior exposure to e-learning to ensure that they had a point of reference to compare this experience to. Participants had varying levels of qualifications and experience ranging from relatively inexperienced individuals to highly experienced practitioners with advanced qualifications and many years practical experience.

A combination of convenience and purposeful maximal sampling were employed in selecting participants. The researcher had access to convenient contacts who could be asked to participate. Purposeful maximal sampling was used to select potential participants from a list of contacts allowing for different perspectives from both relatively inexperienced and highly experienced practitioners to ensure a realistic representation of the broader population (Creswell, 2013a).

The purpose of a case study is to maximise what can be learned; purposeful sampling allows for the selection of individuals that can purposely inform an understanding of the research question and central phenomenon of the study (Creswell & Plano Clark, 2011; Stake, 1998). The cases for this study were selected and grouped purposively to provide a

realistic representation of the industry with a mix of experience and qualification levels, so that each team could act as a microcosm for the wider body of participants. Participants were also selected in this way to ensure that results were not influenced by any team having an unfair advantage in relation to experience or qualification levels of team members.

All participants received an information sheet about the study (**see Appendix C**) and all returned signed consent forms to the researcher (**see Appendix B**)

4.5.2 Setting & Time

Activities were delivered entirely online. Participants could chose a time and place that suited them to undertake the activities.

Activities were delivered over a period of 2 ½ weeks. The commencement date was Friday 31st January and the activities concluded on Monday 16th February. This allowed sufficient time for participants to complete all activities, while also allowing flexibility in allowing participants to choose an optimal time for completing activities.

4.5.3 System and Activity Testing

An individual who did not participate in the activities agreed to test the system and all activities. They identified some anomalies in the scoring system, an issue with one video and an issue with one question where all options were showing as incorrect. All reported issues and anomalies were rectified before the participants were given access to the system.

4.6 Ethics

Ethics approval was sought and granted. Indicative questionnaires, participant information sheets and participant consent forms were included. A board of management information sheet and consent form were also included as the study required permission for the use of the VLE of the researchers' employer. The researcher's bias was acknowledged in the ethics application. Approval was granted after some minor amendments were requested (see **Appendix F**).

4.7 Researcher Bias

The participants all shared a professional relationship with the researcher. The researcher's positionality was acknowledged in the ethics application. To help overcome this bias, participants could complete questionnaires anonymously. During the focus group, this bias was acknowledged with participants and as can be seen in the interview protocol in **Appendix J**, it was stated by the researcher that: "although we hold a professional relationship, please try to leave that aside and answer questions as truthfully as possible. If you feel uncomfortable answering any questions, you do not have to answer them."

Finally, it should be acknowledged that the VLE and tools within the VLE were the property of the researcher's employer. An information sheet and consent form was signed by the secretary of the board of management providing permission for the researcher to use these tools (see **Appendix D**).

4.8 Summary

This chapter described the research methods used in this study. It also described data collection instruments and analysis techniques that were employed to answer the central research question and the sub question. The next chapter will describe the data analysis of each data set.

Chapter 5: Findings, Analysis and Discussion

5.1 Introduction

The previous chapter described the research methods, data collection instruments and analysis techniques used to answer the central and secondary research questions. This chapter will present the findings resulting from an in depth data analysis to answer the research questions posed in the methodology chapter.

The research question that underpinned this study was:

How will gamified learning impact on learner motivation in an online CPD environment?

and the underlying sub question was:

How can gamified learning support learner autonomy, competency and relatedness in an entirely online environment?

5.2 Data Sources and Analysis Approach

The following methods of data collection were used in this study:

- Questionnaire – pre & post activity
- Activity reports from VLE
- Informal discussions
- Focus group interview

Quantitative data was collected and analysed first. The analysis of quantitative data informed the structure and questions used in the focus group interview and questions asked in informal discussions. In this way, the qualitative data elaborated and extended on the quantitative data to help triangulate data.

Prior to any detailed analysis of the data, the researcher conducted a preliminary exploratory analysis of all data as a means of sensitising himself to the data.

5.3 The Cases

Three cases are analysed and discussed within this chapter. Each of the teams formed one of the cases. The team names were: Risk Business (Case 1), Queens of Torts (Case 2) and Dukes of Hazards (Case 3). Teams were formed with a fair mix of experience and qualification levels to ensure that the makeup of teams did not influence results through any team having more experienced members than others.

In discussing each of the cases, a code is used in this chapter so that quotes are clearly attributable. To ensure responses are anonymous, each participant was given a number – participant 1, participant 2 etc. So when quotes are provided in this chapter they will be prefixed by, for example, C1 P1, denoting that the quote was made by Participant 1 from Case 1.

The next sections will examine the sub question, which asks how gamified learning can support learner autonomy, competency and relatedness in an entirely online environment. This will in turn inform the answer to the main research question which asks how gamified learning will impact on learner motivation.

5.4 Autonomy

Autonomy was supported through the principles of choice, experimentation and feedback, which were implemented through the use of levels, variety, freedom to fail and feedback messaging. This section will examine whether the principles used were successful in supporting feelings of autonomy. Before this is examined though, the wider attitude of participants before and after the learning experience will be reviewed. The intention in using questionnaires was to measure elements of motivation in relative terms through comparing pre activity to post activity attitudes (Touré-Tillery & Fishbach, 2014). The full questionnaire analysis is available in **Appendix I.**

5.4.1 Pre & Post Activity Questionnaire Measures of Autonomy

There were two relevant subscales within the pre and post activity questionnaire relevant to providing a relative measure of feelings of autonomy – those of perceived choice and pressure/tension.

5.4.1.1 Perceived Choice

This subscale is considered to be a positive predictor of both self-report and behavioural measures of intrinsic motivation and autonomy. Positive results indicate that learners feel independence and internal assent, indicating that the need of autonomy has been satisfied.

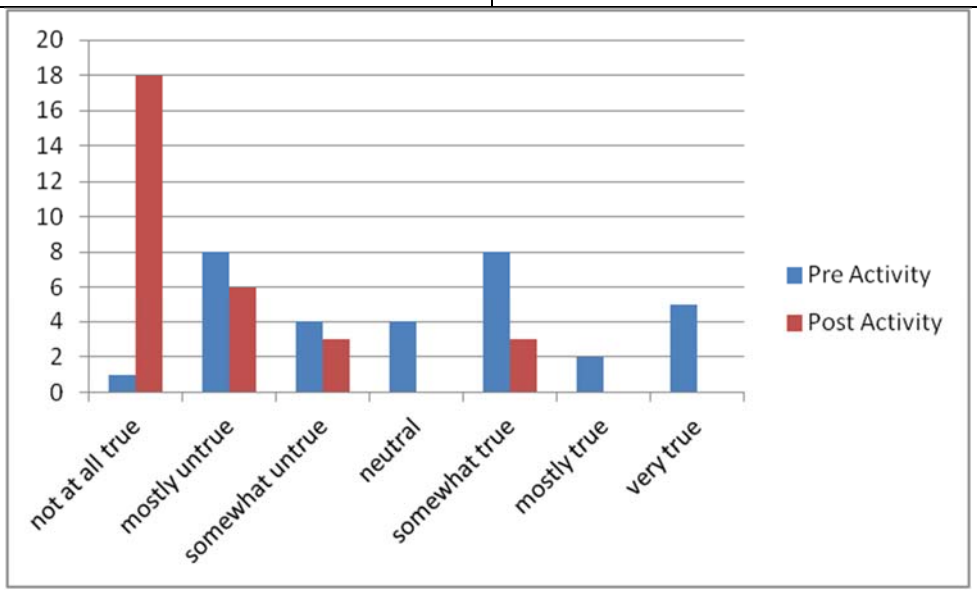
Pre activity, the average score across this subscale was 4.433036, while post activity, the average score was the highest across all subscales at 6.080952, indicating a positive change in attitude towards feelings of autonomy.

In examining the responses to individual questions within this subscale, some significant results emerged. For example, in the final question in the scale, 47% (n=15) of respondents in the pre questionnaire agreed that they do e-learning because they have to, indicating that previously, they felt controlled. Post questionnaire, only 10% (n=3) of respondents said they

did the e-learning activities because they had to and 60% (n=18) stated that it was “not at all true” that they did these e-learning activities because they had to, a very positive indication of feelings of autonomy.

Figure 5.1 – Pre & Post Questionnaire Comparison – Perceived Choice Subscale

Statement Appearing Pre Questionnaire		Statement Appearing Post Questionnaire
Think about your previous experience using CPD e-learning and specifically, think about your experience using compliance based courses (such as Data Protection, Anti Money Laundering, Information Security and Insurance Concepts) and answer these questions		Thinking about the online activities (such as Data Protection, Anti Money Laundering, Information Security and Insurance Concepts) that you recently completed, please answer the following questions:
Q.	**Pre Activity**	**Post Activity**
24	I do e-learning because I have to	I did this e-learning because I had to



Results from this subscale were approached with some caution. By its very nature, CPD involves compliance, which may have influenced participant’s feelings prior to undertaking the learning activities, resulting in a high proportion reporting that they felt a lack of choice. Participant’s greater feelings of choice post activity may have been influenced by a lack of compliance rather than solely as a result of the design of the learning experience.

This was borne out somewhat by a comment made by a participant at the end of the pre activity questionnaire, who commented “e-learning should not be forced upon people but rather chosen by them”, indicating that their prior experience was that e-learning was forced on them, rather than something they chose. In contrast, in the post activity questionnaire, a participant commented that “I wouldn’t say engagement was forced on you”.

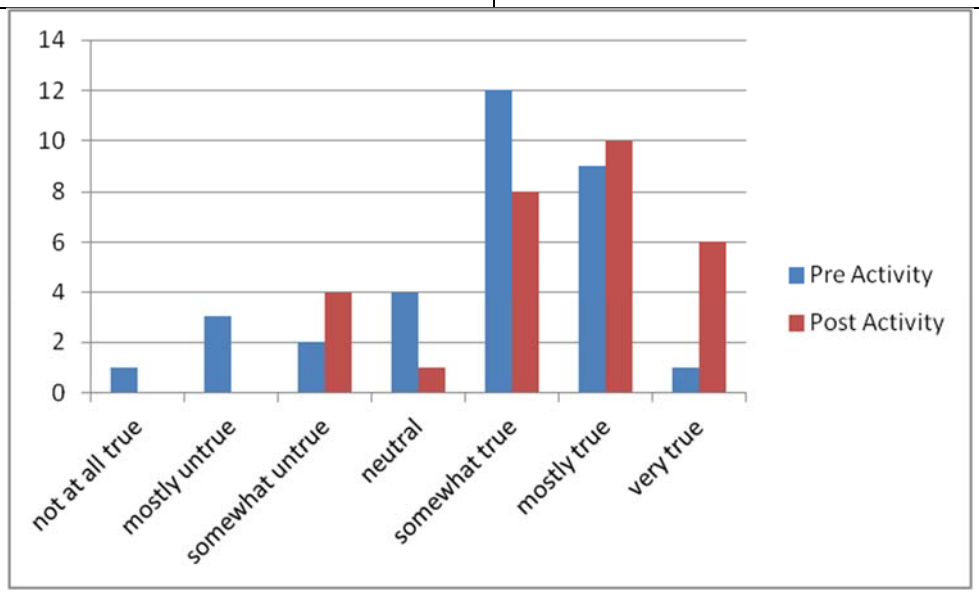
5.4.1.2 Pressure/Tension

The pressure/tension subscale is a negative predictor for intrinsic motivation and autonomy. For feelings of autonomy to be present, learners should not feel pressured or tense.

A comparison of the pre and post questionnaire results shows showed the smallest change in attitude of all subscales, with a shift in average score from 5.18254 pre questionnaire to 5.663866 post questionnaire. Although this difference is relatively small, it is significant that feelings of pressure and tension decreased. In order to be confident of the assessment of autonomy, psychological dynamics need to be considered and evidence of a lack of pressure and tension suggests that participants undertook activities and engaged and persisted out of choice rather than engaging in pressured persistence.

Figure 5.2 – Pre & Post Questionnaire Comparison – Pressure/Tension Subscale

Q.	Pre Activity	Post Activity
14	I feel very relaxed when doing e-learning	I felt very relaxed when doing this e-learning



A small number of participants did report feelings of pressure or tension after completing the activities but all answered somewhat true to all questions. Although there was some evidence of pressure and tension among a small group, it could have been viewed as somewhat positive in encouraging participants. This was noted as something to explore further during focus group interviews.

5.4.2 Choice

The principle of choice was implemented through the use of levels and variety. In examining the patterns of use of the three cases, it was noted that team members across all cases did not always undertake levels in order. An analysis of the order in which participants undertook activities was conducted. An extract from the analysis is shown in **Table 5.1** and the complete analysis is shown in **Appendix O**. The numbers denote the order in which activities were attempted. Those who skipped levels are highlighted.

Table 5.1 Sample of Analysis of Skipping Levels

	C3 P1	C3 P2	C3 P3	C3 P4	C3 P5	C3 P6	C3 P7	C3 P8	C3 P9	C3 P10	C3 P11
Insurance Concepts											
Welcome	1	1	1		1	1	5	1	19	1	1
Level 1	2	2	2		2	2	6	2	20	2	2
Level 2	3	3	3		3	3	7	3	21	3	3
Level 3	4	4	4		4	4	8		22	4	4
Level 4	5	5	5		5	5	9		23	5	5
Information Security											
Welcome	6	6	6	1		6	4		14	6	6
Level 1	7	7	7	2		7	10		15	7	7
Level 2	14	8	8	3		8	11		16	8	14
Level 3		9	9	4		9	12		17	9	
Level 4		10	10	5		10	13		18		
Data Protection											
Welcome	8		14	6		11	1		5		8
Level 1	9		15	7		12	2		6		9
Level 2	10		16	8		13	3		7		15
Level 3	11		17	9		14			11		
Level 4	12		18						12		
Level 5	13		19						13		

This analysis revealed that 43% (n=13) of all active participants “skipped levels”. Of those who did skip levels, 77% (n=10) were highly engaged, attempting all activities. By contrast, 24% (n=4) of those who did not skip levels were highly engaged, attempting all activities. This suggests that those who did choose to skip levels were more engaged in the learning experience a positive indicator for intrinsic motivation.

It was also evident from an analysis of focus group responses that participants felt a strong sense of autonomy as a direct result of the use of levels and variety, confirming the findings from quantitative data.

Participants noted the use of variety as a means for engaging them and catering for their preferences:

C1 P2: “You varied the presentation … the way you had to … do different things, the variety kind of kept you awake”

C3 P4: “You cater for all because the text and the video as well because I prefer to see things in writing as opposed to listen to things.”

Others made reference to the use of levels as a means for supporting choice:

C3 P4: “I …liked the fact that … you didn’t have to go through ... You could pick any of those to start on.” “I did mainly go through from start to finish but sometimes I didn’t.”

C3 P11: “If I start going up levels, I’d get bored. I want to be able to do what I want so it was good I could do that.”

C1 P2: “It catered for people who didn’t want to follow the path as well”

It was noted in reviewing quantitative data that some participants felt pressure, which could damage feelings of autonomy. However, because these feelings weren’t strong, it was hypothesised that pressure might have been viewed as beneficial. This was borne out in qualitative data with participants commenting:

C3 P11: “Even though the emails about points put pressure on I put a few more hours in.”

C3 P4: “I felt a bit pressured when the team points came around…That was good thing to motivate though.”

5.4.3 Experimentation

The principle of experimentation was implemented through the use of freedom to fail, which aimed to encourage learners to take chances with decisions and be exposed to realistic consequences for making poor decisions with a low cost for failure and high reward for success (Gee, 2007; Kapp, 2012a).

The success of freedom to fail was measured in quantitative data through an examination of quiz attempts. The pass mark for all quizzes were deliberately set high at 80% in order to assess whether participants would feel encouraged, through freedom to fail, to attempt quizzes multiple times in order to improve their score.

Across all cases, there was evidence of participants attempting quizzes multiple times to improve their score as shown in **Table 5.2** below.

Table 5.2 – Assessment Attempts Analysis

	Total Assessment Attempts	Average Attempts Per Person	Average Initial Score	Average Best Score
Case 1	44	2	88%	89.52%
Case 2	86	4.526	65.99%	74.91%
Case 3	48	4	32.31%	48.35%

This repetition of activities as a result of freedom to fail provides evidence of persistence, which in turn can be viewed as evidence for autonomy and intrinsic motivation (Kapp, 2012c).

A comment in the post activity questionnaire noted the effectiveness of freedom to fail:

"If you made an error, you could easily go back and review the content / instructions"

Focus group participants also noted the effect of freedom to fail in supporting positive feelings and encouraging learners:

C3 P11: **"**You didn't sort of feel like crap when you got something wrong … so you actually stopped and thought about it."

C3 P11: "Something I liked … was that you could move things again if you got them wrong."

Participants also reported that feedback encouraged to exploration and experimentation.

C3 P4: "It slowly made you think it was ok to go back and just give it a try..."

C1 P9: "After a bit you just gave things your best go and you knew you could go and try again ..."

It is clear from an analysis of the data that freedom to fail helped to demonstrate the participant's agency in a positive way through reinforcing a sense of control over outcomes, thereby supporting feelings of autonomy.

5.4.4 Feedback Messaging

Feedback messaging was used as another method for implementing choice through to providing a sense of progression and signposting for difficulty levels, which was noted in the following comment:

C1 P9: "I liked that it showed you that you know this is the basic bit and then it's going to get a bit more tricky with like some structure you know."

Feedback messages provided during quizzes were non controlling focussing on choice rather than instruction as was evident from the following comment:

C3 P4: “You didn’t really feel like you were being just quizzed … it was like … doing a word search…”

When examined collectively, it is clear that the principles of choice, experimentation and feedback were successful in creating and sustaining feelings of autonomy among participants. However, it is possible that the use of freedom to fail may have had a negative impact on feelings of competency for some, as shall be discussed in the next section.

5.5 Competency

Competency was supported through the principles of challenge, rewards and feedback, which in turn were implemented through the use of levels, points, leaderboards, emotional feedback and visual feedback. This section will examine the effect these principles had in supporting feelings of competency. Before this is examined though, the wider attitude of participants before and after the learning experience should be examined.

5.5.1 Pre & Post Activity Questionnaire Measures of Competency

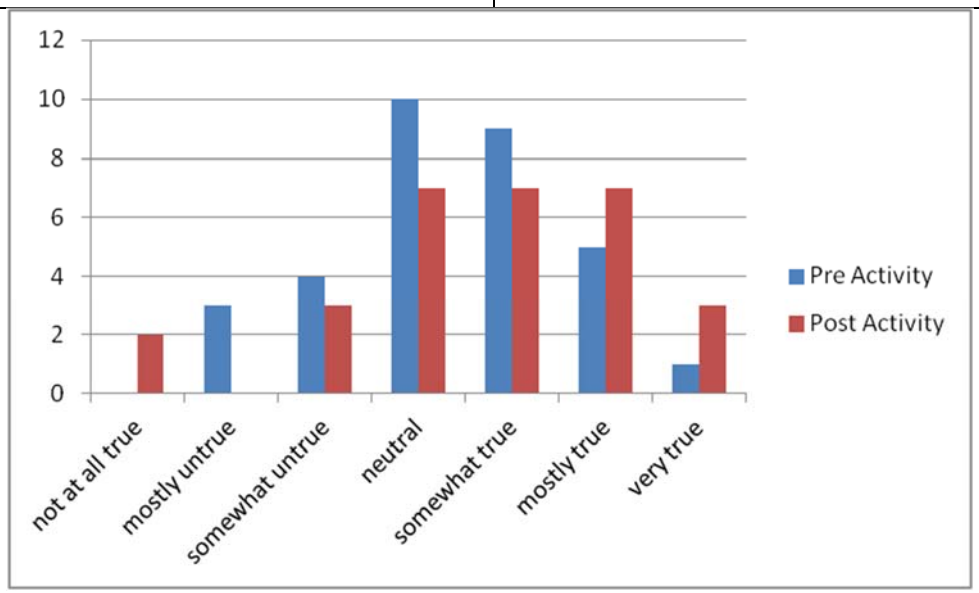
There was one relevant subscale within the pre and post activity questionnaire to provide a relative measure of feelings of competency – the perceived competence subscale. This subscale measured participant’s perception that activities provided a challenging but not overwhelmingly difficult experience with statements for learners to agree or disagree with (Przybylski et al., 2006).

5.5.1.1 Perceived Competence

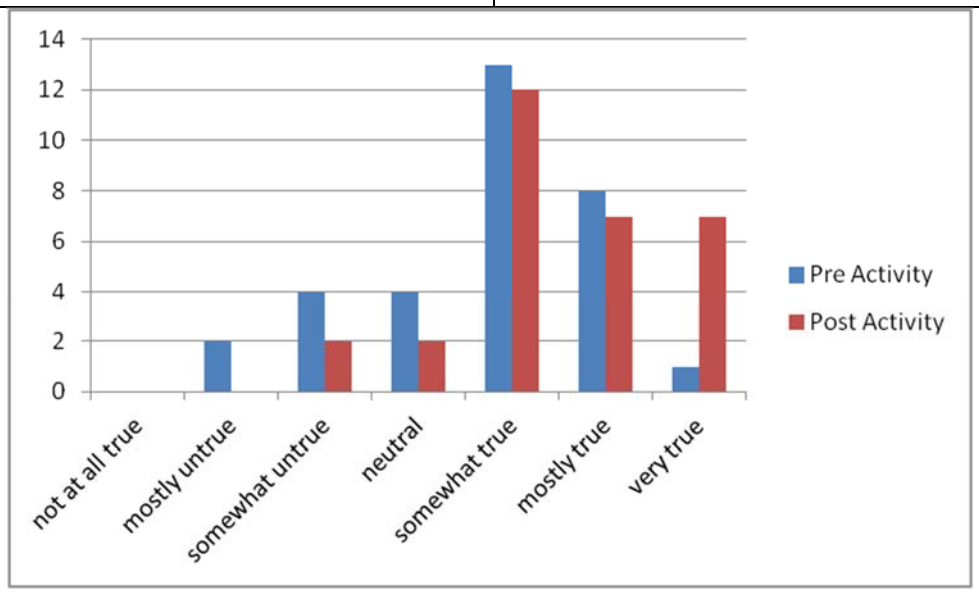
This subscale was intended to be a positive predictor of both self-report and behavioural measures of feelings of competency. **Figure 5.3** displays a comparison of some results from pre and post questionnaires for the perceived competence subscale.

Figure 5.3 – Pre & Post Questionnaire Comparison – Perceived Competence Subscale

Q.	Pre Activity	Post Activity
6	I think I am very good at e-learning	I think I was very good at this e-learning



Q.	Pre Activity	Post Activity
9	After working on e-learning for a while, I feel competent	After working on this e-learning for a while, I felt competent



It was anticipated that the design principles used would promote feelings of effectiveness and even masterfulness in participants (Sheldon & Filak, 2008). There was some verification of this with a change in attitude evident through an increase from the pre activity questionnaire average of 4.625 across the subscale compared to an average of 5.031034

post questionnaire, indicating that participants did have greater feelings of competency after the activities.

However, when responses from this subscale were analysed and compared, there was a consistent group of participants of between 7% (n=2) and 10% (n=3) who responded negatively to questions. It was also notable that, across the subscale, there was a consistent trend for participants to answer with either neutral or somewhat true as their response, rather than replying as mostly true or very true, which would be more positive indicators of feelings of competency.

It was noted by the researcher that competency should be examined more closely during later data analysis stages to help understand these results. The next sections will analyse the principles used to support feelings of competency through an examination of quantitative and qualitative data relating to each of the cases.

5.5.2 Challenge

Challenge was implemented through the use of increasingly difficult levels to provide optimally challenging opportunities for participants. Participants in the focus group reported feeling that levels gave a structure to activities by flagging challenges to come:

C1 P9: "I liked that it showed you that you know this is the basic bit and then it's going to get a bit more tricky ..."

There was also evidence of feelings of satisfaction in having completed more difficult tasks:

C3 P11: "It gave you the structure as well to feel like you were completing something and you knew that it was going to get a little bit harder..."

Some quizzes also employed the use of levels with increasingly difficult questions, which was noted in the focus group:

C3 P11: "… the questions … weren't too hard but they weren't just tick the box … which I liked. I had to actually stop and think about them."

One participant noted the use of levels within quizzes as a means for flagging the level of challenge:

C3 P4: "When you came to the quiz at the end. Even one of those had levels. You know 100 euro, 200 euro … you knew the more money would be harder."

A comment from one participant suggests that activities were optimally challenging for them because, initially, they were afraid to progress onto more difficult tasks but with persistence, they felt able to overcome the challenge:

C3 P11: “I’m really nervous about e-learning usually so I did a lot of the basic stuff and stopped … and went on to the more basic stuff in the next course … but then after a while I was ok.”

Although there was evidence that challenge was effective in stimulating feelings of competency, it is possible that the use of freedom to fail unbalanced activities in favour of autonomy and at the expense of competency. In further discussions in the focus group, the sense of independence and autonomy provided by freedom to fail may have led to participants taking activities less seriously and therefore not feeling effectiveness upon completion because participants knew they could use multiple attempts to get it right:

C1 P9: “you just gave things your best go and you knew you could go and try again”.

The use of gamification in general may have also had an impact on feelings of competency as some participants felt that activities were casual and game like:

C3 P4: “It was like a quiz show nearly”

C2 P8: “I often see people playing candy crush on the way in you know. And you’d normally put that miles apart but if you put this beside it, they’re not.”

5.5.3 Rewards

Points and leaderboards were used to implement the principle of reward with the aim of sustaining feelings of competency with rewards based on high quality performance in an equitable context as means of overcoming some criticism that the use of rewards can be controlling. There was however, some evidence that the use of reward was controlling and pressuring for some, which may have negatively affected feelings of competency. One participant noted that:

C2 P8: “…I don’t want to be the only one left on zero.”

Another participant noted a potential negative aspect in terms of reward:

C1 P9: “…it might be hard to see or find out who’s doing CPD to learn something and who’s doing it to get the points. Just for their team or whatever.”

On the other hand, some liked the use of reward, indicating that it did help to sustain feelings of competency among some participants:

C3 P4: “That to me was the best thing was that there were points up for grabs”

C1 P2: “I just felt like – yeah we’re having a competition here you know. I just really liked that.”

While it is possible to support feelings of competency through the use of reward, it will not be effective for all participants.

5.5.4 Feedback

Visual and emotional feedback was used to implement the principle of feedback. It was intended that a heightening of emotions should result in a sense of accomplishment and mastery when participants completed an activity or met a deadline. Positive visual feedback further helped in sustaining feelings of accomplishment. There was a balance struck between the use of pressure in emotional feedback and the use of reward in positive visual feedback as can be seen in the following comments:

C1 P2: “I loved the part where there were timed things. You know where you had timed questions. That really got me going.” …”.

C2 P8: “I liked the way though as you finished you got a little tick or whatever.”

C3 P11: “It was like yeah I’ve done well.”

C1 P9: Yeah there were a lot of positive words and things like that.

As evidenced by participant comments, the use of feedback was perhaps the most successful method used to develop feelings of competency. However, the use of challenge and reward appear to have been less successful, making feelings of competency difficult to fully sustain for all participants.

5.6 Relatedness

Relatedness was supported through the use of the principles of rewards and accountability, which in turn were implemented through the use of points, leaderboards, teamwork competition and playing alone together. The effects that these principles had in supporting feelings of relatedness within the cases will be examined in this section. Before this is examined though, the wider attitude of participants before and after the learning experience will be examined.

5.6.1 Pre & Post Activity Questionnaire Measures of Relatedness

The relatedness subscale within the pre and post activity questionnaire was used as a relative measure of feelings of relatedness.

5.6.1.1 Relatedness

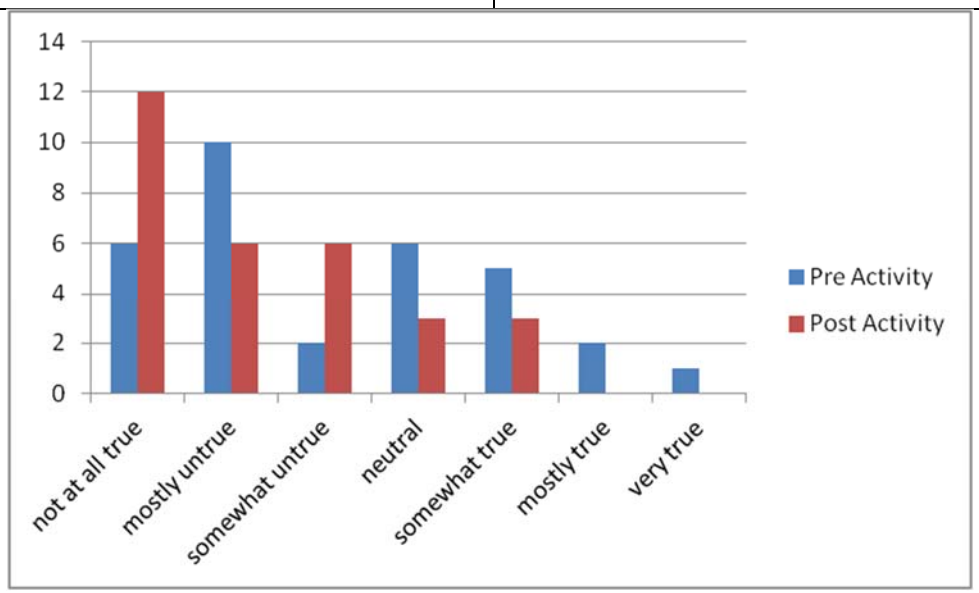
The relatedness subscale relates to interpersonal interactions and feelings of belonging. In the pre questionnaire, this subscale had the lowest average score at 3.992188, indicating a lack of feelings of relatedness among participants prior to the learning experience. The average score post questionnaire showed a positive change to 4.966667, indicating that respondents felt a greater sense of relatedness after the learning experience.

Prior to the learning experience, just 6% (n=2) of respondents said that they felt somewhat close to their peers while doing e-learning. After the learning experience, 38% (n=11) responded positively, a very significant change from the pre activity experience, indicating stronger feelings of relatedness.

To help assess whether these feelings of relatedness were viewed positively, participants were asked if they would prefer not to interact with their peers in an online environment like this again. 10% (n=3) responded that this was somewhat true, 10% (n=3) responded neutrally and 80% (n=24) responded negatively to this, indicating that they would like to interact with their peers in this way again in future, confirming that the learning experience was successful in encouraging feelings of relatedness.

Figure 5.4 – Pre & Post Questionnaire Comparison – Relatedness Subscale

Q.	Pre Activity	Post Activity
27	I'd really prefer not to interact with my peers in the future when doing e-learning	I'd really prefer not to interact with my peers in the future when doing e-learning like this



The next sections will analyse the principles used to support feelings of relatedness as a means to confirm the findings from questionnaires through an examination of quantitative and qualitative data relating to each of the cases. Because some of the principles used to support relatedness are very closely related, some are discussed together in the following sections.

5.6.2 Points and Leaderboards

Points and leaderboards are discussed together here as they both relate to reward. In discussing reward as a means of creating a relational base, one participant did not feel it contributed positively, commenting that:

C1 P9: "It's about your own goals … it might be hard to see or find out who's doing CPD to learn something and who's doing it to get the points."

Others saw points in a more positive light and made a connection to other team members:

C3 P4: "The fact that I knew there were other people on my team meant I wanted to do well."

5.6.3 Teamwork, Competition & Playing Alone Together

These factors are dealt with together because they relate to accountability and social connectedness. In the post activity questionnaire, one participant commented that "The team aspect was positive, it was friendly competition". This sentiment was echoed in the focus group where there was evidence that teamwork and competition were successful in creating a sense of relatedness through competition and teamwork:

C1 P2: "… if you're left to yourself you're letting yourself down but if you're part of a team then you're oh my God."

C3 P4: "… I should do this because there's others relying on me."

C3 P4: "The fact that I knew there were other people on my team meant I wanted to do well."

Teamwork and competition created a social connection and a relational base, even though participants were not directly interacting with each other. There was however, some frustration evident. It was noted when analysing the individual cases that one team performed poorly when compared to others. It was hypothesised that an initial poor performance from the team discouraged some team members from participating. This was investigated further in the focus group and borne out in a comment:

C3 P4: "I was really annoyed my team weren't doing very well. My team had … no points."

There is evidence then that competition and teamwork can be successful in supporting feelings of relatedness but must be used with caution as feelings of relatedness may be damaged for some due to the inactivity of other team members.

5.7 The Impact of Gamification on Motivation

This section will examine the primary research question of this study, which asks how gamified learning will impact on learner motivation in an online CPD environment.

Self Determination Theory (SDT) proposes that in order for intrinsic motivation to exist, the learner needs of autonomy, competency and relatedness must be met. It was therefore necessary to examine the sub question of this study in the previous sections before the main research question could be answered.

The previous sections demonstrated that it was possible to meet the needs of autonomy, competency and relatedness in an online environment for many, but not all participants. Therefore, some, but not all, participants should have had feelings of intrinsic motivation. This section will examine sources of quantitative and qualitative data to help verify the presence of intrinsic motivation among participants.

Intrinsic motivation can be measured in relative terms through comparing previous levels of motivation to current levels. (Touré-Tillery & Fishbach, 2014). It can also be measured through behavioural responses (Bekele, 2010; Eisenberger & Armeli, 1997; Muntean, 2011). Another method for measuring intrinsic motivation is through self reports (Iacovides, 2011; Przybylski et al., 2006; Ryan & Deci, 2000a; Song et al., 2013).

5.7.1 Relative Experience

Intrinsic motivation was measured in relative terms through the use of subscales in pre and post activity questionnaires. One subscale referred specifically to interest/enjoyment. Positive results would be a strong indicator that gamification has a positive impact on intrinsic motivation.

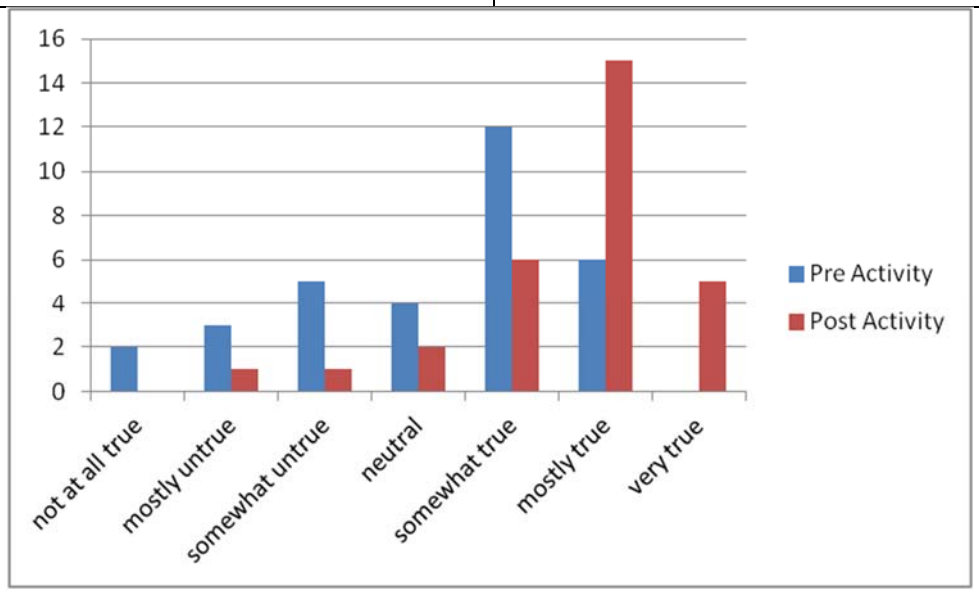
The average score across the subscale pre questionnaire was 4.6375, compared to an average score of 5.926667 in the post questionnaire. This was one of the biggest positive changes across the subscales, second only to perceived choice. The positive change in attitude shown across this subscale provides strong evidence of intrinsic motivation among some participants.

The final question in this subscale – whether e-learning is fun is perhaps one of the most important questions as positive responses here would provide evidence that respondents undertook activities purely for enjoyment or fun, a strong indicator for intrinsic motivation. It

is also the question with the highest number of negative responses across this subscale in the pre activity questionnaire, indicating a lack of intrinsic motivation prior to the learning experience, where 31% (n=10) responded negatively to this question, 13% (n=4) were neutral and although 56% (n=18) responded positively, none chose very true and most (38%; n=12) only somewhat agreed.

Figure 5.5 – Pre & Post Questionnaire Comparison – Interest/Enjoyment Subscale

Q.	Pre Activity	Post Activity
5	e-learning is fun to do	This e-learning was fun to do



After the learning experience, 87% of respondents agreed that the activities were fun with 16% (n=5) responding as very true, 50% (n=15) mostly true while just 6% (n=2) remained neutral and 6% (n=2) responded negatively. This provides evidence for intrinsic motivation among the 87% of respondents that agreed that activities were fun. Similar patterns were seen across the rest of the questions in this subscale, with a general shift towards intrinsic motivation as a result of the use of gamification as a means for supporting the needs of autonomy, competency and relatedness.

5.7.2 Behavioural Responses

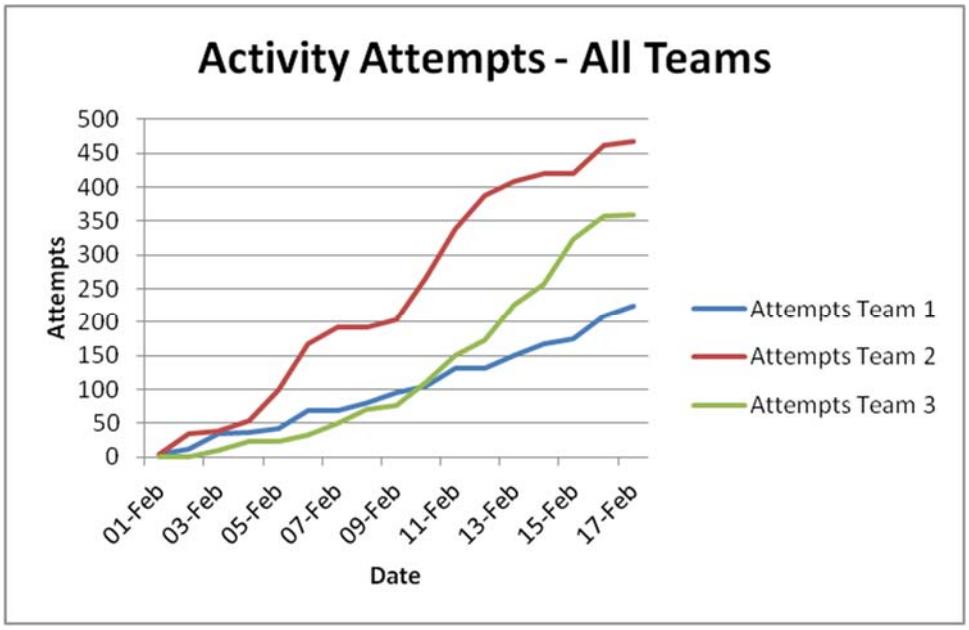
The behavioural responses of time spent and number of attempts were recorded through daily VLE activity reports and used as evidence of effort and persistence, positive indicators for intrinsic motivation (Bekele, 2010; Eisenberger & Armeli, 1997; Muntean, 2011).

When analysing engagement, actions can be interpreted in different ways. For example, if a participant spends a long time on a task, it could mean that motivation is low as they are not interested in completing the task. Conversely it could mean that motivation is high and the

learner is savouring the task and fully exploring it (Touré-Tillery & Fishbach, 2014). To overcome potential difficulty in interpreting learner actions, multiple methods for measuring intrinsic motivation were used and individual cases were analysed for evidence of persistence and then globally analysed to help ensure the accuracy of data triangulation, to ensure no aspects were overlooked and to reduce the potential for wide interpretation (Creswell & Plano Clark, 2011).

The totals attempts by each individual were recorded on a daily basis, allowing for the creation of the chart in **Figure 5.6**. A total of 1,052 activity attempts were made across the entire learning experience, with, on average, 35.09 activity attempts per participant. The consistent level of engagement across the learning experience provides evidence of persistence and effort, indicators of intrinsic motivation.

Figure 5.6 – Activity Attempts All Teams



The use of single cases allowed for some further detailed analysis of the data. As shown in figures **5.7, 5.8 and 5.9** below, participants in all teams engaged on more than one day, evidencing persistence, effort and interest, as participants would be unlikely to login repeatedly if there was a lack of interest.

Figure 5.7 – Activity Attempts Team 1 – All Participants

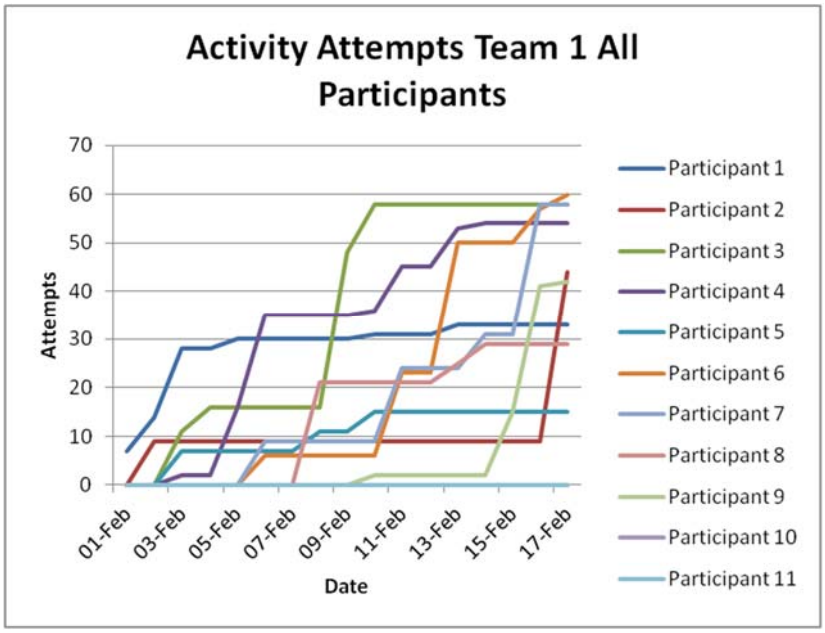


Figure 5.8 – Activity Attempts Team 2 – All Participants

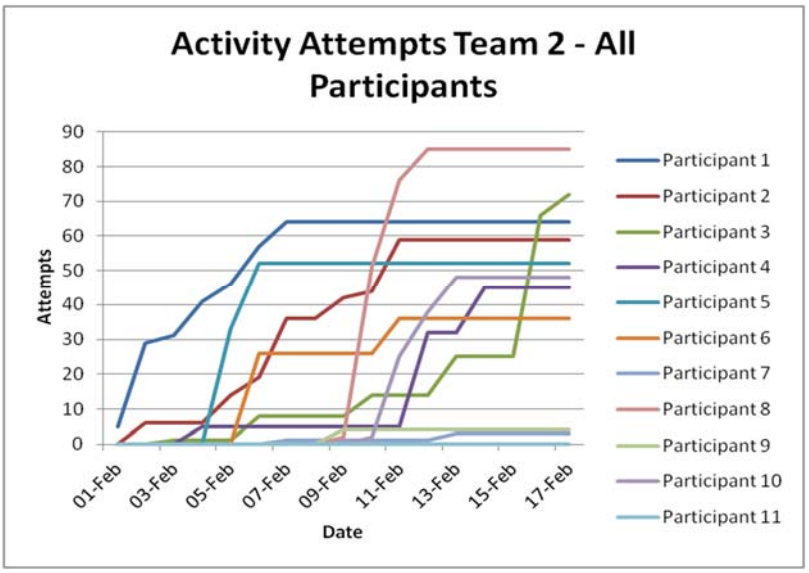
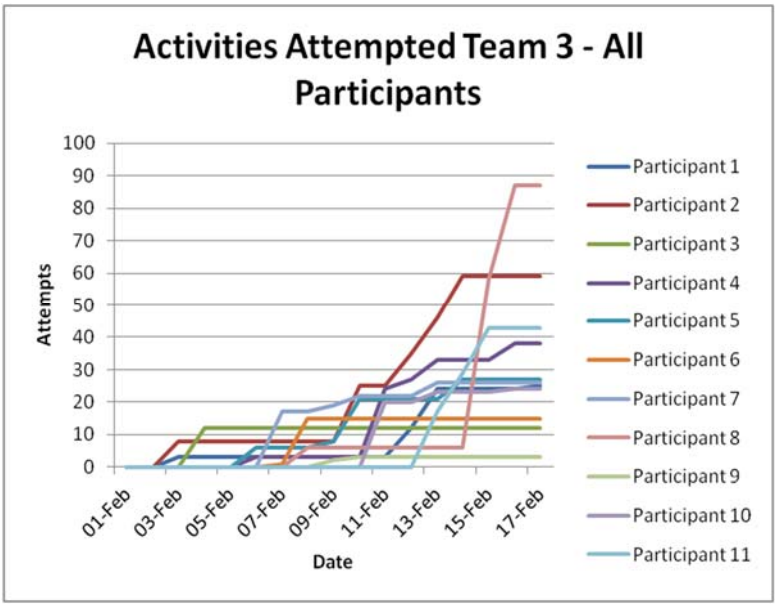


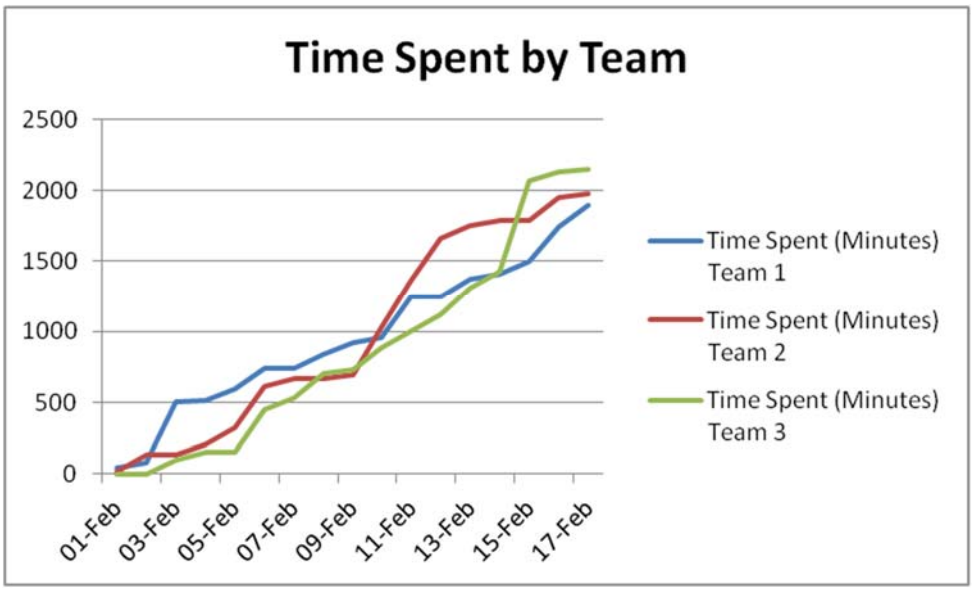
Figure 5.9 – Activity Attempts Team 3 – All Participants



5.5.3 Time Spent All Teams

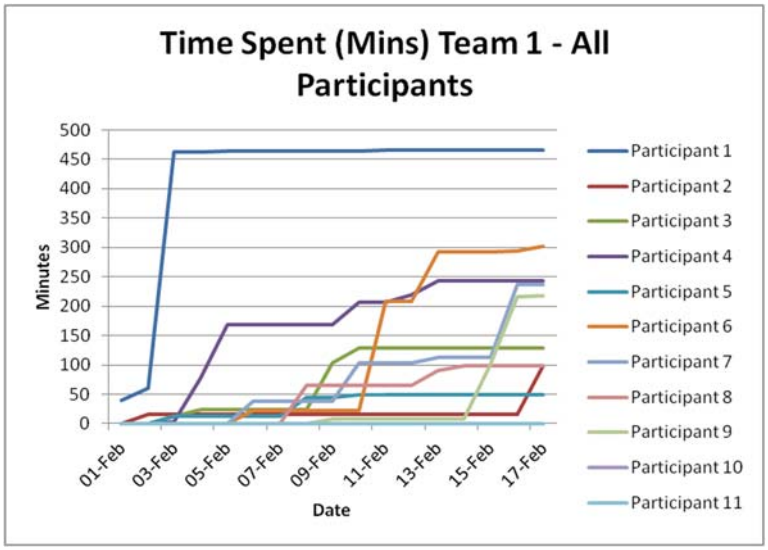
Figure 5.10 shows the time spent by each team. Participants collectively spent over 100 hours undertaking activities. Similar to activity attempts, time spent shows a relatively smooth increase across the duration of the learning experience without unusual spikes in activity. Again, this demonstrates that participants were logging in consistently and regularly throughout the experience.

Figure 5.10 Time Spent by All Teams (in minutes)



When examined in more detail, the time spent by participants as shown in **Figure 5.11** shows that one participant (Participant 1) in team 1 spent a very significant amount of time during the first few days and did not participate significantly again.

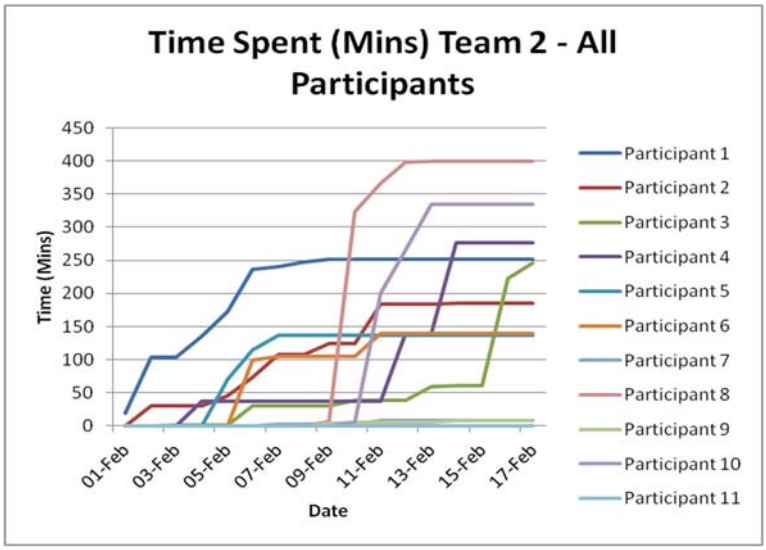
Figure 5.11 – Time Spent Team 1 – All Participants



This participant was contacted informally to enquire whether there was any reason for their relatively intense activity early on. The participant responded that it was due to time. They knew that, due to work activities, they could devote a lot of time at the start of the experience but could not participate later on.

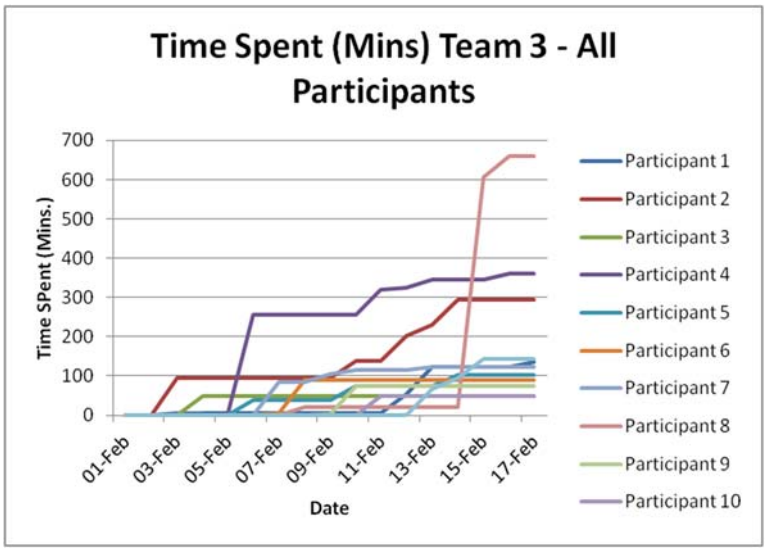
Figure 5.12 provides a more detailed analysis of time spent by team 2. Unlike team 1, there is no one individual who has spent significantly more time than other participants. The majority of participants in this team show evidence of regular, consistent engagement, a good indicator for persistence and effort.

Figure 5.12 – Time Spent Team 2 – All Participants



When examined in more detail, the time spent by participants in team 3 as shown in **Figure 5.13** shows that, similar to team 1, most participants show evidence of regular engagement, but one participant (Participant 8) was an outlier in the data, having spent a very significant amount of time during the final few days only. This participant was contacted informally to enquire whether there was any reason for their relatively intense activity late on in the process. As with the participant in team 1, this participant responded that it was a question of time –they could devote time at the end of the experience but due to work pressures could not participate earlier on. The participant also reported that once they began undertaking activities, they enjoyed the experience and were happy to invest the time.

Figure 5.13 – Time Spent Team 3 – All Participants



Discussions were also held with participants from each team who participated less than average. Without exception, participants who did not engage as fully as others reported that a lack of time due to other commitments was their reason for not participating. One participant summed up the issue with a comment that:

C3 P10: "I would have liked to have done a bit more. The bit I got to do was really great and a big change … but all the time I had was the time at the weekend. During the week I … just don't have the time."

Behavioural responses show strong evidence for intrinsic motivation among some participants, with engagement, effort and persistence all evident for the majority of participants. Those who participated less might, in some cases, have been influenced by a lack of participation from other team members. The biggest barrier to participation though was a lack of time.

5.7.3 Self Reports

Another method for measuring intrinsic motivation is through self reports relating to the activity itself by identifying key adjectives in qualitative data (Iacovides, 2011; Przybylski et al., 2006; Ryan & Deci, 2000a; Song et al., 2013).

Comments were analysed for key adjectives and highlighted as evidence of the presence of intrinsic motivation as a result of the use of gamification.

In informal discussion, one participant commented that

C3 P3: "This is actually addictive. I want to go on and do the next part now."

Another commented that:

C2 P10: "I loved the start of the information security course where it asks for your details and then says why did you do that? It took me by surprise and made me stop and think."

There were several positive comments in the post activity questionnaire, all of which are shown in **Appendix I**

"This type of e-learning was fun and very engaging. It made learning about difficult and somewhat boring topics interesting. I would be happy to do more learning like this in the future."

Similarly, in the focus group, the transcript was analysed for key adjectives

C3 P11: "And it spurred my interest in it in general"

C1 P2: “It was actually pleasurable.”

C3 P11: “When I was doing this whole course I thought if only we had this for all our courses. It was brilliant. I couldn’t get over the freshness the difference the variety and fun.”

C1 P2: “I have to say being a user I was surprised at how much I enjoyed doing this … but I thought this was fun.”

Self reports, coupled with the evidence from the analysis of relative experience, which showed a change in attitude among participants after the learning experience and behavioural responses, which showed evidence of persistence and effort, it is clear that some participants felt intrinsic motivation during the learning experience as a result the use of gamification to support feelings of autonomy, competency and relatedness.

5.8 Unexpected Results

A final summary activity report was pulled from the VLE several days after the learning experience ended. Five participants had continued participating in activities after the learning experience ended. 2 of these participants were contacted to ask why this was. One reported that they wanted the satisfaction of completing all of the activities. The other said that they were genuinely enjoying the activities and wanted to take the time to have a look at all of them. Both of these responses provide further, unexpected evidence for intrinsic motivation.

Some activities within the VLE allowed participants to post comments. The intention was that participants should use this feature to answer questions or make comments relating directly to the content.

An unexpected occurrence was that some participants made more general comments on how they felt about the content. A selection of these is provided in **Appendix N**.

Some common points from these comments were that the activities were memorable, with one participant saying: “I will remember more from this short video than I would from sitting in a class listening to someone drone on” and another saying “This was really memorable. Well done.”

Others noted the relevance of the material with one participant saying “(It) helps to see some “real life” examples for a change…” suggesting that in their prior experience, there was an absence of real life examples.

5.9 Summary

This chapter has presented the process for analysing data and the findings from different data sources used to answer the research questions. The next chapter will discuss the findings by answering the research question and sub question while acknowledging the limitations of the study and will also make recommendations for future work.

Chapter 6: Conclusions and Future Work

This chapter presents a discussion and conclusions on the findings from the study. The research question and sub-questions are used to orientate the discussion in this chapter. The chapter concludes with acknowledgements as to the limitations of the research and suggestions for future research.

6.1 Conclusions Drawn from Study

The research question for this study was:

How will gamified learning impact on learner motivation in an online CPD environment?

The study also had an underlying sub question:

How can gamified learning support learner autonomy, competency and relatedness in an entirely online environment?

The sub-question will be reviewed first because it will assist in fully exploring the primary research question. To answer the sub-question, each of the learner needs of autonomy, competency and relatedness are discussed separately.

6.1.2 Autonomy

Participant autonomy was demonstrated through several measures – pre & post activity questionnaires, VLE activity, free text comments on questionnaires and focus group discussions.

The perceived choice subscale in the pre and post activity questionnaires showed the biggest difference in average score across the subscales, indicating a significant change in attitude. These results were initially approached with some caution as the researcher was aware that the compliance element of CPD may have influenced feelings of a lack of choice in the pre activity questionnaire.

The pressure/tension subscale also provided evidence that autonomy was supported as feelings of pressure and tension decreased when the post activity questionnaire was compared to the pre activity questionnaire. Some did still have feelings of pressure and tension but, as the qualitative data showed, this was viewed positively, either as something that made the experience less tedious or as a measure for encouraging participation.

VLE activity demonstrated that some participants chose to skip levels and that participants also chose to repeat quizzes to improve scores, further evidence of the need of autonomy being met.

Free text comments and focus group comments provided validity to the findings from quantitative data. The overall analysis shows that the use of choice, experimentation and feedback successfully supported autonomy, creating a supporting structure that provided participants with flexibility, yet avoided control and criticism while encouraging feelings of choice, independence and internal assent.

6.1.3 Competency

The pre and post activity questions relating to competency showed some shift in attitudes but this subscale showed the smallest change when compared to all other subscales, suggesting that attempts to foster feelings of competency were less successful than attempts to promote autonomy and relatedness.

Competency may have been affected by the overall design as some participants viewed activities in a similar vein to casual games and therefore did not take them too seriously.

It also appeared that freedom to fail may have had an effect on competency as some participants felt they had the freedom to get questions wrong with low consequences, which may have had a negative effect on feelings of competency, as allowing and even encouraging failure could have had a negative impact on feelings of mastery.

There were however, some positive indicators for competency within the data. In reviewing and coding the data from the focus group interview, the relevance of the learning as compared to participant's past experience, emerged strongly and was a topic that arose continually during the discussion as the comments below show.

C3 P11: "The videos were all real world application." **C2 P8**: "It made you think about what you actually do on a day to day basis." **C1 P2**: "The data protection … had day to day practical application."

This was an important development because, as the literature review showed, gamification can assist with the transfer of learning to the actual situation (Kapp, 2012b). It was also noted in the literature review that CPD should consist of relevant learning activities to avoid it becoming little more than a tick box exercise and a failure to include relevant tasks can lead to an absence of competency (Beffa-Negrini et al., 2002; Friedman, 2012; Gould et al., 2014).

Challenge, rewards and feedback were used to create optimal challenges through multidimensional activities with positive feedback with the aim of promoting feelings of effectiveness or masterfulness in behaviour. There was evidence of success in meeting the need for feelings of competency for some but feelings of competency were fostered less successfully than either autonomy or relatedness due to a lack of balance between competency and autonomy and due to the nature of some activities being too much like a casual game for some.

6.1.4 Relatedness

In the pre activity questionnaire, relatedness had the lowest score of all of the subscales. The positive change evident from the post activity questionnaire was significant when it is considered that part of the design called for the creation of a relational base without direct interaction between participants through the use of the concept of “playing alone together”, allowing participants to experience a sense of relatedness and yet learn on demand and on their own terms.

The focus group revealed that most participants viewed team elements positively and saw that the use of teamwork and competition created a positive sense of accountability.

However, it was noted when analysing the individual cases that one team performed relatively poorly when compared to others. The focus group revealed that an initial poor performance from the team discouraged some team members from participating, which damaged social connectedness and relatedness. For others though, feelings of relatedness were successfully realised through the creation of a relation base using points, leaderboards, teamwork, competition and playing alone together.

These sections have demonstrated that it is possible to satisfy the needs of autonomy, competency and relatedness in an entirely online environment but that satisfaction of these needs for all participants is difficult because the use of gamification may not be suitable for meeting the needs of some. It can be difficult to balance the satisfaction of the needs of autonomy, competency and relatedness. Freedom to fail, while very successful in supporting autonomy, can in turn have a negative effect on competency. Similarly, reward was very positive for some in supporting competency, while for others it added pressure, which did not help in sustaining competency. Feelings of relatedness while met for some through teamwork and competition had a negative effect on relatedness for others as the inactivity of team mates led to frustration.

6.1.5 How Will Gamified Learning Impact on Learner Motivation in an Online CPD Environment?

Having examined the sub question, it is now possible to examine the primary research question.

Intrinsic motivation is driven by and focuses on interest or enjoyment, relatedness, perceived competency and autonomy during the process of pursuing or completing goals (Ryan & Deci, 2000b; Touré-Tillery & Fishbach, 2014).

Self determination theory, proposes that if the needs of autonomy, competency and relatedness are fully met, it will foster the highest forms of engagement and intrinsic motivation, while the deprivation of these needs can cause fragmentation, alienation and amotivation (Chen & Jang, 2010; Ryan & Deci, 2000b). While some participants may not have had these needs entirely met, they were not entirely deprived of these needs either. So although some participants did not experience intrinsic motivation, participation still led to higher quality engagement and learning when compared to their reported past experience with CPD.

The previous sections concluded that it is possible to meet the needs of autonomy, competency and relatedness through the use of gamification for some. The result should therefore be that some participants should have felt intrinsically motivated and should express greater satisfaction with learning as they should enjoy or find interest in the activity for its own sake (Ryan & Deci, 1985).

While intrinsic motivation cannot be observed or recorded directly, it was measured in relative terms, through behavioural responses and through self reports (Bekele, 2010; Eisenberger & Armeli, 1997; Iacovides, 2011; Muntean, 2011; Ryan & Deci, 2000a; Song et al., 2013; Touré-Tillery & Fishbach, 2014).

Pre and post activity questionnaires demonstrated that, in relative terms, some participants felt intrinsic motivation compared to their previous experience. This was validated through an examination of online activity, which showed strong evidence of the behavioural responses of regular, ongoing engagement, persistence and effort, which are all positive predictors for intrinsic motivation. Outliers in the data reported time as the main reason for either a lack of participation or intense but not ongoing participation; none reported a lack of interest. Self reports in questionnaires, informal discussions and the focus group provided further indications of intrinsic motivation with key adjectives providing evidence of intrinsic motivation.

It can therefore be concluded that the use of gamification can have a positive impact on motivation among some learners, possibly even leading to feelings of intrinsic motivation. While there was some difficulty in meeting the needs of autonomy, competency and relatedness for all participants, the use of gamification did have positive results. Not only did it improve the overall attitude of the majority of participants, it also allowed for activities to focus on enhancing competence and performance by providing relevant learning opportunities for participants to apply their knowledge to real life situations, meaning that, in this case, CPD was not simply a tick box exercise.

6.2 Limitations of Research

The study generated a very high volume of both quantitative and qualitative data. As the researcher is a novice, the interpretation of data and conclusions drawn could be improved on. Also, Yin (2009) notes that novice researchers integrating embedded units into a case study tend to conduct analysis at sub unit level and fail to return to the global phenomenon central to the research. Attempts were made to direct the discussion back to the global but this could possibly have been improved on.

The learning experience was delivered over a period of two and half weeks. It would have been desirable to run the experience over a longer period with more activities as a longitudinal study would provide richer data. A lack of time was the most commonly reported barrier to participation and having more time may have encouraged greater participation. Those engaging in CPD are typically required to engage in activities over an entire year, every year. Running the experience over a full year could provide a more realistic comparison.

The novelty of the learning experience may also have had some influence on the outcomes of the study, which would not have been a factor if the experience ran over a longer period.

The size of the group participating provided a reasonable representation of the full population as participants had varying experience levels and qualifications but a larger group of participants would help to further validate results.

6.4 Recommendations from Investigation

Further study would be beneficial to address the limitations discussed above.

In sustaining a gamified learning experience over time, there is a danger that monotony could set in, which could require a greater variation in activities. As one participant in the focus group asked: **C2 P8**: "… is there a risk of running out of variety?"

Further time and resources could allow for the incorporation of other suitable game elements into the design. For example, direct contact between participants could help to improve feelings of relatedness, perhaps through the use of synchronous or asynchronous online discussion. Similarly, procedural generation (Przybylski et al., 2010) could be used to foster both autonomy and relatedness. This is a complicated process whereby environments and content are affected by other players in a game world, thereby generating new content and supporting greater opportunities. If this theory was applied to a learning context, it could support autonomy by providing a greater range of activities for learners. It could also support feelings of relatedness as learners will feel they are in a social environment if there is potential for their choices to affect other learners.

The compliance element of CPD may also require further investigation and consideration. Although the "tick box" method of CPD does not fully consider learner needs, it does ensure the box gets ticked. If learners have too much autonomy and the ability to skip content, it could be difficult from a practical point of view to ensure that the box is ticked to meet compliance requirements.

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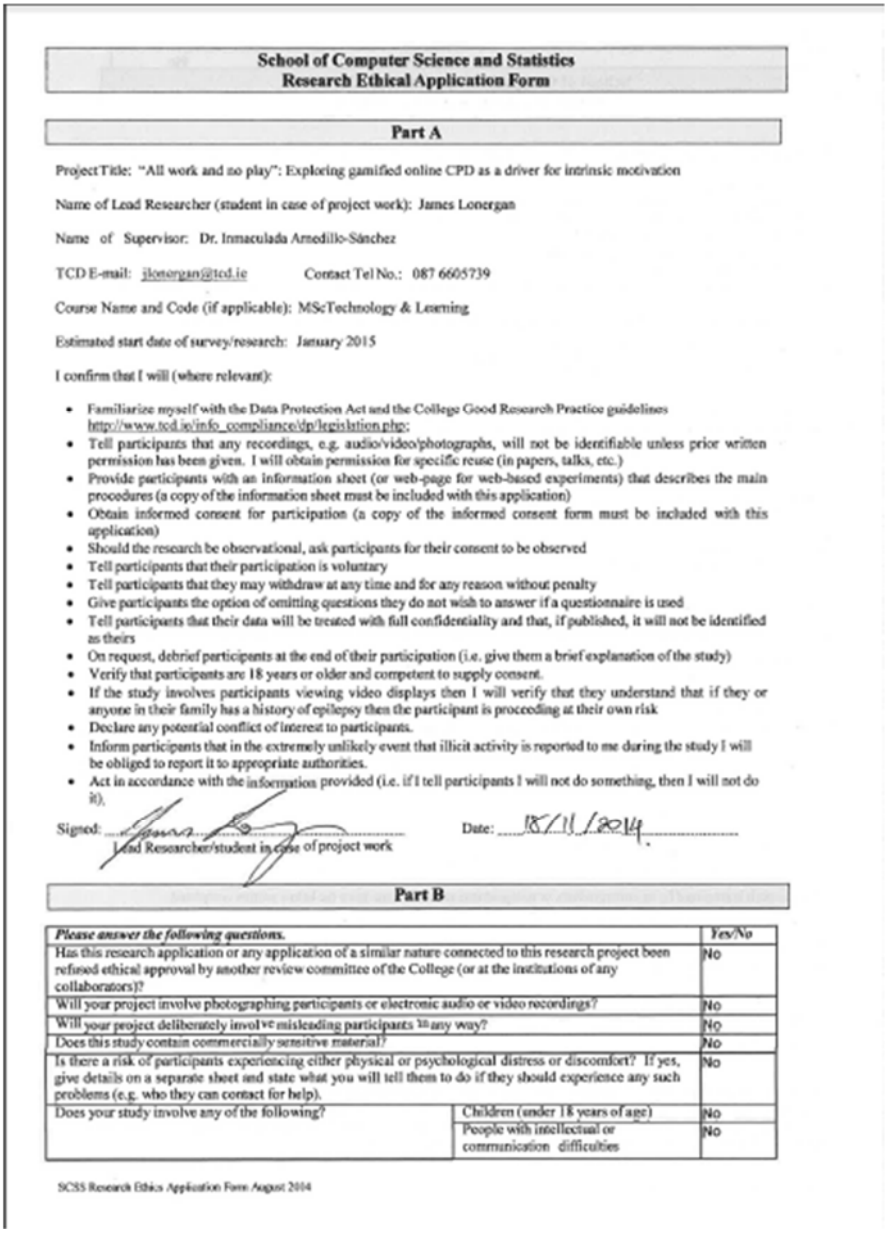
Appendices

Appendix A – Signed Ethics Application



School of Computer Science and Statistics
Research Ethical Application Form

Part A

Project Title: "All work and no play": Exploring gamified online CPD as a driver for intrinsic motivation

Name of Lead Researcher (student in case of project work): James Lonergan

Name of Supervisor: Dr. Inmaculada Arnedillo-Sánchez

TCD E-mail: jlonergan@tcd.ie Contact Tel No.: 087 6605739

Course Name and Code (if applicable): MScTechnology & Learning

Estimated start date of survey/research: January 2015

I confirm that I will (where relevant):

- Familiarize myself with the Data Protection Act and the College Good Research Practice guidelines http://www.tcd.ie/info_compliance/dp/legislation.php;
- Tell participants that any recordings, e.g. audio/video/photographs, will not be identifiable unless prior written permission has been given. I will obtain permission for specific reuse (in papers, talks, etc.)
- Provide participants with an information sheet (or web-page for web-based experiments) that describes the main procedures (a copy of the information sheet must be included with this application)
- Obtain informed consent for participation (a copy of the informed consent form must be included with this application)
- Should the research be observational, ask participants for their consent to be observed
- Tell participants that their participation is voluntary
- Tell participants that they may withdraw at any time and for any reason without penalty
- Give participants the option of omitting questions they do not wish to answer if a questionnaire is used
- Tell participants that their data will be treated with full confidentiality and that, if published, it will not be identified as theirs
- On request, debrief participants at the end of their participation (i.e. give them a brief explanation of the study)
- Verify that participants are 18 years or older and competent to supply consent.
- If the study involves participants viewing video displays then I will verify that they understand that if they or anyone in their family has a history of epilepsy then the participant is proceeding at their own risk
- Declare any potential conflict of interest to participants.
- Inform participants that in the extremely unlikely event that illicit activity is reported to me during the study I will be obliged to report it to appropriate authorities.
- Act in accordance with the information provided (i.e. if I tell participants I will not do something, then I will not do it).

Signed: ..... Date: 18/11/2014
Lead Researcher/student in case of project work

Part B

Please answer the following questions.		*Yes/No*
Has this research application or any application of a similar nature connected to this research project been refused ethical approval by another review committee of the College (or at the institutions of any collaborators)?		No
Will your project involve photographing participants or electronic audio or video recordings?		No
Will your project deliberately involve misleading participants in any way?		No
Does this study contain commercially sensitive material?		No
Is there a risk of participants experiencing either physical or psychological distress or discomfort? If yes, give details on a separate sheet and state what you will tell them to do if they should experience any such problems (e.g. who they can contact for help).		No
Does your study involve any of the following?	Children (under 18 years of age)	No
	People with intellectual or communication difficulties	No

SCSS Research Ethics Application Form August 2014

	Patients	No

School of Computer Science and Statistics
Research Ethical Application Form

Details of the Research Project Proposal must be submitted as a separate document to include the following information:

1. Title of project
2. Purpose of project including academic rationale
3. Brief description of methods and measurements to be used
4. Participants - recruitment methods, number, age, gender, exclusion/inclusion criteria, including statistical justification for numbers of participants
5. Debriefing arrangements
6. A clear concise statement of the ethical considerations raised by the project and how you intend to deal with them
7. Cite any relevant legislation relevant to the project with the method of compliance e.g. Data Protection Act etc.

Part C

I confirm that the materials I have submitted provided a complete and accurate account of the research I propose to conduct in this context, including my assessment of the ethical ramifications.

Signed: ..... Date: 18/11/2014
Lead Researcher/student in case of project work

There is an obligation on the lead researcher to bring to the attention of the SCSS Research Ethics Committee any issues with ethical implications not clearly covered above.

Part D

If external or other TCD Ethics Committee approval has been received, please complete below.

External/TCD ethical approval has been received and no further ethical approval is required from the School's Research Ethical Committee. I have attached a copy of the external ethical approval for the School's Research Unit.

Signed: ..... Date: .....
Lead Researcher/student in case of project work

Part E

If the research is proposed by an undergraduate or postgraduate student, please have the below section completed.

I confirm, as an academic supervisor of this proposed research that the documents at hand are complete (i.e. each item on the submission checklist is accounted for) and are in a form that is suitable for review by the SCSS Research Ethics Committ

Signed: ..... Date: 18th November 2014
Supervisor

Completed application forms together with supporting documentation should be submitted electronically to research-ethics@scss.tcd.ie Please use TCD e-mail addresses only. When your application has been reviewed and approved by the Ethics committee hardcopies with original signatures should be submitted to the School of Computer Science & Statistics, Room F37, O'Reilly Institute, Trinity College, Dublin 2.

Appendix B – Participant Informed Consent Form

TRINITY COLLEGE DUBLIN

INFORMED CONSENT FORM

LEAD RESEARCHER: Mr. James Lonergan

BACKGROUND OF RESEARCH:

The purpose of this study is to explore whether gamified online CPD e-learning can act as a driver for intrinsic motivation in learners. It will present learners with a series of online activities to complete. These activities will contain elements of game mechanics such as levels, points, achievements, leaderboards and feedback to present the content in a new way when compared to the existing content available to learners. The research aims to examine whether this use of gamified online CPD e-learning will impact positively on learner's intrinsic motivation. It will also examine learner's perceptions of the relevance of professional development when presented in a gamified format versus the more traditional text based format that the learners will be familiar with from past experience.

PROCEDURES OF THIS STUDY:

It is estimated that this study will begin in January 2015 and end in February 2015. Participants will be provided with a user id and password to access a Virtual Learning Environment (VLE), where all activities will be contained. Activities will consist of e-learning courses that will be created using tools such as Articulate Storyline, Articulate Studio and Camtasia. Activities may also consist of group work which will be presented using online meeting tools, such as webex and GoToMeeting. At the start of the study, participants will be given detailed instructions in the use of the VLE. During the course of the study, participants may be contacted using methods such as email, telephone and face to face to request that they login to the VLE to complete a particular task or tasks. Participants will be divided into teams. Teams will be awarded points based on items such as scores in individual activities, the participation of each team member and results of group activities. Individuals will also receive points based on their personal participation and scores. Individuals might also have the opportunity to receive "achievement awards" based on achievements such as being the first to complete part of the course, being the first to complete all activities or holding the best score in an activity. Daily leaderboards may be used to rank teams and individuals. The VLE will record data on each participant's use of the system and activities therein. This will include data such as number or logins, last login, time spent, number of attempts, completion status and score. This data will be used to create individual and team leaderboards and will also be used as part of data analysis for the study. Participants will be asked to complete questionnaires and will also be asked to participate in interviews. Interviews will be conducted using means such as: face to face, telephone and email. An opt-out clause will be included with all questionnaires and at interviews. At the beginning of the questionnaire or interview, participants will be presented or have read to them a statement similar to the following: "Each question is optional. Feel free to omit a response to any question: however I would be grateful if all questions are responded to." Participants will be provided with a transcript of notes made during their interview and will have the opportunity to delete any information that they perceive may identify them.

PUBLICATION:

The data will be used to produce a dissertation project as part of the completion requirements for the MSc Technology & Learning in Trinity College Dublin. The research may or may not be published. Any participants who would like to learn of the results of the study can contact the lead researcher to request copies of any reports. Participants will not be identified in the final report. Pseudonyms will be used in cases where a participant is referred to specifically. Individual results may be aggregated anonymously and research reported on aggregate results.

DECLARATION:

- I am 18 years or older and am competent to provide consent.
- I have read, or had read to me, a document providing information about this research and this consent form. I have had the opportunity to ask questions and all my questions have been answered to my satisfaction and understand the description of the research that is being provided to me.
- I agree that my data is used for scientific purposes and I have no objection that my data is published in scientific publications in a way that does not reveal my identity.
- I understand that no photographing, electronic audio or video recording of participants will be used during this study.
- I understand that if I make illicit activities known, these will be reported to appropriate authorities.
- I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights.
- I understand that I may refuse to answer any question and that I may withdraw at any time without penalty.
- I understand that my participation is fully anonymous and that no personal details about me will be recorded.
- I understand that if I or anyone in my family has a history of epilepsy then I am proceeding at my own risk.
- I have received a copy of this agreement.

PARTICIPANT'S

NAME:

PARTICIPANT'S

SIGNATURE:

Date:

Statement of investigator's responsibility: I have explained the nature and purpose of this research study, the procedures to be undertaken and any risks that may be involved. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent.

RESEARCHERS CONTACT DETAILS: Mr. James Lonergan; jlonerga@tcd.ie; 0876605739

INVESTIGATOR'S SIGNATURE:

Date:

Appendix C – Participant Information Sheet

TRINITY COLLEGE DUBLIN

INFORMATION SHEET FOR PARTICIPANTS

Background context of research:
The purpose of this study is to explore whether gamified online CPD e-learning can act as a driver for intrinsic motivation. It will present learners with a series of online activities to complete. These activities will contain elements of game mechanics such as levels, points, achievements, leaderboards and feedback to present the content in a new way when compared to the existing content available to learners. The research aims to examine whether this use of gamified online CPD e-learning will impact positively on learner's intrinsic motivation. It will also examine learner's perceptions of the relevance of professional development when presented in a gamified format versus the more traditional text based format that the learners will be familiar with from past experience.

Procedures relevant to the participant within this particular study:
It is estimated that this study will begin in January 2015 and end in February 2015. Participants will be selected based on qualification held and experience in the industry to help ensure a good mix of levels of experience and expertise. You will be provided with a user id and password to access a Virtual Learning Environment (VLE), where all activities will be contained. Activities will consist of e-learning courses that will be created using tools such as Articulate Storyline, Articulate Studio and Camtasia. Activities may also consist of group work which will be presented using online meeting tools, such as webex and GoToMeeting. At the start of the study, you will be given detailed instructions in the use of the VLE. During the course of the study, you may be contacted using methods such as email, telephone and face to face to request that you login to the VLE to complete a particular task or tasks. You will be divided into teams with other participants. Teams will be awarded points based on items such as scores in individual activities, the participation of each team member and results of group activities. Individuals will also receive points based on their personal participation and scores. Individuals might also have the opportunity to receive "achievement awards" based on achievements such as being the first to complete part of the course, being the first to complete all activities, holding the best score in an activity. Daily leaderboards may be used to rank teams and individuals. The VLE will record data on each participant's use of the system and activities therein. This will include data such as number or logins, last login, time spent, number of attempts, completion status and scores. This data will be used to create individual and team leaderboards and will also be used as part of data analysis for the study. You will be asked to complete questionnaires and will also be asked to participate in interviews. An opt-out clause will be included with all questionnaires and at interviews. At the beginning of the questionnaire or interview, you will be presented or have read to you a statement similar to the following: "Each question is optional. Feel free to omit a response to any question: however I would be grateful if all questions are responded to." Interviews will be conducted using means such as: face to face, telephone and email. You will be provided with a transcript of notes made during their interview and you will have the opportunity to delete any information that you perceive may identify you.

Declarations of conflicts of interest:

- It is acknowledged that you hold a professional relationship with the researcher. In order to help ensure the veracity of questionnaire responses, a third party "gatekeeper" will deliver questionnaires to you and will collect all responses. This will help to warrant that your responses are anonymous and thereby not affected by your relationship with the researcher. You may refuse to participate in interviews if you feel that it will impact on your relationship with the researcher. During interviews, you will be asked to ensure that you give your full and honest opinion and to try not to let your relationship with the researcher influence your answers. This study is entirely unrelated to any activities or interests that you share with the researcher.

The voluntary nature of participation:

- You reserve the right to withdraw and to omit individual responses without penalty.

Expected duration:

- It is estimated that the study will be conducted during January 2015. It is expected that the total duration of your involvement will be no more than 8-10 hours, but this could vary dependent on how long you decide to spend on each task and whether you decide to undertake tasks multiple times.

Anticipated risks/benefits to the participant

- No risks are anticipated. It is expected that you will experience a positive learning experience and will have a positive attitude to learning through this method. You may experience a positive impact on knowledge acquisition and practical, workplace skills.

The provisions for debriefing after participation

- If any comments are attributed to you, you will be debriefed to explain the understanding the researcher took from the comment and the context in which the comment will be used.

Preservation of participant and third-party anonymity

- Participants and third parties will not be identified in the analysis, publication or presentation of resulting data and findings. Pseudonyms will be used in cases where comments or information is attributed to any individual.

Inadvertent discovery of illicit activities

- If any participants make illicit activities known, these will be reported to appropriate authorities.

Provision for verifying direct quotations and their contextual appropriateness

- You understand that the researcher holds the provision for verifying direct quotations and their contextual appropriateness.

Appendix D – Board of Management Informed Consent Form

TRINITY COLLEGE DUBLIN
BOARD OF MANAGEMENT INFORMED CONSENT FORM

LEAD RESEARCHER: James Lonergan

BACKGROUND OF RESEARCH:
The purpose of this study is to explore whether gamified online CPD e-learning can act as a driver for intrinsic motivation in learners. It will present learners with a series of online activities to complete. These activities will contain elements of game mechanics such as levels, points, achievements, leaderboards and feedback to present the content in a new way when compared to the existing content available to learners. The research aims to examine whether this use of gamified online CPD e-learning will impact positively on learner's intrinsic motivation. It will also examine learner's perceptions of the relevance of professional development when presented in a gamified format versus the more traditional text based format that the learners will be familiar with from past experience.

PROCEDURES OF THIS STUDY:
It is estimated that this study will begin in January 2015 and end in February 2015. Participants will be provided with a user id and password to access a Virtual Learning Environment (VLE), where all activities will be contained. Activities will consist of e-learning courses that will be created using tools such as Articulate Storyline, Articulate Studio and Camtasia. Activities may also consist of group work which will be presented using online meeting tools, such as webex and GoToMeeting. At the start of the study, participants will be given detailed instructions in the use of the VLE. During the course of the study, participants may be contacted using methods such as email, telephone and face to face to request that they login to the VLE to complete a particular task or tasks. Participants will be divided into teams. Teams will be awarded points based on items such as scores in individual activities, the participation of each team member and results of group activities. Individuals will also receive points based on their personal participation and scores. Individuals might also have the opportunity to receive "achievement awards" based on achievements such as being the first to complete part of the course, being the first to complete all activities, holding the best score in an activity. Daily leaderboards may be used to rank teams and individuals. The VLE will record data on each participant's use of the system and activities therein. This will include data such as number or logins, last login, time spent, number of attempts, completion status and scores. This data will be used to create individual and team leaderboards and will also be used as part of data analysis for the study. Participants will be asked to complete questionnaires and will also be asked to participate in interviews. An opt-out clause will be included with all questionnaires and at interviews. At the beginning of the questionnaire or interview, participants will be presented or have read to them a statement similar to the following: "Each question is optional. Feel free to omit a response to any question: however I would be grateful if all questions are responded to." Interviews will be conducted using means such as: face to face, telephone and email. Participants will be provided with a transcript of notes made during their interview and will have the opportunity to delete any information that they perceive may identify them.

PUBLICATION:
The data will be used to produce a dissertation project as part of the completion requirements for the MSc Technology & Learning in Trinity College Dublin. The research may or may not be published. Any participants who would like to learn of the results of the study can contact the lead researcher to request copies of any reports. Participants will not be identified in the final report. Pseudonyms will be used in cases where a participant is referred to specifically. Individual results may be aggregated anonymously and research reported on aggregate results.

DECLARATION:
- I am 18 years or older and am competent to provide consent.
- I have read, or had read to me, a document providing information about this research and this consent form. I have had the opportunity to ask questions and all my questions have been

answered to my satisfaction and understand the description of the research that is being provided to me.

- I agree that the researcher may make use of the Insurance Institute of Ireland's Virtual Learning Environment (VLE) for the purposes of completion of this project.
- I agree that the researcher may use the VLE for presentation of learning materials to participants in this study.
- I agree that the researcher may use the VLE to record participant's use of the VLE and learning materials
- I have received a copy of this agreement.
- I have the authority to sign this consent form on behalf of the Board of Management of The Insurance Institute of Ireland.

COMPANY SECRETARY NAME: Frank Craven

COMPANY SECRETARY'S SIGNATURE:

Date:

Statement of investigator's responsibility: I have explained the nature and purpose of this research study, the procedures to be undertaken and any risks that may be involved. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent.

RESEARCHERS CONTACT DETAILS: Name: James Lonergan; Email: jlonerga@tcd.ie**; Phone: 0876605739**

INVESTIGATOR'S SIGNATURE:

Date:

Appendix E – Board of Management Information Sheet

TRINITY COLLEGE DUBLIN

INFORMATION SHEET FOR BOARD OF MANAGEMENT

Background context of research:
The purpose of this study is to explore whether gamified online CPD e-learning can act as a driver for intrinsic motivation in learners. It will present learners with a series of online activities to complete. These activities will contain elements of game mechanics such as levels, points, achievements, leaderboards and feedback to present the content in a new way when compared to the existing content available to learners. The research aims to examine whether this use of gamified online CPD e-learning will impact positively on learner's intrinsic motivation. It will also examine learner's perceptions of the relevance of professional development when presented in a gamified format versus the more traditional text based format that the learners will be familiar with from past experience.

Procedures relevant to the Board within this particular study:
It is estimated that this study will begin in January 2015 and end in February 2015. Participants will be provided with a user id and password to access a Virtual Learning Environment (VLE), where all activities will be contained. Activities will consist of e-learning courses that will be created using tools such as Articulate Storyline, Articulate Studio and Camtasia. Activities may also consist of group work which will be presented using online meeting tools, such as webex and GoToMeeting. At the start of the study, participants will be given detailed instructions in the use of the VLE. During the course of the study, participants may be contacted using methods such as email, telephone and face to face to request that they login to the VLE to complete a particular task or tasks. Participants will be divided into teams. Teams will be awarded points based on items such as scores in individual activities, the participation of each team member and results of group activities. Individuals will also receive points based on their personal participation and scores. Individuals might also have the opportunity to receive "achievement awards" based on achievements such as being the first to complete part of the course, being the first to complete all activities, holding the best score in an activity. Daily leaderboards may be used to rank teams and individuals. The VLE will record data on each participant's use of the system and activities therein. This will include data such as number or logins, last login, time spent, number of attempts, completion status and scores. This data will be used to create individual and team leaderboards and will also be used as part of data analysis for the study. Participants will be asked to complete questionnaires and will also be asked to participate in interviews. An opt-out clause will be included with all questionnaires and at interviews. At the beginning of the questionnaire or interview, participants will be presented or have read to them a statement similar to the following: "Each question is optional. Feel free to omit a response to any question: however I would be grateful if all questions are responded to." Interviews will be conducted using means such as: face to face, telephone and email. Participants will be provided with a transcript of notes made during their interview and will have the opportunity to delete any information that they perceive may identify them.

Declarations of conflicts of interest:
It is acknowledged that participants hold a professional relationship with the researcher. In order to help ensure the veracity of questionnaire responses, a third party "gatekeeper" will deliver questionnaires and collect responses. This will help to warrant that responses are anonymous and thereby not affected by participant relationship with the researcher. Participants may refuse to participate in interviews if they feel that it will impact on their relationship with the researcher. During interviews, participants will be asked to ensure that that they give their full and honest opinion and to try not to let their relationship with the researcher influence their answers. Participants will be advised that this study is entirely unrelated to any activities or interests that they share with the researcher.

The voluntary nature of participation:

- Participants reserve the right to withdraw and to omit individual responses without penalty.

Expected duration:

- It is estimated that this study will be conducted during January 2015. It is expected that the total duration of participant involvement will be no more than 8-10 hours but this could vary dependent on how long they decide to spend on each task and whether they decide to undertake tasks multiple times.

Preservation of participant and third-party anonymity

- Participants and third parties will not be identified in the analysis, publication or presentation of resulting data and findings. Pseudonyms will be used in cases where comments or information is attributed to any individual.

Inadvertent discovery of illicit activities

- If any participants make illicit activities known, these will be reported to appropriate authorities.

Provision for verifying direct quotations and their contextual appropriateness

The researcher holds the provision for verifying direct quotations and their contextual appropriateness.

Appendix F – Email Confirming Ethics Approval

FW: FW: Request for ethics approval

Inbox x

Sara Gutierrez Llaneza <Sara.Gutierrez@scss.

28/11/2014

to me, research-ethics

Dear James,

Many thanks for this revision. The Research Ethics Committee have reviewed and approved your application.
You may proceed with this study.

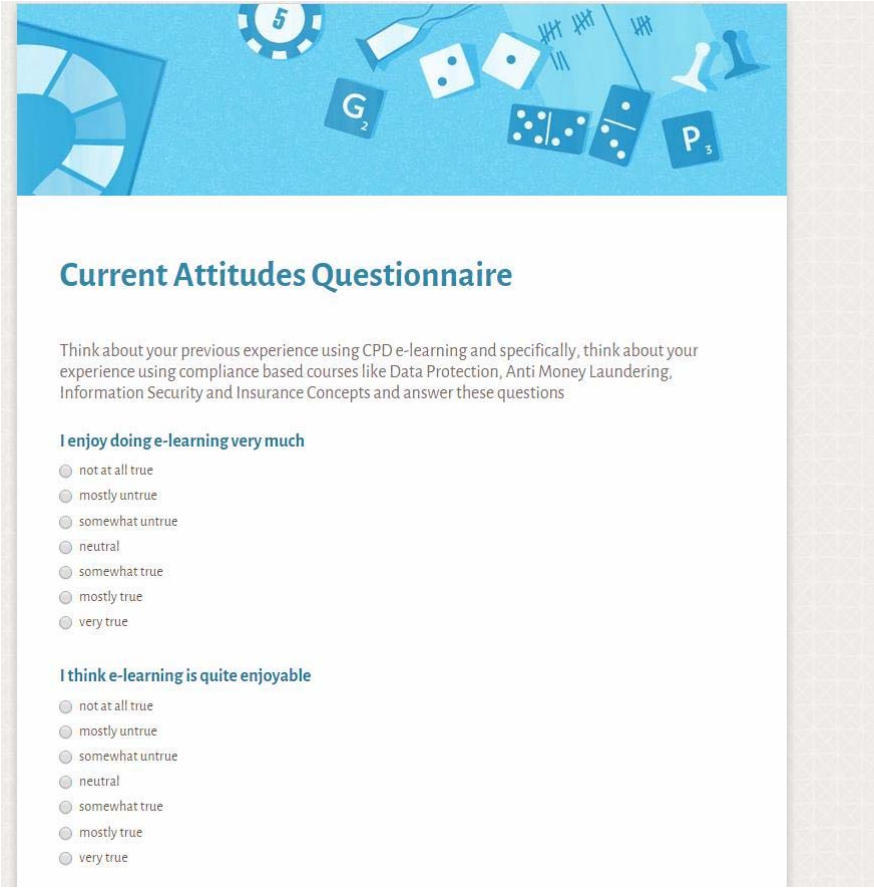
We wish you success in your research.

Regards,

Sara

From: James Lonergan [mailto:jlonerga@tcd.ie]
Sent: 27 November 2014 12:09
To: Sara.Gutierrez@scss.tcd.ie
Subject: Re: FW: Request for ethics approval

Appendix G – Pre Activity Questionnaire



Current Attitudes Questionnaire

Think about your previous experience using CPD e-learning and specifically, think about your experience using compliance based courses like Data Protection, Anti Money Laundering, Information Security and Insurance Concepts and answer these questions

I enjoy doing e-learning very much

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I think e-learning is quite enjoyable

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I think e-learning is boring

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

e-learning does not hold my attention at all

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

e-learning is fun to do

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I think I do well at e-learning, compared to others

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I think I am very good at e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

After working on e-learning for a while, I feel competent

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I am satisfied with my performance at e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I don't try very hard to do well at e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I put a lot of effort into e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

It is important to me to do well at e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I feel very tense when doing e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I try very hard at e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I feel very relaxed when doing e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I feel pressured while doing e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I am anxious while doing e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I feel like it is not my own choice to do e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I believe I have some choice about doing e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I don't really have a choice about doing e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I feel like I have to do e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I do e-learning because I have no choice

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I do e-learning because I want to

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I do e-learning because I have to

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I feel really distant to my peers when doing e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I'd really prefer not to interact with my peers in the future when doing e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I feel close to my peers when doing e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I'd like a chance to interact with my peers more often when doing e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

Additional Comments

If you have any additional comments that you would like to share in relation to any of these questions or in relation to e-learning, please include them by filling in the box below.

Submit

Appendix H – Post Activity Questionnaire

Post Activity Questionnaire

Thinking about the online activities (such as insurance concepts, information security, data protection, anti money laundering) that you recently completed, please answer the following questions:

I enjoyed doing this e-learning very much

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I think this e-learning was quite enjoyable

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I thought this e-learning was boring

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

This e-learning did not hold my attention at all

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

This e-learning was fun to do

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I think I did well at this e-learning, compared to others

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I think I was very good at this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

After working on this e-learning for a while, I felt competent

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I am satisfied with my performance at this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I didn't try very hard to do well at this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I put a lot of effort into this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

It was important to me to do well at this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I felt very tense when doing this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I tried very hard at this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I felt very relaxed when doing this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I felt pressured while doing this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I was anxious while doing this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I felt like it was not my own choice to do this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I believe I had some choice about doing this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I didn't really have a choice about doing this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I felt like I had to do this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I did this e-learning because I had no choice

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I did this e-learning because I wanted to

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I did this e-learning because I had to

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I felt really distant to my peers when doing this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I'd really prefer not to interact with my peers in the future when doing e-learning like this

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I felt close to my peers when doing this e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

I'd like a chance to interact with my peers more often when doing e-learning

- not at all true
- mostly untrue
- somewhat untrue
- neutral
- somewhat true
- mostly true
- very true

Additional Comments

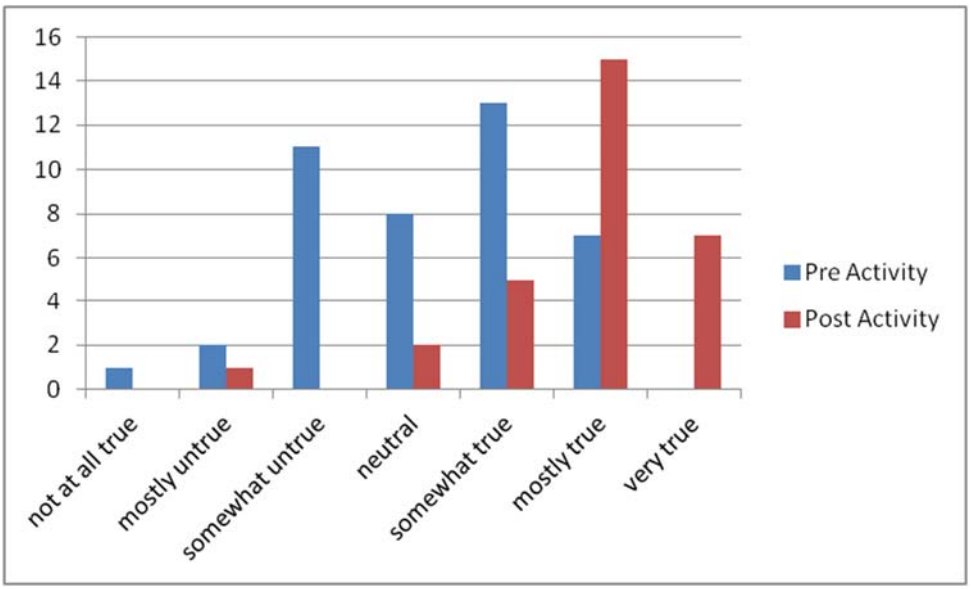
If you have any additional comments that you would like to share in relation to any of these questions or in relation to the e-learning you completed, please include them by filling in the box below.

Appendix I – Pre & Post Questionnaire Analysis

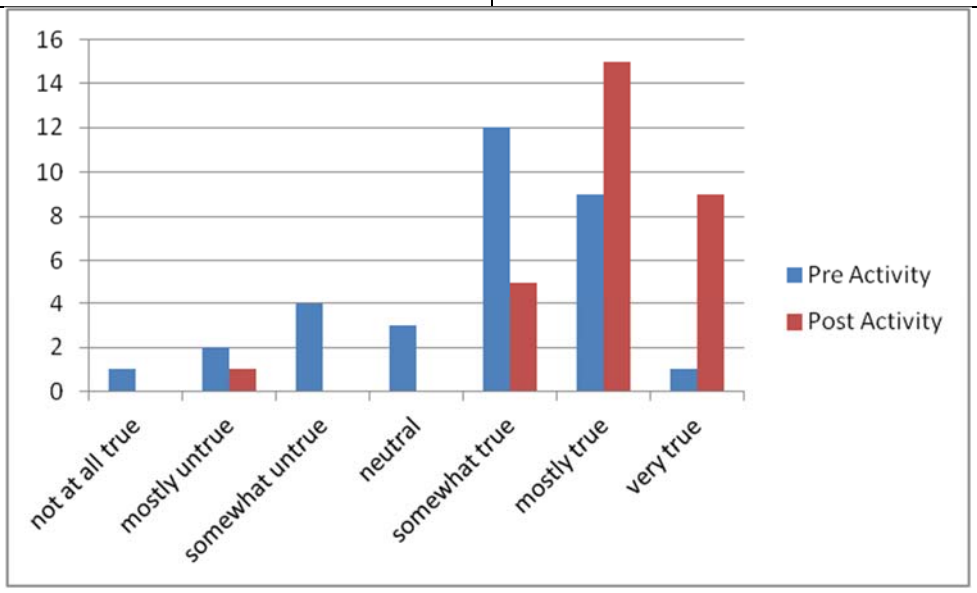
Statement Appearing Pre Questionnaire	Statement Appearing Post Questionnaire
Think about your previous experience using CPD e-learning and specifically, think about your experience using compliance based courses (such as Data Protection, Anti Money Laundering, Information Security and Insurance Concepts) and answer these questions	Thinking about the online activities (such as Data Protection, Anti Money Laundering, Information Security and Insurance Concepts) that you recently completed, please answer the following questions:

Interest / Enjoyment

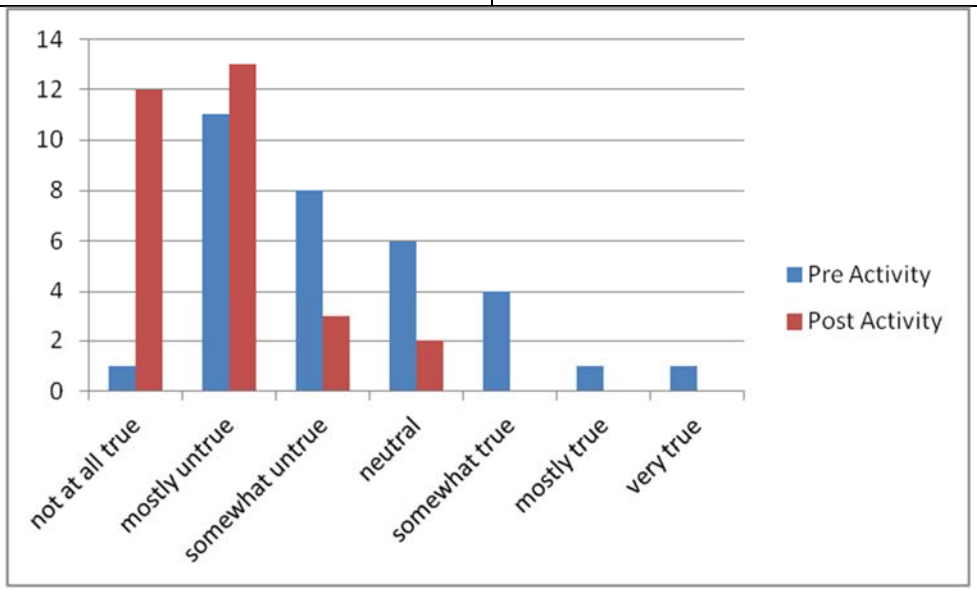
Q.	Pre Activity	Post Activity
1	I enjoy doing e-learning very much	I enjoyed doing this e-learning very much



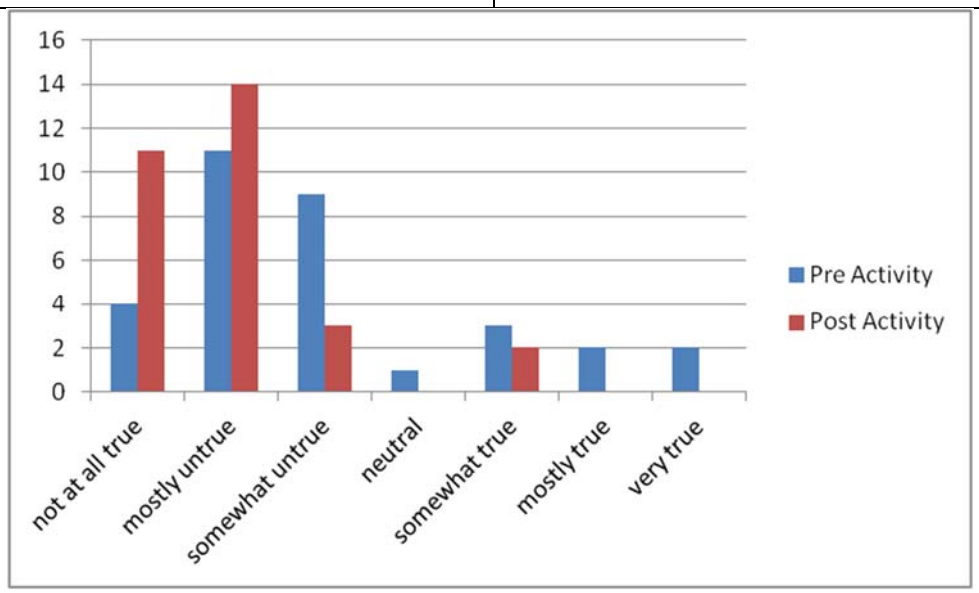
Q.	Pre Activity	Post Activity
2	I think e-learning is quite enjoyable	I think this e-learning was quite enjoyable



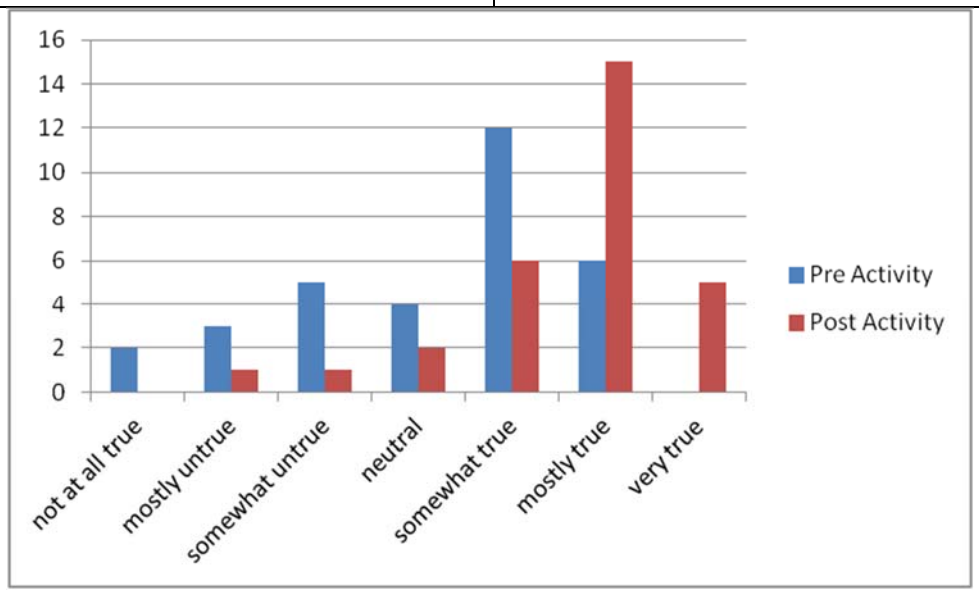
Q.	Pre Activity	Post Activity
3	I think e-learning is boring	I thought this e-learning was boring



Q.	Pre Activity	Post Activity
4	e-learning does not hold my attention at all	This e-learning did not hold my attention at all



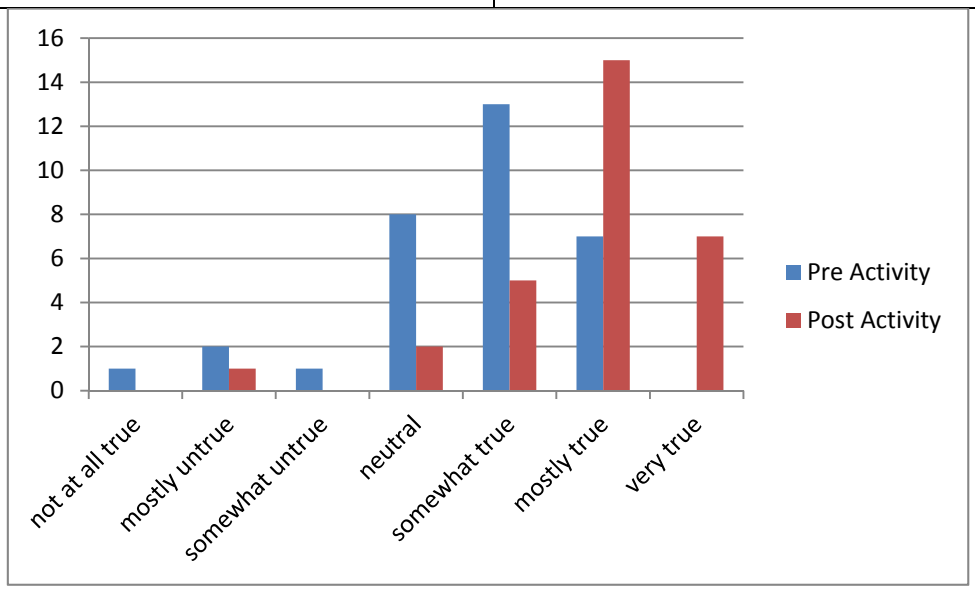
Q.	Pre Activity	Post Activity
5	e-learning is fun to do	This e-learning was fun to do



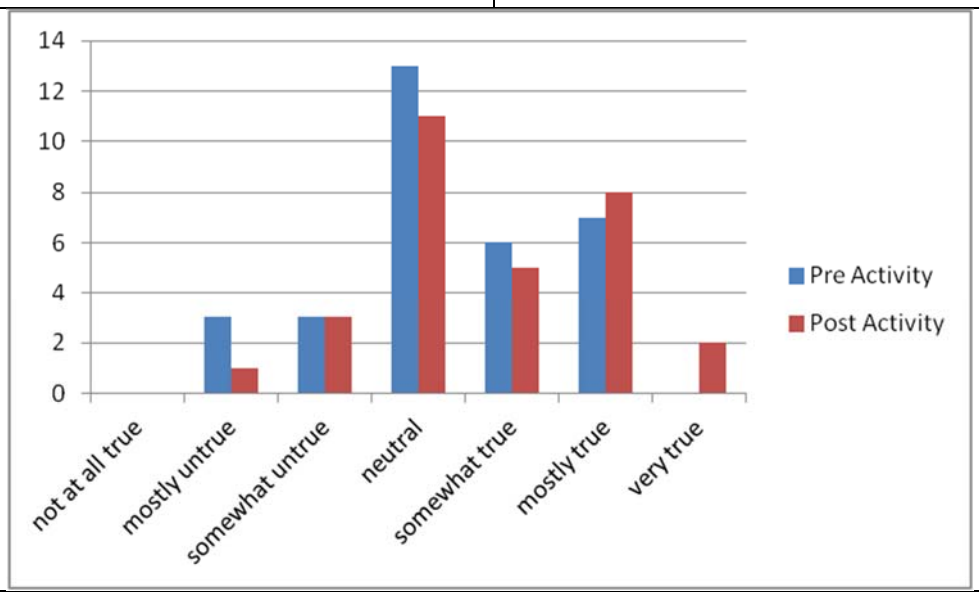
Average Across Interest / Enjoyment Sub-scale	
Pre Activity	**Post Activity**
4.6375	5.9266667

Perceived Competence

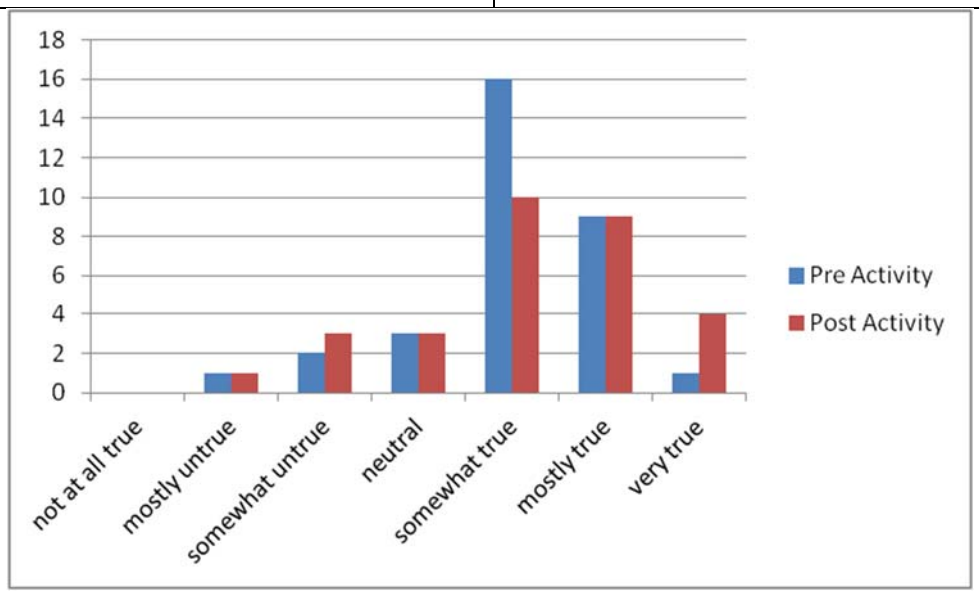
Q.	Pre Activity	Post Activity
6	I think I am very good at e-learning	I think I was very good at this e-learning



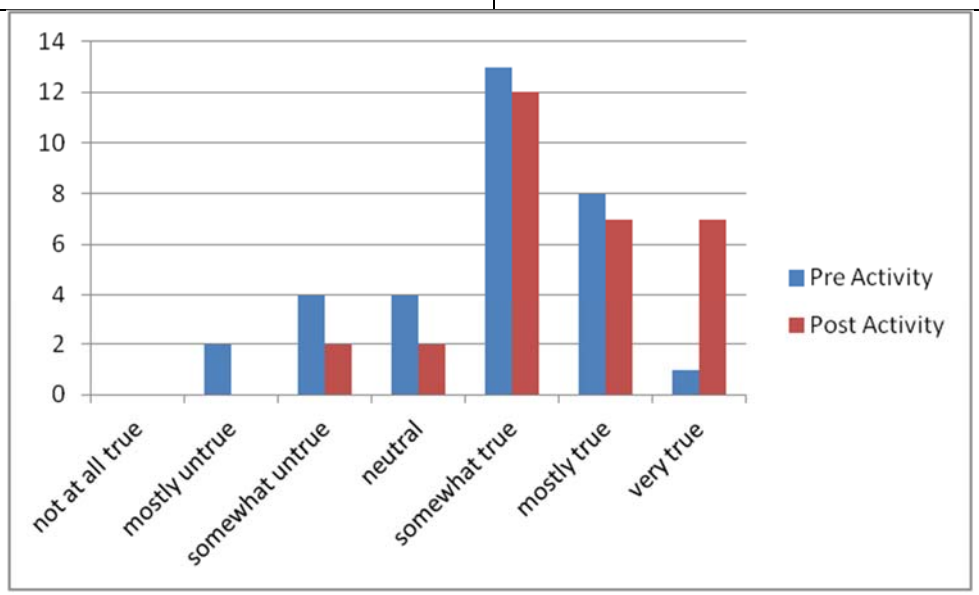
Q.	Pre Activity	Post Activity
7	I think I do well at e-learning, compared to others	I think I did well at this e-learning, compared to others



Q.	Pre Activity	Post Activity
8	I am satisfied with my performance at e-learning	I am satisfied with my performance at this e-learning



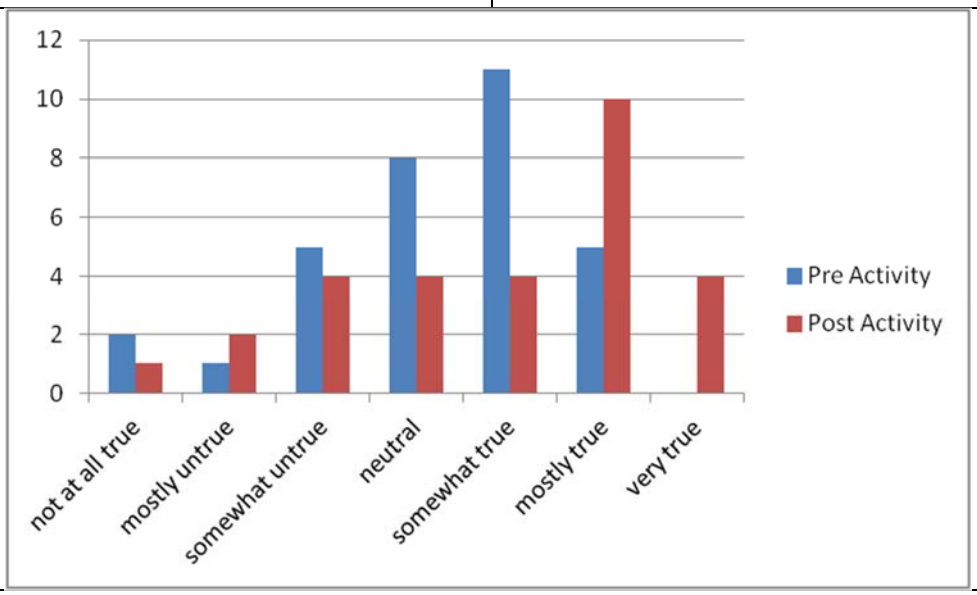
Q.	Pre Activity	Post Activity
9	After working on e-learning for a while, I feel competent	After working on this e-learning for a while, I felt competent



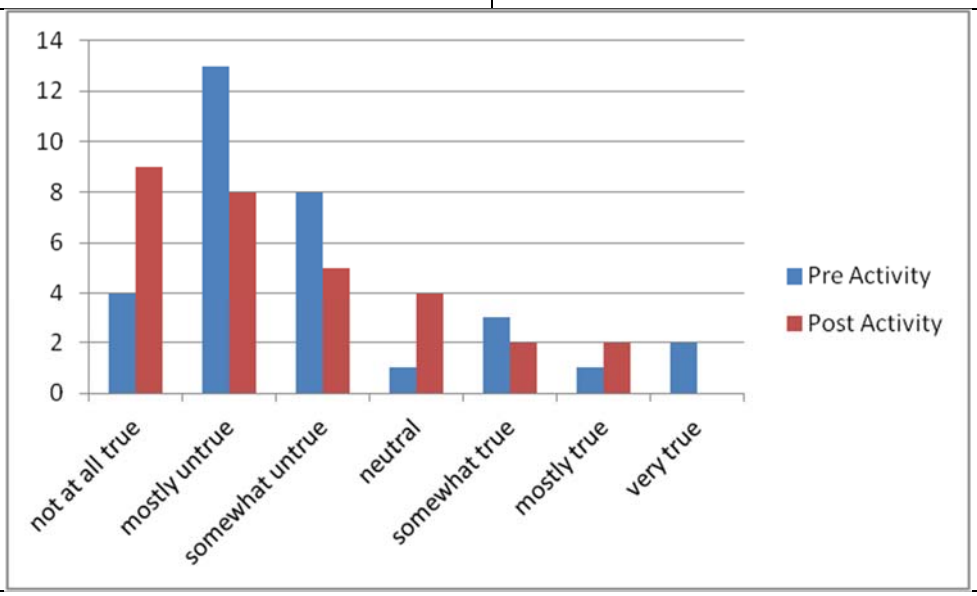
Average Across Perceived Competence Sub-scale	
Pre Activity	**Post Activity**
4.625	5.0301034

Effort / Importance

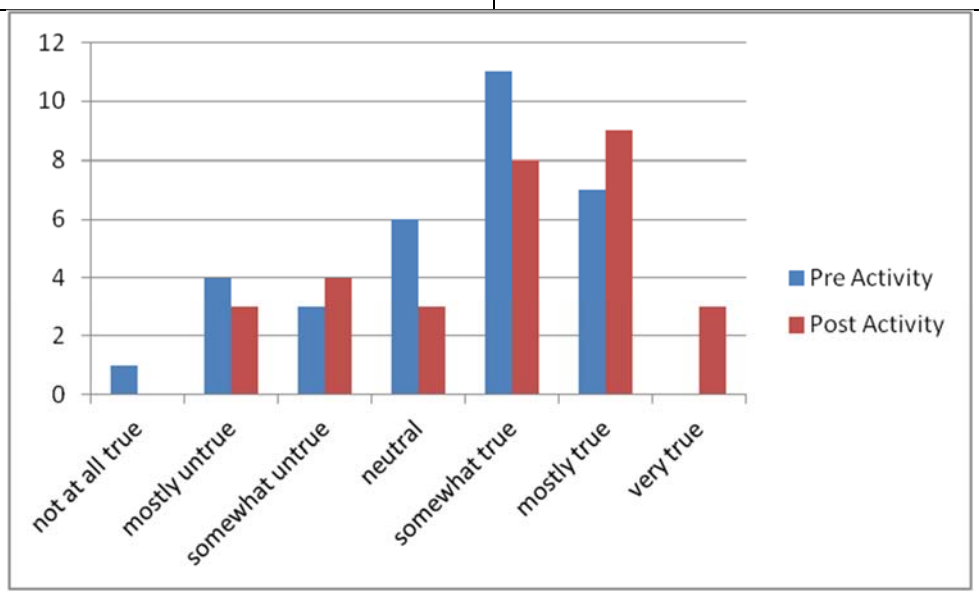
Q.	Pre Activity	Post Activity
10	I put a lot of effort into e-learning	I put a lot of effort into this e-learning



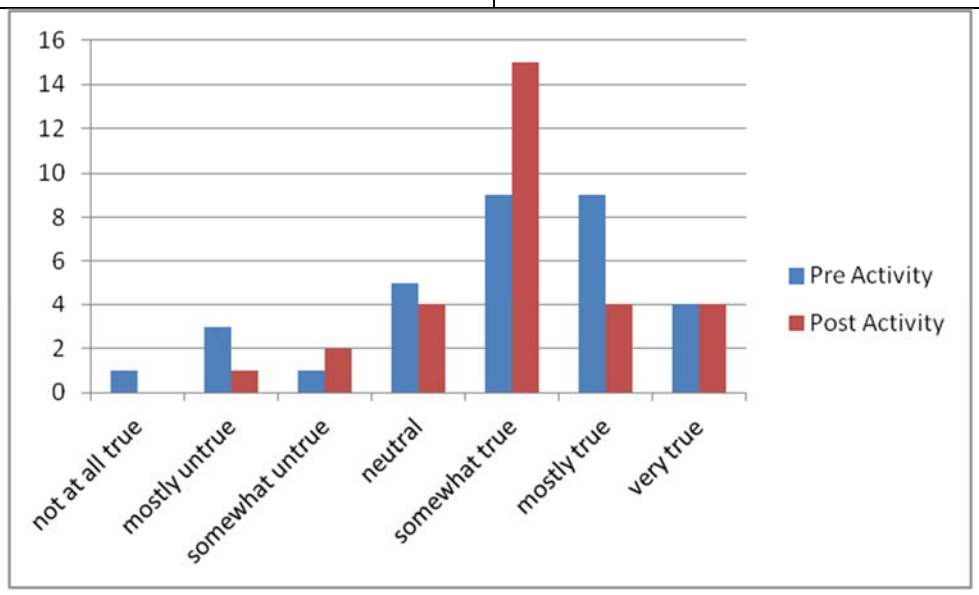
Q.	Pre Activity	Post Activity
11	I don't try very hard to do well at e-learning	I didn't try very hard to do well at this e-learning



Q.	Pre Activity	Post Activity
12	I try very hard at e-learning	I tried very hard at this e-learning



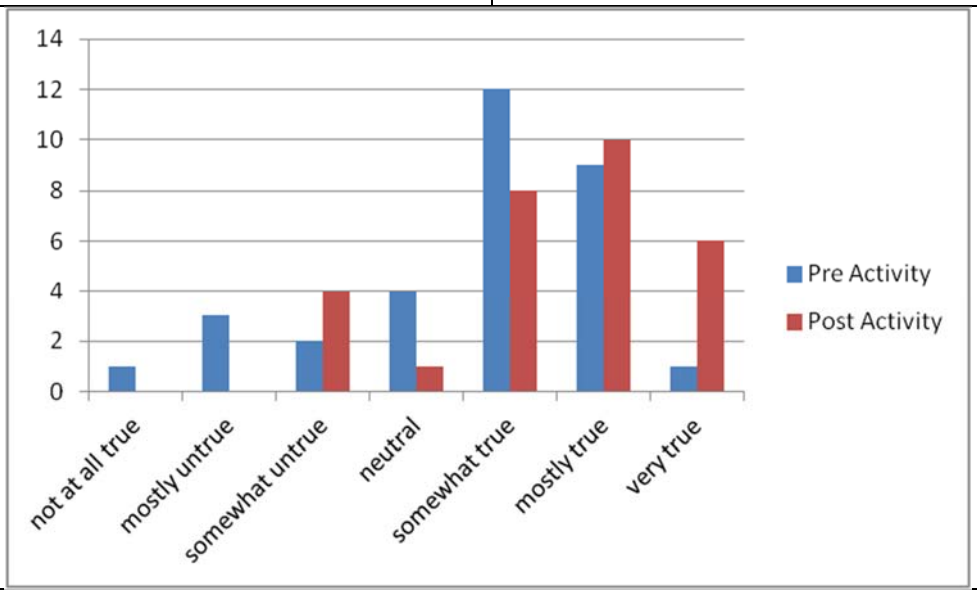
Q.	Pre Activity	Post Activity
13	It is important to me to do well at e-learning	It was important to me to do well at this e-learning



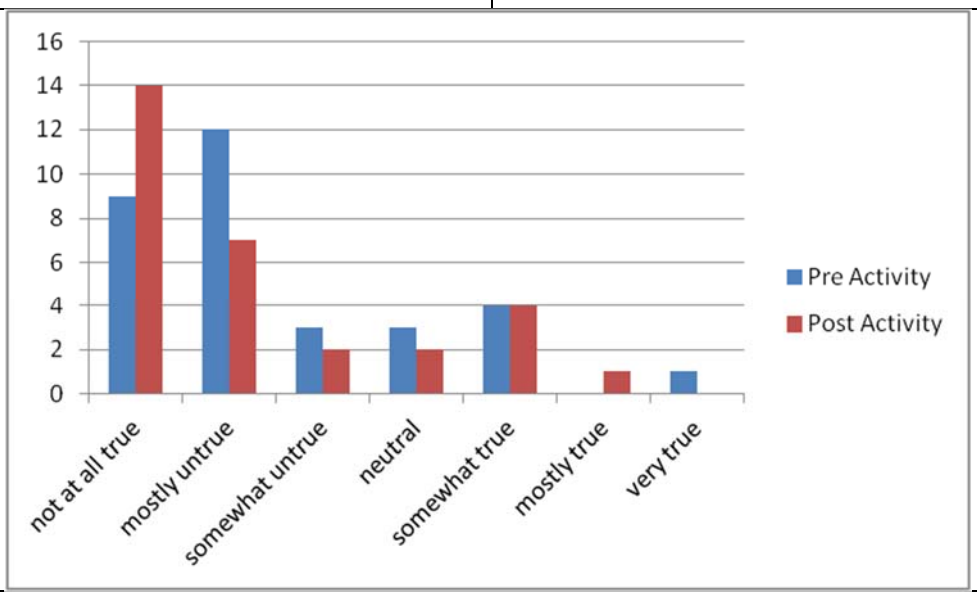
Average Across Effort/Importance Sub-scale	
Pre Activity	**Post Activity**
4.648438	5.033333

Pressure / Tension

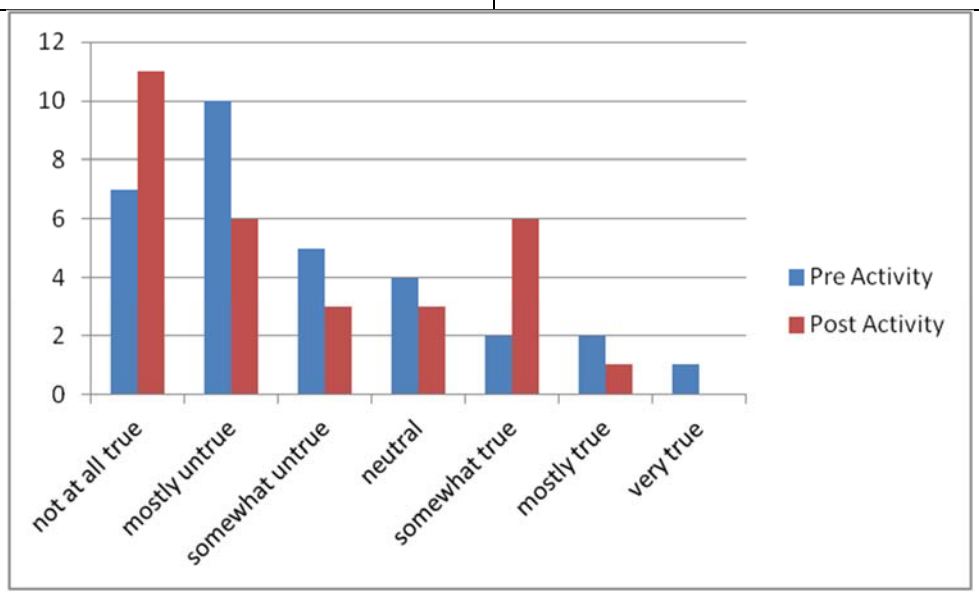
Q.	Pre Activity	Post Activity
14	I feel very relaxed when doing e-learning	I felt very relaxed when doing this e-learning



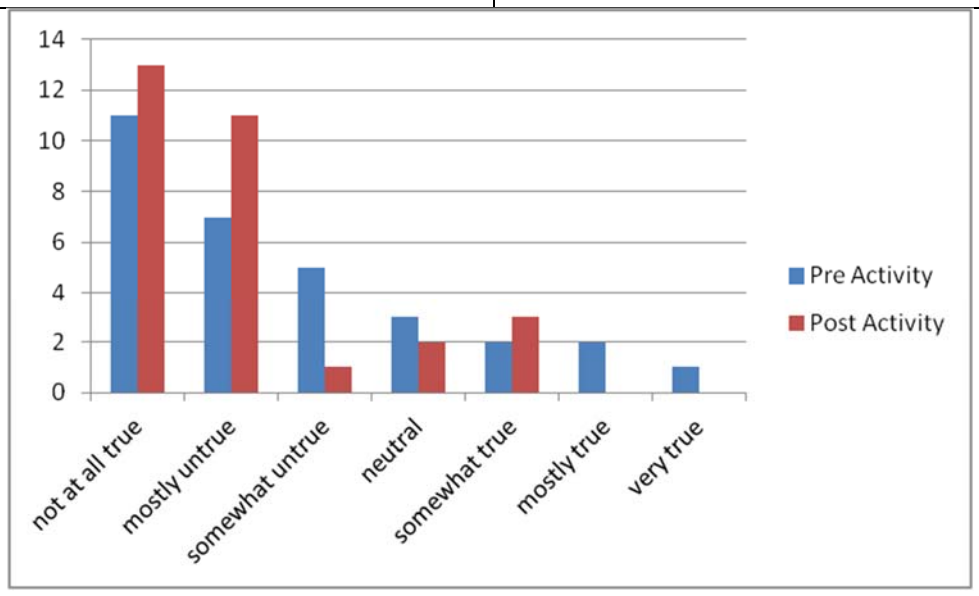
Q.	Pre Activity	Post Activity
15	I feel very tense when doing e-learning	I felt very tense when doing this e-learning



Q.	Pre Activity	Post Activity
16	I feel pressured while doing e-learning	I felt pressured while doing this e-learning



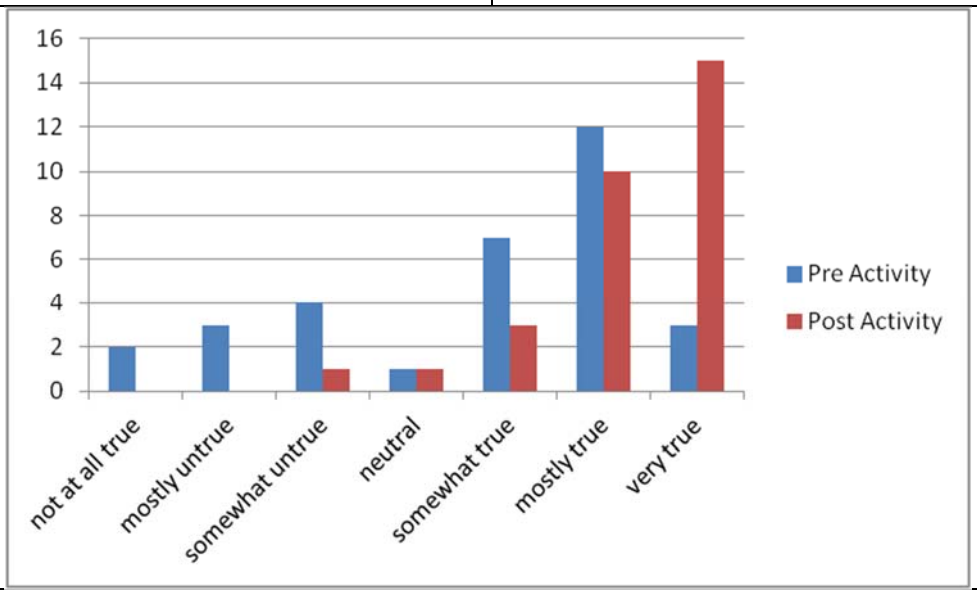
Q.	Pre Activity	Post Activity
17	I am anxious while doing e-learning	I was anxious while doing this e-learning



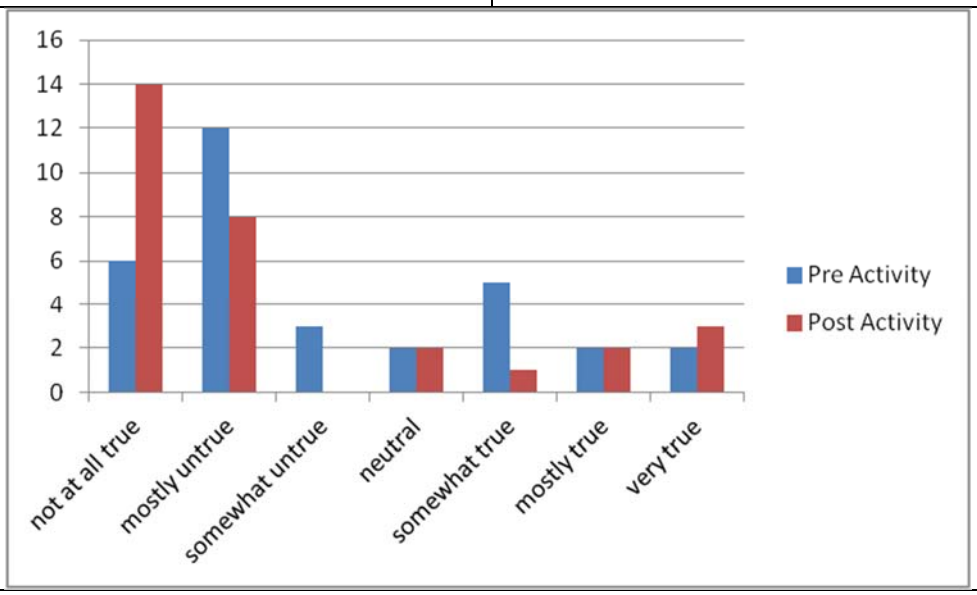
Average Across Pressure/Tension Sub-scale	
Pre Activity	**Post Activity**
2.815776	5.620402

Perceived Choice

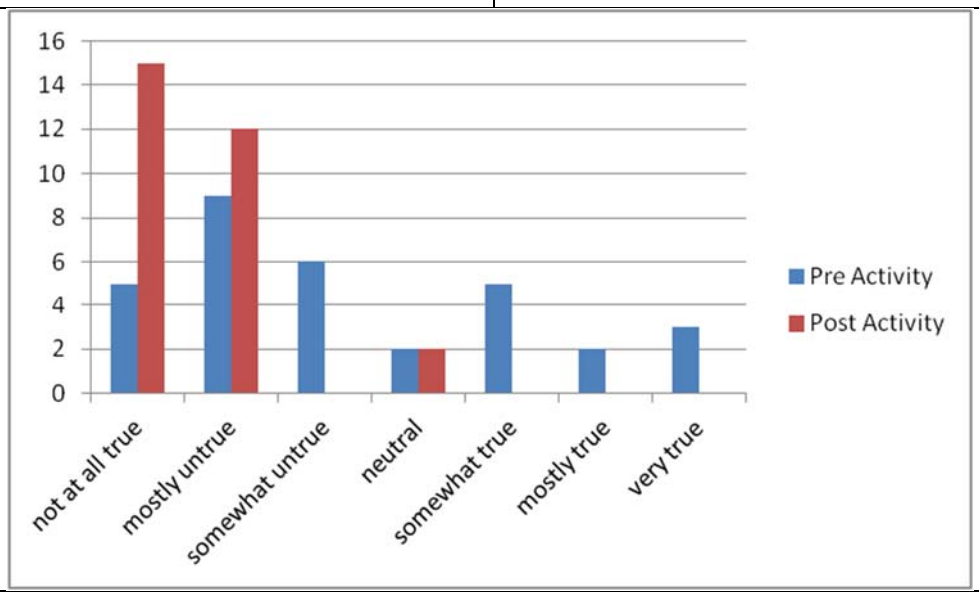
Q.	Pre Activity	Post Activity
18	I believe I have some choice about doing e-learning	I believe I had some choice about doing this e-learning



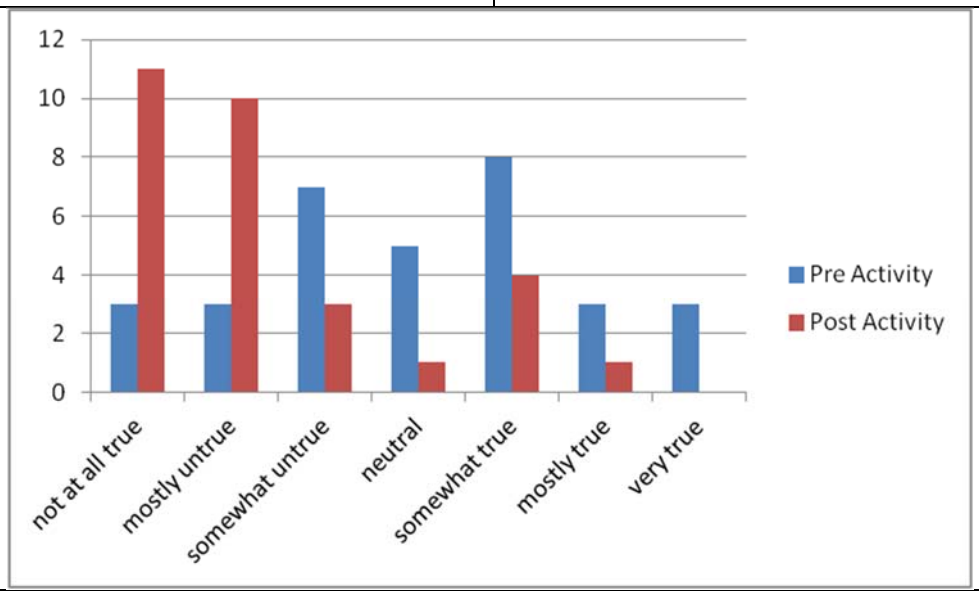
Q.	Pre Activity	Post Activity
19	I feel like it is not my own choice to do e-learning	I felt like it was not my own choice to do this e-learning



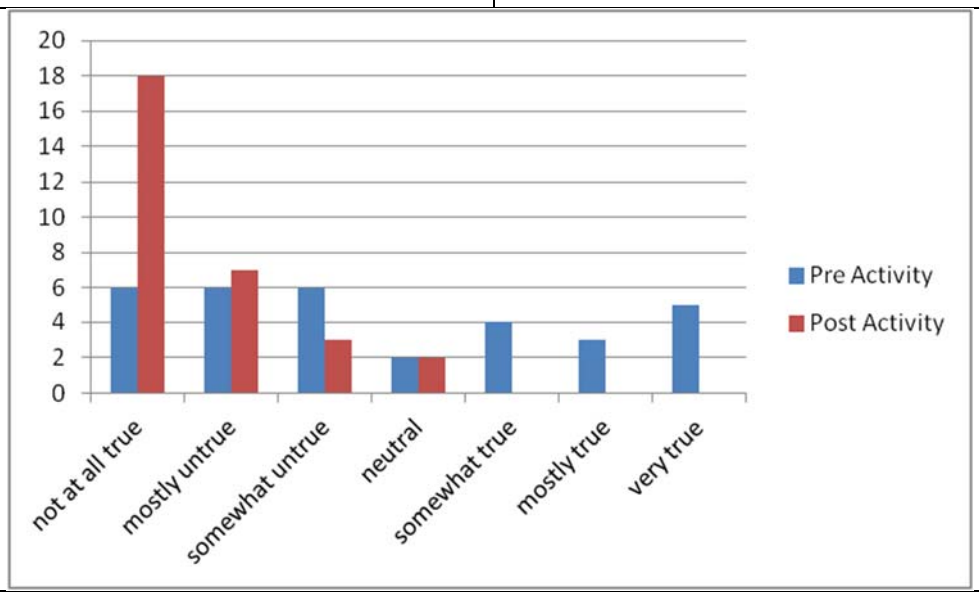
Q.	Pre Activity	Post Activity
20	I don't really have a choice about doing e-learning	I didn't really have a choice about doing this e-learning



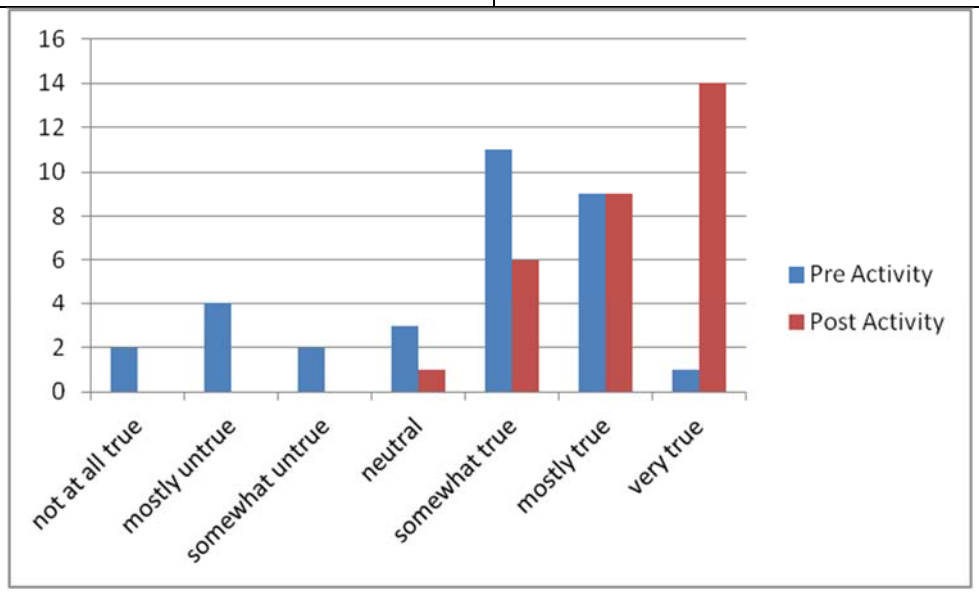
Q.	Pre Activity	Post Activity
21	I feel like I have to do e-learning	I felt like I had to do this e-learning



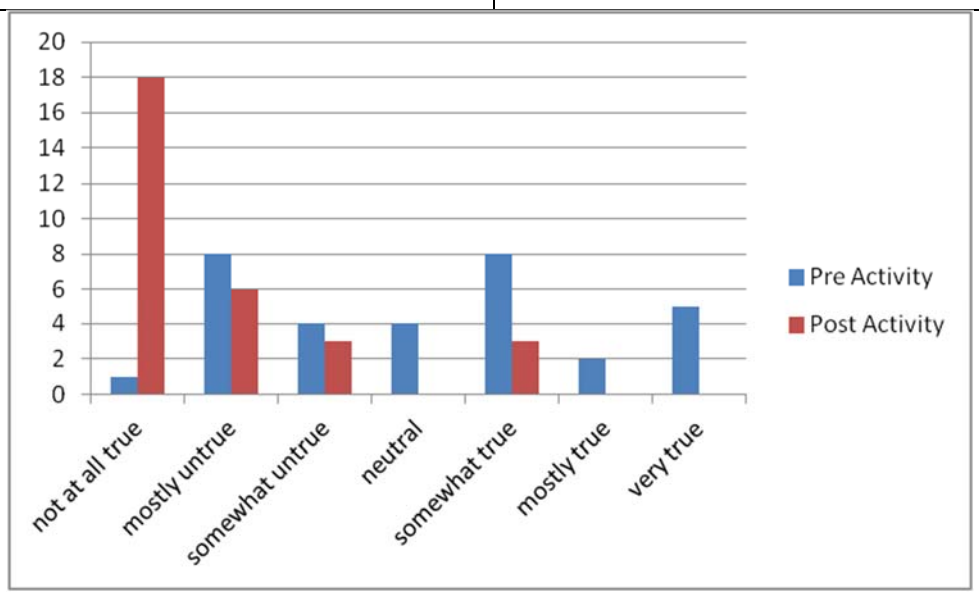
Q.	Pre Activity	Post Activity
22	I do e-learning because I have no choice	I did this e-learning because I had no choice



Q.	Pre Activity	Post Activity
23	I do e-learning because I want to	I did this e-learning because I wanted to



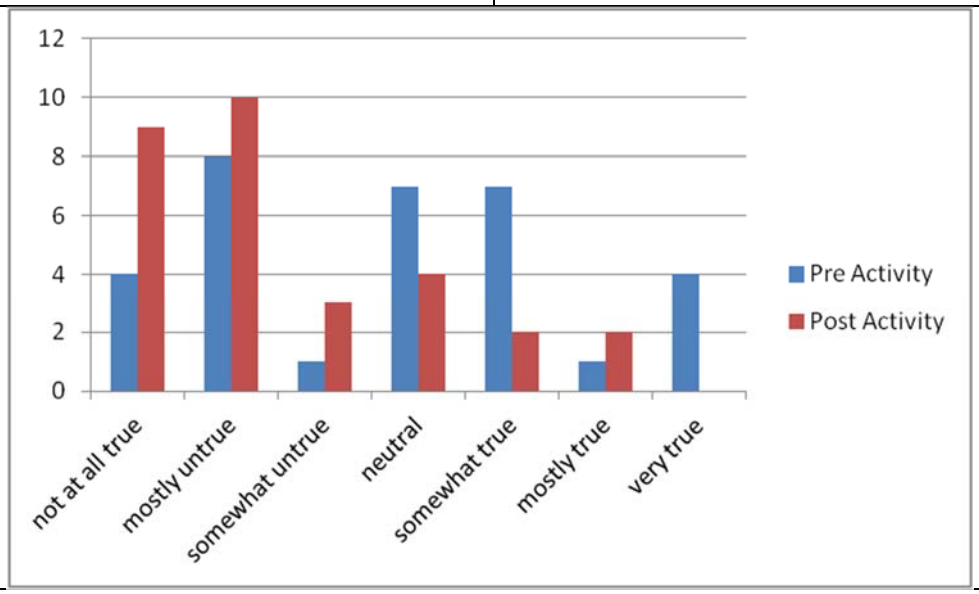
Q.	Pre Activity	Post Activity
24	I do e-learning because I have to	I did this e-learning because I had to



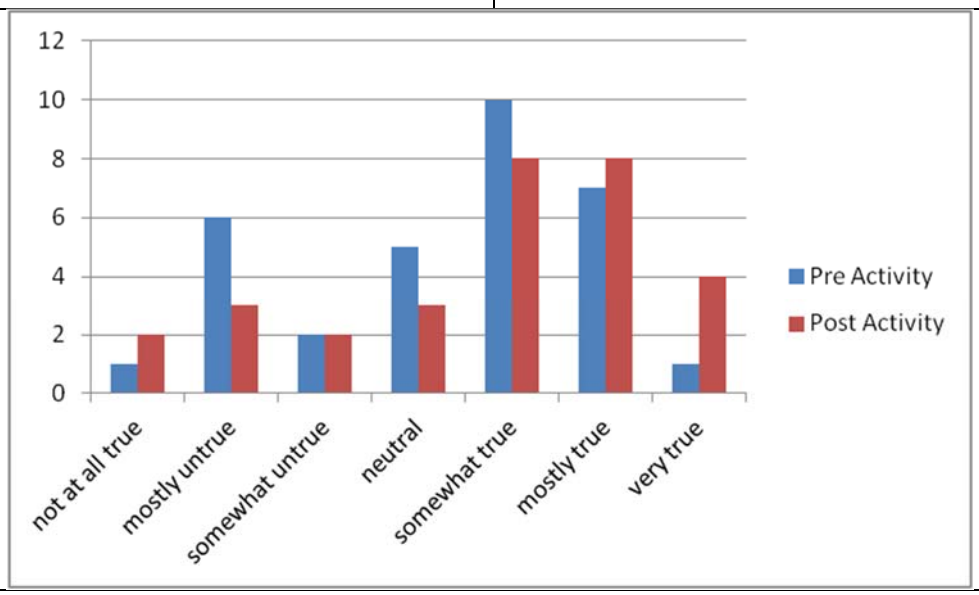
Average Across Perceived Choice Sub-scale	
Pre Activity	**Post Activity**
4.433036	6.080952

Relatedness

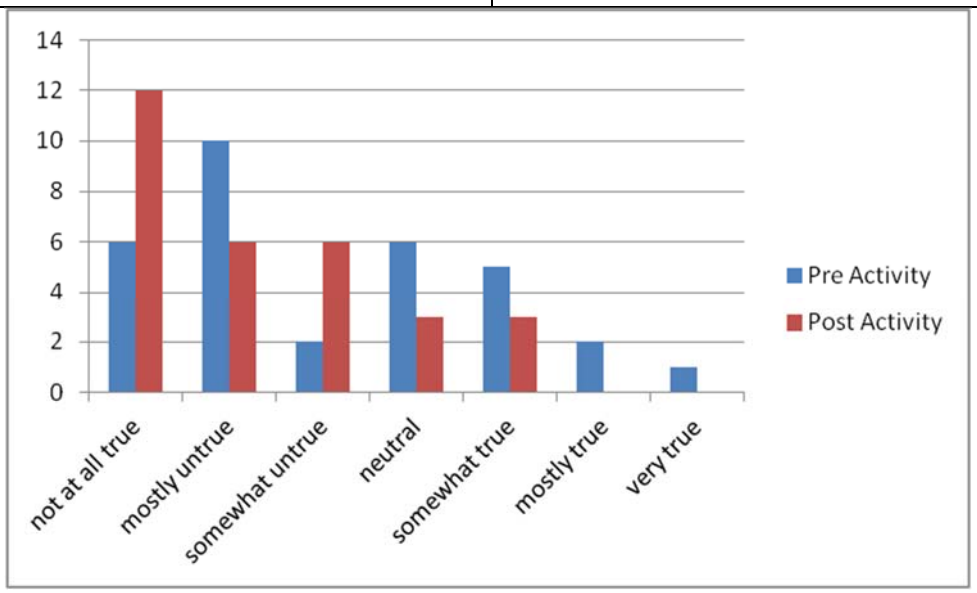
Q.	Pre Activity	Post Activity
25	I feel really distant to my peers when doing e-learning	I felt really distant to my peers when doing this e-learning



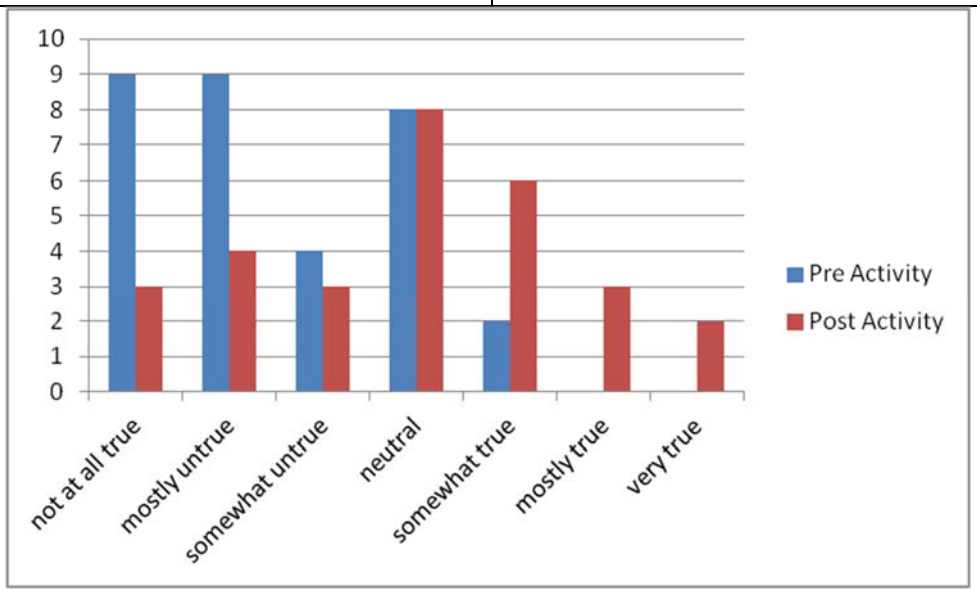
Q.	Pre Activity	Post Activity
26	I'd like a chance to interact with my peers more often when doing e-learning	I'd like a chance to interact with my peers more often when doing e-learning



Q.	Pre Activity	Post Activity
27	I'd really prefer not to interact with my peers in the future when doing e-learning	I'd really prefer not to interact with my peers in the future when doing e-learning like this



Q.	Pre Activity	Post Activity
28	I feel close to my peers when doing e-learning	I felt close to my peers when doing this e-learning



Average Across Relatedness Sub-scale	
Pre Activity	**Post Activity**
3.992188	4.966667

Comments Pre Activity

e learning should not be forced upon people but rather chosen by them. In fact it is most likely that people that have no choice or who are forced to do e learning then that is likely to produce poor results (and unhappy people).
E-learning is something that is increasingly evident in professional and educational activities. There are alternatives but the convenience of e-learning is what makes it so appealing. Although intimidating to some who may not be used to it, e-learning is very accessible once you give it a go.
I much prefer to receive my training face to face and the e-learning I have completed to-date has always felt life knowledge exchange rather than competency enhancement.
I've had to do large quantities of e-learning since qualifying as CIP because not being based in Dublin means I have very little other choice in gaining enough hours towards my CPD requirements.
My e-learning activities are primarily driven by convenience but my preference is to learn in a group setting where there is an opportunity to interact with my peers. E-leaning can sometimes feel like an isolating experience.
My experience with e learning is that it is good preparation for multiple choice exams. Where its modular learning I find it very one dimensional.
Nothing of note to add. All of our internal courses on CPC, Data Protection, money Laundering, Ethics.....etc are via elearning. These are all mandatory. ELearning is just an addition to the various mediums of learning and we all really need to embrace it.

Comments Post Activity

An opportunity to motivate the team might have been useful! Ralph Reigl webinar was the worst part of the whole exercise 'What the worst that can happen" video clips excellent
At first, I didn't think I'd get into this at all as I didn't really like the e-learning that I did before. But after the first few parts, I got into it. I really liked it was broken up into small bits so I could do some, make some progress and come back again the next day and do a bit more. The e-learning I'd done before was long and boring - you read and answer a few questions. You dont really learn anything that way. At least this way I was doing something and I still remember some of it.
Excellent e learning courses James-see my email from yesterday for more specific feed back Thank you for letting me participate!
I benefitted from this - as we interact with students regularly we need to be mindful of data protection issues
I found the course to be very well designed and conceptualised. Had other external commitments not coincided with the exercise I felt I would have been able to give this much more of my time. I enjoyed the elements of the material I was able to get through. Well done!
I loved the videos at the start of each module as they brought the theory into practice and life. There are two main things that I would comment on: - the length of modules and sub-modules: I think you should aim to have an approximately the same number of slides in each sub-module, because when you get used to a sub-module having 8-10 slides and then you open the next one with 22 in it, it's really dis-heartening, especially if you've allocated a certain amount of time to complete it based on previous experience. - it's REALLY important to word the options in quizzes in a similar way to the information in the slides and have the facts correctly - there is nothing more frustrating than knowing that you chose the right option based on the info in the slides and it's coming up as wrong - and there is nobody to say it to.
I think the elearning would benefit from assuming that the student had no level of proficiency

and as a result covered some of the technical issues covered in a supporting elearning module. There were reference to terms like "average" and no reference to what that meant. the quizzes were excellent.
I was surprised at how much I enjoyed doing this. The team and competition element really added to it - I wanted to beat the other guys I know who were doing it! I also liked the way it was broken up so even by doing a small bit, I felt like I was making progress.
Overall quality of Learning material was good. There're was significant overlap with our own internal on line learning (CPC, data protection, money laundering , fraud, business ethics..etc). Well done on a really good project
Probably one of the best e learning modules I've seen. Humour and videos helped greatly.
The leader board was great because it gave me extra impetuous to complete more e-learning. The team names were great because I felt a bit closer to the others also partaking in this course. I was surprised by how much I actually enjoyed doing this course - normally I sit in a room reading the book cover to cover and do not usually enjoy online activities, but it was so interactive and had modern examples I could relate to that also put it in a realistic perspective for me. I really enjoyed the games that tested your knowledge during the course, as they took the "hard slog" learning aspect away from it. I really enjoyed the 'what's the worst that can happen' videos at the start of the courses - they put a lot of it into perspective for me as well, especially as in a lot of the cases it could easily happen.
The leader board/peer involvement was at times a double-edged sword. It drove me to do the learning but was also a mild source of pressure as to how performance was measured.
The team aspect was very positive, it was friendly competition. The content was good but I think the way it was portrayed made it more engaging as the person involved had to engage. I wouldn't say the engagement was forced at all and you would be surprised how willing people are to engage.
This format of e-learning was innovative and creative. There was lots of interaction and the use of imagery, layout, clicking, videos, questions etc all helped in remembering the content. I can still remember elements of the content by the increase in interaction! The instruction were clear and the element of gamification brought out some extra motivation to get through the topics. The layout was intuitive and if you made an error, you could easily go back and review the content / instructions. Whilst there was not much difficulty in this content, it perhaps could be hard to bring in the same element of interaction to a specific product module. But I think this is the direction that e-learning should take going forward. Unfortunately, I did not get to complete all of the e-learning due to other commitments (work / life / social). I think I completed half of it in the time I had available. Well done on putting together a comprehensive package.
This type of e-learning was fun and very engaging. It made learning about difficult and somewhat boring topics interesting. I would be happy to do more learning like this in the future.
Unfortunately I did not have the amount of free time I would have liked to spend on this exercise. I had intended engaging with it in a much more robust manner than I actually did - but I simply was distracted by other commitments that could not be ignored and my participation in this exercise unfortunately suffered as a result. But I felt it was very well put together and very user friendly. I would be positively disposed to doing a similar exercise should the opportunity arise in the future but first I would ensure that I had enough time to properly engage with the process.
Very impressive work Mr Lonergan!

Appendix J – Focus Group Interview Protocol

Focus Group Protocol

Location	
Observer	
Date / Time	
People attending	

"Hello, my name is James Lonergan. I am conducting research towards completion of an MSc in Technology and Learning with Trinity College Dublin. I will conduct this focus group. I am investigating the impact that adding game elements to CPD e-learning has on motivation. I am very interested in learning about your thoughts and experiences."

"When I report results from this study, no specific names will be used."

"This focus group should take no more than 20-30 minutes. Keep in mind that there are no right or wrong answers. All thoughts are important so please don't be afraid to give your opinion."

"Lastly, please note that although we hold a professional relationship, you should please try to leave that aside and answer questions as truthfully as possible. If you feel uncomfortable answering any questions, you do not have to answer them but it will be of assistance to the research if you do answer all questions."

"Are there any questions before we begin?"

Questions	Observations/Thoughts
To begin with, let's talk about the experience. Can you talk to me about what happened during the experience and how did you feel? What was your favourite thing about the experience? Why do you think you liked this? What was your least favourite thing about the experience? Why do you think you disliked this? I'd now like to focus in on some specific	

elements of the design and how you felt about them. Levels were used to structure the activities. How did the use of levels make you feel? In designing activities, I tried to ensure there was some variety. Can you talk to me about how you felt about this? Feedback was used both after you answered questions and in other ways such as visual feedback and timers. How did the use of feedback make you feel? Did you feel free to experiment during the learning experience? Can you tell me about that? What affect did the use of rewards like points and leaderboards have? There were elements of both teamwork and competition. Did these affect the learning experience for you in any way? Thank participants for their time	

Appendix K – Focus Group Transcript

Focus Group Interview Transcript (names removed to preserve anonymity). Comments have been attributed to individuals through use of a code. C1 P2 refers to case 1, participant 2, C2 P4 refers to case 2 participant 4 and so on.

Researcher:

To start with, let's talk about the experience itself - what happened and how you felt about it. Does anyone want to get the ball rolling?

C1 P2

I loved the part where there were timed things. You know where you had timed questions. That really got me going. That was like oh it's timed! You know I think that added to the competitive level that for me was the real key for me. You know it really got me going.

C3 P4

It was like a quiz show nearly

C1 P2

Yeah. Yeah

C3 P4

It was like that show. What's it called - two tribes?

All

Laughter

C1 P2

Or Countdown.

All

Yeah, it was like Countdown. General agreement, laughter.

C1 P2

And the variety of the screens. The colour and the variety of the screens was great as well.

Researcher

So was there pressure and fun?

C1 P2

Yes, I liked the pressure though. Because you know sometimes you could be doing e-learning and it's a bit tedious. It's like you're going, going through the motions. But because you added in these little layers of, you know and you varied the presentation you know the way you had to click on different things and do different things, the variety kind of kept you awake and kept you kind of – oh what's going on here – you know. The novelty value.

C3 P4

And as well even just having the videos as well as just having you know the information on the screen. I think the videos helped break that up even further and it was like. I'm kind of one of these type of people, I hear someone saying something or I see it you know in a video, I'd probably remember that more than reading it off a powerpoint so you know so I find that it broke up all the points.

All

Yeah.

C3 P4

And it's funny, because you cater for all because the text and the video as well because I prefer to see things in writing as opposed to listen to things so that was good that you all kinds of what do you call it audio and visual people were catered for.

C2 P8

Even the different types of videos you had. Like one was let's say your one was in serious breach of data protection and I was like jaysus, she's an awful whinebag isn't she.

All

Laughter

C2 P8

Then there was the stupid idiot giving out his personal information but there was the guy in it who was in The Inbetweeners so I was like what's he at here.

All

Yeah. Oh Yeah.

C2 P8

It was just like and I was oh your one might be in a bit of hot water. It was funny. You know the way you just get your first initial reaction you judge straight away. It was a great opportunity for judging.

C3 P11

But in fairness, the videos were all real world application. Like how many people keep things on their laptop. If you want to bring something home you put on your laptop or you just chuck it on a usb and you don't even think what would happen if that usb was stolen.

All

Yeah.

C1 P2

People still don't get it you're right C3 P11?

C3 P11

I found the data protection one really interesting.

C1 P9

Yeah, me too.

C3 P11

And it spurred my interest in it in general because like it just made me really think about your own data that's out there. And I loved the little thing about where like insert your details here.

C1 P2

Me too. That was very clever. That was a brilliant one.

C3 P11

And the thing was I didn't even give my details. I was like, this is a trick. I was so nervous, I clicked next and I was like I was really nervous because I was like oh my God, this is going to say I failed it or something.

Researcher

Did anyone else fill in their information on that one?

All

Yes.

C1 P2

So C3 P11 you really listened to the course if you didn't fall for it.

C1 P9

What I liked about that was that basically the computer was asking you for your personal information and you've just put it in because it told you to.

C1 P2

Yeah. So that was a really good way of demonstrating. It does actually you know add another layer to it that makes you sit up and pay attention you know.

C1 P9

Yeah

C3 P11

And the questions, they weren't too hard but they weren't just tick the box either. Which I liked. I had to actually stop and think about them. And I loved the ones where you had to match them. It was like being a child again.

All

Yeah, oh yeah. General agreement.

C2 P8

Or eh do you know like what do you do? Do you bin it? Do you shred it? That was just. Because it just mixed it all up. It wasn't the same quiz thing. You didn't really feel like you were being just quizzed too. It was like you were you know doing a word search or something.

C1 P2

I suppose that's something. You know the variety in it. You didn't know what the screens were going to present so you it kept you interested all the time do you know what I mean?

C1 P9

Something I liked about the bin it trash it thing was that you could move things again if you got them wrong. You know, it wasn't like you know, you're wrong.

C1 P2

Yeah. It's not judging you. It's like the system isn't judging you.

All

Laughter

C3 P4

But as well you know when you're being quizzed or whatever, it's the normal kind of what is questions, whereas this was like you had to properly think about it because you were like well you could technically bin that or you could shred it so it made you think.

C1 P2

It was close enough that you had to think.

C2 P8

It made you think about what you actually do on a day to day basis.

All

Yeah.

C2 P8

I hoard. You know I should be shredding this stuff.

C1 P2

The data protection was probably the one that was most influence. Maybe because it had day to day practical application.

Researcher

What about you C1 P9?

C1 P9

There were some quizzes I got wrong because I was doing things completely that I shouldn't be. Maybe I was shredding things when I should be binning. So yeah, it was good actually. It taught me something anyway.

C2 P8

To be honest, doing that certainly beats sitting being like flicking through just normal powerpoint slides where you get your quiz at the end and you're like, oh what a surprise (sarcastic). And if you don't get that right or you don't pass it you go back and oh what a surprise (sarcastic) the same thing over and over whereas you kind of varied.

C3 P11

It was very fresh wasn't it? Most of the ones we do are so dated. I mean in general.

C1 P2

Yeah. The layout and the format and that.

C3 P11

Just the e-learning in general I've seen you know. Courses online are very dated.

C1 P2

Yeah. And the timing thing was the biggest thing for me. I just felt like – yeah we're having a competition here you know. I just really liked that.

C3 P11

Yeah I really liked that as well.

C2 P8

People as well with insurance and data protection they nearly put it into. You know they may as well just put it into a grey box and say yeah that's about as good as that will get. But they don't actually give explanation (C1 P2 – yeah the day to day stuff of actual living it) and people don't even see past it they just say oh insurance or data protection and like I'm nearly so bored even saying those words I don't even look at what's beyond the powerpoints I don't

even think it could be made any more interesting. But just a bit of colour and actually doing something was great.

All

Yeah yeah.

Researcher

So was there anything that anyone didn't like?

C2 P8

I think it was that you didn't feel pressured into doing it. But you were kind of fooled by the colours or something. You're kind of taking it all in and you're kind of oh! I'll just play this game this is grand. But I didn't feel under pressure. I just liked popped on for half an hour here and there so no I don't think there was anything.

C1 P2

I wish I had more time

C3 P4

I felt a bit pressured when the team points came around. I was really annoyed my team weren't doing very well. My team had like no points. That was good thing to motivate though. It was a good motivating factor. The fact that I knew there were other people on my team meant I wanted to do well.

C1 P2

It's probably a good idea then for e-learning to set people up in groups with a target so that kind of who's at the top of the league now and who's at the bottom

C3 P11

The only thing is that the atmosphere could get vicious in the industry if you did that.

C3 P4

I was going to say that. It worked for us but…

C3 P11

I think the industry is competitive as it is so if you were to do this it would be just. It could be a negative. Even though the emails about points put pressure on and I put a few more hours in. I'm really nervous about e-learning usually so I did a lot of the basic stuff and stopped at the ones that said like team in it and went on to the more basic stuff in the next course because I felt nervous but then after a while I was ok.

C1 P9

Yeah, I felt a bit like that too but got into it then.

C1 P2

Another thing is. I'm probably the thickest here when it comes to technology and the use of technology. Sometimes with the functionality I was like do I X this screen or how do I get on. I struggled a bit sometimes because I'm thick on things like that. Do you know what I mean? And I know no one else would but because I'm archaic and I'd be like I had no computer in my office. I started off with no computer in my office.

C3 P11

Yeah but you just had to read what it said like now press the X in the corner because yeah otherwise you wouldn't know.

C1 P2.

Yeah it was grand once I got the hang of it.

Researcher

Was the look of things something to do with it?

Confused who is speaking

Yeah. It could be a bit. With different things you might not be sure.

C1 P2

You catered though for a diverse group who are IT literate and then people like me. That's the only bit I struggled a bit with and then I got frustrated sometimes because I was conscious I was in a league and wanted to finish.

C2 P8

I liked the way though as you finished you got a little tick or whatever. I was like yeah.

C1 P9

Yeah yeah. I liked that too actually.

C3 P11

It was like yeah I've done well.

C1 P9

Yeah there were a lot of positive words and things like that.

Researcher

Ok so I might move on to some of the more specific design elements that were used and see how you felt about those. So one of the ones that were used was levels to structure the activities. So what did you feel about the use of levels?

C1 P9

You mean the view with the progression?

C1 P2

Oh yeah the visual progression. Yeah it was good to see that the visual progression to see where you where you how you're doing on the module I suppose yeah.

C3 P11

Did other people like pick a course and just keep going up the levels? Is that what everyone else did?

C1 P9

That's what I did yeah.

C3 P11

I picked different courses and did level one from this and level two from that and I was wondering what other people did?

C1 P2

I might have skipped some bits but then I went back

C2 P8

I was getting freaked out. I was like that's a yellow, I have to finish that and then I did some courses again when they were gone green and finished as well.

C3 P4

That did drive me mad. I had to go back in and finish all the bits.

C1 P9

I liked that it showed you that you know this is the basic bit and then it's going to get a bit more tricky with like some structure you know.

C3 P4

I also liked the fact that in the different type of modules or the different things that we were looking at, you didn't have to go through fraud and then to this and then to this. You could pick any of those to start on as well but you'd know if one was harder.

C1 P2

Yeah so it catered for people who didn't want to follow the path as well.

C3 P4

When I was in it I did mainly go through from start to finish but sometimes I didn't.

C1 P2

Yeah so you really catered for both didn't you. That must have been hard to put together.

C3 P11

If I started just going up levels, I'd get bored. I want to be able to do what I want so it was good I could do that.

Researcher

So if you had to put a couple of words on it?

C1 P2

I suppose structure

C3 P11

Structure and flexibility. It gave you structure with the flexibility. It gave you the structure as well to feel like you were completing something and you knew that it was going to get a little bit harder so you'd know right it's going to get a little bit harder so I might need to focus a little bit more now. Cos say for the intro you might be watching a little video or something you know you'd be like grand sit back watch this video grand level 1 say intro completed and then like the next level you're like now I really need to sit and read this so you were able to put your time to it and you knew where to allocate your time to. But in saying that I did it in bursts. I think it's hard to tell as well over two weeks.

C1 P9

Yeah it's a small enough snapshot.

C1 P2

Over a longer period. Yeah. The variety though…

C2 P8

It's even something though you know you have your iphone you know, you're on the commute home you're like ah I'll do another level here you know. It's just accessible and it's easy and it's not like. It's as easy as you know flicking into daily mail on your way home. You know. It's not. You're not sitting there looking at someone speaking at you or just slides and text going by and it just makes it a lot easier. I often see people playing candy crush on the way in you know. And you'd normally put that miles apart but if you put this beside it, they're not. The information you're getting and taking in.

C1 P9

I know what you mean but I'd still be playing candy crush!

All

Laughter

Researcher

C3 P4, we're you trying to say something there.

C3 P4

When you came to the quiz at the end. Even one of those had levels. You know 100 euro, 200 euro. You know that sort of thing. It was the same as you know if you saw that on someone's phone you'd be like oh this is some sort of money game. A who wants to be a millionaire type quiz or something and you knew the more money would be harder.

Researcher

Something you mentioned a little while ago C1 P2 was variety, which is something we've touched on a bit already. Can you tell me a bit more about this and how you felt about it?

C1 P2

Yeah, plenty of variety. Kind of kept you guessing.

C3 P11

I think there was just enough. I think if there was more it would have been a mess. You know that kind of way because you need an overall kind of a structure to it so.

C1 P2

You'd have people like me really struggling!

C2 P8

Yeah, too much and you'd find yourself a bit confused and this is a bit all over the place. There was a certain amount of structure so that you were familiar.

C3 P11

This is a course you'd be doing on lunch or after work so you kind of have to think of that and that kind of worked.

C1 P2

When people are like C2 P8 was saying on the bus or the luas or whatever and you can do fifteen minutes, it's all these little chunks. You could do 15 minutes on the bus every day.

C2 P8

You could be waiting on the kids at piano levels or whatever.

C3 P4

You don't have to mentally prepare yourself to psyche yourself up to sit down and get stuck in for an hour.

C1 P2

Yeah and then you actually pay attention and remember the stuff.

C2 P8

And does anyone know anyone's house that's quiet for an hour? It's just it's a lot more realistic this way and I'd say this would go down a lot better with people than what's there. It's just like 15 minutes of your lunchbreak is not that much when you think about it.

C3 P4

I actually. I did a few towards the end of my lunch a couple of times and it didn't even feel like I was being like forced to do it. Actually if this type of thing was the requirement for me I wouldn't actually have any problem sitting down for fifteen minutes of my lunch.

C1 P9

It wasn't like a big ordeal.

C1 P2

It was actually pleasurable.

C2 P8

And then it got kind of competitive with points and all.

C1 P9

I think that comes back to time though. Some people might have more time.

C3 P11

I know (person X) yesterday was raging he couldn't do it. He wasn't impressed that (person Y) and (person Z) got high scores. He was like why did he have to do it when I had corrections to do. You could probably see though who had time but that's where your short videos come in. I remember like that breaking bad video where in five minutes. There you go you know, you've just learned placement, layering and integration are the main parts of

money laundering. Less than five minutes actually do you know what I mean. So that really helped.

Researcher

Yeah I really liked that video. I was slightly depressed after I first saw it though when I was watching Breaking Bad I thought that's a really good explanation of the money laundering process and then I was like God I need a life!

All

Laugher

C3 P11

When I was doing this whole course I thought if only we had this for all our courses. It was brilliant. I couldn't get over the freshness the difference the variety and fun. I was like Oh my God, other students would go on in leaps and bounds.

C1 P2

I think it would be so impressive. You'd be well ahead of the posse in terms of what's out there.

C3 P11

Because it looks like it's new every time because of the variety. Do you know what I mean? You feel like you're doing a fresh new thing, a fresh new thing, a fresh new thing. And if it's more accessible for people who they won't even realise they're doing online e-learning. Because if I think online e-learning I almost get heart palpitations like I'd used to rather go and sit at 4 hours than do one hour online. But like if it was that easy and fun all the time. Like people won't even realise they're doing it. The term online throws me whereas I just thought I'd do this course instead. I just mean the concept of online could scare a lot of people. I was just so surprised at how easy it was to get through.

Researcher

I'm just coming to the last few questions. We've covered a lot of these points in conversation already. I might put some of these together. We kind of talked about feedback in terms of answers you get to questions and also visual like ticks when you finish something so I wanted to get your thoughts on how that made you feel but I'll also throw in did you feel free to experiment too? So how did experimentation and feedback make you feel?

C1 P2

I certainly felt free to.

C3 P11

You didn't sort of feel like crap when you got something wrong. So you were able to go now why did I get that wrong so you actually stopped and thought about it.

C1 P9

And then you'd go back.

C3 P11

Rather than trying to just complete it. You could go back and move things around again and go oh now I get it, now I get why I got that wrong. And you could go back. Whereas a lot of the time you just go abcdefg get it done. Right. Got that wrong. Feck. Aw anyway just finish it.

All

Mmm. Yeah.

C3 P4

For me it wasn't like a NRR you got this wrong you big thicko. It slowly made you think it was ok to go back and just give it a try and it was grand.

C1 P9

I thought so too. After a bit you just gave things your best go and you knew you could go and try again so I was. It was like you could you know. I remembered more of it that way.

Researcher

So just the last couple of bits we haven't touched on as much detail yet. We'll put these together too. Rewards, Teamwork and Competition

C1 P9

So kind of the points and leaderboards and all?

Researcher

Yes exactly.

C3 P4

That to me was the best thing was that there were points up for grabs. Points for you and for your team and that way like there was the competitive and depending thing. Also a guilt thing like I can't let my team down. But there was also like ooo I could be top of the leaderboard. I ended up nowhere near but I liked the possibility that I could have been.

All

Laughter

C1 P2

I do think that was very motivating for me. Because if you're left to yourself you're letting yourself down but if you're part of a team then you're oh my God.

C3 P4

Yeah I was like I should do this because there's others relying on me.

C2 P8

Yeah and they're probably doing loads and your might bring them down. A way of doing it. Do you know like C3 P11 made a very good point you could have teams in insurance companies with different departments. People against each other. Just friendly and you don't have to worry about it getting Aah.

C1 P2

I think that would work in a company. People struggle to do CPD and then the year end rush comes. It would be a good motivator to get people involved earlier.

C3 P4

I know you could see it kind of when you logged where you could see it as well in but you know it could be a thing like when James sent that email with the actual leaderboard. It was like ooh who's where.

C3 P11

Yeah I could avoid who was where on the leaderboard until James sent an email. And I was feck my team's so low I need to go back so I think you need something like that. You need

an email or a flagging system telling people where they are because if you have to go in and look yourself if you're down because you're not going into it. There's a good chance you're not going to go in and check where you are. That's escapism. But yeah.

Researcher

How did the points and leaderboards make you feel when you were online?

C1 P2

I thought my team would fall behind.

C1 P9

That I was doing because I saw myself on the leaderboard and I was trying to get myself up the leaderboard more than my team.

C3 P11

Fair enough but…

C1 P9

You know when I'm doing CPD I do it for myself like and maintaining my designation myself and the team thing was new to me so.

C2 P8

I think there was a bit of both. I was Oh I don't want to be the only one left on zero.

Researcher

I think that's a good point C1 P9. Can you tell me a bit more about that.

C1 P9

It's about your own goals. Maybe you don't put them in teams because it might be hard to see or find out who's doing CPD to learn something and who's doing it to get the points. Just for their team or whatever.

Researcher

I think we're almost done. I'd just like to take a minute for us to do a quick exercise to pop up some points on these posters about how you felt in relation to each of these points we covered. Or just put up any word you think is relevant. I'll put up these two post its which

say structure and challenge under levels, which are words we used earlier. Just to give you some. It should give you some idea of how to do this exercise. Ok off you go.

(general noise, talking, laughter)….

Researcher

Ok. Thanks everyone again for taking part. Are there any last points anyone would like to make or anything we didn't get to discuss that you'd like to?

C2 P8

Do you know when you're doing lots of variety. I suppose is there a risk of running out of variety. If this was to go out like I'd say if this was to go ahead for the first year I'd say it would be a great novelty but just to keep it fresh and to nearly hold back some a little to keep it so that every time they go in so that. (C1 P2: don't show all your goods in one go) Just keeping it sustainable and keeping the variety sustainable.

C1 P2

I have to say being a user I was surprised at how much I enjoyed doing this. Normally I'd be. You know it might be like. Oh I have to. But I thought this was fun.

C1 P9

Yeah and if you have a lot there you won't annoy people so they're not saying nothing relates to me. People just want to go in and do it but it has to relate to. It has to be relevant.

C1 P2

Overall though there was good variety and the competition bit really grabbed me.

C2 P8

It was great the way something some information you're so used to looking at can look so different. It just even didn't look like the same kind of information. I was like you know. If I read that in a book. Groan. It definitely freshened it up.

C1 P9

What amazes me actually is that it's a while since we finished but I still remember the stuff.

All

Yeah.

C1 P2

Yeah it just shows doesn't it. There's a lasting impact.

C2 P8

For all the right reasons.

All

Laughter

C2 P8

Look I found this really helpful anyway.

C1 P9

Were there any mistakes with the points? I think I should have had more?

All

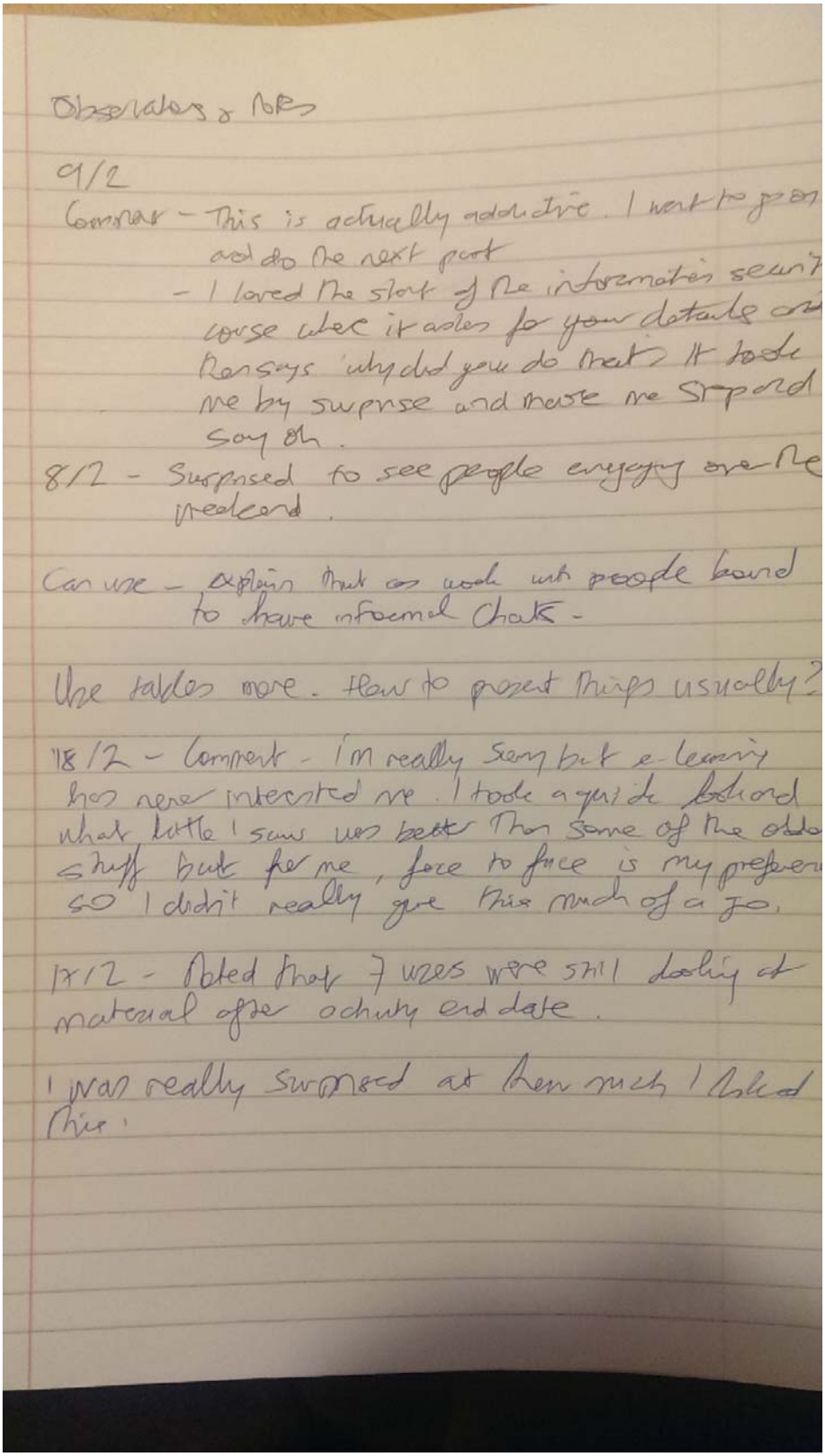
Laughter

Researcher

Ok. Thanks again everyone for your input. Thank you all again.

Appendix L – Image from Focus Group Exercise

Appendix M – Extract from Research Journal Recording Informal Comments



Appendix N - Informal Communications: Comments on Activities

Some activities within the VLE allowed participants to post comments. The intention was that participants should use this feature to answer questions relating to the content. An unexpected occurrence was that some participants made more general comments on how they felt about the content. These are provided below:

- I will remember more from this short video than I would from sitting in a class listening to someone drone on.
- This was really memorable. Well done.
- I think this would be a useful tool, particularly as part of a training programme as it is informative.
- Good video. Helps to see some “real life” examples for a change, even if they were a bit exaggerated.
- Really liked this video. I found the information security one a bit annoying but this was really useful.
- Some of it was a bit exaggerated but made the point well. What amazes me is that we do give info to people who give off the impression of authority and we are nearly embarrassed to refuse.
- Good description. Change of medium holds interest.

Appendix O – Analysis of Participants Skipping Levels

	C2 P1	C2 P2	C2 P3	C2 P4	C2 P5	C2 P6	C2 P7	C2 P8	C2 P9	C2 P10	C2 P11
Insurance Concepts											
Welcome	1	1	11	1	1	1	1	2		17	
Level 1	2	2	10	2	2	2	2	1		18	
Level 2	3	3	9	3	3	3		3		6	
Level 3	4	4	7	4	4	4		4		7	
Level 4	5	5	8	5	5	5		5		8	
Information Security											
Welcome	6	6	12	6	6	6		6		1	
Level 1	7	7	13	7	7	7		7		2	
Level 2	8	8	14	8	8	8		8		3	
Level 3	9	17	15	9	9	9		15		4	
Level 4	10	18	16	10	10	10		16		5	
Data Protection											
Welcome	11	16	1	11	11	11		9	1	9	
Level 1	12	19	2	12	12			10	2	10	
Level 2	13	20	3	13	13			11		11	
Level 3	14	21	4		14			17		12	
Level 4	15	22	5		15			18		13	
Level 5	16	23	6		16			19		14	
Anti Money Laundering											
Welcome	17	9	18					12		15	
Level 1	18	10	19					13		16	
Level 2	19	11	20					14		19	
Level 3	20	12	17					20		20	
Level 4	21	13	21					21		21	
Level 5	22	14	22					22		22	
Level 6	23	15	23					23		23	

	C1P1	C1P2	C1P3	C1P4	C1P5	C1P6	C1P7	C1P8	C1P9	C1P10	C1P11
Insurance Concepts											
Welcome	1	1	1	1	1	1	4	2	1		
Level 1	2	2	2	2	2	2	5	7	2		
Level 2	3	3	3	8	3	3	6	8	3		
Level 3	4	4	4	9	4	4	7	9	4		
Level 4	5	5	5	10	5	5	8	10	5		
Information Security											
Welcome	6	6	6	3	6	13	12	1	6		
Level 1	8	7	7	4	7	14	13	3	7		
Level 2	9	8	8	5	8	15	18	4	8		
Level 3	7	9	9	6		16	14	5	21		
Level 4	10	10	10	7		17	19	6	22		
							20		23		
Data Protection											
Welcome	12	11	11	11		18	1	11	9		
Level 1	13	12	12	12		19	2	12	10		
Level 2	14	13	13	13		20	3	13	11		
Level 3	15	14	14	14		21	9		18		
Level 4		15	15	15		22	10		19		
Level 5		16	16	16		23	11		20		
Anti Money Laundering											
Welcome		17	17	17		6	15		12		
Level 1		18	18	18		7	16		13		
Level 2		19	19	19		8	17		14		
Level 3		20	20	20		9	21		15		
Level 4		21	21	21		10	22		16		
Level 5		22	22	22		11	23		17		
Level 6		23	23	23		12	24		18		
	C3 P1	**C3 P2**	**C3 P3**	**C3 P4**	**C3 P5**	**C3 P6**	**C3 P7**	**C3 P8**	**C3 P9**	**C3 P10**	**C3 P11**
Insurance Concepts											
Welcome	1	1	1		1	1	5	1	19	1	1
Level 1	2	2	2		2	2	6	2	20	2	2
Level 2	3	3	3		3	3	7	3	21	3	3
Level 3	4	4	4		4	4	8		22	4	4
Level 4	5	5	5		5	5	9		23	5	5
Information Security											
Welcome	6	6	6	1		6	4		14	6	6
Level 1	7	7	7	2		7	10		15	7	7
Level 2	14	8	8	3		8	11		16	8	14
Level 3		9	9	4		9	12		17	9	
Level 4		10	10	5		10	13		18		
Data Protection											
Welcome	8		14	6		11	1		5		8
Level 1	9		15	7		12	2		6		9
Level 2	10		16	8		13	3		7		15
Level 3	11		17	9		14			11		
Level 4	12		18						12		
Level 5	13		19						13		
Anti Money Laundering											
Welcome			11				14		1		10
Level 1			12				15		2		11
Level 2			13				16		3		12
Level 3			20				17		4		13
Level 4			21				18		8		
Level 5			22				19		9		
Level 6			23				20		10		