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The Centralised Development of Elearning Resources

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Centralisation of elearning Resource Development

Abstract

This thesis explores the centralisation of elearning resource development in New Zealand Institutes of Technology and Polytechnics (ITPs). There was a significant gap in existing research relating to the organisation of elearning resource development. The tertiary education sector has been subject to significant and rapid change with associated challenges. Centralisation has been mooted as contributing to a solution for these challenges. The lack of research around centralised development of resources makes it difficult to support such a claim. To address this, the thesis explored three areas: the extent to which centralised development of elearning has been adopted, the perceived advantages and disadvantages of a centralised model, and the attitudes teaching staff hold towards a centralised model.

The study applied a mixed method convergent parallel research design. This drew on data from interviews with elearning managers and from a survey of teaching staff.

Findings established that three categories of centralisation exist in New Zealand ITPs; decentralised, centralised and highly centralised. The typical composition and functions of the centralised teams were defined for each category. The findings supported the perceived advantages and disadvantages identified in existing research, but also identified additional advantages. These included better project management, more clarity around roles and responsibilities, that elearning resources produced by a centralised unit was more student focussed and specific cost saving information. Levels of understanding around the financial advantages of a centralised model were inconsistent. The attitudes teaching staff held towards a centralised model were seen as to some extent ambivalent. Attitudes were more positive where the staff already operated within a centralised model.

The thesis makes a significant contribution where there was a gap in existing research. This new knowledge is directly relevant to current decisions around cost of development, composition of central teams, expectations when adopting a centralised model, and planning to centralise or decentralise. These findings are both timely and significant as recent mergers, qualification reviews and the expectation to innovate and adopt new models of delivery increase the need for more efficient solutions to creating elearning resources.

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Chapter One: The Centralised Development of Elearning Resources

Introduction

> *...across the tertiary system, many teachers and groups of teachers are innovating, including integrating new technology into their teaching practice. Passionate professionals are trying new things. But there is a lack of system dynamism necessary for these approaches to scale up and transform education delivery.*

> (New Zealand Productivity Commission, 2016a, p. 2)

As the New Zealand Productivity Commission (2016a) suggest, education is changing rapidly. Institutions and leaders need to find solutions and innovations to meet the demands of this change. Tertiary education faces significant challenges within the context of this change. These include: creating alignment between national and institutional priorities; ensuring long term financial sustainability; creating equity of opportunity for learners; ensuring quality; and meeting the demands of internationalisation (OECD, 2008). Technology is a significant component of these challenges and for some, a solution (Ministry of Economic Development, 2008; Newman & Scurry, 2015). As elearning is the use of technology to the advantage of the learner it is a significant part of the solution (Guiney, 2014). There is therefore interest in scaling the production of elearning resources. Centralising resources and processes may offer some answers as to how to scale production of resources (Higgins & Prebble, 2008a). However, there is currently little evidence to inform what format centralisation could take, how effective it will be or how to implement it successfully (Guiney, 2013). This leaves unanswered questions around whether to centralise, to what extent to centralise, what functions to centralise, how to organise a centralised team and how to manage the implementation of a centralised model with teaching staff. The current body of research is either not specific to the New Zealand or the Institutes of Technology and Polytechnics (ITP) sector, or it does not relate specifically to centralisation of elearning resource development.

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Rationale for study

A review of literature identified significant gaps around the extent of centralised development in New Zealand ITPs, the advantages and disadvantages of a centralised development model and the attitudes teaching staff hold towards a centralised model. The research undertaken here, adds to the body of knowledge where these gaps were identified. This in turn may inform decisions about the organisation of elearning resource development within the New Zealand ITP sector (Institutes of Technology and Polytechnics). As the findings relate specifically to the New Zealand ITP sector and to the centralisation of elearning, the research undertaken here aims to contribute to the ITP sectors capability to meet the demands of rapid change (New Zealand Productivity Commission, 2016a).

Purpose

The aim of this project was to inform decisions around the organisation of elearning resources by answering the following questions:

- To what extent are New Zealand ITPs centralising the development of elearning resources?
- What advantages and disadvantages do staff see in the centralised development of elearning resources?
- What attitudes do teaching staff hold towards centralised development of elearning resources?

Research boundaries

The scope of this research is to explore the phenomenon of centralisation of elearning resources development within the New Zealand ITP sector (Institutes of Technology and Polytechnics). The ITP sector consists of 16 institutions which receive government funding via the Tertiary Education Commission (TEC) to deliver

education and training. In 2014-2015 this sector received TEC funding to provide education to the equivalent of 55,000 full time students (Tertiary Education Commission, 2016).

Structure of the thesis

The thesis is structured into the six chapters as outlined here. Chapter one, the current chapter, introduces the study and explains its purpose and rationale. The boundaries of the study are also been described. Chapter Two is a review of the existing literature around each of the research questions. Chapter Three explains the methodology of the research undertaken, and why that methodology was selected. In Chapter Four the findings are presented. These findings are organised around each of the three research questions. A discussion of the findings is presented in Chapter Five. This is again organised around the three research questions. Chapter Six concludes the research by drawing on the discussion and describing the significance and implications of the findings to the field of study. This includes specific recommendations for those making decisions about the organisation of elearning resource development. Opportunities for further study are also described.

Chapter Two: Literature Review

The purpose of this chapter is to examine the existing literature around centralisation of elearning resource development. This examination established the extent to which existing research has provided information and understanding around centralised developments, and identified research gaps. In later chapters this provided a benchmark against which the significance of the research undertaken here was measured, and situated it within the wider context of existing literature. The review of literature was undertaken in several sections. The available literature was used to define what elearning and elearning resource development encompasses and what centralisation means within the context of this study. Research which describes the extent to which centralised models have been adopted was then examined. The extent to which literature describes the perceived advantages and disadvantage of adopting centralisation in New Zealand are critiqued. In the final section the literature which informs understanding of attitudes towards centralised development is examined.

What is elearning?

This section will look at definitions of elearning in current literature and adopt a definition for the purposes of this study. International research will be examined first, then New Zealand based literature, before drawing on both to create an operational definition for this research. This definition will then be used to inform what resource development is within the scope of this study.

There is a wide range of definitions available for the concept of elearning both internationally (Alonso, López, Manrique, & Viñes, 2005; Bates & Sangra, 2011; Bates, 2001; Bermejo, 2005; Liao & Lu, 2008; Manning & Curtis, 2012) and in New Zealand (Butterfield et al., 2002; Higgins & Prebble, 2008a; Louwrens, 2013;

Marshall, 2012; Ministry of Economic Development, 2008; Ministry of Education, 2016). Some definitions are generic and some are context specific. However, they tend to have two common concepts: some use of Information Communications Technology (ICT); and an intent to support learning.

An international example of this is Mosakhani and Jamporazmey (2010) who describe elearning as having two main components; structure and communication. This definition of elearning places a lot of emphasis on the medium or infrastructure through which the learning is transferred rather than how that infrastructure is used. This is not easily applicable to the New Zealand context, as the internet infrastructures they refer to are no longer a point of difference in a learning environment where internet is almost ubiquitously available. It also emphasises information transfer which relates more to a behaviourist approach to education (Anderson & Dron, 2011) than to the constructivist approach (Fosnot, 2013) currently more widely adopted in New Zealand (McPhail, 2015). This definition does not sufficiently describe the pedagogical considerations in elearning in New Zealand.

Attempts have been made to develop a more operational definition of elearning by introducing different categories to the definition. This categorisation is predominantly based on perspectives (Ministry of Education, 2016; Mosakhani & Jamporazmey, 2010; Sangrà, Vlachopoulos, & Cabrera, 2012; Wilson, 2012). Sangrà et al.(2012) examined definitions from many perspectives: technology driven perspective; delivery systems orientated perspective; communication orientated perspective; and from an educational paradigm. They utilised a Delphi technique to distil what elearning meant to many different groups across the globe, which illustrated the complexity of this concept.

One perspective that Sangrà et al. (2012) did not adequately cover was from a quality management and statistical requirements perspective. This is an important

consideration in New Zealand as the New Zealand Ministry of Education requires the use of internet to be reported on annual data returns from all tertiary institutions. They provide four categories based on the need to access internet resources: no online resources, "optional access, recommended access, required access" (Ministry of Education, 2016, p. 101). The Ministry of Education recognise that this categorisation has significant weaknesses, particularly in evaluating the extent to which blended courses use elearning (Guiney, 2016a). Wilson (2012) offered several alternatives to this reporting structure. The four banded approach suggested by Wilson provides a New Zealand definition with simple but adequate structure that also incorporated the purpose of accessing the online resources: no digital access; administrative use of digital technology; digital technology used to enhance or reinforce learning; exclusively digital interaction.

Bates (2001) reinforces this by suggesting that "any course that uses information and communication technology to enhance the learning process may be considered to fall into the category of elearning" (p. 10). Within the New Zealand compulsory education sector this focus on the purpose of elearning is embedded into the standards by which schools are evaluated, as elearning must be seen to facilitate and support learning (Education Review Office, 2016). The key element from Bates' and the Educational Review Office descriptions that integrate with Wilson's proposed categories is that elearning must enhance the learning.

Only the final category proposed by Wilson describes fully online learning, with no face to face interaction. Nichols (2008) describes blended or hybrid learning as learning that takes place partly in a face to face mode and partly through distance approaches. There is currently no categorisation officially used within the governance of the New Zealand tertiary sector which provides categories based on the extent of elearning within a blended course (Guiney, 2016b).

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By integrating the international definitions and blended learning definitions with Wilson's more local banded categories proposal, the following definition has been adopted for this research (Wilson, 2012):

> *E-learning refers to the use of digital technologies intended to enhance or support online and blended learning, but excludes purely administrative use of digital technology.*

What is elearning resource development?

There are two aspects to this question: what are elearning resources; and what is involved in the development of them? The resources required in elearning as defined above are broad ranging. Some research has established categorisation of resources by types, format or course structure (Clark & Mayer, 2011; Steen, 2008). Bonk & Khoo (2014) provide an extensive range of examples of the type of elearning activities and digital objects that would require the development of resources. These include individual online lessons, the development of courses within a learning management system, media production, developing resources to support blended delivery which will be hosted online, developing individual online interactions, activities, and assessments, developing characters, case-studies or scenarios. The following definition of elearning resources has been adopted for this research:

> *Elearning resources are digital objects or collections of objects, designed to enhance the students learning more so than merely providing an organisational administrative function.*

Traditionally elearning resources have been developed through the ADDIE model of instructional design (Dick, Carey & Carey, 2006). This model describes five stages in the production of elearning resources: Analysis, Design, Development, Implement and Evaluate. In this model design is described as "a detailed plan of instruction that includes selecting the instructional methods and media and determining the

instructional strategies" (Allen, 2006, p. 437). Development has been described as when "the student and instructor lesson materials are developed"(Allen, 2006, p. 438). If the ADDIE model had been adopted across all ITPs, then this definition may have been useful. However, several other methodologies have influenced elearning design in more recent years, for example: Successive Approximation Model (SAM) (M. Allen & Sites, 2012); Rapid Prototyping (Derouin, 2005; Shih, Tseng, & Yang, 2008); and Agile (Doherty, 2010). One commonality across these emerging models is the importance of an iterative approach to design. This is in contrast to the linear ADDIE approach. Therefore, it cannot be assumed that there is a clear division between the design stage and the development stage. For that reason, in this research, the term development of elearning resources has been taken to include the actions taken to design the resources as well as develop them.

What is centralised development?

In this section literature providing some background to the drivers for centralisation is discussed. Then a definition of centralisation is developed that allows an organisation to be described as showing an extent of centralisation through its characteristics, rather than a binary centralised or decentralised dichotomy. This definition is based on the examination of literature describing examples of centralisation, types of centralisation and then synthesising the key elements into a definition applicable at an educational institution level.

Literature providing a definition of organisational centralisation in a broader context is examined, and then narrowed to include only literature specific to the organisation of elearning resource development in a New Zealand tertiary education context. This more local focus may increase the relevance of any research findings to decision making in New Zealand ITPs.

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The current international and local tertiary education environment presents challenges of scaling education to meet demand and maintaining quality within a challenging financial environment (Ministry of Education, 2014; Nichols, 2004). Wilson (2010) shows that these are drivers for increased adoption of elearning solutions. Existing research highlights that institutions are looking for solutions to meet the challenges of demand for high quality elearning resources within financial and skills limitations (Allan, O'Driscoll, Simpson, & Shawe, 2013; Anderson, Gardner, Ramsbotham, & Tones, 2009; Anderson, Wiley, & Power, 2011; De Freitas & Oliver, 2005; King & Boyatt, 2015; Kirkup, 2014). In line with this international trend the New Zealand Government has given clear direction that tertiary institutions need to make effective use of technology in order to maintain their relevance (Ministry of Economic Development, 2008; Ministry of Education, 2014; New Zealand Productivity Commission, 2016b). Both centralised (Higgins & Prebble, 2008b) and decentralised (Mykota, 2013) approaches have been used in attempts to meet this demand. The next section will discuss what form the existing research suggests centralised models can take.

The general concept of organisational centralisation can be defined as where resources are "…authorised and allocated by the senior management team from a central pool." (Jarzabkowski, 2002, p. 3). While Jarzabkowski's general definition of centralisation lends some meaning to an educational context, it is not specific enough to differentiate organisations in the complex context of elearning development, so it falls short of a workable definition in which to frame this research.

There is a substantial body of research which describes education based examples, where authority and resource allocation is deliberately either centralised or decentralised to some extent. Some of this literature provided examples of education systems which have become more centralised (Dee & Jacob, 2011; Haim &

Romm, 1988; Kremer, Moulin, & Namunyu, 2003; Laukkanen, 2008; Liu, Murphy, Tao, & An, 2009; Malherbe, 2006), whilst others describe systems becoming increasingly decentralised (Caldwell, 2009; Davies, 2002; Fitzgerald & Gunter, 2011; Lundahl, 2002). There were also some examples where within the same system, some functions that had been centralised were becoming decentralised and vice versa (Holmgren, Johansson, & Nihlfors, 2013; Lessard, 2003; Møller & Skedsmo, 2013; Neuman, 2009; Tan & Ng, 2007).

While some of the literature addressed education as a whole, without differentiating between the compulsory and tertiary sectors (Lessard, 2003; Lundahl, 2002), the research predominantly referred to the compulsory sector (Caldwell, 2009; Davies, 2002; Dee & Jacob, 2011; Fitzgerald & Gunter, 2011; Haim & Romm, 1988; Kremer et al., 2003; Liu et al., 2009; Malherbe, 2006; Neuman, 2009). There was not extensive research available that specifically addressed themes of centralisation in the tertiary sector (Guiney, 2013; Higgins & Prebble, 2008a, 2008b; Laukkanen, 2008).

The research available reported on centralisation across a range of cultural and geographical contexts. This included North America (Dee & Jacob, 2011; Fitzgerald & Gunter, 2011; Lessard, 2003), Scandinavia (Holmgren et al., 2013; Laukkanen, 2008; Lundahl, 2002; Møller & Skedsmo, 2013), Africa (Kremer et al., 2003; Malherbe, 2006), Asia (Liu et al., 2009; Tan & Ng, 2007), the Middle East (Haim & Romm, 1988) and New Zealand (Guiney, 2013; Higgins & Prebble, 2008a, 2008b).

The body of research is recent and drawn from diverse sectors of education across the globe; issues around centralisation and decentralising are current areas of interest. However, very little of the work discussed above examines centralisation at an institutional level rather than a national or systems level. This is highlighted by the fact that while being consistent in the use of the term *centralisation,* terms such as *devolved* or *democratised* were used rather than *decentralised* (Davies, 2002;

Haim & Romm, 1988; Kremer et al., 2003; Lessard, 2003; Tan & Ng, 2007). This wording indicates the relationship that is frequently described between the organisation of education and the wider socio-political situation in that country (Borck, 2007; Haim & Romm, 1988; Koren, 2007; Kremer et al., 2003; LaBelle & Ward, 2011). As the research undertaken in this study is examining centralisation at an organisational level, the more macro view of educational systems described above is to some extent limited in its relevance. However, it does introduce the concept that some functions may be centralised while others are decentralised.

Most commonly research describes centralised control of functions such as finance (Borck, 2007; Herbst & others, 2008; Hwang, Tsai, Yu, & Lin, 2011; Liu et al., 2009), administration (Fitzgerald & Gunter, 2011; Lessard, 2003), quality control (Holmgren et al., 2013; Stensaker, 2003; Tan & Ng, 2007) and achievement standards (Dee & Jacob, 2011; Laukkanen, 2008; Møller & Skedsmo, 2013; Zenios & Steeples, 2004). The literature examined above did not provided an example where all of those functions were concurrently identified as centralised. This supports the use of a definition based on common characteristics of centralisation, rather than a dichotomous, centralised versus devolved definition.

While the extent of the literature above established that centralisation is an area of interest in education research, it does not establish different types of centralisation. Bray (1999) identified two key types: territorial and functional. The examples discussed in the research above all align with *functional centralisation*; the extent of centralisation is determined by the level to which the control of a function is concentrated at a higher organisational level. The extent of *territorial centralisation* is however determined by the geography of where control is centred; at a remote capital, regional, district or institution. These terms are frequently used in literature describing the type and extent of centralisation at national or governmental levels (Dafflon, 2015; Friedmann & Weaver, 1979; Gradus, 1984; Schimmelfennig, Leuffen,

& Rittberger, 2015; Yang & Li, 2014). Even when referencing education specifically the terms functional or territorial centralisation are generally only used to describe the extent of governmental control on education, rather than to describe the type and extent of centralisation within an education organisation or elearning resource development process (Mok, 2013).

There is a limited number of studies that look at the extent or form of centralisation of elearning activities in New Zealand (Gedera, 2015; Gedera, 2016; Guiney, 2013; Higgins & Prebble, 2008a; OECD, 2005). OECD (2005) surveyed a range of international tertiary institutions including the Open Polytechnic which is a New Zealand ITP. The report provided examples of institutions with centralised elearning strategies and the extent to which the decisions about how elearning is delivered were centralised. The Open Polytechnic was described as having centralised resources to develop elearning product, managing quality of elearning. Open Polytechnic is however a fully online distance learning institution rather than a campus based/ blended delivery institution like the majority of the other New Zealand ITPs, therefore caution should be exercised in generalising the characteristics described as applicable to other New Zealand ITPs. Another consideration is that this work was published in 2005 and over a decade later, in a climate of fast changing educational technology, the relevance of the findings may be less relevant to today's ITPs.

The findings of Higgins & Prebble (2008a) provide insight into several New Zealand ITPs with a clear focus on organisational structures and the design and development of resources, and as such provide key literature for this research. The report provided examples of centralised decision making as well as completely devolved decision making. There were examples of centralised resource development, and decentralised resources development. Overall the report emphasised the range of different approaches to organising the provision of elearning, but suggested that a

decentralised approach was the most common approach in the New Zealand tertiary sector. There are however several limitations to how Higgins & Prebble (2008a) describe the characteristics of centralised elearning development today. While this work is more recent than the OECD report there has still been significant changes in elearning since its publication such as cloud based computing, collaborative environments, mobile learning and personal learning environments (Johnson et al., 2016; Johnston, Adams, & Cummins, 2011). There are three weaknesses in the way that data were collected. The institutions in Higgins & Prebble (2008a) were selected based on the research team's prior knowledge of what characteristics they demonstrated. This method of selecting participants creates the possibility that the characteristics studied are not representative across all ITPs as the study will only focus on characteristics that the researchers were already aware of. For example, their description of strong centralised leadership within Otago Polytechnic. The second weakness is that the data were gathered for each institution from one source; a member of their senior leadership team. This creates the possibility that the data will only describe characteristics from a top down perspective, which does not necessarily represent what is experienced by teaching staff. Thirdly, that the data were gathered from universities, wānanga and ITP, therefor the finding cannot be said to be specific to the ITP sector.

Rather than focussing on sector level analysis, Gedera (2016) conducted a thematic analysis from the perspective of an elearning designer within a centralised development process in a New Zealand ITP. While in contrast to Higgins & Prebble (2008a) and OECD (2005) Gedera delved more deeply and more specifically into the implications of centralisation on elearning resource development, the scope of the research is limited to one ITP and in the context of a specific learning design project. This suggests a significant research gap which is reinforced by Guiney (2013, p. 13) who suggests that there are "only a few studies on New Zealand tertiary sector

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organisational approaches to e-learning and these tend to involve only small numbers of participants."

Based on the review of literature above there does not appear to be a current, accepted definition of centralisation relevant to educational institutions, that could be readily used to describe the extent to which the development of elearning resources has been centralised.

To create an operational definition, the characteristic of centralisation in education have been considered alongside the typology established at a national/government level. Therefore, for this research, the extent of centralisation in development of elearning resources is defined as:

> *The extent to which organisational characteristics create a greater territorial and/or functional distance between educators and the processes involved in the development of elearning resources.*

With this definition in mind the next section examines the advantages and disadvantage that previous research associate with such a centralised approach.

Reported advantages and disadvantages of centralised elearning development

This section addresses the extent to which existing literature describes the advantages and disadvantages of adopting a centralised model of elearning resource development.

Caldwell suggests that centralisation is a better option when "the values of control, uniformity and efficiency are in ascendance, and decentralisation indicated when freedom, differentiation, and responsiveness are preferred" (Caldwell, 2009, p. 55). The notion that centralisation supports increased control and uniformity has significant support in existing literature which refers specifically to the quality of resources centrally produced (Guiney, 2013; Mugridge, Mills, & Smith, 2006; OECD, 2005). Efficiencies through cost reduction are also widely supported in that

centralised development enjoys economies of scale (Choy, 2007; Garrison & Kanuka, 2004; Guiney, 2013; Higgins & Prebble, 2008a; Kirkup, 2009; MacKeogh & Fox, 2008). There are several other important advantages to using a centralised model that Caldwell (2009) does not refer to. A centralised model has been suggested as advantageous where institutional leadership is trying to make significant organisational changes (Roder & Rata-Skudder, 2012; Softić & Bekić, 2008). These changes may be pedagogical, and a centralised model could provide the opportunity to make this "systemised and generalised" (Zenios & Steeples, 2004, p. 7) through increasing the role modelling of best practice (Keesing-Styles & Ayres, 2011).

While these advantages are well described in the literature that is relevant to the New Zealand tertiary sector there are equally well supported disadvantages to using a centralised model of elearning resource development.

It has been suggested that a more centralised locus of control jeopardises academic autonomy and will lead to "bland homogeneity" (OECD, 2005, p. 137). Bates & Sangra (2011) refer to an undesirably uniform approach to teaching across all subjects. This generates resistance to change which staff may generalise to elearning rather than centralisation of elearning development.

Teaching staff may teach as they were taught and resist change (Blin & Munro, 2008), often using "academic freedom as an academic crutch" (Rovai & Jordan, 2004, p. 7). Further resistance may be met through the perceived conflict of roles for academics; a centralised teams perceived to be reducing their academic freedom. The logistics of managing bottlenecks where even minor changes require centralised action generates another issue for centralisation (OECD, 2005). For example, when centralised team create resources on applications that are not available to teaching staff. As a response to this, institutions have been seen to some extent to decentralise, while still retaining centralised development functions (Higgins &

Prebble, 2008a). Drawing the locus of control to a centralised unit can be perceived as increasing distance between where the resources are developed and the relationship between the teacher and the learner. Holt et al. (2001) identify several issues with this increased distance: reduced autonomy; reduced innovation and lost localisation.

While these advantages and disadvantages give some indication of what could be expected from a centralised model of elearning resources development, there is very little evidence to directly inform the New Zealand ITP sector.

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Attitudes to centralised development of elearning resources

There is clearly some knowledge around the advantages and disadvantages of a centralised development model, but to be able to understand the likelihood of successful implementation it is necessary to understand the attitude the end users hold towards it. The purpose of this section is to explore the relevant literature around attitudes that educators hold towards a centralised model of elearning resource development. In order to do so the concept of attitude was defined.

According to Fishbein (1967), attitude is conceptualised as "learned predispositions to respond to an object or class of objects in a favourable or unfavourable way" (Fishbein 1967, p. 257). In the context of this study this means learned dispositions towards a centralised model of elearning resource development. This has in some instances been simplified to a likes and dislikes dichotomy (Schwarz & Bohner, 2001). However, in other studies attitude is seen as a complex construct having various constituent elements; motivational, emotional, perceptual, cognitive, connotative and affective (Bannon, 1985; Henle & Michael, 1956; Liaw, Huang, & Chen, 2007; Petty, Wegener, & Fabrigar, 1997; Schwarz & Bohner, 2001).

This tension between a simple model and one with separate layers of attitude is evident in research that relates to the technology acceptance model (Davis, 1993; Davis, Bagozzi, & Warshaw, 1989). Early iterations of the Technology Acceptance Model (TAM) described perceived usefulness, perceived ease of use, attitude and behavioural intentions as contributing factors to actual use of a technology (Davis, 1993; Davis et al., 1989; Jackson, Chow, & Leitch, 1997; Taylor & Todd, 1995). Later iterations of TAM suggested that attitude did not have a significant impact on behavioural intention or actual use of technology (Holden & Karsh, 2010; Legris, Ingham, & Collerette, 2003; Teo, 2009, 2010; Turner, Kitchenham, Brereton, Charters, & Budgen, 2010; Venkatesh & Bala, 2008). These later models have been

challenged in that they adopted a basic definition of attitude that did not differentiate between cognitive and affective attitudes (Yang & Yoo, 2004). Yang and Yoo identified that cognitive attitude when isolated from affective attitude did in fact have a significant influence on behavioural intention. Therefore, for this research the definition of attitude adopted is that of cognitive attitude as "an individual's specific beliefs related to the object", as described by Yang and Yoo (2004, p. 20).

While there is a significant body of research that explores educator's acceptance of specific technologies (Fresen, 2011; King & He, 2006; Lau & Woods, 2008; Nair & Mukunda Das, 2012; Wong, 2015) there is no evidence of it being applied to an organisational solution to support the implementation of technology such as the centralisation of elearning resource development. There is however significant research around the roles attitudes play in organisational change. The separation of cognitive and affective attitude is also adopted in this broader research, see for examples Neiva, Ros, & Torres (2005). Neiva et al. (2005) identified both oppositional factors and acceptance factors. There was also evidence that resistance to change was greater when negative attitudes were held (Valley & Thompson, 1997) and that negative attitudes to change were related to increased levels of occupational stress (Vakola & Nikolaou, 2005). Negative attitudes to organisational change have been linked to lower employee engagement and higher staff turnover (Towers Watson, 2014). There was no evidence of research informing organisational change that related to centralisation of elearning resource development.

The review of literature above showed that there is extensive research relating to educators' attitudes to using technology in education, and to the use of specific technologies. There is also significant research around how employees' attitudes are linked to organisational change. However, there was an absence of research specifically relating to the attitudes teaching staff held towards a centralised model

of elearning resource development. This research gap was apparent not only in the New Zealand ITP sector, which is the scope of the research undertaken here; there was no evidence of research to specifically inform this question internationally either.

Conclusion

The review of literature identifies several gaps in the current body of research that the study undertaken here seeks to address. While the existing research can provide a definition of centralised development, it does not provide any information about the extent or form of centralisation in the New Zealand ITP sector. There is significant research relating to the advantages and disadvantages of adopting a centralised model, but there is insufficient coverage of the New Zealand ITP sector to inform what could reasonably be expected for an ITP adopting a centralised model. While there is a significant body of research around educators' attitudes to adopting technology and another body around attitudes to organisational change there was a gap between these two bodies. Literature relating to attitudes to centralisation of elearning resource development was very sparse.

This research therefore focusses on filling the gaps in the existing body of research in order to better inform decisions in relation to centralised elearning development. The project examines the following questions:

- To what extent are New Zealand ITPs centralising the development of elearning resources?

- What advantages and disadvantages do staff see in the centralised development of elearning resources?

- What attitudes do teaching staff hold towards centralised development of elearning resources?

Chapter Three: Methodology

This chapter sets out the methodological approach that guided the research and justifies its selection by the researcher. It outlines the paradigm in which the research was conducted. Data collection methods are discussed as well as limitations in using the chosen method. Ethical considerations are also discussed.

The research was designed from a pragmatic perspective and a mixed method approach was selected. A convergent parallel design was selected (Creswell & Plano Clark, 2010). This entailed initially separate analysis of qualitative data from interviews and quantitative data from questionnaires. Integration of those data then took place to produce the results and findings.

Adoption of a Pragmatic Paradigm

Before undertaking any exploration of social situation involving factors such as attitudes, it is important to be clear what philosophical paradigms have impacted on the research design. Morgan (2007) suggests that paradigms operate at three levels: epistemology; methodology; method. This section will address each level in turn.

The acquisition of understanding around elearning, on the time line of epistemology is a very recent development and has emerged in an era more accepting of the values of post-positivism (Trochim, 2006). This post-modernist philosophy lends itself to study of organisational strategies and professional attitudes that are complex, open ended and do not necessarily comply with traditional thinking. This matches Morgan's (2007) assertion that a pragmatic paradigm of research is characterised by inter-subjectivity and abductive reasoning. Elsenbroich, Kutz, & Sattler (2006, p. 1) summarise that this abduction is amplitive and that it "provides more knowledge than can be obtained deductively from a given knowledge base. However, neither induction nor abduction are truth preserving". This aligns with the epistemology of

this research as it sets out to explore and describe a complex situation rather than to definitively and deductively prove or disprove a theory.

There is concern that while such a pragmatic approach is justifiable at the level of a philosophical paradigm, will it also apply at a methodological level (Denzin, 2012)? Ellingson (2009) proposed a model which used a range of different data sources to inform research, and places these on a qualitative continuum with bricoleurs working to one end in an art/impressionist zone and scientist/realists working at the other. This continuum has guided the researcher's pragmatic approach to data analysis which sits in the middle ground of Ellington's model; benefiting from a mix of data sources, while maintaining credibility with readers who hold a traditional viewpoint on data sources.

The researcher has constructed their own world view. This viewpoint has been influenced by working within a centralised elearning development unit. It is therefore impractical to suggest that a singular or impartial stance could be assumed in methodology. A pragmatic umbrella paradigm which accepts the intrinsic influence of many paradigms better describes the perspective influencing the design of this work. It is this pragmatic "what works" approach that has guided the mixing and timing of qualitative data and quantitative data in order to work around constraints, limitations and interference (Denzin, 2012, p. 84).

The methods of data collection selected are based on the need to answer the research questions, the accessibility of participants, and the scope of the research investigation. These methods give primacy to the research questions and seek the best outcome in the given situation. This aligns with a pragmatic application of methods (Mackenzie, N., & Knipe, 2006). Having established a paradigm in which to frame the study the next section describes the methodology.

Centralisation of elearning Resource Development

Rationale for Selecting a Mixed Method Design

The selection of the most appropriate research methodology is fundamental to sound research design. There were many benefits in selecting a mixed method design for this project. Johnson & Onwuegbuzie (2004) describe mixed methods and the pragmatic paradigm described above as "philosophical partners" (p. 16). Bryman (2006) proposes sixteen different reasons for selecting a mixed methodology, five of which are directly relevant to this research: triangulation; offsetting; completeness; utility; and diversity of views. It is worth explaining how each reason benefits this research in more detail.

Triangulation is the benefit traditionally cited for selecting a mixed methodology (Greene, Caracelli, & Graham, 1989). Triangulation can occur in the methodology. For example, the triangulation of quantitative and qualitative data. It can also occur between perspectives (Wilson, 2010b). For example, the triangulation of managers' and teachers' perspectives. This research benefited from both. *Offsetting* is the benefit realised by matching the advantages of one method to the disadvantages of another. For example, due to the difficulty of access and high time commitment associated with interviews, only relatively small sample sizes were in scope for an individual researcher. This was offset against the efficiency and reach of online surveys in order to benefit from the richness of interviews, while still integrating the perspectives of many participants. *Completeness* is the advantage generated when two sources or perspectives are integrated to create a fuller picture than would be possible from either separately. This was very relevant to this research, as providing a complete description of centralisation of elearning resources depended on integrating more than one perspective. The *utility* of this research may also be greater through the selection of a mixed methodology, as the aim of the research was to better inform decisions about the organisation of elearning resource development. For sound decisions to be informed, they are likely to require

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consideration of issues from more than one perspective. This is closely linked to the benefits of including two *different views*. As some of the previous research in this area was from the perspective of senior institutional leaders (Higgins & Prebble, 2008a) it was important that this research included other points of view. It also had to recognise the differences in these points of views as well as the agreements.

As described above, there are many advantages to adopting a mixed methodology, selecting the most appropriate type of mixed method can also create distinct advantages for the research.

Rationale for Selecting a Convergent Parallel Design

Creswell & Clark (2010) identify four key decisions in selecting the most appropriate type of mixed method study: the level of interaction between quantitative and qualitative strands; the priority given to each strand; the timing of each strand; and where and how to mix the two strands. A convergent parallel design is characterised by a lack of interaction between quantitative and qualitative data until they are integrated late in the research process. Both strands of data are collected in parallel and given equal weight in the integrated results (Creswell & Plano Clark, 2010). This section outlines how a convergent parallel design was used in this research, by describing each of the four key decisions in turn and the possible associated challenges.

The interaction of the two strands was delayed until they were integrated as results and findings. Each strand came from a different source and perspective. Interviews were carried out with elearning managers and surveys with educators. Integration of these sources earlier in the process would have been possible on an institution by institution basis rather than based on the whole sample. This was not appropriate for two reasons: the research questions were focussed on phenomenon at the ITP sector level rather than institutional level; and linking the opinions of the elearning

manager with the teaching staff could have compromised the anonymity of survey respondents, interviewees and institutions. Selecting this method created an unforeseen limitation in the study; some of the themes which emerged from the interview were different from the themes that the questionnaire asked about. This created difficulties when integrating the data from the survey with the data from the interviews. This was particularly true for research question two which related to the advantages and disadvantages of centralised development. This may have been due to the selection of a parallel research design. It can also be attributed to the known disadvantages of an online survey being restricted in its flexibility (Berg & Lune, 2004) or that the two different perspectives, recognised or valued different things as useful.

No justification was found to prioritise the data from either method or perspective as more important that the other. To do so would have demanded a more quantitative approach to analysing the qualitative data, which would reduce the benefits of triangulation of methods (Denzin, 2012; Wilson, 2010a). Therefore, equal priority was adopted for the integration of data.

Sequential timing can be used to allow data from one perspective to identify emergent questions to inform the second. This would have been a desirable feature in this research. However, to allow for a flexible time frame across organisations participating and still access consistent results, a sequential structure was not adopted. There was an administrative dependency within each participating institution as the elearning manager (Qualitative) distributed the request to teaching staff to participate in the survey (Quantitative). This sequencing determined access to the survey participants, but did not influence the format or content of the survey. There were interviews being conducted with one institution concurrently with surveys in another. This indicates a best match to a concurrent design, which allows

a shorter data collection period- a decision in line with a pragmatic approach to research.

The mixing of strands in this research was characterised by late integration; survey and interview data were analysed separately then integrated. This was the best fit, as each data set comes from a different source and perspective; interviews were carried out with elearning managers, and surveys with educators and then integrated as results and findings.

Based on the above decisions about levels of integration, priorities of sources, timing, and mixing of strands, within a pragmatic paradigm, the best-fit model of mixed method design was seen to be a convergent parallel design (Creswell & Plano Clark, 2010). Figure 3.1 illustrates the parallel processes in this method, with integration of the two strands during the writing of results and findings with equal priority.

Mixed Method Design

↓

Convergent Parallel Design

| Qualitative | Quantitative |

↓

Data Collection

| Interviews with elearning managers | Online survey of teaching staff |

↓

Data Analysis

| Content analysis | Statistical analysis |

↓

Emphasis

| Equal Priority | Equal Priority |

↓

Integration of results through common framework of Technology Acceptance Model (TAM)
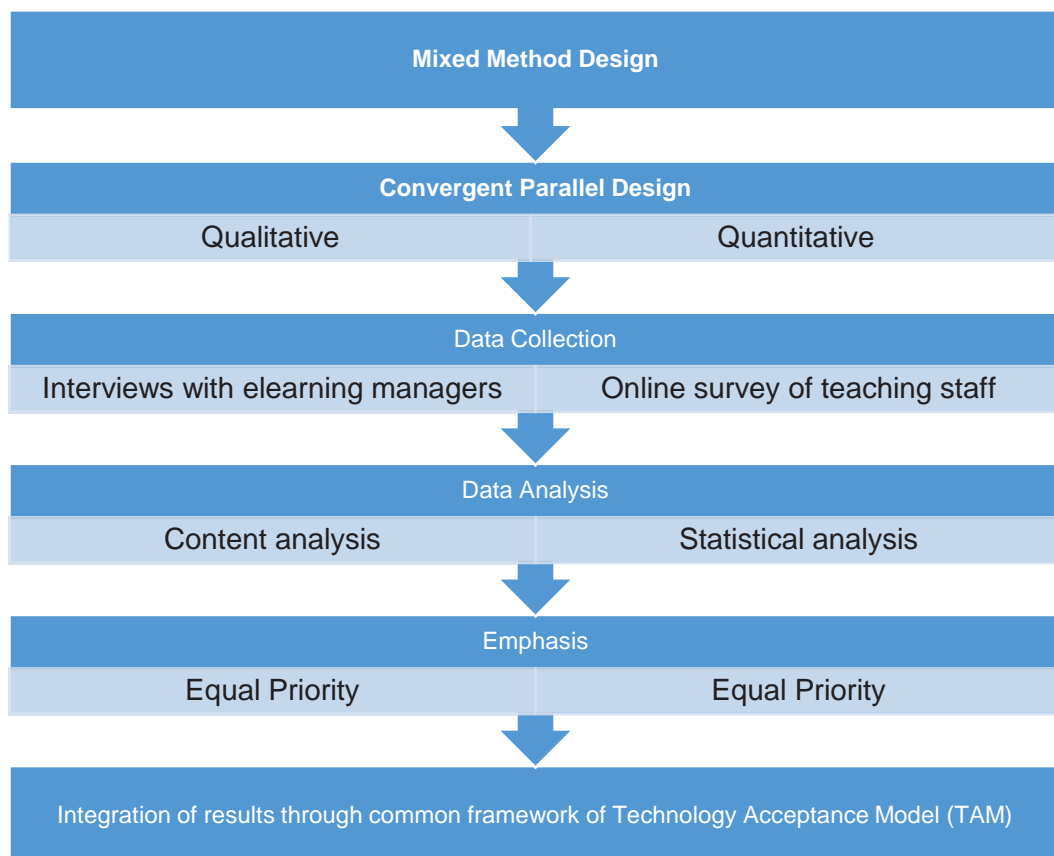
Figure 3.1: Summary of convergent mixed method design.

There are several possible challenges to using a convergent parallel design (Creswell & Plano Clark, 2010). These were mainly based around managing the data. In collecting the data, it can be a challenge for a single researcher to have the capacity to manage the amount and variety of data. In analysing the data, it can be challenging for a single researcher to have the capability to demonstrate both the quantitative and qualitative research skills to the level required. It can also be challenging to integrate seemingly disparate sources of data in a meaningful way. Systems were put in place to manage these challenges. Research software (Nivo11 and SPSS23) was used to manage the data. Online statistics support was used to guide quantitative analysis (Laerd Statistics). An online transcription service was used to manage the researcher's workload (Rev.com). The Technology Acceptance Model (TAM) was used as a structure for both the qualitative and quantitative data collection tools, to allow easier integration of data. These measures adequately managed the challenges without inhibiting the advantages of a convergent parallel design.

Centralisation of elearning Resource Development

Description of Data Collection Methods

To maximise the amplitive advantages of drawing understanding from diverse sources, and merging the understandings gathered, two separate data collection techniques were required. Two perspectives were explored; the viewpoint of the teaching staff and the viewpoint of elearning managers. All current New Zealand Institutes of Technology and Polytechnic (ITPs) except the researcher's employer were invited to participate in this study.

As stipulated as an ethical requirement, permission to approach participants was gained through a letter (Appendix 2) and information sheet (Appendix 4) mailed to chief executives of the institutions. Where permission was granted the researcher invited the institutions elearning manager to an online interview, and also to request their cooperation in distributing the invitation to complete an online survey to educators within their institution. This format provided qualitative data from the managers' interviews and quantitative data from the educators' surveys. This approach has been successfully used in a similar context by Wilson (2010). This request triggered an internal ethics process for several institutions. The required information was supplied by the researcher and confirmation of approval received from the local ethics committees before the interviews were conducted.

Ethical Issues in Data Collection

All research needs to be scrutinized from an ethical perspective as the processes of conducting or sharing the research may present risks to individuals or organisations. Where possible steps should be taken to mitigate these risks. Any risks assumed as acceptable must be done in balance with the potential benefits of the research. The research was scrutinised by the Massey University Human Ethics Committee (MUHEC) before any contact was made with potential participants. This section outlines the ethical considerations that were identified as relevant to this study: privacy,

anonymity and confidentiality; under representation of specific population groups; informed consent and the right to withdraw; and the role of the researcher. The measures put in place to mitigate against these risks are described below.

Privacy, anonymity and confidentiality

It was anticipated that some of the information disclosed in the interviews would be of a sensitive nature at an individual, organisational and sector level. To ensure that participants were able to confidently share information in a safe environment, privacy, anonymity and confidentiality were primary concerns.

The risks associated with being identified at an individual level included: possible offence to colleagues or previous colleagues; damage to relationships with colleagues or management, disciplinary action for mistakenly disclosing confidential information; negative effect on career prospects. The risks associated with institutions being identifiable from interview data included: possible damage to professional relationships; damage to brand; possible disruption of organisational change initiatives. Risks that could have had an impact at sectors level include loss of competitive advantage and damage to current or future collaboration.

Frankfort-Nachmias & Nachmias (1996) identify three dimensions of privacy: sensitivity of the information; the setting; and dissemination of information. These dimensions have been used by other researchers to guide comprehensive measures to manage the associated risks (Hartnett, 2010). This section will address each in turn.

Measures in place to mitigate these risks in regard to the sensitivity of the information included emphasising to the participant that they have the ability to select to what extent they participate in the interview or survey. If the discussion became uncomfortably sensitive, they could elect not to respond to that question or withdraw from the process at any time. This was clear in all communications with

the participant (Appendices 3,4,5,8,9 and 10). If the interview participants realised the sensitive nature of the conversation in retrospect, they had the opportunity to redact it when reviewing the transcript of the conversation. This was done in one instance where the interviewee discussed their predecessor's performance and elected to redact it from the transcript due to its sensitive nature. Survey participants had the ability to withdraw from the survey or delete a response to any given question up to the point where the survey was submitted. After that point due to the anonymity of responses it was not possible to identify their response to withdraw it. This information was shared prior to commencing the questionnaire. Closely linked to the sensitivity of the discussion is the setting in which the discussion took place.

The setting for all of the interviews was via online video conference (Skype for Business or Adobe Connect), with the interviewer in a private room. Interviewees selected a location in which they were comfortable and uninterrupted. This setting adequately protected the participant's confidentiality and privacy. The survey participants had absolute control of where they completed the questionnaire, so could find a location that met all of their personal requirements.

All data were secured on a password protected system. Transcription was done under a strict confidentiality agreement (Appendix 6) to protect the privacy of all individuals and organisations participating. On completion of the project, the data were passed to the researcher's supervisor for secure storage for 5 years. Where identifiable information was provided by respondents, pseudonyms were used in interview transcripts and the research thesis. There was significant variation in the job title of interview participants, so the generic title of eLearning Manager was adopted in all transcripts and this thesis. All interviewees were given the opportunity to approve the final transcript as satisfactorily anonymised and accurate by completing a transcript release form via email (Appendix 7). Given the relatively

small number of polytechnic institutions and the level of familiarity between New Zealand institutions there was still a risk that identification of institutions may be made through deduction. Information sheets reflected that this risk exists, but that every effort would be made to reduce this possibility.

These measures adequately protected participants from the risks associated with privacy, anonymity and confidentiality.

Lack of participation of Māori

Within the New Zealand context alignment with the principles of the Treaty of Waitangi is an important ethical consideration (Hudson & Russell, 2009). Participation of Māori is a key principle of the treaty. There was a risk that research outcomes may not include the opinions of Māori if the invitation to participate was not viewed as inclusive from a Māori perspective. This risk was addressed by interviewees being offered the opportunity to invite a support person, iwi or whanau to the interview where appropriate. This gesture was intended to indicate to the potential interviewees that the researcher recognised the importance of whanaungatanga as a core value that "engenders collective responsibility for each other's wellbeing, through a commitment to sharing knowledge freely among a group"(MacFarlane, 2013, p. 143). This opportunity was communicated through the participant's information sheet. The researcher discussed the proposal with a representative of the office of the Kaitohutohu in the institution in which he is employed and no specific barriers to Māori participation were identified. During the interview process no participants chose to invite a support person.

Informed consent and the right to withdraw

Informed consent is a fundamental element of ethical research. There are four requirements for consent to be valid: legally competent; comprehending; informed;

and voluntary; (Frankfort-Nachmias & Nachmias, 1996; Levine, 1991). This section will address each in turn.

The researcher assumed that if the participants were employed as elearning managers and make decisions in that capacity that they were legally competent to make the decision to participate.

While the wording of all information sheets and the questionnaire was kept to an accessible level of English there was still some educational terminology present. Given the experience and qualifications of the potential participants this was not seen as a barrier to comprehending the information required to make an informed decision.

Consent was assured as voluntary and informed at several stages in this process. Firstly, at an organisational level when consent was sought from the chief executive to approach their staff with an invitation to participate. This request included information to ensure that consenting to allow access to the organisation was done in an informed manner. Secondly, if consent was granted, the email inviting the elearning managers to participate included an information sheet (Appendix 4) relating to the interview process and a copy of the initial approach to the chief executive (Appendix 2). The conditions for participating outlined in the information sheet were accepted by the participant by email before the interview and then confirmed verbally at the start of each interview. The interviewees all had the opportunity to elect if they would respond to any of the questions and to terminate the interview at any point. Two interviewees elected to not respond to specific questions. The interviewees were provided with a copy of the transcript of their interview. They had the option of not approving the transcript and withdrawing their participation in the research at that point. For survey participants there was the risk that the invite coming from the elearning manager may actually be a forced choice

to participate rather than completely voluntary. This risk was managed through the provision of a draft email suggesting how the manager could word the invitation to participate (Appendix 8). This was reinforced in the information and consent documents (Appendices 9 and 10).

While these measures align this research methodology with the fundamentals of informed consent, it does so from a western perspective based on the concept of an "autonomous person" (Levine, 1991, p. 49). From a Māori worldview the decision to share knowledge does not necessarily belong to an individual, but may belong to a whanau (family or group) (Hudson & Russell, 2009). From this perspective it is important that the principle of Protection, as stated in Te Tiriti o Waitangi (Warren, 2013), was respected and that no Māori participant was put in a situation that was culturally uncomfortable or unsafe due to consenting to participate in a process developed from a western worldview. This consideration was managed by the number of exit points available even after the consent had been provided, and by the researcher observing the level of comfort of the participant to gauge whether any intervention was necessary. Interventions may have included a break from the interview or moving past the section of questions that were creating discomfort. No participant gave any indication of discomfort and no interventions we made.

The role of the researcher

There are risks associated with a conflict of roles inherent in conducting research within the researcher's own place of work. These risks include undermining a significant organisational change process, compromising the researcher's employed role and compromising the quality of the data. As the researcher's employer is currently undergoing a centralisation process for the development of elearning, it would not be possible for the researcher to undertake the interviews or surveys without the responses being compromised. The researcher discussing centralisation

may also have compromised the gradual socialisation an organisational change which was to implement a more centralised process. As the researcher is employed in the centralised elearning development unit, conducting the research may also compromise the researcher's relationships with colleagues. For these reasons the institution in which the researcher is employed has been excluded from the project.

Based on the identified risks, the mitigating measures put in place, the approval of the Massey University Human Ethics committee and the potential benefits of this research, the researcher proceeded to collect data.

Qualitative Data Collection: Managers' Interviews

This section describes the use of online interviews with elearning managers across the participating ITPs. It addresses why an online interview was selected as an appropriate method of collecting qualitative data, and then describes the processes of designing, and conducting the interviews.

Interview Design

Interviews are the backbone of qualitative data collection (Merriam, 2009; Yin, 2003). The main utility of an interview is to access understandings that are not easily observable such as attitudes, feelings, intentions for the future or actions from the past (Patton, 2002; Tuckman & Harper, 2012). Interviews have been used in small scale intensive studies, but can also be designed for use with larger numbers of participants.

Merriam (2009) outlined three categories of interview: highly structured; semi structured; unstructured. Highly structured interviews have predetermined questions in a set order, similar to a survey. As this research aims to explore a situation across several organisational contexts, this format of interview was seen as too restrictive. Unstructured interviews assume a more conversational structure, using open ended questions and adapting the direction of the interview based on the responses. While this format would have provided the openness required to explore the research topic, it could have provided significant challenges in integrating the qualitative and quantitative data without there necessarily being any aligned structure between the two. A semi-structured interview was designed to align sections of the interview with the main factors of the Technology Acceptance Model (TAM) (Appendix 5). The first two sections of the interview (context and extent of centralisation) were specific to this research project and did not align with the TAM. The questions relating to the advantages and disadvantages of centralised development included questions based

on perceived ease of use (PEU) and perceived usefulness (PU), both of which are key factors in the TAM. The questions relating to attitudes to centralisation were based on cognitive attitudes (ATT) and behavioural intentions (BI), which are also factors in the TAM. This structure not only allowed the questions to be based on previous studies but it also allowed easier integration with the survey questions which benefited from the same structure.

In designing the individual questions within each section some very open ended exploratory questions and some more closed questions were included. The exploratory questions allowed the researcher to gain broader more comprehensive data. The more closed questions were aligned with similar questions in the quantitative survey of teaching staff. This facilitated easier integration of the two strands of data.

Interviews are subject to varying degrees of reliability just like other methods of gathering data. A limitation of interviews is that the data is self-reported. This may be influenced by factors such as what the interviewee thinks is the desired response or their level of self-awareness (Tuckman & Harper, 2012). Feedback was sought on the initial interview plan from the research supervisors and the researcher's colleagues to establish face validity. Several changes were made based on that feedback. There is concern in some research for possible bias when the researcher is also the interviewer (Chenail, 2011). Because this research is based in a very specific context in a relatively unexplored area of study, it was unlikely that a substitute interviewer would have had the knowledge and understanding to adapt appropriately within the context of a semi-structured interview. Therefore, the researcher also conducted the interviews.

Centralisation of elearning Resource Development

Conducting Interviews

When permission was approved by the chief executives and where required, approval from individual institution's ethics committees, an online interview was arranged between the researcher and the elearning manager. The elearning manager received an information sheet (Appendix 4) about the research in advance and a copy was available at the beginning of the interviews. This was conducted through Skype or Adobe Connect according to the preference of the interviewee. The interviewer was located in a private room which was unidentifiable as a specific institution and the interviewee was requested to use a quiet and private location. The interviews were recorded then transcribed by a transcriber who was required to sign a confidentiality agreement. The transcripts were then anonymised and any direct reference to institutions removed to maximise confidentiality. The interviewees held a range of job titles that could easily have revealed their identity. To this end the term *Elearning Manager* has been used as a generic term in order to protect their anonymity. The interviewees received an electronic copy of the transcript for their approval via a transcript release email (Appendix 7).

Who participated in the interviews?

On commencing this research there were 18 separate ITPs operating in New Zealand. During the course of the research several mergers were implemented. This resulted in a total of 15 separate ITPs. All 15 ITPs except the researcher's employer were invited to participate. Two institutions declined the invitation to participate. One cited being in the middle of an organisational change targeting the provision of elearning as the reason for declining. One ITP did not respond to the invitation. One ITP provided consent to approach the elearning manager but the elearning manager did not respond to the invitation.

Centralisation of elearning Resource Development

In total ten ITPs participated in the interviews. As a sector, ITPs measure funding and activity levels in Equivalent Full Time Students (EFTS). As a sector over 61,000 EFTS were funded in 2014 (New Zealand Productivity Commission, 2016b). The 10 ITPs participating in this research represented 75% of those EFTS (Tertiary Education Commission, 2015). This indicates that the data provides a description with broad coverage of the ITP sector.

The interviewees were the managers identified by the chief executives as responsible for the development of elearning resources.

Qualitative Data Analysis

Many analysis methods have been described for qualitative data (Coolican, 2013). Leech & Onwuegbuzie (2008) direct researchers to explore a broad range of analysis options and provide guidance on their selection. They identify four types of data sources (Talk, Observations, Documents, and Images/Video) and the appropriate analysis for each type suggested. In line with this guidance, the qualitative data sources used for this study were interviews with the elearning managers

Content analysis was used to identify trends and meaning within the data. Content analysis emerged from the fields of media and communications as a method of analysing text and media communication for meaning (Barcus, 1959 as cited in Leech & Onwuegbuzie, 2008). The method depends on coding data by theme and then analysing the frequency or coverage of theses codes. While these codes may be based on previous work or theory, they may also emerge as the data is analysed by the researcher in a more inductive style. The number of times a phrase or code appears (the frequency count) can also be analysed further through more quantitative tools (Kelle, 1996 as cited in Leech & Onwuegbuzie, 2008).

Hsieh & Shannon (2005) further define three sub categories of content analysis: conventional content analysis, directed content analysis and summative content

analysis. Conventional content analysis supports research in an area that has limited pre-existing work or where it is desirable that the research is not guided by prior understandings or preconceptions. In directed content analysis the coding is predetermined by existing theories or research. The operationalization of these codes is thus determined by prior work and coding can begin immediately without a stage allowing for emergent themes. Summative Content Analysis has commonalities with manifest content analysis (Potter and Levine-Donnerstein, 1999 as cited in Hsieh & Shannon, 2005), quantitative descriptive analysis (Sandelowski, 2000) and latent content analysis (Berg & Lune, 2004) where the frequency or coverage of specific words or phrases is counted. The analysis of codes in this research relate to the way in which the terms were used rather than solely the frequency, thus exposing more latent understandings.

In this case the selected data analysis methodology used was a hybrid of conventional content analysis and directed content analysis. Fereday (2006) supports this hybrid approach that firstly combines a deductive thematic analysis that uses a coding template as a framework to initially analyse the data, and then progresses to an inductive thematic analysis which focusses more on identifying the emergent themes within the relevant areas of the framework at a second level of coding. In identifying concepts or themes the codes can be combined or separated into sub categories to form a branching/hierarchical structure (Morse and Field, 1995 as cited in Hsieh and Shannon, 2005). In forming these flexible structures, the researcher was able to draw directly from the content of the data as well as take advantage of a pre-existing framework for analysis. The pre-existing framework came from the Technology Acceptance Model (TAM). This model was adopted for three reasons: it directly describes elements relevant to the research questions; it provided examples of research tools with proven validity on which to base the interview questions; it provided a clear structure in which to eventually integrate the qualitative and

quantitative data (F. Davis, 1993; F. D. Davis et al., 1989; Jackson et al., 1997; Taylor & Todd, 1995). Some disadvantages identified in using this flexible approach include that it may jeopardises the perceived credibility of the research and lowers the level of internal validity (Lincoln and Guba, 1985 as cited in Hsieh and Shannon, 2005). The researcher addressed these issues by structuring the interview questions in line with the factors described in the TAM for consistency, basing the questions on the valid and well used survey tools, approaching the interpretation of themes in an iterative process , and utilising NVIVO software to manage the data in a rigorous fashion (Beekhuyzen, 2010; Hoover & Koerber, 2011; Welsh, 2002).

In this process the analysis can draw upon three metrics: the existence of coding relevant to a specific category; the number of coding references relevant to that category; or the coverage of text coded as relevant to that category (percentage of total text area coded in a specific way). In general, the number of coded references and the coverage of coding were not used. Both of these metrics could be used in a more quantitative content analysis which has the disadvantage of identifying "surface meaning" rather than the more latent meaning (Riff, Lacy, & Fico, 2014, p. 30).This research design focussed more on a qualitative content analysis where the existence of coding, and the words used were generally analysed in preference. This is in line with the pragmatic paradigm to which this research is aligned.

Quantitative Data Collection: Educators' Survey

This section describes the use of an online questionnaire to survey teaching staff across the participating ITPs. It addresses why a survey was selected as an appropriate method of collecting quantitative data, then describes the processes of designing, conducting and validating the survey tool.

Survey Design

The survey was required to capture responses from the perspective of the teaching staff in a manner that would allow integration with the qualitative data from the interviews. This could have been done through telephone, person to person, mail or online surveys. In order to protect anonymity and to be able to access a greater number of participants in the given time, person to person, telephone surveys and mail surveys were not considered practicable. An online questionnaire was selected as the most appropriate method to conduct the survey.

Questionnaires are the most common method of gathering data in education research (Burns, 2000). They allow researchers to measure a participants knowledge, likes and dislikes, attitudes and beliefs (Tuckman & Harper, 2012) and therefore are well matched to this project's research questions. Wright (2005) describes the advantages and disadvantages of online surveys. In this case, the main advantages were being able to access a group that would otherwise have been generally inaccessible. This group of tertiary teaching staff is likely to have good internet access and adequate digital skill. The data can be collected in an extremely time and cost efficient manner. The researcher also saw that the ability to complete the questionnaire on a mobile device may be a significant positive factor for busy teaching staff. The disadvantages may include that there is no guarantee that the respondents will be representative of the wider population and that the data may be less rich, because neither the researcher nor the participant has the opportunity to clarify the meaning of the questions or the responses. These disadvantages were considered acceptable given that the research seeks to describe a situation rather than establish relationships for a broader context and that the qualitative interview data provided an extensive source of rich data. The questionnaire was developed based on a process similar to that described by Hinkin (1998): item generation; content validity; decide on the number of items; decide on scales.

The items were generated by a deductive process (Hinkin, 1998). Six sections were identified. The first section gathered demographic information about the participant and their experience as an educator. The second section gathered information relating to the extent of centralisation adopted in their institution. The other sections gathered data based on the factors from the Technology Acceptance Model(TAM): Perceived Usefulness (PU); Perceived Ease of Use (PEU), Attitudes (A); and Behavioural Intention (BI)(F. Davis, 1993; F. D. Davis, 1989; Dishaw & Strong, 1999; W. R. King & He, 2006; Ng, Shroff, & Cher Ping, 2013; Teo, 2009). The section designed to gather data around the factor of attitude was designed to specifically measure cognitive attitude, rather that affective attitude. The affective component of attitude refers to how much the person likes something, while the cognitive component refers to an individual's specific beliefs related to it. This is based on Yang and Yoo's (2004) assertion that only cognitive attitude had a significant impact on behavioural intention. (H. D. Yang & Yoo, 2004) An assumption was made in the design of the questions relating to behavioural intention. The question asked if the teacher supported the adoption of a centralised model. The assumption was made here that if the participant did not intend to use a centralised development model, they would not support its adoption. This assumption may not have been entirely accurate as some participants may be recommending the adoption of the centralised model as more appropriate for many of their colleagues, while having no intention to use the model themselves. This limitation in the survey design was seen as acceptable on the basis that it was likely to be a small number of participants who responded in this vain.

The content validly was supported in two ways. Firstly, the questions were generally based on structures from previous studies which used the TAM. Most of these studies have demonstrated high levels of internal validity (Lau & Woods, 2008; Ng et al.,

2013; Teo, 2010; H. D. Yang & Yoo, 2004). Secondly, the questionnaire was also reviewed by the researcher's colleagues for face validity.

The number of items was based on allowing adequate opportunity for the participant to describe their context within an estimated 10-20 minutes. This time estimate incorporated consideration for the number of questions, the difficulty of questions and the capabilities and motivation of the anticipated respondents. The final questionnaire (Appendix 10) included 27 questions designed to be easily answered on a Likert scale, short answer or multiple choice. Burdein (2013) suggests that this format will reduce the number of participants that abandon the questionnaire without completing it.

The scales were based on a 5 point Likert scale. Given that most of the factors being explored were continuous in nature, it was important to use an odd number of points on the scale rather than artificially forcing the participant to sit on one side of the centre or the other. Baka, Figgou, & Triga (2012) suggested that the neutral mid-point is often used by participants who do not know the answer or do not understand the question. For this reason, a sixth point was added to allow an "I don't know response". To ensure that participants were not encouraged to tick the same response for all questions in each section without reading individual questions, the polarity of the questions was varied.

When the four stages of Hinkin's item generation process were complete, the survey was considered ready to be used (Hinkin, 1998). The following sections describe how the survey was conducted, who participated in the survey and how the internal validity of the survey was established.

Conducting the survey

The questionnaire was distributed as a link to an online survey using Survey Monkey. The link was distributed to teaching staff by the elearning manager who had previously participated in the interview. This was done by email and via staff notices on the institutional intranets. The extent of the distribution was entirely up to the elearning manager as they saw fit within their institution. A suggested email template was provided by the researcher for their convenience, but this was in no way enforced (Appendix 8). The link was anonymous and not traceable to any participant or institution.

The number of individuals who were invited to participate in the survey by the elearning managers was not known by the researcher, therefore establishing a response rate was not possible. Observing the number of responses over time via the dashboard available on Survey Monkey allowed the researcher to see when the number of responses per week was declining. This was used to send a reminder to the elearning managers in case they had not yet extended the invitation and then later to request that they forward a reminder to the teaching staff. Both of these strategies resulted in the number of responses in the following week increasing.

Who participated in the interviews?

In total 54 responses were received. Many participants skipped questions as they worked through the questionnaire but in general the number of respondents to each question was higher than 40.

The profile of the respondents was predominantly female (73%) in the 40-59 age bracket (65%). Most respondents had completed postgraduate study at Post Graduate Diploma or Masters levels (58%), teacher education to Diploma level (58%), and had

more than 10 years of teaching experience (66%). To protect anonymity there was no data collected around subject area or institutions or locations.

To protect the anonymity of the individuals and the institutions participating, the survey of the teaching staff was anonymous. Because of this, it cannot be confirmed whether the responses from the teaching staff came from staff across all of the participating ITPs or only a few. Therefore, those who responded may or may not represent a true cross section of all the participating ITPs.

The survey produced a relatively small data set, which on its own would not accurately provide data to answer the research questions. However, in the context of triangulating both method and data in a mixed method study this quantitative data were seen as a valuable contribution to this study.

Quantitative Data Analysis

The quantitative data generated by the survey of the teaching staff was subjected to two separate statistical analyses to establish internal reliability of the survey tool and to explore possible associations between factors.

As the questionnaire was designed with six sections, four of which explored factors in the TAM, it was important to establish that the items within the questionnaire actually measured what they were designed to measure (internal reliability). The internal reliability of items in each section was examined using Cronbach's Alpha analysis. There has been some disagreement as to the use of Cronbach's Alpha with sample sizes smaller than n=300 (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Yurdugul (2008) suggests that robust analysis of internal validity can be achieved with sample sizes as low as n=30. There has also been debate as to what level of internal reliability is acceptable for research. Gliem & Gliem (2003) suggested that scores in the region of α=0.6 were questionable and that scores of α=0.7 were

acceptable. However, Peterson (1994) suggested that for preliminary research scores as low as $\alpha=0.6$ have been considered acceptable.

The researcher recognised that Cronbach's Alpha analysis may be less valid with smaller sample sizes and that high internal reliability is less likely to be established in exploratory studies such as this research. However, given that this analysis was based on other established tools, on an established model, and within the context of a mixed methodology where results were triangulated with qualitative data, it was seen as an acceptable best available fit. This is in line with the pragmatic paradigm in which this research is based. As a result, some questions were withdrawn from the relevant sections in order to bring the Alpha score to an acceptable level. They were however still available to inform the research as separate items. Appendix 11 provides detail of this statistical analysis. By integrating the data from both this quantitative survey data and the qualitative interview data, the researcher was able to present finding in response to the research questions.

The data were also examined to explore any possible monotonic association between factors or responses to individual questions. For example, to explore whether there was an association between the number of years a participant had been teaching and the level of perceived usefulness that they saw in a centralised model. A Spearman's rank order correlation analysis was used to explore these associations. The procedure described by Laerd Statistics (2015) was followed. This included an initial analysis for monotonic association based on scatter plots produced in SPSS and completing a bivariate analysis.

Summary: Methodology

This chapter has described the reasons for the adoption of a pragmatic paradigm. This paradigm supported the use of a mixed research methodology. A convergent parallel design was adopted. Ethical issues were considered, and adequate measures

described to manage the associated risks of harm. The selection and design of both

the qualitative and quantitative data collection and analysis was described. The

findings, which integrate both the quantitative and qualitative data is described in

the next chapter.

Chapter Four: Findings

In this section the data relevant to each of the research questions is analysed and the results reported. The research questions posed in the introductory chapter are used as headers to guide the presentation of the findings. The findings from the interview with the elearning managers are presented alongside the findings from the survey of the teaching staff. These are integrated to triangulate between the two perspectives and methods. The similarities and differences between the two perspectives are described. This approach provides a more comprehensive and reliable response to the research question (Creswell & Plano Clark, 2010).

Research Question 1: To what extent has the centralisation of development of elearning resources been adopted?

This section addresses the extent to which centralisation of elearning resources has been adopted within the different institutions. First, the descriptions of a centralised model from the perspectives of the elearning managers, and from the teaching staff were clarified. Secondly, the extent to which a centralised model has actually been adopted by the institutions was analysed. Thirdly, a more detailed analysis of what that centralisation actually looked like was undertaken.

How did elearning managers and teaching staff describe a centralised model?

Each elearning manager was asked to describe what centralised development of elearning resources meant to them, in their context. This was not a description of the level of adoption in that institution, but an unpacking of the elearning managers conceptualisation of centralisation. The elearning managers identified a range of factors in their descriptions. The analysis was important to fully understand what was meant when the participants later described the extent to which their organisation had adopted a centralised model and what that adopted model looked like.

The elearning managers drew upon a range of factors in their descriptions of centralisation. There was also a range in the number of factors identified as relevant. Some elearning managers responded to this interview question very concisely and others discussed aspects at length. This could have been influenced by factors such as time constraints and preferred communication styles. Therefore the number of times that a specific factor was referred to by each elearning manager, was not seen as indicative of the level of importance. Thus this analysis was based on the number of factors identified rather than the frequency at which they were identified.
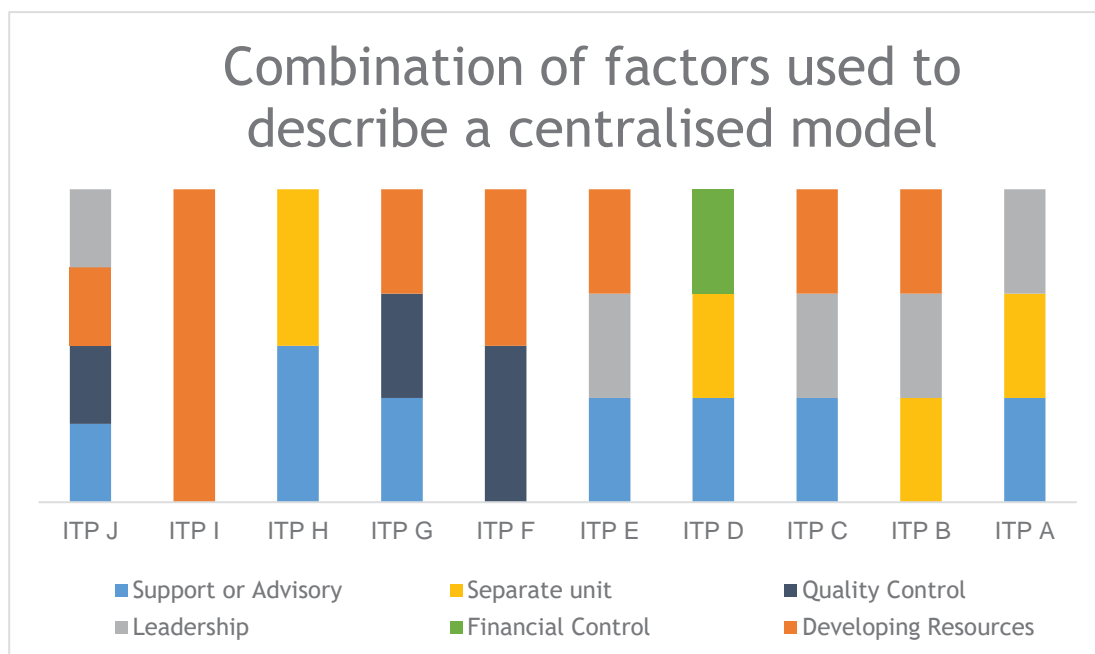
Figure 4.1: Combination of factors used to describe a centralised model

The most common factors identified in a centralised model were: a supporting or advisory role; developing resources; and providing leadership. The least commonly identified factors were: quality control; being part of a separate unit; and financial control (which was only identified by one ITP).

Figure 4.1 shows there was variation in the combination and number of factors identified by the participants. For example, the elearning manager of ITP A

identified three factors: support or advisory role, being a separate unit, and providing leadership. The description provided by the elearning manager of ITP I was noticeably different in that the only centralised role identified was the production of elearning resources. A pattern was not identified in terms of the number or combination of factors, but most elearning managers identified three or more factors.
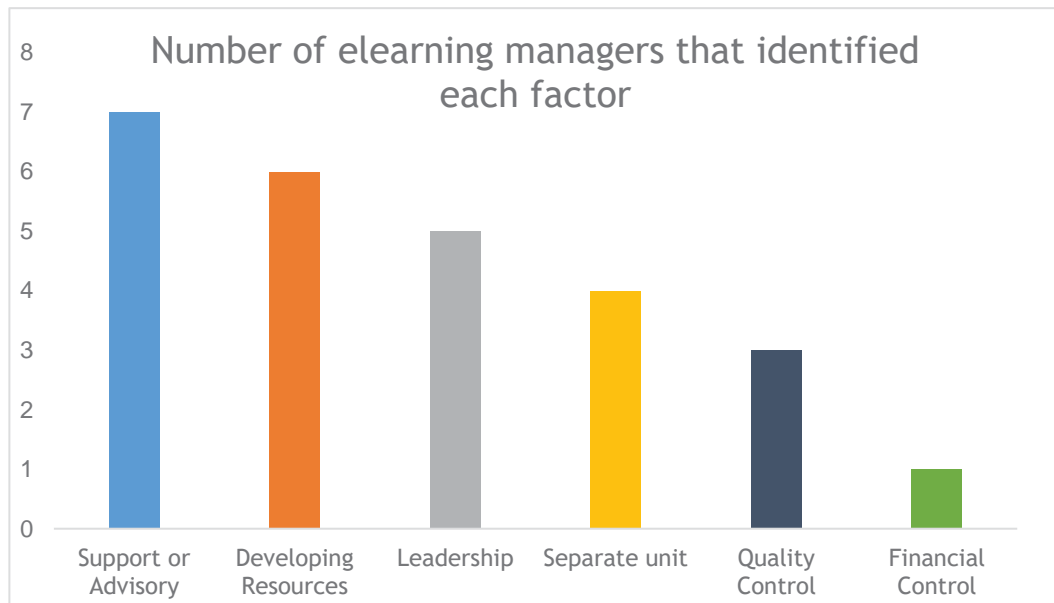
Figure 4.2: Number of elearning managers that identified each factor

Figure 4.2 shows the number of elearning managers who identified each of the factors in their description. It also shows both the range of factors identified, and how commonly they were seen as an important part of a centralised model. The importance of the support/advisory role of centralised units and of the development of resources such units provide is clear; seven of the ten elearning managers mentioned the support/advisory role and six mentioned the development of resources. Figure 4.2 also shows a perceived lack of importance given to financial controls in a centralised model as only one elearning manager mentioned it as a factor.

Centralisation of elearning Resource Development

In summary, the elearning managers identified a range of different factors. They varied in the number of factors they identified and the combination of factors used to describe the concept of centralised development of elearning resources.

To what extent has the centralisation of development of elearning resources been adopted?

The interviews provided a rich source of data describing the organisational context in which the elearning managers worked. Themes emerged around the extent of adoption of centralisation, the functions that were centralised, the size and composition of the centralised teams, and the level of territorial centralisation that existed.
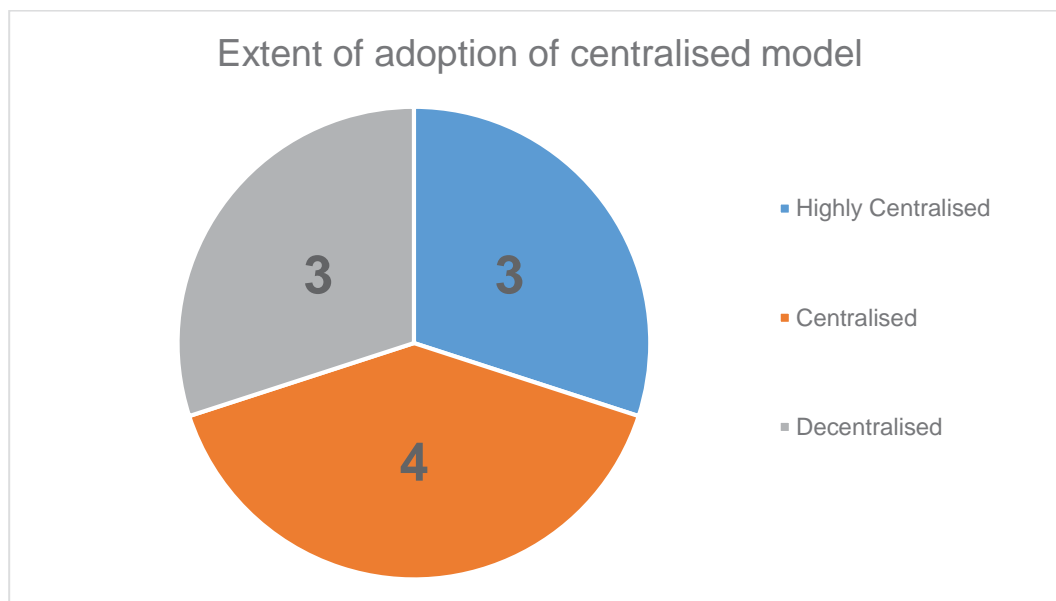
Figure 4.3: Extent of adoption of centralised model

Extent of adoption

Elearning managers were asked to what extent they felt their organisation had adopted a centralised model of developing elearning resources. Three categories emerged from analysis of their responses: highly centralised; centralised; decentralised. Figure 4.3 demonstrates that three of the elearning managers perceived their organisation as working within a decentralised model, even though

they all had a central team with responsibility for elearning. Four perceived that they were working in a centralised model. Three elearning managers identified that they worked within highly centralised models. To gain a full understanding of the extent of centralisation it is necessary to also explore the perspectives of teaching staff.

Teaching staff were asked a series of questions in the survey (See Appendix 10) to explore their perspectives on whether the institution they worked in was an example of the centralised model of the development of elearning resources. The responses to questions seven to fourteen in Table 4.1, were scored on a 5 stage Likert scale from Strongly disagree to Strongly agree. Some questions were negatively coded to allow the polarity of the questions to be alternated. Responses were given values from one to five; one indicated a lower level of centralisation and five indicated a higher level of centralisation. The frequency data below is ordered with responses indicating the least centralisation on the left, to the most centralisation on the right. There is a separate column for the frequency of *I do not know* responses. This format is used throughout this chapter to present frequency data for the survey questions.

Table 4.1 Survey data relevant to extent of centralisation

	Indicating least centralisation		Neither agree nor disagree	Indicating most centralisation		I do not know
7-The normal practice in the organisation in which I work is an example of centralised development of elearning (n=48)	6 (13%)	13 (27%)	10 (21%)	9 (19%)	7 (15%)	3 (6%)

Question seven asked teachers whether normal practice in their institution was an example of a centralised model. The most common response was to disagree with the statement, thus indicating that their institution had not adopted a centralised model (27%). However, when the agree and strongly agree responses were aggregated (34%)

and compared to the aggregated disagree and strongly disagree responses (40%), there appeared to be a more even split between the number of institutions adopting a centralised model, than the single most common response indicated. The aggregated frequencies indicated almost as many teaching staff believed they worked within a centralised model, as believed they did not.

The findings from the teaching staff and from the elearning managers were then compared. Both sets of data indicated that ITPs were well spread along a spectrum from decentralised to centralised. This indicates that there is not a specific extent of centralisation that has been adopted across the participating ITPs; institutions have adopted differing levels of centralisation. To understand the question of extent of centralisation more comprehensively, it was necessary to analyse the data around the functions that had been centralised, and the composition of the centralised teams.

Functions that were centralised

Functional centralisation refers to the way in which different groups of tasks are designated to a centralised team. Questions eight to fourteen were designed to unpack why the teaching staff responded in the way that they did in questions seven, by examining several functions separately. Throughout this group of questions 11-20% neither agreed nor disagreed with the statements. These responses were not showing a preference so are not aggregated with the results in the following paragraphs.

Responses to questions ten and eleven indicated some adoption of centralisation. Question ten related to the development of resources for online delivery, and 68% of respondents indicated that it was the responsibility of a centralised team. Question eleven related to the definition of quality standards, and 54% of respondents indicated that it was centralised.

Centralisation of elearning Resource Development

Table 4.2 Survey data relevant to extent of centralisation

	Indicating least centralisation		Neither agree nor disagree	Indicating most centralisation		I do not know
8-In my organisation when an online component is required for a blended course, teaching staff normally develop the online resources. (n=44) *	14 (32%)	23 (52%)	5 (11%)	0 (0%)	0 (0%)	2 (5%)
9-In my organisation when an online component is required for a blended course, an elearning development unit within the institution normally develops the online resources. **(n=44).**	7 (16%)	21 (48%)	9 (20%)	1 (2%)	2 (5%)	4 (9%)
10-When a complete course needs to be developed for online delivery, teaching staff normally develop the resources. (n=44). *	0 (0%)	4 (9%)	7 (16%)	9 (20%)	21 (48%)	3 (7%)
11-The elearning development unit within my institution defines the quality standards to which elearning resources need to be developed. **(n=44).**	**5 (11%)**	**6 (14%)**	**6 (14%)**	**16 (36%)**	**8 (18%)**	**3 (7%)**
12-The elearning development unit within my institution identifies the training needs of teaching staff with respect to elearning technology. **(n=44).**	7 (16%)	6 (14%)	9 (20%)	12 (27%)	7 (16%)	3 (7%)
13-In my organisation teaching staff normally identify their own training needs when it comes to elearning. **(n=44).** *	14 (32%)	16 (36%)	7 (16%)	5 (11%)	0 (0%)	2 (45%)

14-In my organisation funding for the development of elearning resources is controlled by a specific elearning unit. **(n=44).**	6 (14%)	8 (18%)	7 (16%)	5 (11%)	1 (2%)	17 (39%)
* Indicates a question that was negatively coded.						

The remaining questions indicated less centralisation. Question eight and nine related to producing resources for blended courses. 84% and 64% respectively indicated a less centralised approach. Question twelve and thirteen related to the identification of teachers training needs. While 43% of respondents to question twelve indicated that it was a centralised function, 30% indicated that it was not. In question thirteen 68 % indicated that it was not centralised. Question fourteen related to financial control. 32% indicated that it was not centralised. However, 39% did not know if it was.

These findings suggest that from the teachers' perspective the functions of developing resources for online courses and the defining of quality standards are centralised functions. The functions related to developing resources for blended courses and identifying teachers training needs were not centralised. The function of financial control was less likely to be centralised, but there was a high number of teachers who did not know.

The elearning managers also identified a range of examples of functional centralisation. When providing a description of what the concept of centralised development of elearning resources meant, they identified several functions that were performed by the centralised units; quality, support/advising staff, developing resources, providing leadership and financial management. When describing the actual extent to which functions were centralised, the additional function of the

management of institutional systems was identified. This section describes this functional centralisation in more detail.

Functional centralisation
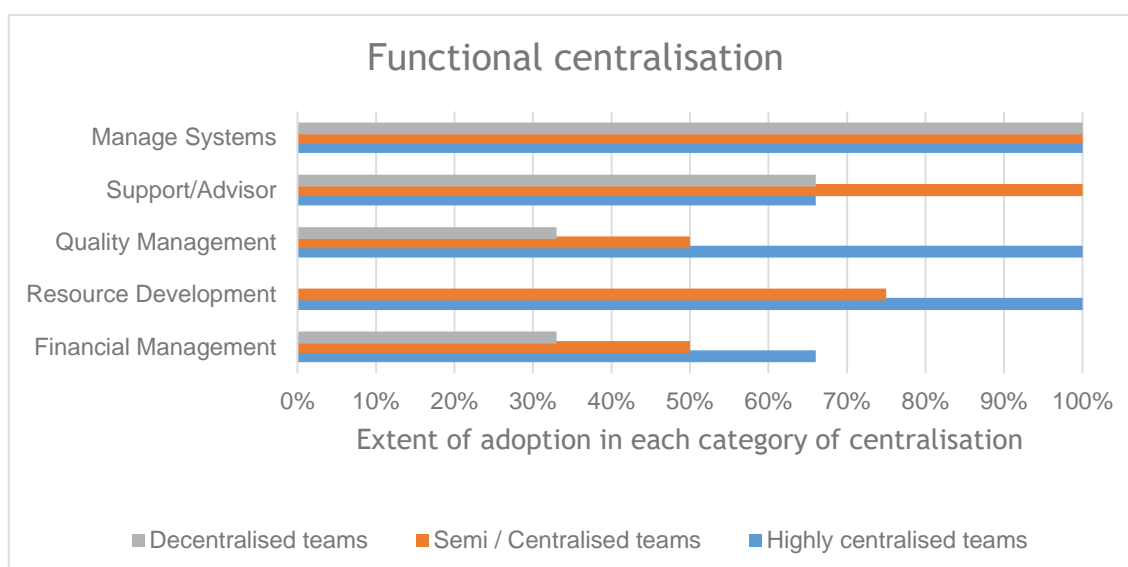
Figure 4.4: Functional centralisation

Figure 4.4 describes how, according to the elearning managers, the adoption of these functions varied across the three categories of centralisation. As there were different numbers of institutions in each of the three categories of centralisation, percentages were used rather than actual numbers of institutions, to allow comparisons to be made. For example, 65% of teams categorised as decentralised, centralised responsibility for the support or advisory function, whereas 100% of institutions in the centralised category centralised the same function.

The one function which was centralised across all institutions was the management of educational technology systems. This generally referred to the institutions Learning Management System (LMS). Management of this system sat with the central elearning team in all institutions, rather than with an IT services unit. For example:

> *I'm also the business owner for a few systems which are the learning management system, which we currently use Moodle, our E-Portfolio system which is Mahara, and apps for education*

> (Interview, Elearning Manager, ITP D, Centralised category)

Centralisation of elearning Resource Development

By considering the total number of participants rather than the percentage of responses in each category of centralisation, other themes were apparent. The role of advisor or supporting teaching staff was described as centralised by eight of the ten elearning managers. There were two exceptions; one institution that identified as being decentralised (ITP E) and one that identified as being highly centralised (ITP F). The decentralised institution had a small team and did not identify any other centralised functions other than the management of the learning management system. The highly centralised team did not advise the on-campus teaching staff other than sharing resources that they used in delivery of online courses from that centralised unit (The teaching staff delivering online courses, were part of the centralised unit).

When providing a description of what centralisation meant, elearning managers described the management of resource quality as a centralised function. In describing the actual extent of centralisation, elearning managers identified both the management of the quality of resources, and the quality management processes involved in compliance with New Zealand Qualifications Authority (NZQA) requirements. They identified the centralisation of quality management across all categories of centralisation Figure 4.4. It was most prevalent in highly centralised teams (100%) and less prevalent in centralised (50%) and decentralised team (33%). The elearning manager of ITP G (centralised category) explained that they had "taken on academic staff development, and the academic quality assurance program approval and accreditation". The elearning manager of ITP G suggested "…that the central team is key to it being developed [course content] and has a part in quality assurance around that content" (Interview, Elearning Manager, ITP G). As seen in Table 4.2 (Question11) teaching staff also saw a similar emphasis in quality; from their perspective, it was the most commonly centralised function.

Centralisation of elearning Resource Development

No institutions that identified as decentralised saw the development of elearning resources as a role for their central team. All but one of the elearning managers in the centralised and highly centralised categories identified resource development as a role for their centralised team. As illustrated below the reason for this was based on the sustainability and effectiveness of this function being centralised. Instead, they focused on their Learning Designers providing guidance and support to the teaching staff who would develop their own resources.

> *I think what we saw in previous years were a range of quite resource-intensive approaches that weren't necessarily sustainable without a specific kind of external support and resource. It wasn't a sustainable model. It certainly wasn't lifting our overall practice, I guess, around the embedding of effective e-learning.*
> (Interview, Elearning Manager, ITP H, centralised category)

The teaching staff saw this quite differently. They thought that the actual development of elearning resources for online courses was more likely to be done by the teaching staff than a centralised team. The development of resources for blended course was however more often done by the teaching staff (see Table 4.2, Questions 8,9,10 and 14).

While financial control was only identified by one elearning manager, as part of their description of a centralised model (Figure 4.2), it was identified as a function that was actually assigned to the centralised team by half of the elearning managers. The elearning managers who identified this were from ITPs in all three categories of centralisation (see Figure 4.4). The teacher's responses indicated a level of ambiguity as to whether the central elearning unit was responsible for financial control, as 39% of respondents did not know. From those who did feel they knew, 32% either disagreed or strongly disagreed that financial control of elearning development was the responsibility of a centralised team (see Table 4.2, Question 14). In summary, financial control is not described as a key element of the concept of centralisation by elearning managers, but in practice they recognised it was.

Centralisation of elearning Resource Development

Teaching staff did not see financial control as a centralised function but a large number did not know. These findings identify not only differences between the perspective of an elearning manager and of a member of teaching staff, but also a level of ambiguity as to who has financial control.

It has been identified that both teaching staff and elearning managers see the centralisation of support/advisory and quality functions similarly. They differ in their perspectives on the centralisation of resources development and financial management. The teachers' responses are not linked to a given institution, but rather examples of the teachers' voice across the participating institutions. Therefore, it cannot be assumed that the survey data is equally representative across all of the ITPs.

Size and composition of centralised teams

Further analysis of the interviews with the managers provided a more qualitative description of the extent to which centralisation had been adopted in terms of the size of the centralised team and the roles within the teams. Table 4.3 describes the team size within each category of perceived adoption of a centralised model.

Table 4 3 Team size in each category of centralisation

Cat.	Highly Centralised			Centralised				Decentralised		
ITP	A	C	F	G	D	H	J	B	E	I
Size	Medium (11-20)	Medium (11-20	Large (21-60)	Medium (11-20	Medium (11-20	Large (21-60)	Medium (11-20	Medium (11-20	Small (<10)	Small (<10)
Mean	Mean of 32 staff			Mean of 19 staff				Mean of 6 staff		

Centralisation of elearning Resource Development

The number of staff in the central elearning team varied considerably throughout the three categories of centralisation. The largest team consisting of around 60 staff and the smallest only one member of staff (assigned on a part time basis). A pattern emerged where the organisations that were identified as more centralised, had a higher number of staff in the centralised teams. The highly centralised teams had an average of 32 staff, the centralised and centralised teams had an average of 19 staff and the decentralised teams had an average of 6 staff.

However, the mean number of staff hides many factors. For example, the data does not take into account the fact that many staff were assigned to the centralised team as part of their full time role. In particular, learning advisors were often described as working part-time in the centralised team and part-time within a capability development team. Several managers referred to using fixed term or casual contract staff particularly around media development roles. In the largest team (60 Staff) the boundary between the staff developing the resources and those facilitating the learning was not clear; they were all on the same central team and shifted from one role to the other. There was also little discussion about the nature of employment, such as length of contract or remuneration. Several elearning managers referred to temporary project based teams, often in relation to meeting the requirement of changes in qualification criteria imposed by the New Zealand Qualifications Authority over a three to five-year term (NZQA, n.d.). For example, the elearning manager of ITP H:

> *The role I'm doing now is kind of a once-in-a-lifetime opportunity. When else is an institution going to essentially pull together a resource of 30 [staff] around course development over three years? We're learning a lot and yeah, look forward to the next couple of years.*

<p align="right">(Interview, elearning manager, ITP H, centralised category)</p>

Therefore, the number of staff reported may not accurately reflect the extent the organisation has committed to a centralised model in terms of actual number or cost of full time equivalent staff.
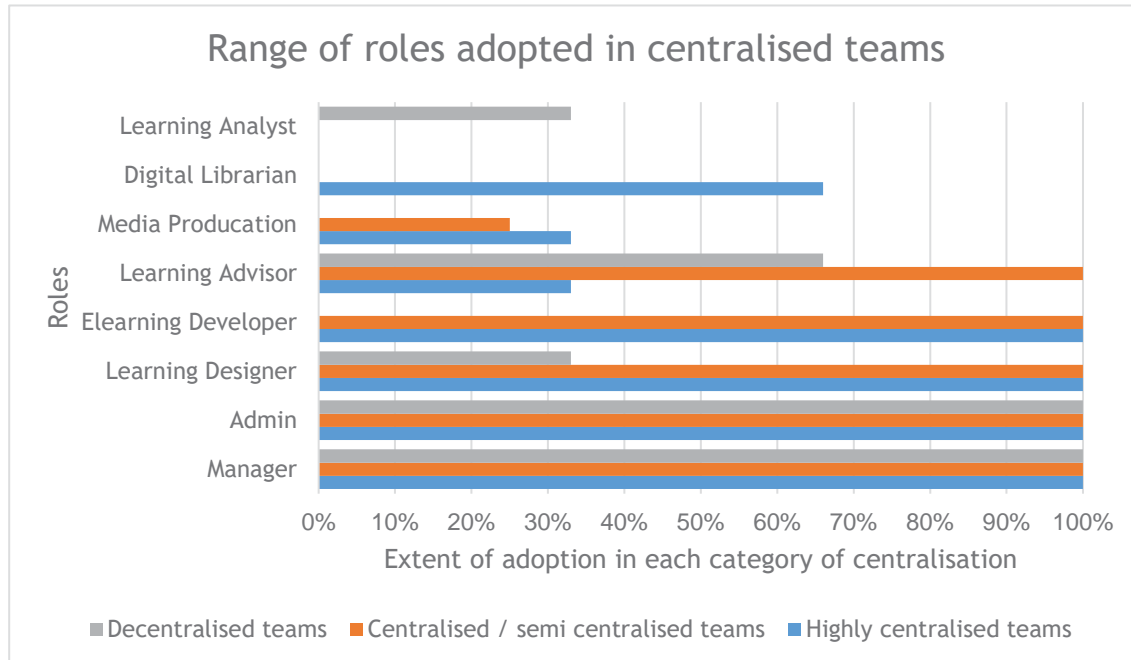
Figure 4.5: Range of roles adopted in centralised teams

The range of roles identified within the centralised teams also varied considerably across the ITPs. While it was possible to provide a profile of the roles adopted in each team, doing so would present a risk to the anonymity of participants. Therefore, the data is presented in an aggregated format, in Figure 4.5. As there were different numbers of institutions represented in each category, percentages have been used rather than the actual number of institutions to allow comparisons to be made. Figure 4.5 Range of roles adopted in centralised teams

A total of eight different roles were identified across all of the institutions. Figure 4.5 describes the extent to which centralised teams included these roles in each of the three categories of centralisation. Centralised teams included a broader range of roles than decentralised teams; seven roles compared to five. Two roles were consistently adopted across all institutions; administrative support and a manager.

Centralisation of elearning Resource Development

Learning designers and elearning developers were present in all highly centralised and centralised teams. There was also one small decentralised team that had a learning designer. Learning advisors were present in all centralised teams and most of the decentralised teams, but less common in the highly centralised teams (33%). This may be due to them placing more emphasis on centrally produced resources, rather than advising teaching staff on how to design and develop resources. Only two highly centralised teams had digital librarians. The two largest teams had media production staff. Only one team had a learning analyst. This was identified by the elearning manager as a decentralised team.

While this data describes the extent to which a range of roles was centralised it does not describe the relative emphasis placed on those roles within the centralised teams, and the number of staff or cost of staff within each role was not available in the data gathered.

Territorial centralisation
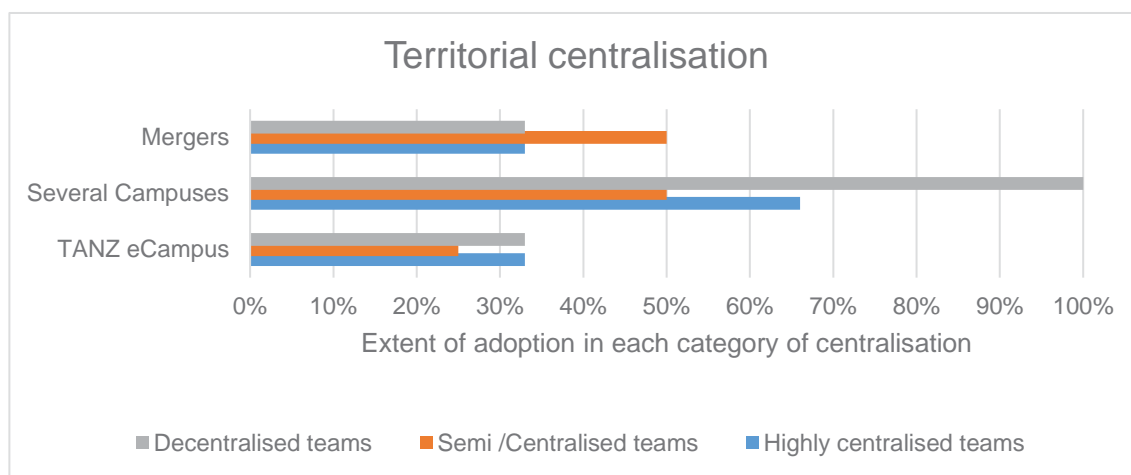
Figure 4.6: Territorial centralisation

There were three themes that emerged around territorial centralisation: mergers; serving several campuses; and involvement in a collaborative eCampus project. Figure 4.6 illustrates the extent to which these themes apply to each of the three

categories of centralisation. For example, mergers have impacted 33% of decentralised teams and 50% of centralised team

Four institutions identified that elearning resource development had become more centralised as a result of mergers between ITPs. Some have been subject to complete mergers, where entirely new entities have been established. Others have remained separate entities, but in some tight strategic alliances. The outcome for elearning development were the same for both; one central team becoming responsible for elearning across both institutions. This was a very current phenomenon, as three separate mergers took place within the time frame of this research project. Mergers affected institutions in all three categories of centralisation.

Seven ITPs identified that they centralised the development of elearning resources in one location to service several campuses that were geographically spread. This was also apparent across all categories of centralisation. Two elearning managers cited the ability to serve remote campuses more effectively as the initial motivation to move to a more centralised model. The elearning manager of ITP C when discussing reasons for centralisation, suggested that it "related to providing service initially for a specific course and making sure that we could provide service to a distributed student group with very poor access to internet".

Three institutions described being part of a collaborative ecampus project in a way that indicated increased territorial centralisation. The Tertiary Accord of New Zealand (TANZ) is a group of six New Zealand ITPs collaborating on a range of projects. One such project is the TANZ eCampus on which five of the member institutes are collaborating. Participating institutions contribute resources (staff, funding and online learning resources) to the project and courses are marketed, managed and delivered online through one shared platform. The resources are developed either in a central TANZ development team or contracted to individual

member institutions. The resources are available to all institutions. This is an example of territorial centralisation, as the responsibility for development of elearning recourses is centralised in one team on behalf of the five member ITPs. The three ITPs that identified as part of the TANZ ecampus were spread across all three categories of centralisation. Therefore, the three themes impacting on territorial centralisation (mergers, separate campuses and the TANZ eCampus) did not appear to be linked to any specific category of centralisation.

Typical profiles based on extent of centralisation

Based in the analysis above, it is possible to integrate both the perspectives of the elearning managers and the teaching staff to provide typical profiles for each category of centralisation. This section identifies the common characteristics in each category.

Decentralised

Institutions that identified as being decentralised constituted 30% of the ITPs that participated, and tended to have smaller centralised teams (mean of 6 staff). The team was most likely to include a Manager, Admin Support and Learning Advisors. The functions assigned to these teams were usually the management of the LMS, and providing support or advice to teaching staff in how to develop elearning resources.

Centralised

Institutions that identified as centralised constituted 40% of the ITPs that participated, and tended to have medium sized centralised teams (mean of 18 staff). The team was most likely to include a Manager, Admin Support, Learning Advisors, Learning Designers and Elearning Developers. The functions assigned to these teams were usually the management of the LMS, providing support or advice to teaching

staff in how to develop elearning resources, developing elearning resources, financial management, and quality management.

Highly Centralised

Institutions that identified as highly centralised constituted 30% of the ITPs that participated, and tended to have larger centralised teams (mean of 32 staff). The team was most likely to include a Manager, Admin Support, Learning Designers, Elearning Developers, and a Digital Librarian. The functions assigned to these teams were usually the management of the LMS, developing elearning resources, financial management, and quality management. These teams were less likely to include the support/advisory function.

Summary: To what extent has centralisation of elearning resource development been adopted?

This section explored and integrated the elearning managers and staff perspectives on the extent to which the participating institutions have adopted centralisation as a model of elearning development. This identified similarities and differences between the two perspectives. A range of factors were integrated to provide a model of typical teams at different levels of centralisation; highly centralised, centralised and decentralised.

Research Question 2: What advantages and disadvantages do staff see in the centralised development of elearning resources?

The second research question explores the perceived advantages and disadvantages of adopting a centralised model of elearning resource development from both the teaching staff and the elearning managers' perspectives. The question was addressed by exploring two separate, but overlapping factors from the Technology Acceptance Model: Perceived Ease of Use (PEU) and Perceived Usefulness (PU). This section explores each factor in turn. The data from the two perspectives were integrated around emergent themes.

Perceived Usefulness

Perceived usefulness can be described as the extent to which a person believes that using a system will enhance their job performance. In this instance a centralised development model is the system in question.

Table 4.4 Survey questions relating to perceived usefulness

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
15. Developing elearning resources is something I need to do myself to be able to do my job well (n=44).	1 (2%)	1 (2%)	4 (9%)	14 (32%)	23 (52%)	1 (2%)
16. Having a specialist team develop elearning resources will help me meet the expectations of my role. (n=44).	3 (7%)	2 (5%)	11 (25%)	10 (23%)	16 (36%)	2 (5%)
17. A central elearning development unit is the most cost effective way to	4 (9%)	3 (7%)	12 (27%)	8 (18%)	6 (14%)	11 (25%)

develop elearning resources. (n=44).						
18. I would use more elearning if someone else was developing the resources for me. (n=44).	8 (18%)	8 (18%)	8 (18%)	10 (23%)	10 (23%)	0 (0%)

This factor was explored from the perspective of the teaching staff through a set of four questions in the online survey (Table 4.4). The mean level of perceived usefulness was calculated based on the responses to questions 16 ,17 and 18 of the survey. Question 15 was removed from this calculation to increase the internal reliability as described in Appendix 11. The mean score was 3.08 where one represents least useful and five represents most useful. This indicated that teaching staff in general adopted a neutral stance as to whether a centralised model was useful.

For this data to inform a more comprehensive understanding, it was necessary to identify themes and integrate the perspectives of the teaching staff and the elearning managers around them. From content analysis of the interviews with the elearning managers, five themes emerged which suggested they saw a centralised model as useful in terms of: cost; quality; leadership; consistency; and access (Figure 4.7). Each was explored separately.
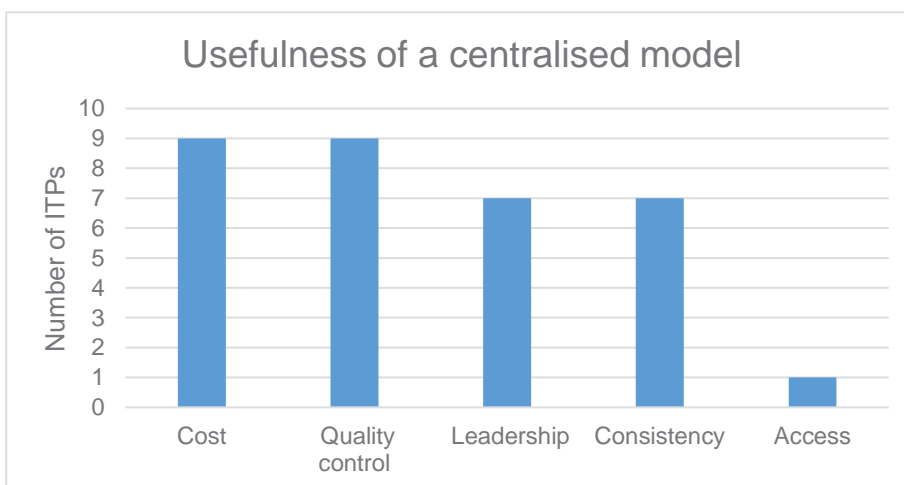
Figure 4.7: Usefulness of a centralised model

Centralisation of elearning Resource Development

Cost

Nine of the ten elearning managers referred to cost. Elearning managers spoke about
the financial usefulness extensively and in very specific terms, as supported by the
following examples:

> *If you're looking at models where we're trying to cost out development in terms of
> how much it costs to produce one credit, a lot of people just don't want to ask that
> question because it's a horrendous amount. It can be just shy of about a $1,000.
> Ideally, you're dialling that down as you're getting bigger and bigger*

> (Interview, Elearning Manager, ITP B, decentralised category)

> *The cost of development is reduced. For development in the distributed model we
> worked on costs of $2000-2500 per credit for a substandard product. We aim for
> $700-1500 for a centralised development project. This is for a blended course, fully
> online might be near the $2000 mark.*

> (Interview, Elearning Manager, ITP C, highly centralised category)

> *…we can be a bit more strategic about how we go about doing that and get a real
> picture of what it's costing us; what we could save.*

> (Interview, Elearning Manage, ITP D, centralised category)

These three examples came from ITPs from each of the three categories of
centralisation, so this theme was not limited to a specific category of centralisation;
the elearning manager still recognised the financial advantages of a centralised
model.

From the perspective of the teaching staff there was less clarity as to the financial
advantages of a centralised model. Question 17 in the survey asked if they thought a
centralised model was the most cost effective way to develop elearning resources
(Table 45). 25% of the teaching staff who responded did not know. Of those who did
know, 27% neither agreed or disagreed and only 32% agreed or strongly agreed.

While the elearning managers in all categories recognised financial advantages to
centralisation the same benefits were not apparent to the teaching staff.

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Table 4.5 Survey data relevant to advantage for financial control

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
17. A central elearning development unit is the most cost effective way to develop elearning resources. (n=44)	4 (9%)	3 (7%)	12 (27%)	8 (18%)	6 (14%)	11 (25%)

Quality

The elearning managers saw clear advantages in quality control through a centralised model. For example, "they [teaching staff] can tell you what they need or what is needed, and know that the product that they get back is a quality one" (Interview, Elearning Manager, ITP B). The extent to which the resources were student focussed was also seen to increase in a centralised model; "the end product is better and more focussed on students rather than on what the lecturer wants to do with tech" (Interview, Elearning Manager, ITP C).

The themes around quality were not limited to the quality of the elearning resources but included the academic quality control process. For example, "I think the benefits of having more centralisation are obviously that you've got more awareness and more control over academic quality and we are able to drive that centrally" (Elearning Manager, ITP A). One elearning manager summed up their confidence in the quality improvement that a centralised model afforded them as follows:

> *Because it's managed centrally, everyone has to meet the same quality standards and get that through. It runs through our instructional design and academic compliance. Those areas work very closely with every developer. The program managers know what's going on.*

(Interview, Elearning Manager, ITP F, highly centralised category)

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There were no specific quality related questions in this section of the survey for teaching staff to allow triangulation on this theme. However, when asked what they would most like a centralised service to do for them, one member of teaching staff suggested that the provision of quality standards would be desirable.

Leadership

Of the ten elearning managers interviewed, seven referred to a centralised model improving the ability to provide leadership. This related to leadership for pedagogical and technological change. One manager, while focusing on technological change said the role was "supporting the entire institute with a clear direction of what e-learning should look like, but also what tools and resources they have available to them" (Elearning Manager, ITP E). Other managers focussed more on leading the pedagogical changes:

> *To see an overall shift in terms of the majority of practice rather than just shifts at the fringes… Having a centralised unit very much allows us to ensure that the work that's being done and the kind of approaches and messages are in line with core institutional strategies.*

> (Interview, Elearning Manager, ITP H, centralised category)

Consistency

Seven of the ten elearning managers referred to maintaining consistency of the product. Consistency related to the characteristics of the product and of the process. There was support that the product would have more consistent "format, look and layout" because of centralisation (Interview, Elearning Manager, ITP F). This was linked to the ability to "develop and control templates" across the elearning platform (Interview, Elearning Manager, ITP C). The advantages gained in increased consistency of process and practice were well described in this quote:

> *…the only way to get consistency, particularly in terms of aligning practice with institutional strategy and principles around learning and teaching … Having a centralised team to facilitate that process is critical.*

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Access

Access was referred to by only one elearning manager as an advantage of a more centralised model. However, it was seen as the primary reason for adopting a centralised model in that institution, due to its geographical location. Many of their students endured poor internet connectivity in remote areas, which required specific skills and design considerations when developing elearning. These needs were seen as better met from a central unit with specific skills, training and resources.

Lack of usefulness

Three broad negative themes emerged around the perceived usefulness (i.e. lack of usefulness) of a centralised model: lack of effectiveness in creating change; reduced flexibility; and lack of ownership.

Seven elearning managers expressed some concern around the effectiveness of a centralised model to create significant change. This referred to both cultural and pedagogical change. One concern was the resource intensiveness of a centralised approach and whether the production of resources would lead to changes in pedagogical practice:

> *We could be running ourselves into a resource black hole really where we're designing these amazing programs. High calibre programs, but we don't have the infrastructure to be able to support them at a very fundamental level of delivery.*

(Interview, Elearning Manager, ITP B, decentralised category)

Around half of the elearning managers expressed concern around the lack of flexibility. Elearning managers referred to the chance that resources may become very "vanilla" (Elearning Manager, ITP E). They expressed concern that centralised

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development of resources would not reflect the diversity of practice within their

institution and inhibit innovation:

> *There's the potential for the lack of uniqueness. There's a whole range of things it depends on but we've got vastly different faculties in a lot of ways. They teach vastly different subject areas and all have different approaches. All have different needs. Standardising and saying this is the way you must do it, you have that limitation of innovation*

> (Interview, Elearning Manger, ITP E, decentralised category)

Others described the need to find a balance in fully supporting the staff while still

fostering innovation:

> *It's finding that balance of having a centralised and recommended core of platforms, but not stifling and being so restrictive that you shut out those other kind of innovative, edgy, experimental approaches. That's hard. It's actually not that easy to find that balance.*

> (Interview, Elearning Manager, ITP H, centralised category)

There was a disadvantage described around a lack of ownership of the resources and

process. This issue was many faceted. It was suggested that it created a

"dependency" or "blame" culture where staff may tend not to upskill because

everything was centralised (Interview, Elearning Manager, ITP A). Another aspect is

the strong heritage around academic freedom. Centralisation of resources can be

seen as taking this freedom away and not "capturing as much of that individual

enthusiasm from the passionate staff who are real advocates" (Interview, Elearning

Manager, ITP A).

While it was possible to integrate some of what the teaching staff reported in the

survey, with what the elearning managers said around financial advantages and

quality control, there was little overlap in the other themes identified.

In analysing the data in table 4.4 there is something of a contradiction between the

responses to question 15 and the responses to question 16 and 17. The vast majority

of teaching staff feel that they should be developing their own resources, but they

also saw that a centralised team would help them meet the expectations of their role, and to increase their use of elearning.

As described in Table 4.6 a Spearman's rank-order correlation test was conducted to examine whether there was an association between how the teachers described the perceived usefulness of a centralised model and the demographic information from the first few questions in the survey (see Appendix 10 for details). For example, was there an association between how useful the teachers saw a centralised system and the number of years they had been teaching for? Preliminary analysis did not demonstrate a monotonic association, as assessed by visual inspection of scatterplots. No statistically significant associations were identified. Thus an association between perceived usefulness and demographic data was not established.

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Table 4.6 Spearman's rank order correlation of demographic factors and perceived usefulness

data.

		Developing elearning resources is something I need to do myself to be able to do my job well	Having a specialist team develop elearning resources will help me meet the expectations of my role.	A central elearning development unit is the most cost effective way to develop elearning resources	I would use more elearning if someone else was developing the resources for me	I would use more elearning if someone else was developing the resources for me	Mean Perceived Usefulness
What is your age?	Correlation Coefficient	-.075	-.232	-.063	-.157	.025	-.166
	Sig. (2-tailed)	.628	.130	.684	.308	.875	.282
	N	44	44	44	44	43	44
What is the highest level of education you have personally completed?	Correlation Coefficient	-.097	.032	-.132	-.015	.114	-.043
	Sig. (2-tailed)	.532	.839	.393	.923	.469	.781
	N	44	44	44	44	43	44
What is the highest level of teacher/education qualification you have completed?	Correlation Coefficient	.005	.045	-.158	.067	.069	-.023
	Sig. (2-tailed)	.979	.796	.366	.701	.693	.894
	N	35	35	35	35	35	35
How many years of teaching experience do you have?	Correlation Coefficient	-.165	-.165	.058	-.215	-.145	-.093
	Sig. (2-tailed)	.292	.289	.712	.167	.352	.551
	N	43	43	43	43	43	43

Perceived ease of use

Perceived ease of use can be described as the extent to which a person believes that using a particular system would be free from effort. In this study this referred to the perceived level of effort required to work within a centralised model. Both the teaching staff and the elearning managers responded to this topic from the perspective of the effort required from a teacher. This is in contrast to perceived usefulness data where the elearning managers focussed more on the benefits at an institutional level.

This factor was explored with teaching staff through a set of four questions in the online survey (Table 4.7). The mean level of perceived ease of use was calculated based on the responses to questions 19, 20 and 21 of the survey. Question 22 was withdrawn from this calculation to increase the internal reliability as described in Appendix 11. The mean score was 2.50 where one represents least ease of use and five represents most ease of use. This indicated that teaching staff may have neither agreed nor disagreed that a centralised model was easy to use. To understand this more comprehensively it is necessary to look at the frequency data for the individual questions (Table 4.7).

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Table 4.7 Survey data relating to perceived ease of use

	Indicates least ease of use		Neither agree nor disagree	Indicates most ease of use		I do not know
19. I find developing elearning resources easier to do myself than having someone else develop them. (n=43). *	12 (28%)	9 (21%)	13 (30%)	7 (16%)	2 (5%)	0 (0%)
20. Developing elearning resources is not a skill set I have. (n=43).	12 (28%)	16 (37%)	6 (14%)	8 (19%)	1 (2%)	0 (0%)
21. Dealing with centralised departments is more difficult than doing things myself. (n=43). *	8 (19%)	9 (21%)	12 (28%)	10 (23%)	3 (7%)	1 (2%)
22. When someone else has developed elearning resources for me the process has been clear and easy to follow. (n=43).	4 (9%)	5 (12%)	9 (21%)	10 (23%)	2 (5%)	13 (30%)
*indicates that the question was reverse coded.						

More teaching staff indicated that they would find it easier to develop elearning resources themselves rather than through a centralised unit (Question 19 and 21, Table 4.7). Most of them felt that they were equipped with the skills to do so (65%). No one responded that they did not know if they had these skills; they all felt that they knew what was required, whether they felt capable of it or not (Question 20, Table 4.7). 28% who had had resources made for them indicated that the process had been easy (Question 22, Table 4.7). However, many did not know how to respond to this question (30%). This may have been because they did not have any experience of resources being developed for them.

In summary, while the mean of the responses indicate teachers were to some extent ambivalent as to whether resources are developed centrally, the responses to the

individual questions in the scale indicate that teaching staff think it is easier to develop elearning resources themselves that through a centralised team, and that they have the skill to do so. Where they had experience of working with a centralised unit they described it as easy to do so, but many did not know.

The elearning managers identified several factors that could make it easier for teachers to operate within a centralised model than a do-it-yourself decentralised model. There was a clear message from many elearning managers that they thought a centralised model was the easiest for the teaching staff. One example was the elearning manager from ITP C who cited their annual customer satisfaction survey as providing "95% positive feedback on what we are doing. This reflects what the staff think of a centralised model. They prefer to do it this way" (Interview, Elearning Manager, ITP C, highly centralised category). This was supported by several other elearning managers, for example:

> *Certainly reading between the lines in terms of some of our evaluation data, that most staff would actually appreciate just being able to essentially go to a unit and give them a whole lot of resources and have things developed.*

> (Interview, Elearning Manager, ITP H, centralised category)

One barrier that was identified in decentralised development was how to organise release time for teachers to develop resources. A centralised model provided project management systems, institution wide schedules and extra resources that had not been available in the past. The elearning manager of ITP J supported this; "you've got project management control centralised, you've got responsibility for delivering on specific parts of the project".

Several elearning managers referred to the ease of operating in a centralised model where roles and expectations were more clearly understood. For example:

> *We're very clear about the roles and responsibilities, and the agreement of that team is there to do. What the agreement is of the facilitator and the subject matter expert.*

(Interview, Elearning Manager, ITP B, decentralised category)

There were several issues raised by the elearning managers that described how a centralised system may actually be more difficult for teachers. The development of a dependency culture and negativity based on previous centralisation initiatives were identified as problems. The elearning manager from ITP A referred to this in describing the demise of a previous centralised development unit; "There was a dependency culture that rose up around the use of that unit" (Interview, Elearning Manager, ITP A, highly centralised category). The elearning manager from ITP B identified that their organisation was based on a Deans structure with each business unit operating very separately. This made it difficult for staff to access a central unit.

There were also several references to the lack of "scope for tinkering" (Interview, Elearning Manager, ITP I, decentralised category). This referred to whether staff had control and skills to adapt the resources after the initial development was complete; "How free are they to continue to make changes and continue to adapt things in the teaching space as opposed to the development phase" (Interview, Elearning Manager, ITP B, decentralised category).

Summary: What advantages and disadvantages do staff see in the centralised development of elearning resources?

This section addresses the second research question relating to the advantages and disadvantages of adopting a centralised model for elearning development from the perspective of the institution and the teaching staff. This involved exploring the factors of perceived usefulness and perceived ease of use.

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Teaching staff were to some extent ambivalent about the advantages of using a centralised model, but many recognised its usefulness. The results indicated that a centralised model offered advantages in quality management, provision of leadership, maintaining consistency, better organised projects with clear roles and responsibilities, and clearer understanding of process. While elearning managers clearly recognised the financial benefits of a centralised model, teaching staff were much less aware of them.

Some limitations were also recognised. A centralised model was seen as lacking flexibility, being ineffective in implementing organisational change, developing a dependency culture, lacking the ability for resources to be freely adapted after development, and a poor fit to organisations with very discrete departments in their structure. Teaching staff however, indicated that it would be easier to develop resources themselves rather than through a central unit. Most of them felt they had the skill to do so.

The third research question examines attitudes to centralised elearning resource development and whether there is support to use centralised models in the future.

Research Question 3: What attitudes do teaching staff hold towards centralised development of elearning resources?

This section explores the attitudes that teachers display towards centralised development as seen from both the teachers' perspective and the elearning managers' perspective. It then explores the behavioural intentions that both teachers and elearning managers have towards a centralised model, to create a comprehensive picture of teachers' attitudes to the centralised development of elearning resources.

Attitudes

Attitude can be described as being disposed to respond in a particular way. Cognitive attitudes relate to constructed thoughts or ideas that influence our response. Data relating to the cognitive attitudes that teaching staff held about centralised elearning development were gathered through three questions in the online survey (Table 4.8). The internal reliability of this group of questions as a tool to measure attitude was examined using the Cronbach's Alpha Test, as described in Appendix 11. They were found to have a high level of reliability and all 3 question were included in the analysis (α=0.850).

The three questions were scored on a Likert scale of one to five where five indicated a more positive attitude towards a centralised model. A mean score across the three questions was then calculated. The mean level of attitude was 2.71. This indicated that in general teaching staff were slightly negative about a centralised model. It was necessary to examine the responses to each question to understand this more comprehensively.

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Table 4.8 Survey data relevant to attitude

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
23. Centralisation is generally a good thing (n=43).	3 (7%)	5 (12%)	22 (51%)	9 (21%)	3 (7%)	1 (2%)
24. I am reluctant to see elearning development done in a centralised unit (n=43). *	7 (16%)	9 (21%)	12 (28%)	12 (28%)	2 (5%)	1 (2%)
25. Taking responsibility for developing resources away from the educator will have a negative impact on learning (n=43). *	12 (28%)	10 (23%)	10 (23%)	6 (14%)	3 (7%)	2 (5%)
* Indicated that question was reverse coded.						

The responses to question 23 suggested that many teaching staff were not decided on the idea of centralisation, as 53% neither agreed nor disagreed. The responses to question 24 suggested an almost equal split between teachers who were reluctant to use a centralised model, and those that were not reluctant. Data from both of these questions indicates that to some extent the teaching staff show ambivalence towards a centralised model of elearning resource development.

The responses to question 24 indicated that there was a strong negative attitude towards responsibility for developing elearning resources being centralised. 51% of teaching staff felt that it would have a negative impact on learning.

Table 4.9 Spearman's rank order analysis of demographic data and data relating to attitudes to centralisation.

		23 Centralisation is generally a good thing.	24 I am reluctant to see elearning development done in a centralised unit.	25 Taking responsibility for developing resources away from the educator will have a negative impact on learning
What is your age?	Correlation Coefficient	-.302*	-.417**	-.273
	Sig. (2-tailed)	.049	.005	.077
	N	43	43	43
What is the highest level of education you have personally completed?	Correlation Coefficient	-.092	-.172	-.418**
	Sig. (2-tailed)	.556	.271	.005
	N	43	43	43
What is the highest level of teacher/education qualification you have completed?	Correlation Coefficient	-.201	-.246	-.247
	Sig. (2-tailed)	.247	.154	.153
	N	35	35	35
How many years of teaching experience do you have?	Correlation Coefficient	-.062	-.241	-.136
	Sig. (2-tailed)	.691	.120	.386
	N	43	43	43
Weak Correlation ≤0.35		Moderate correlation 0.36-0.67		Strong Correlation ≥0.68

* Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

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A Spearman's rank order analysis was conducted to explore if there were monotonic associations between indicators of attitude, and demographic information (Table 4.9). For example, was there a difference in attitudes between staff who had been teaching for a long time and those how had been teaching for fewer years? Preliminary analysis indicated that there may be some monotonic associations, as assessed by visual inspection of the scatterplots. There were three statistically significant, weak or moderate associations identified. The age of the member of teaching staff had a negative relationship with two of the questions relating to attitude. The older the teacher the less likely they were to think that centralisation was a good thing ($r_s(41)= -0.302, p<0.05$) and the more reluctant they would be to see elearning resources developed in a central unit ($r_s(41)= -0.417, p<0.01$). The highest level of education that the teacher held the more likely they were to believe that centralisation will have a negative impact on learning ($r_s(41)= -0.418, p<0.01$).

A Spearman's rank order analysis was conducted to explore if there were monotonic associations between indicators of attitude, and the extent to which the institution in which the teacher worked had adopted a centralised model. For example, was there a difference in attitudes between staff who worked within a centralised model and those who worked in a decentralised model? This analysis compared responses from teaching staff in the seven questions related to the extent of centralisation adopted, to their responses to the questions relating to attitude. Preliminary analysis indicated that there may be some monotonic associations, as assessed by visual inspection of scatterplots. The analysis revealed several relationships between indicators of attitude and indicators of a centralisation. These results are summarised in Table 4.10. Questions 24 and 25 were negatively coded so that higher scores still reflected more positively towards centralisation despite the reverse polarity of the wording of the question.

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Table 4.10 Spearman's rank order analysis of data relating to attitudes towards

centralisation and extent of centralisation of the organisation in which the teacher worked.

		23 Centralisation is generally a good thing.	24 I am reluctant to see elearning development done in a centralised unit. (negatively coded)	25 Taking responsibility for developing resources away from the educator will have a negative impact on learning (negatively coded)
The normal practice in the organisation in which I work is an example of centralised development of elearning.	Correlation Coefficient	.227	.317[*]	.034
	Sig. (2-tailed)	.143	.038	.831
	N	43	43	43
In my organisation when an online component is required for a blended course, teaching staff normally develop the online resources.	Correlation Coefficient	.203	.225	.221
	Sig. (2-tailed)	.191	.147	.155
	N	43	43	43
In my organisation when an online component is required for a blended course, an elearning development unit within the institution normally develops the online resources.	Correlation Coefficient	.451[**]	.462[**]	.290
	Sig. (2-tailed)	.002	.002	.060
	N	43	43	43
When a complete course needs to be developed for online delivery, teaching staff normally develop the resources.	Correlation Coefficient	.302[*]	.188	.259
	Sig. (2-tailed)	.049	.228	.094
	N	43	43	43
The elearning development unit within my institution defines the quality standards to	Correlation Coefficient	.325[*]	.450[**]	.400[**]
	Sig. (2-tailed)	.033	.002	.008

which elearning resources need to be developed.	N	43	43	43
The elearning development unit within my institution identifies the training needs of teaching staff with respect to elearning technology.	Correlation Coefficient	.097	.291	.246
	Sig. (2-tailed)	.536	.059	.111
	N	43	43	43
In my organisation teaching staff normally identify their own training needs when it comes to elearning.	Correlation Coefficient	-.051	.064	.027
	Sig. (2-tailed)	.745	.684	.865
	N	43	43	43
Weak Correlation ≤0.35	Moderate Correlation 0.36-0.67		Strong Correlation ≥0.68	
** Correlation is significant at the 0.01 level (2-tailed).				
* Correlation is significant at the 0.05 level (2-tailed).				

The responses from teaching staff to the question relating to the centralised definition of quality standards, showed a weak to moderate positive and statistically significant relationship with their responses to all three attitude questions. Where a member of the teaching staff worked in an institution where quality standards were defined centrally they were more likely to think that centralisation was a good thing ($r_s(41)= 0.325, p<0.05$), less likely to be reluctant to see development done centrally ($r_s(41)= 0.450, p<0.01$), and less likely to think that centralised development will have a negative impact on learning ($r_s(41)= -0.400, p<0.01$).

The responses to the question relating to centralised development of elearning resources for blended courses showed moderate positive and statistically significant relationships with two of the questions relating to attitude. If a teacher worked in an organisation where elearning resources for blended courses were developed centrally, they were more likely to think that centralisation was a good idea ($r_s(41)= -0.302, p<0.01$) and less likely to be reluctant to see elearning developed centrally ($r_s(41)= -0.462, p<0.01$).

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Two other weak statistically significant positive relationships were identified. Where teachers identified as working within an institution where centralised development was normal practice, they were less likely to be reluctant to have elearning resources developed centrally ($r_s(41)= 0.317, p<0.05$). Teachers who worked in institutions where complete online courses were more likely to be developed centrally, were more likely to think that centralisation was a good idea ($r_s(41)= 0.302, p<0.05$).

All of these relationship indicate that from the teachers' perspectives, the more an ITPs had adopted a centralised model, the more likely staff were to have a positive attitude towards centralisation. This does not indicate that centralisation creates a positive attitude, only that where centralisation exists positive attitudes are more likely to exist.

The elearning managers described their understanding of the teaching staffs' attitudes towards centralisation. These descriptions varied considerably in the extent to which they were positive or negative. Figure 4.8 shows some of the words identified in content analysis, that were used by elearning managers to describe how they perceived the teachers' attitudes. These terms are not easily quantifiable for analysis. For example, one manager's interpretation of the term positive, may be very different from another's. The words were also used in the context of a fuller description which included other aspects of attitude. For example, one manager used the terms "reluctant" and "pleased" in the same sentence (Interview, Elearning Manager, ITP D). Therefore, no overall conclusion as to how the elearning managers collectively described teachers' attitudes was pursued. It was however possible to look at the data from each individual manager to evaluate how they described attitudes.

Figure 4.8: Words used to describe teachers' attitudes

Based on coded references from the content analysis, the descriptions provided by the elearning managers were categorised as predominantly negative (1), mixed (2), or predominantly positive (3). For example, one elearning manager used the terms "positive, very positive", "supported", "relieved" and "sceptical" (Interview, Elearning Manager, ITP C). This was categorised as predominantly positive. The elearning manager of ITP J did not describe the attitudes in a way that this analysis could be conducted. Table 4.11 shows the collation of this categorisation, mapping the attitudes described to the extent to which the ITP had adopted a centralised model. From this mapping it appeared that the teaching staff in ITPs which had adopted more centralised models, were perceived by the elearning managers as having more positive attitudes towards centralisation.

Table 4.11 Elearning managers' descriptions of teacher's attitudes

	Highly Centralised			Centralised				Decentralised		
ITP	A	C	F	G	D	H	J	B	E	I
ATT	2	3	3	2	3	2	NK	2	1	1
Key: 1-Predominantly negative, 2-Mixed, 3-Predominantly positive, NK- Not Known										

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This was further supported by the elearning managers who referred to either a change in attitude after implementing a centralised model or there being two different sets of staff; those who had experienced working within a centralised model and those who had not. The manager in ITP C described this change succinctly; "When I started in a distributed model it was 80:20 against, now it would be 80:20 for centralisation". Another described the scale of change "It was a huge shift. It really, really was. It hasn't happened overnight. It's been gradual over the 10 years" (Interview, Elearning Manager, ITP F). One elearning manager described the attitudes part way through the implementation of a centralised model.

> At the moment, I'd say if we looked across the whole institute, we've probably got a 60/40. 60 would be okay with it, 40 would want to carry on as they are. 80/20 is the proportion of people we've already been working with and what their attitudes are.

(Interview, Elearning Manager, ITP G, centralised category)

In integrating the findings from the responses from the teaching staff with the responses from the elearning managers, a more reliable description of attitudes to centralisation can be made. The teaching staff and the elearning managers both support the finding that teachers who work within ITPs that have adopted a centralised model are more likely to have a positive attitude to centralisation. There is some indication that the age of the teacher and the highest level of qualification they hold, may relate to how positively they feel about centralisation. The teachers and the elearning managers both described more positive attitudes towards centralisation, in institutions that had adopted higher levels of centralisation.

Behavioural intentions

Where cognitive attitude refers to specific beliefs, behavioural intention relates to conscious plans to act in a certain way. The data gathered from survey questions 26 and 27 produced data that related to behavioural intentions (Table 4.12). The responses to question 27 indicated the participants level of intent to support their

institution operating in a centralised model. This was scored on a Likert scale where one indicated a lack of intent and five indicated a high level of intent. The mean score for this question was 3.12. While 26% did not agree or disagree on this, 42% either agreed or strongly agreed. This indicates that in general the teaching staff were generally either ambivalent or had positive intent to use a centralised model. Only 28% did not intend to support a centralised model.

Table 4.12 Survey data relevant to behavioural intentions

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know	Rating Average
27. I support the adoption of centralised development of elearning within my organisation. (n=43)	6 (14%)	6 (14%)	11 (26%)	13 (30%)	5 (12%)	2 (5%)	3.12

26. Which of the following would you most likely want a centralised elearning development service to do (select all that apply)?		
Answer Options	Response Percent	Response Count
Provide training to help you develop resources	90.5%	38
Provide support for developing fully online learning courses	83.3%	35
Provide support for developing fully blended courses (a mix of online and face to face)	83.3%	35
Provide training to help you deliver online and blended learning	78.6%	33
Make activities or online resources	50.0%	21
Design activities or online resources	40.5%	17
Other (please specify)	16.7%	7

> - Provide best-practice models for structuring blended learning. Current workload is so high that it is difficult to attend training even if it is available. Takes time from preparation of delivery resources and marking. Feel a bit caught in a bind here
> - Provide exemplars of works which can then be replicated
> - Work with lecturers to design online activities and resources
> - Provide quality standards for education technology implementation.
> - Provide training in the use of the technology that makes the use of different resources easier.
> - The issue would be having time to do the development yourself and access to the training and resources

A Spearman's rank order analysis was conducted to explore if there were monotonic associations between behavioural intention and the demographic data provided in the preliminary questions (Table 4.13). For example, was there any relationship between the number of years that the teacher had been teaching for and their behavioural intention to support a centralised model? Preliminary analysis indicated that there may be some monotonic associations, as assessed by visual inspection of scatterplots. A weak negative statistically significant relationship was identified between the age of the teacher and their behavioural intentions towards centralisation ($r_s(41)= -0.312$, $p=0.05$). Older teachers were less likely to have positive intentions towards centralisation.

Table 4.13 Spearman's rank order analysis of data relating to behavioural intentions towards centralisation and demographic information.

		I support the adoption of centralised development of elearning within my organisation.
What is your age?	Correlation Coefficient	-.312[*]
	Sig. (2-tailed)	.042
	N	43
What is the highest level of education you have personally completed?	Correlation Coefficient	-.132
	Sig. (2-tailed)	.398

	N	43
What is the highest level of teacher/education qualification you have completed?	Correlation Coefficient	-.030
	Sig. (2-tailed)	.864
	N	35
How many years of teaching experience do you have?	Correlation Coefficient	-.109
	Sig. (2-tailed)	.488
	N	43
Weak Correlation ≤0.35	Moderate correlation 0.36-0.67	
** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).		

A Spearman's rank order analysis was conducted to explore if there were monotonic associations between behavioural intention (Question 27), and the extent that teaching staff indicated elearning resource development was centralised in their ITP (Table 4.14). For example, was there a difference in behavioural intention between staff working in highly centralised models and those working in decentralised models? Preliminary analysis indicated that there may be some monotonic associations, as assessed by visual inspection of scatterplots.

Table 4.14 Spearman's rank order analysis of data relating to behavioural intentions towards centralisation and extent of centralisation.

		I support the adoption of centralised development of elearning within my organisation.
The normal practice in the organisation in which I work is an example of centralised development of elearning	Correlation Coefficient	.331*
	Sig. (2-tailed)	.030
	N	43

In my organisation when an online component is required for a blended course, teaching staff normally develop the online resources. (reverse coded)	Correlation Coefficient	.307[*]
	Sig. (2-tailed)	.045
	N	43
In my organisation when an online component is required for a blended course, an elearning development unit within the institution normally develops the online resources.	Correlation Coefficient	.522[**]
	Sig. (2-tailed)	.000
	N	43
When a complete course needs to be developed for online delivery, teaching staff normally develop the resources (reverse coded)	Correlation Coefficient	.340[*]
	Sig. (2-tailed)	.026
	N	43
The elearning development unit within my institution defines the quality standards to which elearning resources need to be developed	Correlation Coefficient	.267
	Sig. (2-tailed)	.083
	N	43
The elearning development unit within my institution identifies the training needs of teaching staff with respect to elearning technology	Correlation Coefficient	.156
	Sig. (2-tailed)	.318
	N	43
In my organisation teaching staff normally identify their own training needs when it comes to elearning	Correlation Coefficient	-.020
	Sig. (2-tailed)	.899
	N	43
In my organisation funding for the development of elearning resources is controlled by a specific elearning unit	Correlation Coefficient	.045
	Sig. (2-tailed)	.777
	N	43
Weak Correlation ≤0.35	Moderate correlation 0.36-0.67	
** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).		

The analysis identified four positive and statistically significant relationships. There

was a moderate relationship between behavioural intention and the level to which

development was centralised for blended courses ($r_s(41)= 0.522$, $p=0.01$). There were weak positive relationships between behavioural intention and the extent to which centralisation was the normal practice ($r_s(41)= 0.331$, $p=0.05$), online courses were developed by a centralised unit ($r_s(41)= 0.340$, $p=0.05$) and online components for blended courses were developed by a centralised unit ($r_s(41)= 0.307$, $p=0.05$). These all indicate that teaching staff that worked in ITPs with higher levels of centralisation were more likely to intend to participate in a centralised model.

The elearning managers were asked what proportion of staff would support working in a centralised model and to what extent they supported it themselves. They tended towards the middle ground, rather than describe polar opinions. The following are examples of how they described their perceptions of teaching staffs' behavioural intentions:

> *I'd say it would be a 60/40 split. We have some very passionate staff who want to be able to create peer pieces. We work alongside them to do that and build the capability up, so they can then do that. We share that… Some will display fierce autonomy*
>
> (Interview, Elearning Manager, ITP B, decentralised category)

> *We'd get 40% for, we'd get 20% against, and we'd get 40% that are apathetic. Herein lies the problem of modern society.*
>
> (Interview, Elearning Manager, ITP J, centralised category)

> *I wouldn't be surprised if there was a majority vote towards non-centralized. That's for kind of the reasons we've touched on: people seeing it as being more accessible, more relevant, more ready to listen to what I want to do.*
>
> (Interview, Elearning Manager, ITP H, centralised category)

When asked about their own behavioural intentions the responses were generally more positive, although often with specific limitations. One manager supported centralisation to a limit "where it is support that is centralised not the control" (Interview, Elearning Manager, ITP C, highly centralised category). Others referred to time and rate of technological change and innovation:

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> *I think that I do support it. I think it's right for the organization at this point in time. It may not always be. I think particularly, as I said, as technology advances and especially as more stuff is freely available and people can curate their own stuff through the cloud, I don't think we'll be able to hang onto that level of support, realistically. For the next five years, I think it's the right strategy but I don't know beyond that.*

<div align="right">(Interview, Elearning Manager, ITP A, highly centralised category)</div>

> *…because I think that having the ability to have some kind of centralised messages and approaches and that kind of standardisation across, I think is very important. But, within reason. Here's the stuff that you need to work to, but also kind of green fields to be able to develop and innovate as well.*

<div align="right">(Interview, Elearning Manager, ITP E, decentralised category)</div>

The responses from each elearning manager were mapped against the extent to which their institution was working to a centralised model. In this mapping, if an elearning manager showed little reservation in their intent to follow a centralised model they were give a score of three (high levels of intent). If they had more reservations and described the limits to which they intended to adopt a centralised model they scored two (intent with limitations). If they were generally against a centralised model they scored one (low level of intent). For example, the intentions of the elearning managers in ITP A and E, as quoted above, were given a score of two. This was collated in Table 4.15. This mapping shows that most elearning managers have intent to adopt centralisation to some extent, although with limitations. Only two of the ten elearning managers held low levels of intent to adopt a centralised model.

Table 4.15 Behavioural intent of elearning managers

Cat.	Highly Centralised			Centralised				Decentralised		
ITP	A	C	F	G	D	H	J	B	E	I
BI	2	2	3	3	3	2	1	2	2	1
Key 1- Low level of intent, 2- Intent with some limitations, 3- High level of intent										

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Those operating in a centralised model intended to continue doing so, even when aware of the limitations. One described a strong rationale for their intent to support a centralised model, specifically for online courses:

> For online courses, again, we've got very tight control around that … We're moving to a facilitator role rather than a standard teaching role where we are controlling what happens within the course. The course content remains stable.

> (Interview, Elearning Manager, ITP G, Centralised Category)

Those in organisations that had adopted decentralised models, also generally stated an intent to adopt a centralised model, but with limitations.

This section has analysed three different sets of data: the survey data relating to the teachers behavioural intentions; the interview data relating to the teachers behavioural intentions; and the interview data relating to the elearning managers behavioural intentions. All of these analyses support that there is intent to continue working within a centralised model where it had already been adopted to some extent, and that there was intent to use a centralised model in the ITPs that had a lower level of centralisation.

Summary: What attitudes do teaching staff hold towards centralised development of elearning resources?

This section explored the separate but overlapping themes of the attitudes and behavioural intentions of teachers and elearning managers towards the adoption of a centralised model of learning resource development. The teachers were found to some extent to have an ambivalent attitude towards the adoption of a centralised model. There was some association between the level of attitude and the level of centralisation that the respondent was working in. This was also linked to a *before and after effect* where attitudes were described more positively after teaching staff had experienced a centralised model. Behavioural intentions were seen to follow a similar pattern in that the higher the category of centralisation the more intent to

use a centralised model was apparent. Elearning managers working in ITPs with lower levels of centralisation also expressed intent to support a centralised model, but described specific and significant limitations to this intent. Older staff, and staff who held higher level academic qualification were more likely to hold negative attitudes to centralisation than their peers.

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Summary of findings

This chapter addressed each of the research questions in turn. For each question the responses of the teaching staff and the responses from the elearning managers were described and analysed. The findings from both perspectives were integrated with the intention of providing a more comprehensive and valid description of the situation.

The first research question related to the extent of centralisation of elearning resources. The findings identified similarities and differences between the perspectives of the teaching staff and the elearning managers. A range of factors were integrated to provide a model of typical teams at different levels of centralisation; highly centralised, centralised and decentralised.

The second research question related to the perceived advantages and disadvantages of a centralised model. The findings identified that the teaching staff were to some extent ambivalent about the advantages of using a centralised model, but many recognised its usefulness. The results indicated that a centralised model offered advantages in quality management, provision of leadership, maintaining consistency, better organised projects with clear roles and responsibilities, and clearer understanding of process. While elearning managers clearly recognised the financial benefits of a centralised model, teaching staff were much less aware of them.

Some limitations were also recognised. A centralised model was seen as lacking flexibility, ineffective in implementing organisational change, developing a dependency culture, lacking the ability for resources to be freely adapted after development, and a poor fit to organisations with very discrete departments in their structure.

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The third research question related to the attitude teaching staff held towards centralisation. The findings suggested that teachers were to some extent ambivalent attitude towards the adoption of a centralised model. There was some association between the level of attitude and the level of centralisation that the respondent was working in. This was also linked to a *before and after effect* where attitudes were described more positively after teaching staff had experienced a centralised model. Behavioural intentions were seen to follow a similar pattern in that the higher the category of centralisation the more intent to use a centralised model was apparent. Elearning manager working in ITPs with lower levels of centralisation also expresses intent to support a centralised model, but described specific and significant limitation to this intent. Older staff, and staff who held higher level academic qualification were more likely to hold negative attitudes to centralisation that their peers.

The next chapter will discuss how these findings relate to previous research and their implications for those making decisions about elearning resources development.

Chapter Five: Discussion

Introduction

The research questions related to the centralisation of elearning development. These questions explored: the extent to which New Zealand ITPs were centralising the development of elearning resources; the perceived advantages and disadvantages that staff saw in centralised development of elearning resources; and the attitudes that teaching staff held towards centralised development of elearning resources.

This chapter discusses the significance of the research findings for each of these questions in turn. For each question the findings of the research undertaken here will be discussed in light of the existing body on knowledge. The findings will then be interpreted in light of the similarities and differences with existing research.

Research Question 1: To what extent has the centralisation of development of elearning resources been adopted?

The findings from the research undertaken here, suggest that there is no specific extent of centralisation that applies generically across the ITP sector. The extent of centralisation can instead be described in three categories: decentralised; centralised; and highly centralised. The participating ITPs were spread through all three categories, with no single category being the dominant model. Based on the number of staff, the roles of the staff and the functions that the centralised teams performed, a description of a typical team in each category was constructed. The data around financial control was much less consistent than the data for other functions. Elearning managers did not consider it an important element in the conceptualisation of a centralised model. However, they did identify it as a commonly centralised function in practice. Many teaching staff did not know if financial control was centralised or not. Table 5.1 summarises the findings relating to

team size, the roles adopted in typical teams and the functions they performed. It should be noted that the teachers identified that there was a much less centralised approach for the development of online resources for blended courses than for fully online courses, but the elearning managers did not differentiate.

Table 5.1 Description of typical centralised teams

	Decentralised	Centralised	Highly Centralised
% of ITPs	30% of the ITPs that participated	40% of the ITPs that participated	30% of the ITPs that participated
Size of team	Smaller centralised teams (mean of 6 staff).	Medium sized centralised teams (mean of 18 staff)	Larger centralised teams (mean of 32 staff)
Roles in team	• Manager, • Admin Support • Learning Advisors.	• Manager, • Admin Support, • Learning Advisors, • Learning Designers • Elearning Developers	• Manager, • Admin Support, • Learning Designers, • Elearning Developers, • Digital Librarian.
Centralised functions	• Management of the LMS, • Providing support or advice to teaching staff	• Management of the LMS, • providing support or advice to teaching staff, • managing quality, • developing elearning resources, • financial management • quality management.	• Management of the LMS, • managing quality, • developing elearning resources, • financial management (These teams were less likely to include the support/advisory function.)

In broad terms while the ITPs that participated were spread across the three categories of centralisation, 70% of them were either centralised or highly centralised. The more centralised institutions had bigger centralised teams, less emphasis on roles to support academics staff (such as learning advisors), more emphasis on roles related to producing elearning resource (such as elearning developers) and more likely to have specialist roles such as digital librarians. The less centralised teams tended to be smaller and more focused on supporting the

production of elearning rather than developing it in house. The responsibility for managing the institutional learning management system was part of the central teams' role at all levels of centralisation.

There were also three themes that emerged around territorial centralisation: mergers; serving several campuses; and involvement in a collaborative eCampus project. These three themes were apparent across all three categories of centralisations.

The data from the research undertaken here integrated the perspectives of both the elearning managers and the teaching staff. Therefore, the model of typical teams that is presented here, may be considered an informed and a reliable description of the situation at the time of writing.

The findings of the research undertaken here, vary from the existing research in several important ways. The existing research (Higgins & Prebble, 2008a) describes a selection of ITPs within the context of the broader New Zealand tertiary education which includes universities, private institutions and Wānanga (Māori tertiary institutions). The research undertaken here describes only ITPs, and more of them. The existing research is drawn from the perspective of executive staff. The research undertaken here is drawn from the elearning managers and the teaching staff, therefore encompasses a broader range of perspectives. The findings of the research undertaken here are specific to ITPs and are not mixed with findings for Universities and Wānanga, which are generally much larger institutions, delivering a different range of qualifications. One key difference in the findings of Higgins and Prebble (2008a) and this research is the extent of centralisation that they describe. Where Higgins and Prebble contested that decentralisation was the predominant model, the research undertaken here did not find that to be the case. 70% of the ITPs that participated were in fact highly centralised or centralised. This may be due to

Higgins and Prebble including non ITP institutions in their research or may represent a change in the status quo since 2008. This is an important finding, as it provides a new baseline description of how elearning resources are developed. This baseline of predominantly centralised or highly centralised development can be used as a reference point describing *what* is happening, so that future research can evaluate *how* it is happening.

To the researcher's knowledge there is no existing research that provides a categorisation of different extents of centralisation, and no research that described the typical composition of the centralised teams or different extents of centralisation. Guiney (2013) specifically identifies this gap. As such the findings of this research, add significantly to the available knowledge in this area. This will be significant for decision makers in ITPs as they develop strategy and evaluate practice and to managers and teaching staff as they implement that strategy.

Research Question 2: What advantages and disadvantages do staff see in the centralised development of elearning resources?

The research undertaken here focussed on two factors in the technology acceptance model; perceived usefulness and perceived ease of use. It found that the advantages perceived as most important were cost control, quality control, provision of leadership, maintaining consistency of product/experience, clarity around roles and responsibilities, better organised projects and clearer understanding of processes. There was consensus between managers and teaching staff about most of the advantages with an exception around financial advantages of centralised development. While cost reduction was identified as an advantage by most of the managers, teaching staff were much less aware of it. The disadvantages identified in this research were that a centralised model was seen to lack flexibility, was ineffective in implementing organisational change, developedadependency culture,

to lack the ability for resources to be freely adapted after development, and was a poor fit for organisations with very discrete departmental structures.

No statistical relationship was established between demographic information about the teachers and how they perceived advantages and disadvantages of a centralised model.

As stated earlier, these findings are based on data from a significant section of the New Zealand ITP sector. The perspectives of both the elearning managers and the teaching staff are incorporated in the findings. Therefore, the advantages and disadvantages described can be seen as well informed and a reliable description of the perceptions at the time.

The findings of the research undertaken here, supported existing research (Caldwell, 2009; Choy, 2007; Guiney, 2013; Higgins & Prebble, 2008a; Keesing-Styles & Ayres, 2011; Kirkup, 2014; Mugridge et al., 2006; Oced, 2005) in that it identified many of the same advantages and disadvantages. The finding in the research undertaken here varied in that it refers specifically to the priorities of the New Zealand ITP sector and identified factors not apparent in existing research.

Being informed specifically by the New Zealand ITP context is significant. New Zealand has unique cultural and political considerations, such as the implications of the Treaty of Waitangi and prioritising Māori learners. There are significant differences in scale between universities and polytechnics. There is also significant and rapid change occurring which is specific to the ITP sector and impacts on elearning development; an increased number of mergers and the compulsory review and redevelopment of all qualifications below degree level.

Factors that the research undertaken here identify as advantages, in addition to that supported by previous research include: better project management, more clarity

around roles and responsibilities and that elearning produced by a centralised unit was more student focussed and specific cost saving information. While it was not clear to teaching staff that there were cost advantages, elearning managers identified that developing elearning through a centralised unit provided significant cost savings (up to 50% reduction). Existing research did not provide an estimate of the level of savings possible.

Several disadvantages of centralisation were identified in the research undertaken here, that were not apparent in existing research (Bates & Sangra, 2011; Higgins & Prebble, 2008a; Holt, Rice, Smissen, & Bowly, 2001; OECD, 2005; Rovai & Jordan, 2004) . The additional disadvantages of centralisation identified in the research undertaken here included: ineffective in implementing organisational change, restricting the ability for resources to be freely adapted after development; and a poor fit for organisations with very discrete departmental structures.

Existing research did not include the perspective of the teaching staff to the extent it has been here (Higgins & Prebble, 2008a, 2008b; OECD, 2005). The existing research was based on the perspectives provided by senior leadership. Here, teaching staff were seen to some extent to be ambivalent about the advantages of a centralised system, but they did contest that it would be easier to do it themselves, and that they had the skills to do so.

Previous research (Higgins & Prebble, 2008a, 2008b; OECD, 2005) had not explored associations between demographic information of teaching staff (such as age or educational back ground) and how they perceived the advantages and disadvantages of a central development model. This study did not find any statistically significant relationships between these factors. This was an important finding, as it did not support any one demographic group of teaching staff holding specific views on the advantages or disadvantages of a centralised model.

Research Question 3: What attitudes do teaching staff hold towards centralised development of elearning resources?

The research undertaken here focussed on two factors in the technology acceptance model; cognitive attitudes and behavioural intentions. The findings clarified what teaching staff believed about a centralised model and whether they intended to support its adoption.

The findings indicate that teaching staff are to some extent undecided or ambivalent towards a centralised model of elearning development. However, there was a widely held belief that centralisation would have a negative effect on learning (Table 4.9). There was some indication that the teachers who were older and held higher levels of academic qualifications held more negative attitudes to centralisation. This to some extent contradicts the findings from research question two where no statistically significant relationship was identified between demographic information and seeing the advantages and disadvantages of a centralised model. This can be interpreted as older staff with higher levels of academic qualification being more likely to hold a negative attitude towards centralisation, irrespective of their level of understanding of the advantages and disadvantages of centralisation. There were very positive attitudes around the centralised development of quality standards.

The teaching staff held more positive attitudes towards centralisation when they worked within a more centralised model. This indicates that those operating within a centralised model are not doing so reluctantly. There was also an indication that a significant change in attitude takes place as part of the move towards a more centralised model. Negativity prior to centralisation changes to positivity after centralisation. The belief teachers expressed that centralisation could have a negative impact on learning, was less apparent in centralised organisations.

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While there was no evidence to suggest an association between attitudes to centralisation and the level of teacher education the teaching staff had undertaken, there was the suggestion from one ITP, that a centrally developed online teacher education programme had contributed significantly to increasing positivity to centralisation. Factors such as the level of the teacher education programme, its mode of delivery, and the recency of their study may, or may not, contribute to the impact on attitudes.

In existing research there is little more than cursory mention of educator's attitudes towards centralisation (Higgins & Prebble, 2008a, 2008b; OECD, 2005). The researcher was unable to access any research that focussed on behavioural intentions towards a centralised model of elearning resource development. As such the findings of the research undertaken here are new contributions to the body of knowledge.

Summary

This chapter has discussed the findings of the research undertaken here and compared them to the existing body of knowledge. This has resulted in identifying new understandings of the composition of centralised teams and how extensively centralisation has been adopted. Additional advantages of centralisation were identified. It was identified that attitudes to centralisation were seen as more positive in centralised organisations. In the concluding chapter of the thesis the way in which this new knowledge contributes to the existing body of knowledge, and its practical implications will be explored in the light of the limitations of this study.

Chapter Six: Conclusions

Introduction

Education is changing rapidly. Technology is one of the prime drivers of change in education to which the increased use of elearning is a significant contributory factor. Centralising the development of elearning resources may offer some answers to the problems of scaling production of elearning resources in line with this rate of change. However, as Guiney (2013) identifies there is currently little evidence to inform decision makers as to what format centralisation of elearning resource development could take, or how to implement it successfully.

The research undertaken here, aimed to address the unanswered questions around whether to centralise, to what extent to centralise, what functions to centralise, how to organise a centralised team, and what attitudes to expect around centralisation. The current situation in the New Zealand Institute of Technology and Polytechnic (ITP) sector was examined by exploring three research questions:

- To what extent are New Zealand ITPs centralising the development of elearning resources?

- What advantages and disadvantages do staff see in the centralised development of elearning resources?

- What attitudes do teaching staff hold towards centralised development of elearning resources?

This chapter describes the contribution this study has made to research, the implications for decision making, the limitations of the research, and potential for future research.

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Contribution to Research

This study makes an original contribution to New Zealand based research in education and specifically the ITP sector. In responding to each of the research questions, it brings to light several new findings about the organisation of elearning resource development in the New Zealand ITP sector.

In exploring the extent to which centralisation of elearning resource development has been adopted, the findings make a valuable contribution to an area of knowledge where significant research gaps exist. These include providing a categorisation of centralisation which suggests typical features of a centralised unit such as size, roles and functions. The findings have gone a long way to describing the current extent and shape of centralisation in the New Zealand ITP sector.

The findings support existing research (Guiney, 2013; Higgins & Prebble, 2008a; OECD, 2005) around the perceived advantages and disadvantages of centralised models of elearning resources development. Several other perceived advantages and disadvantages are described that had not previously been highlighted. These include better project management, more clarity around roles and responsibilities, that elearning produced by a centralised unit was more student focussed and specific cost saving information. Inconsistency in the understandings around the financial advantages of a centralised model are also identified; elearning managers saw it as important, but teaching staff did not know about them.

This study begun to fill a gap between technology related research (Fresen, 2011; King & He, 2006; Lau & Woods, 2008; Nair & Mukunda Das, 2012; Wong, 2015) and organisational research (Neiva et al., 2005; Towers Watson, 2014; Vakola & Nikolaou, 2005) by specifically addressing attitudes towards centralised elearning resource development. Teaching staff were seen to be ambivalent or undecided in their beliefs around centralisation of elearning resource development, the main concern

being the potential for a negative impact on learning. Attitudes tended to be more negative among older teaching staff with higher levels of academic qualification and more positive where the teaching staff worked in an organisation which had already adopted a centralised model. Attitudes were described as becoming more positive after teaching staff had experienced working within a centralised model. This is a significant addition to the slim body of existing research in this area (Higgins & Prebble, 2008a; OECD, 2005).

Implications of Research

The New Zealand tertiary sector is experiencing an increased pressure for rapid change and innovation (New Zealand Productivity Commission, 2016a). Some difficult and strategic decisions are going to be made in the coming years, that will have a long term impact on the sector. Therefore, stakeholders at all levels need to be equipped with the most relevant and current information. These stakeholders include strategic decision makers, managers and teaching staff. The findings are highly relevant to all of these stakeholders and inform the difficult strategic and operational decisions they currently face.

In deciding to what extent to centralise elearning resource development, the three categories of centralised team described, give the decision maker a picture of typical team composition. From that they can compare their current situation and their vision of their desired future situations. This could either prompt change to align with a particular model, or a clearer understanding of why their context requires a different approach. They can then iterate their own localised model. The findings will also assist with establishing the potential costs of a centralised unit. This is currently highly relevant, as decisions are being made about the reorganising of elearning resources development because of mergers and collaborations between ITPs.

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The findings of this study may also equip decision makers and teaching staff with a better understanding of what to expect from a centralised model. Many of the findings support the advantages and disadvantages of selecting a centralised model that had been identified in previous studies (Caldwell, 2009; Choy, 2007; Guiney, 2013; Higgins & Prebble, 2008a; Keesing-Styles & Ayres, 2011; Kirkup, 2014; Mugridge et al., 2006; Oced, 2005). Therefore, it is reasonable to suggest that a centralised model could enjoy the following advantages: significantly lower cost of production; higher quality output; more consistent output; and better alignment with organisational objectives. Equally, the consistent disadvantages identified were a lack of flexibility, and a lack of autonomy for teaching staff. These should be anticipated when moving towards a more centralised model. For teaching staff, they can be more confident in their anticipation of the benefits of centralisation and better backed by research when expressing their concerns about autonomy and academic freedom. For leaders and decision makers they can be more confident in how they present a business case either for or against centralisation in their context.

Advantages to a centralised model which emerged from this study that had not been highlighted in the previous studies included a clearer understanding of roles and processes, better project management and provision of leadership. The understanding that becoming more centralised alone is not enough to change culture and pedagogy was more prevalent in this research than previous (Higgins & Prebble, 2008a). While these new findings should be considered within the decision making process, they are as yet unsupported by other research. For teachers and strategic decision makers alike, this means that they cannot be as confident in realising the advantages/disadvantages which have emerged uniquely from this research, compared to the advantages/disadvantages that have also been identified in earlier research (Guiney, 2013; Higgins & Prebble, 2008a; OECD, 2005). However, it does identify that it is possible to realise these advantages and disadvantages. Therefore,

planning and decision making should seek to incorporate the management of this possibility.

A specific finding was the difference in understanding of the financial advantages between the teaching staff and the elearning manager. If the teaching staff had been as aware of the advantages as the elearning managers, their expectations of a centralised model may have been higher.

When planning the implementation of a more or less centralised model, decision makers may draw upon the alignment between the research undertaken here, and the existing research to reinforce the advantages of a centralised model. If this understanding is shared, then the ambivalence of the teaching staff may be more easily swayed towards, or away from a centralised model.

Expectations of centralisation are linked to the attitudes staff develop towards it. The cognitive attitudes that staff hold towards a centralised model will directly impact on how they intend to engage with it. Findings showed that while there was some negativity, teaching staff held relatively neutral attitudes towards centralisation. It was also clear that as an organisation moved towards a more centralised model the teaching staff became more positive about it. For teaching staff this means that they can have more confidence that a shift to a centralised model is less likely to lead to them working within a model which their peers and themselves feel negative about. There was an exception where despite being equally aware of the advantages of a centralised model, older teaching staff with higher level qualifications were seen to hold more negative attitudes to centralisation. For managers and decision makers this provides them with more information on which to plan implementation and anticipate how they may manage attitudes. This study suggests several practical steps for decision makers to incorporate into their plans for centralisation, that may more effectively manage staff attitudes.

Firstly, recognise and share the finding that staff working within a centralised model tend to be positive about it. In particular, this should allay some concerns about a negative impact on learning as the experience of those working within centralised models do not support such a concerns. Secondly, provide success stories. Staff working within a centralised model were seen to be more positive about centralisation. Providing evidence of success from established centralised teams may provide some exposure to the benefits and create the same shift in attitude. These examples may be from other ITPs or selected groups within the ITP which could be considered as pilot groups for centralised processes. To increase the likelihood of success from the pilot, factors such as age, level of qualification, and the development of centralised quality standards should be considered. Thirdly, review the design of the teacher education qualification that the organisation supports for teaching staff; does it include the preparation of staff to use a centralised model of elearning development?

These new understandings are timely as decision makers grapple with three issues to which the findings indicate centralisation may contribute towards a solution. Firstly, there is a significantly increased quantity of courses being developed as a result of the government led review of the entire sub-degree qualifications structure (NZQA, n.d.). Secondly, there is a significant number of organisational changes in the sector including mergers, strategic alliances and collaborative projects, all which have resulted in more centralised models being adopted. Thirdly, there is an increased pressure for the ITP sector to break the inertia currently perceived to be holding it in existing models of education delivery and advance into new and innovative models (New Zealand Productivity Commission, 2016b). Having clearer expectations of the impact of a centralised model may contribute to higher quality decision making. This may influence strategic direction and rate of change across the ITP sector.

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In summary, this study provided the teachers, managers and strategic decision makers with a model on which to base local decisions. A more reliable and broader description of what can be expected from a centralised model is now available. Several considerations to help manage attitudes when implementing a change in the level to which elearning resource development is centralised are provided. This is a significant and timely contribution to resolving issues currently impacting the ITP sector.

Limitations

The main limitation is that the number of teaching staff participating provided only a limited coverage of the sector, compared to the coverage provided by interviewing ten elearning managers. As the surveys completed by the teaching staff were anonymous, there was no way to confirm how many ITPs were represented in the data. It is possible that for any given elearning manager interviewed, that no teaching staff from the same ITP participated. As interviews with the ten elearning managers created extensive data, whereas the surveys only created a limited data set, the findings may also be biased towards the perspective of the elearning managers. As there was no intent to explore the relationship between how the elearning manager and the teaching staff responded in any given ITP, this was not seen as a significant limitation. The integration of research methods and perspectives compensates for this limitation and provides an adequate description of the situation.

Opportunities for further research

As the nature of this study was exploratory, it is reasonable to expect further studies to focus on evaluating specific aspects of centralised development, for example, evaluating whether the centralised development of elearning resources has actually increased the quality of the learning experience or the learners' outcomes. This

study sought to describe centralisation and the extent of its adoption in the New Zealand ITP sector. It therefore sets the scene for further research to evaluate its effectiveness. In this section three opportunities for further research are described in the following areas; a deeper understanding of centralised team composition, identifying where centralised elearning resource development can provide advantages to specific groups of learners, and gaining a greater understanding of the potential role of a teacher education programme in supporting the implementation of a centralised model.

While the findings from this research describe the extent to which a range of roles were centralised, it does not describe the relative emphasis placed on those roles within the centralised teams. The number of staff or cost of staff within each role was not available in the data gathered. For example, the number of part time staff and the amount of development work that was contracted out, were not within the scope of this study. This deeper understanding of the composition of a centralised team could be the focus of future research.

One elearning manager identified increased access to learning for students in rural areas with poor internet coverage, as the key reason to adopt a centralised model; without a centralised skills base the specific technical requirements to allow student to access the resources were unlikely to be met. Higher quality internet service is becoming increasingly ubiquitous in New Zealand, therefore adopting a centralised model for this specific reason is likely to diminish in importance. However, it does identify that pooling scarce skills into a centralised unit could have advantages for specific groups of learners. No research was identified that informed how a centralised model of elearning development could directly impact outcomes for specific groups of learners. For example, exploring whether there are specific design considerations that could better support Māori (Institutes of Technology and Polytechnics of New Zealand, 2005; Tiakiwai & Tiakiwai, 2010) and Pacific learners

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(Koloto, Katoanga, & Tatila, L, 2006). Can they be more effectively implemented in a centralised or decentralised model of resource development? Are centralised units better equipped to develop elearning that meets the needs of learners with specific learning difficulties, such as dyslexia (Ivanova, Andreev, & Terzieva, 2010; Nganji, 2012) or a visual impairment (Freire, Linhalis, Bianchini, Fortes, & Pimentel, 2010) ? Given the potential positive impact on priority learners, these questions warrant the attention of further research.

While there was no evidence to suggest an association between attitudes to centralisation and the level of teacher education the teaching staff had undertaken, there was the suggestion from one ITP, that a centrally developed online teacher education programme had contributed significantly to increasing positivity to centralisation. Factors such as the level of the teacher education programme, its mode of delivery, and the recency of their study may, or may not, contribute to the impact on attitudes. These could be important design consideration for tertiary teacher education programmes, and as such warrant further research.

The research conducted here has therefore not only provide new knowledge where there was previously gaps, it has also identified areas for further research which could have a positive impact on learners, staff and institutions.

Final thoughts

The quote with which this thesis began described the New Zealand Tertiary sector as a system which lacked the "dynamism necessary for these [innovative] approaches to scale up and transform education delivery" (New Zealand Productivity Commission, 2016a, p. 2). The New Zealand tertiary sector is unlikely to remain in its current form, in an increasingly global education market. The rate of change in education is currently fast, but it is likely to accelerate exponentially. With technology tracking on a similar curve, large scale disruption of tertiary education should be expected.

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While the advantages of centralisation identified in this study may assist institutions in dealing with the current rate of change, they may not be relevant in the near future. Disruptive technology solutions are increasingly based in open networks. For example, Facebook, Trip Advisor, BlaBlaCar, Uber, Airbnb and Google+ are all disruptive networks based on openness and trust. They cannot be controlled by a centralised business unit. Their impact on the hospitality and transport industries can testify to that. Potential disruptors such as LinkedIn and Degreed may have a disruptive effect on education. Centralisation of elearning resource development may therefore be in tension with the demands of new models of tertiary in the near future.

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Appendices

Centralisation of elearning Resource Development

Appendix 1: Glossary

LMS	Learning Management System
TAM	Technology Acceptance Model
NZQA	New Zealand Qualifications Authority
TEC	Tertiary Education Commission
ITP	Institutes of Technology and Polytechnics
Wānanga	Maori tertiary institutions
TROQ	Targeted Review of Qualifications
PU	Perceived Usefulness
PEU	Perceived Ease of Use
BI	Behavioural Intention
elearning	*The use of digital technologies intended to enhance or support online and blended learning, but excludes purely administrative use of digital technology.*
Elearning resources	*Digital objects or collections of objects, designed to enhance the students learning more so than merely providing an organisational administrative function.*
Centralised Development of elearning resources	*The extent to which organisational characteristics create a greater territorial and/or functional distance between educators and the processes involved in the development of elearning resources.*

Appendix 2: Letters to Chief Executives of New Zealand Polytechnic Institutions

MASSEY UNIVERSITY
INSTITUTE OF EDUCATION
TE KURA O TE MATĀURANGA

7 March 2016
«Title» «First_Name» «Last_Name»
Chief Executive
«Company_Name»
«Address_Line_1»
«Address_Line_2»
«Address_Line_3»

«GreetingLine»

Re Investigation of the extent to which eLearning development has been centralised, the level to which centralisation is seen as useful and staff attitudes to centralisation.

My name is Ray O'Brien, Senior Online Learning Designer at Otago Polytechnic. I am currently studying towards a Masters of Education (elearning) with Massey University. This letter is to request your permission to interview the manager responsible for elearning at your institution via video conference. I also request permission for an invitation to be extended by the elearning manager to teaching staff to participate in an anonymous online survey. The information gathered will be used in a thesis as part of the requirements of my Masters of Education (Elearning) This study has been approved by Massey University Human Ethics Committee.

The study aims to investigate the extent to which the development of elearning resources has been centralised, how useful centralisation is seen to be and educators' attitudes to the centralised development of elearning resources. The purpose of this study is to better inform organisational strategic decision making.

Elearning resources could include individual online lessons, the development of courses within a learning management system, media production, developing resources to support blended delivery which will be hosted online, developing individual online interactions, activities, and assessments, developing characters or case studies.

There are two target groups in the study, the first being individuals that are responsible for the adoption of elearning across your institution. I have identified, «eLearning_Manager», «job_title» as holding this responsibility. Please correct me if I have misinterpreted this. This person will be invited to participate in an online interview with me (approximately 30 – 40 minutes) regarding the level of centralisation of elearning development, the attitudes of teaching staff that have been observed, and the perceived usefulness of centralised elearning development. The other group is the teaching staff. This group will be invited to complete an online survey regarding the extent to which they feel elearning resource development has been centralised in your institution, the level to which they see centralisation as useful and their attitudes to centralisation. The data will be collected through an online questionnaire (approximately 10 – 20 minutes). Staff will be able to access it through a link that will be emailed to your elearning manager for distribution. The data will be kept safe through the use of a password protected database.

Online survey responses will be anonymous and not identifiable to institutions. Redactions and pseudonyms will be used to interview transcripts and survey text to manage potential identification

of individuals or organisations. Participants will have the right of withdrawal at any time should they so wish. The final thesis will only describe trends and will not identify individual institutions.

The process of data collection, including timelines, is described below:

Early March 2016	Invite elearning manager to participate in online interview
21/3/ 2016	Online interviews commence at mutually agreed times.
	Invitation from elearning manger to extended to teaching staff to participate in online survey.
	Online survey opens
	Transcripts available for review by interviewees
31/5/2016	Online interviews completed
30/6/2016	Online survey closes.
	Responses held on secure server
	Transcripts available for approval by interviewees
3/10/2016	Data collection, analysis and writing complete.
1/11/2016	Store data securely with thesis supervisor at Massey University for 5 years
	Recordings of interviews deleted
2017	Research available under open licence

If you have any queries about the study please do not hesitate to contact me or my supervisors as below.

I look forward to working with your institution to develop a clearer understanding of elearning resource development in our sector.

Yours sincerely,

Ray O'Brien

Researcher: Ray O'Brien ray.obrien@op.ac.nz, 64 21766937
Supervisors: Dr Maggie Hartnett M.Hartnett@massey.ac.nz, 64 6 356 9099 X 84409
                Dr Amy Wilson A.D.Wilson@massey.ac.nz, 64 6 356 9099 X 86044

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 15/73. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz .

Appendix 3: Interview consent form

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TE KURA O TE MATAURANGA

Academic's Attitudes to Centralisation of eLearning Development

INTERVIEW PARTICIPANT CONSENT FORM

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree/do not agree to the interview being sound recorded.

I agree/do not agree to the interview being image recorded.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: _____ **Date:** _____

Full Name – printed _____

Appendix 4: Information sheet for interview participants

MASSEY UNIVERSITY
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TE KURA O TE MATĀURANGA

Information sheet for Interview participants

Educators' attitudes to the centralised development of elearning resources

Researcher(s) Introduction

My name is Ray O'Brien and I am conducting research to investigate the extent to which eLearning development has been centralised, the level to which centralisation is seen as useful and staff attitudes to centralisation within the New Zealand Polytechnic context.

The findings of this research may inform decision making around the organisation of elearning resources development. This research is partial fulfilment of the requirements of a Masters in Education specialising in eLearning.

Project Description and Invitation

This project will gather information through online surveys and interviews with New Zealand Polytechnic staff. You are invited to participate in a short online interview (30-45 minutes) which will investigate the extent to which elearning resource development is centralised, how useful centralisation is seen as in your institution, and the attitudes of educators. The date and time of the interview will be agreed between yourself and the researcher by email.

Participant Identification and Recruitment

As the eLearning Manager or the nominated manager responsible for elearning within your institution you are invited to participate in this project. This has the consent of the chief executive of your institution. Participation is on a completely voluntary basis.

Data Management

Your participation in the interview will remain confidential. The interview will be recorded and then transcribed. Direct reference to your institution will be replaced with a pseudonym in the subsequent transcription of the conversation.

The data will be stored on secure server and password protected. Participants should note that it may be possible for a well-informed reader to deduce the institution being discussed despite anonymization of transcript and pseudonyms being used. The researcher will take all practicable steps to reduce the likelihood of this when reporting the research findings.

All recoding files will be deleted at the end of the project. All files will be transferred to secure storage at Massey University or deleted at the conclusion of the project. The final research thesis will be publically available through Massey online library service or on request by email to the researcher.

Participant's Rights

You are under no obligation to accept this invitation. If you decide to participate, you have the right to decline to answer any particular question or to ask for the recording to be turned off at any time during the interview.

You will be asked to review and release the transcript of your interview. This may not be withdrawn at a later stage. The final research thesis will be publically available through Massey online library service or on request by email to the researcher.

Project Contacts
- The contact details for the researcher are: Ray O'Brien, email: ray.obrien@op.ac.nz

- The contact details of the researcher's supervisor: Dr Maggie Hartnett (M.Hartnett@massey.ac.nz) or Dr Amy Wilson (A.D.Wilson@massey.ac.nz).

- If you have any questions about the project please contact the researcher and/or supervisor.

Ethics Approval
This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 15/73. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

Centralisation of elearning Resource Development

Appendix 5: Interview schedule

Interview will be scheduled at mutually agreed times between 1/2/2016 and 29/3/2016.

Provisional Questions for Interviews

Context:

What is your understanding of centralisation of "elearning resource development"?

The definition for this study:

> *The extent to which organisational characteristics create a greater territorial and/or functional distance between educators and the processes involved in the development of elearning resources.*

To what extent has elearning development been centralised in this organisation?

How was this achieved?

[Summarise response]

Who were the drivers of this strategy?

Were they the appropriate people to be driving this strategy?

Perceived usefulness:

What do you see as the possible benefits of centralised elearning development for your organisation?

Which do you see as the most significant? And why?

What do you see as the disadvantages of centralised elearning development?

Which do you see as the most significant? And why?

Perceived ease of use:

What do you see as the main challenges for teaching staff within a centralised

model?

Is that different than from an organisational perspective?

What mechanisms could be put in place to support them?

Centralisation of elearning Resource Development

Would it be perceived as easier than doing it themselves of harder?

Cognitive attitudes:

Do you believe teaching staff generally view centralised development of elearning as positive or negative (or are they indifferent)?

What have you seen that brings you to this conclusion?

Do you believe teaching staff would generally feel undermined or supported if elearning was developed centrally (or don't they care)?

Besides undermined and supported, what other words would you use to describe educators' attitudes to centralised development of elearning?

Do you think your teaching staff see development of elearning as part of their academic role? Why? Why not?

What areas of elearning development do you think the teaching staff will want to maintain control of and what would they be most willing to pass to a centralised role? Why?

Are there any factors that you would consider are common misconceptions from educators about centralised development of elearning?

Behavioural intent:

What proportion of your teaching staff do you think are supportive of adopting a centralised model?

Why? What about those who are not supportive? What do you think the reasons for this are?

Do you support centralisation? Why? Why not?

Appendix 6: Confidentiality Agreement

MASSEY UNIVERSITY
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TE KURA O TE MATAURANGA

Centralised Development of Elearning Resources

TRANSCRIBER'S CONFIDENTIALITY AGREEMENT

I .... (Full Name – printed) agree to transcribe the recordings provided to me.

I agree to keep confidential all the information provided to me.

I will not make any copies of the transcripts or keep any record of them, other than those required for the project.

Signature: _____ **Date:** _____

Te Kumenga
ki Pūrehuroa

Institute of Education
Cnr Albany Drive & Collinson Road, Private Bag 11222 (PN900), Palmerston North 4442, New Zealand T +64 6 356 9099 www.massey.ac.nz

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Appendix 7: Transcript release form

MASSEY UNIVERSITY
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Centralised Development of Elearning Resources

AUTHORITY FOR THE RELEASE OF TRANSCRIPTS

I confirm that I have had the opportunity to read and amend the transcript of the interview(s) conducted with me.

I agree that the edited transcript and extracts from this may be used in reports and publications arising from the research.

Signature: _____   **Date:** _____

Full Name - printed _____

Appendix 8: Draft email invitation from eLearning Manager to participate in survey

To: teachingstaff@institution.ac.nz

From: elearningmanager@institution.ac.nz

Subject: Centralisation of elearning resource development; invitation to participate in Massey University research survey

Dear Teaching Staff,

As an institution we have been invited to participate in a research project which aims to investigate the extent to which eLearning resource development has been centralised, the level to which centralisation is seen as useful and staff attitudes to centralisation. This research is being undertaken by a student from Massey University, Ray O'Brien, as part of his Masters research. It focuses on New Zealand ITPs and may inform decision making as to how elearning development is best structured in our context.

Participation in this research has been approved by [CEO] and I extend the invitation to you to participate in a short 10-20 minute online survey. This survey is anonymous and participation is voluntary. Please view the participant information sheet via this link.

Regards,

Elearning Manager

Appendix 9: Information sheet for survey participants

MASSEY UNIVERSITY
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Information sheet for survey participants

Centralisation of elearning resource development

SURVEY INFORMATION SHEET

Researcher(s) Introduction
My name is Ray O'Brien and I am conducting research to investigate the extent to which elearning resource development has been centralised, the level to which centralisation is seen as useful and staff attitudes to centralisation.
The findings of this research may inform decision making around the organisation of elearning resource development. This research is partial fulfilment of the requirements of a Masters in Education specialising in elearning at Massey University.

Project Description and Invitation
This project will gather information through online surveys and interviews with New Zealand Polytechnic staff. You are invited to participate in a short online survey (10-20 minutes) which will contribute valuable data to this project.
Please follow this link to participate in the survey. You may withdraw from the survey at any point, but due to the anonymous nature of the survey, once you have submitted your final response you will not be able to withdraw your responses from the dataset.

Data Management
Your participation in the survey will remain confidential and anonymous. Direct reference to institutions will be replaced with pseudonyms before the data is analysed.
The data will be stored on a secure server and password protected. Participants should note that as there are a small number of polytechnic institutions in New Zealand it may be possible for a well-informed reader to deduce the institution being discussed despite anonymization of transcript and pseudonyms being used. The researcher will take all practicable steps to reduce the likelihood of this when reporting the research findings.
All files will be transferred to secure storage at Massey University or deleted at the conclusion of the project.

Participant's Rights
You are under no obligation to accept this invitation. Completion and submission of the questionnaire implies consent. You have the right to decline to answer any particular question.
The final research thesis will be publically available through Massey online library service or on request by email to the researcher.

Appendix 10: Survey Questions

The centralised development of elearning resources

Survey information page

Researcher Introduction

My name is Ray O'Brien and I am conducting research to investigate the extent to which elearning resource development has been centralised, the level to which centralisation is seen as useful and staff attitudes to centralisation.

The findings of this research may inform decision making around the organisation of elearning resource development. This research is partial fulfilment of the requirements of a Masters in Education specialising in elearning at Massey University.

Project Description and Invitation

This project will gather information through online surveys and interviews with New Zealand Polytechnic staff.

You are invited to participate in this short online survey (10-20 minutes) which will contribute valuable data to this project.

You may withdraw from the survey at any point, but due to the anonymous nature of the survey, once you have submitted your final response you will not be able to withdraw your responses from the dataset.

Data Management

Your participation in the survey will remain confidential and anonymous. Direct reference to institutions will be replaced with pseudonyms before the data is analysed.

The data will be stored on a secure server and password protected. Participants should note that as there are a small number of polytechnic institutions in New Zealand it may be possible for a well-informed reader to deduce the institution being discussed despite anonymisation of transcript and pseudonyms being used. The researcher will take all practicable steps to reduce the likelihood of this when reporting the research findings.

All files will be transferred to secure storage at Massey University or deleted at the conclusion of the project.

Participant's Rights

You are under no obligation to accept this invitation. Completion and submission of the questionnaire implies consent. You have the right to decline to answer any particular question.

The final research thesis will be publically available through Massey online library service or on request by email to the researcher.

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Project Contacts

The contact details for the researcher are: Ray O'Brien, email: ray.obrien@op.ac.nz

The contact details of the researcher's supervisors: Dr Maggie Hartnett (M.Hartnett@massey.ac.nz) or Dr Amy Wilson (A.D.Wilson@massey.ac.nz).

If you have any questions about the project please contact the researcher and/or supervisor.

Ethics Approval

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 15/73. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

* 1. This questionnaire is anonymous and confidential. Reference to specific organisations should be avoided.

Please check the box below to confirm that you have read and understand the content of the information above and that by participating in this survey you give consent for your responses to be used for research as described.

◯ I accept the conditions above.

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The centralised development of elearning resources

Information about you

2. What is your age?

( ) 20 or younger

( ) 21-29

( ) 30-39

( ) 40-49

( ) 50-59

( ) 60 or older

3. What is your gender identity?

( ) Male

( ) Female

( ) Gender Diverse

( ) Prefer not to say

Other (please specify)

[   ]

4. What is the highest level of education you have personally completed?

[   ]

Other (please specify)

[   ]

5. What is the highest level of teacher/education qualification you have completed?

[   ]

Other (please specify)

[   ]

6. How many years of teaching experience do you have?

[   ]

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7. Please indicate to what extent you agree or disagree with the following statement. This is done on the scale from "strongly agree" to "strongly disagree". If you do not know how the statement applies to your organisation please select the "I do not know box".

The normal practice in the organisation in which I work is an example of centralised development of elearning. (For example if there is another part of the organisation that develops elearning instead of the educators)

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
◯	◯	◯	◯	◯	◯

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The centralised development of elearning resources

Information about your organisation

Please indicate to what extent you agree or disagree with the following statements. This is done on the scale from "strongly agree" to "strongly disagree". If you do not know how the statement applies to your organisation please select the "I do not know box".

8. In my organisation when an online component is required for a blended course, teaching staff normally develop the online resources.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

9. In my organisation when an online component is required for a blended course, an elearning development unit within the institution normally develops the online resources.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

10. When a complete course needs to be developed for online delivery, teaching staff normally develop the resources.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

11. The elearning development unit within my institution defines the quality standards to which elearning resources need to be developed.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

12. The elearning development unit within my institution identifies the training needs of teaching staff with respect to elearning technology.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

13. In my organisation teaching staff normally identify their own training needs when it comes to elearning.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

5

14. In my organisation funding for the development of elearning resources is controlled by a specific elearning unit.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

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The centralised development of elearning resources

The usefulness of centralised development of elearning

Please indicate to what extent you agree with the following statements. They all relate to how useful you perceive centralised development of elearning to be.

15. Developing elearning resources is something I need to do myself to be able to do my job well.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

16. Having a specialist team develop elearning resources will help me meet the expectations of my role.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

17. A central elearning development unit is the most cost effective way to develop elearning resources.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

18. I would use more elearning if someone else was developing the resources for me.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

7

Centralisation of elearning Resource Development

The centralised development of elearning resources

The ease of use of centralised development of elearning

Please indicate to what extent you agree with the following statements. They all relate to how easy you perceive using a centralised model of elearning development would be/is.

19. I find developing elearning resources easier to do myself than having someone else develop them.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

20. Developing elearning resources is not a skill set I have.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

21. Dealing with centralised departments is more difficult than doing things myself.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

22. When someone else has developed elearning resources for me the process has been clear and easy to follow.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

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The centralised development of elearning resources

Attitudes to centralised development of elearning resources

Please indicate to what extent you agree with the statements below. These statements relate to your attitude to centralised development of elearning.

23. Centralisation is generally a good thing.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

24. I am reluctant to see elearning development done in a centralised unit.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

25. Taking responsibility for developing resources away from the educator will have a negative impact on learning.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

26. Which of the following would you most likely want a centralised elearning development service to do (select all that apply)?

☐ Design activities or online resources

☐ Make activities or online resources

☐ Provide support for developing fully online learning courses

☐ Provide support for developing fully blended courses (a mix of online and face to face)

☐ Provide training to help you develop resources

☐ Provide training to help you deliver online and blended learning

☐ Other (please specify)

_____

27. I support the adoption of centralised development of elearning within my organisation.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I do not know
○	○	○	○	○	○

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The centralised development of elearning resources

Survey complete

Thank you very much for contributing to this survey.

By pressing the "Done" button you confirm that you are happy for your responses to be used in this research and recognise that they will not be able to be withdrawn after that point.

Thank you,

Ray O'Brien

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Appendix 11: Statistical Appendix- Internal reliability

This appendix provides a description of the statistical processes used to establish the internal validity of each factor in the questionnaire. Each factor is addressed in turn using SPSS to generate Cronbach's Alpha score. Based on these scores, data from specific questions were considered for inclusion or exclusion depending on how they contributed to the measure of the factor as intended.

Factor 1: The extent to which the participant's organisation has centralised the development of elearning resources.

Questions seven to fourteen in the questionnaire were designed to gather data relevant to the extent to which the institution in which the participant worked had adopted a centralised model. Question seven asked the participant to rate the level of centralisation while questions eight to thirteen were items designed to measure different aspect of centralisation. If questions eight to thirteen are a valid measure of centralisation then comparison with question seven will give an indication how well the participant understands the concepts of the centralisation of elearning development. This group of seven questions received 44 valid responses. Questions 8, 10 and 13 were reverse coded to allow for the opposite polarity of the wording of the questions. This produced a Cronbach's Alpha score of 0.756. While removing question 14 would have increase the score to 0.792, the inclusion of a question about funding was seen as more important than a small increment in the alpha score. This indicates an acceptable level if internal validity in describing the extent to which the participant's institution has adopted a centralised model. No changes were required to improve this scale.

Centralisation of elearning Resource Development

Factor 2: Perceived Usefulness

Questions 15 to 18 were designed to measure teaching staff's perception of how useful a centralised development model could be. 44 valid responses were received. Question 15 was reverse coded to allow for the opposite polarity of the wording of the question.

These four items produced a Cronbach's Alpha score of 0.651. By withdrawing question 15 from the analysis the Alpha score increased to 0.732. On reflection it was identified that question 15 focussed more on the respondent's beliefs about their own job that the usefulness of a centralised model of elearning development. For that reason, question 15 was removed from the analysis of perceived usefulness, but was considered in the research as separate data. 0.732 indicates an acceptable level if internal validity in describing the extent to which participants see a centralised model as useful.

Factor 3: Perceived Ease of Use

Questions 19 to 22 were designed to measure teaching staff's perception of how easy a centralised model of elearning development is to use. 43 valid responses were received. Questions 19 and 21 were reverse coded to allow for the opposite polarity of the wording of the questions.

These four items produced a Cronbach's Alpha score of 0.610. This is generally considered a low level of internal validity of a scale (Peterson, 1994). Removing question 22 from the scale increased the Alpha score to 0.693. This is significantly closer to the 0.7 acceptability level. For this reason, question 22 was removed from the analysis of perceived ease of use, but was considered in the research as separate data.

Factor 4: Attitudes

Questions 23 to 25 were designed to measure teaching staff's attitudes to a centralised model of elearning development. 43 valid responses were received. Questions 24 and 25 were reverse coded to allow for the opposite polarity of the wording of the questions.

These three items produced a Cronbach's Alpha score of 0.850. Removal of any of the items reduced the alpha score. This was considered a high level of internal validity in measuring the teaching staff's attitudes (Peterson, 1994).

Factor 5: Behavioural intention

Questions 26 and 27 were designed to gather data about what aspects of a centralised team the teaching staff showed intent to use if given the opportunity. The aim of these questions was not to create an aggregated score for this factor but to examine in more detail the intentions around each aspect. For this reason, internal validity is not a relevant test for this section.