Factors that influence the efficacy of Professional Development in Digital Technologies for New Zealand Primary School Teachers.

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ABSTRACT

"With digital technologies now accepted as an integral part of our society, our workplaces and our homes, the challenge has been to ensure they also become an integral part of our education system" (Education in New Zealand, 2017). Recently, the Ministry of Education has revised the New Zealand Curriculum and emphasised the need for teachers of years 0-10 to integrate the Digital Technologies Curriculum in all schools. In order to do this, teachers require effective professional development (PD).

This study uses a practitioner-researcher approach to investigate teachers' experiences and perceptions of the factors of the design and implementation of Digital Technologies PD that increase its efficacy. Further to this, the literature is explored and used to identify factors that impact its effectiveness. The study also examined teachers' perceptions of the transferability and relevance of the findings to other educational contexts.

Teachers took part in seven compulsory Digital Technologies PD workshops and up to five optional workshops over two school terms. Through questionnaires and individual semi-structured interviews, 11 participants shared their perceptions and experiences of the PD, identifying the factors that influenced its effectiveness.

The findings of the study indicated that factors of collaboration, discussion, and ongoing time and support should be included in PD. The content and activities of the PD need to be hands-on, practical and meet the needs and contexts of the teachers in the programme. Further to this, the facilitators of PD programmes require strong communication skills, approachability, and passion. Strong relationships between the facilitator and teachers need to be made and maintained. In addition, the facilitator must be responsive and flexible to the needs of the teachers in the PD.

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ABBREVIATIONS

PD: Professional Development
ICT: Information and Communications Technology

CHAPTER ONE: INTRODUCTION

“With digital technologies now accepted as an integral part of our society, our workplaces and our homes, the challenge has been to ensure they also become an integral part of our education system” (Education in New Zealand, 2017). The Ministry of Education requires that by Term 1 in 2020, all schools and kura in New Zealand will be teaching the Digital Technologies Curriculum from years 0-10. It highlights that “teachers must be supported in developing and enhancing their own ICT knowledge and skills, through professional learning and consistent, ongoing support” (Ministry of Education, 2006, p. 10). With the impending date fast approaching, it is clear there is a need for quality professional development (PD) within this new area of learning to support teachers, so they are ready for the implementation of this curriculum.

This study provides an insight into an in-house PD programme roll-out in a New Zealand primary school, designed to enhance digital teaching and learning. The literature is explored and used to identify factors that have both positive and negative effects on the efficacy of PD. The experiences of participants, as well as the researcher (as the PD facilitator), are examined. Guskey and Yoon (2009) stated that “those responsible for planning and implementing professional development must learn how to critically assess and evaluate the effectiveness of what they do” (p. 495). Conclusions are then drawn about the most effective factors of a PD programme and the impact on those who take part.

Alongside this, teacher’s perceptions of the transferability and relevance of the study's findings are examined to ascertain the most effective ways of sharing the findings in the wider education community. The results of the research are intended to be shared with other educators and leaders to benefit them when providing, designing and implementing effective PD in Digital Technologies.

1.1 Research aim and guiding questions

The aim of this research was to investigate the literature and teachers' perspectives for the factors that increase the efficacy of PD in Digital Technologies, with a view to disseminating the factors that are the most important. Alongside this, the research explored the value of the findings and the best avenue to share these throughout the education sector.

The research will be drawing conclusions from the literature and data collected from participants during this study. The following questions have guided the research:

1. What are the recommended factors for the design and implementation of effective PD as identified by the literature?

2. What are teachers' perceptions of the key factors of the design and implementation process for effective PD in Digital Technologies for a New Zealand primary school?

3. What are teachers' perceptions of the transferability and relevance of the findings for the recommended factors for effective PD?

1.2 Thesis outline

Chapter One: Introduction

In Chapter One, I describe the context and topic of the study. This chapter also includes the research aim, guiding questions and thesis outline.

Chapter Two: Literature Review

In this chapter, the literature related to the relevant themes and ideas in this study are explored. The literature review examines factors in the design and implementation of a PD programme both in the context of Digital Technologies and others. The key themes explored are design and structure, accountability, content and relevance, communities of learning and collaboration, support and facilitation, as well as some barriers to effective PD.

Chapter Three: Methodology

Chapter Three contains a description of the theoretical frameworks used in this research describing practitioner research and the action research perspective. This chapter also describes the processes for participant recruitment, the procedures, as well as the instruments for data collection and analysis. Furthermore, validity and reliability considerations are explored and addressed.

Chapter Four: The Professional Development Workshops

This chapter details the planning and implementation of the PD workshops, including the processes I followed as the facilitator, and the structure of the sessions and topics covered.

Chapter Five: Results

In Chapter Five, the results from the initial and second questionnaires are detailed and examined for trends and points of interest. The data from the interviews are organised into themes and examined.

Chapter Six: Discussion

In this chapter the significant findings of the study, with reference to the literature, are discussed.

Chapter Seven: Summary, recommendations, limitations and areas for further study

This chapter summaries the key points made in the discussion. Recommendations are then made which other teachers, leaders, facilitators and schools might wish to consider when designing and implementing a PD programme in Digital Technologies. Alongside this, the limitations of this study are discussed, and suggestions for further study are recommended.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction to Literature Review

PD refers to “many types of educational experiences related to an individual’s work” (Mizell, 2010, p. 3). Many professionals must continue learning and developing their practice in order to best carry out their job. PD in education has been found to have a “substantial impact on student learning” (Timperley, Wilson, Barrar, & Fung, 2007, p. xxv). It can take on many forms, and numerous articles have debated the nature of PD, the forms it takes, and the PD content. Borko (2004) stated that “teacher’s professional development (PD) is essential in efforts to improve our schools” (p. 3). Despite this, Sparks (2002) emphasises that despite the number of books, articles and other publications published to improve the quality of PD, “all this information is producing only marginal improvements in the quality of professional development in schools” (p. i-i). Therefore, it is important to collate and distil the current literature to identify the most commonly effective factors that influence PD. Although many researchers such as Guskey (2002), Sparks (2004), and Starkey, et al. (2009), attempt to define “effective” PD, there is little agreement as to what factors look like within an effective PD programme.

This investigation is even more urgent for New Zealand educators, as teachers are faced with the challenge of implementing a Digital Technologies Curriculum by 2020, and support is

needed to implement this. One hundred per-cent of the research participants believed that other educators would benefit from Digital Technologies PD. Therefore, PD providers must specifically identify which factors of effective PD apply to the context of Digital Technologies. Due to the lack of research on Digital Technologies PD in the New Zealand context, answers to the following questions must be found in order to support teachers:

- What are the factors that influence the efficacy of PD specifically in Digital Technologies?
- More importantly, what are the factors for effective PD that apply in the context of teachers in New Zealand primary schools.

The literature review attempted to seek out current effective factors in PD from different countries, education levels and subjects. Most of the literature relates to Digital Technologies or e-learning. The key themes explored are design and structure, accountability, content and relevance, communities of learning and collaboration, support and facilitation, as well as some barriers to effective PD such as time demands and pressures, teacher attitudes and beliefs, and resourcing and organisational constraints.

2.2 Design and structure

Goos, Dole and Makar (2007) discuss the different forms that PD might take, including being delivered “informally by colleagues and mentors in a school or more formally through organised activities such as workshops and conferences” (p. 26). This can be described as “in-house PD” or “external PD”. Hill (2008) describes “in-house PD” as led by current staff who work with other teachers school-wide. This PD method is also supported by Timperley et al. (2007) who discuss the benefits of internal expertise and teachers teaching teachers. The external PD model as suggested by Gilmore (2008) and Deluca, Luu, Sunn, and Klinger (2012), is characterised by having an external facilitator, mentor or coach work with teachers either at school or outside of school.

Alongside these methods, there is much debate over the most effective PD structure within

these approaches. Findings from various literature supported the use of structures including using online platforms, forums, communities or websites to share resources, videos and discussions as a particularly effective way of delivering PD (Borko, 2004; Deluca et al., 2012; Dingle, Brownell, Leko, Broadman & Haager, 2011; Glass & Vrasidas, 2007; Paez, 2003; Prestridge & Tondeur, 2015). Herro (2015) discussed how “accessing professional learning communities such as those found on Twitter or Pinterest, forming cohorts with interested colleagues and committing to sharing best practices fosters and supports new learning transferable to classrooms” (p. 26). Whilst Prestridge and Tondeur (2015) identified the ease of access, and Herold (2013) emphasised how an online delivery can be seen as more efficient and less costly.

However, Herold (2013) raised reservations about the lack of personal connection when solely using an online delivery. There was also debate over what effective online PD looks like, ranging from forums and online journals to course modules. Using solely an online method of content delivery seems to also conflict with the strong consensus in much of the literature that states that content should involve active learning opportunities (Digweed, 2018; Dingle et al., 2011; Garet, Porter, Desimone, Birman & Yoon, 2001; Paez, 2003), “concrete experiences” (Robles 2006, p. 17) and should be mostly hands-on (Carlson & Gadio, 2002). Goos et al. (2007) summarised this as “authentic, practice-based learning opportunities” (p. 28), which leads to support for the efficacy of a “blended” approach (Blackboard Inc, 2015; Carlson and Gadio, 2002; Herold, 2013; Prestridge and Tondeur, 2015; Robles, 2006). A blended learning, or a “hybrid model” (Carlson & Gadio, 2002, p. 126), includes both online and face-to-face PD learning. Glass and Vrasidas (2007) stated that “such blended models of PD can better serve the needs of today's teachers” (p. 99).

Other effective factors suggested within the literature for PD were observations (Paez, 2003; Gilmore, 2008; Timperley et al., 2007), and coaching and mentoring (Garet et al., 2001). Thornton (2015) discussed how coaching and mentoring systems can be sites of mutual learning. However these factors were discussed in little detail as to the process or models of how the coaching and mentoring should be carried out to be deemed most effective.

Much of the literature highlighted the importance of linking PD with systems already threaded

throughout the school. Timperley et al. (2007) discussed the importance of the initiatives to be based in the school, and Garet et al. (2001), Gerstein (2013), and Robles (2006) supported this, stating that opportunities for PD should be within a teacher's regular workday and "embedded in their daily schedule" (Gerstein, 2013, p. 1). Similarly, Prestridge and Tondeur (2015) commented that the PD should be "considered as part of what they were doing in their classrooms rather than as an add-on or additional exercise" (p. 206).

Some literature also commented on the importance of the process for designing a PD programme. Glass and Vrasidas (2007) and Prestridge and Tondeur (2015), discussed the importance of including teachers in the design of PD. Robles (2006) stated the benefits of "teacher involvement in the planning, delivery and evaluation of professional programs" (p. 27). Gerstein (2013), and Dede, Eisenkraft, Frumin, and Hartley (2016), said that this leads to teachers taking ownership of the learning. Lee (2005) highlighted the effectiveness of using planning frameworks and templates when designing PD. Similarly, Deluca et al. (2012) suggested the following framework to work through when designing PD:

A: Identifying policy priorities
B: Specifying issues and goals
C: Identifying teachers for focused PD based on need
D: Categorising teacher needs
E: Selecting and implementing PD that works in with teachers
F: Conducting an evaluation of the PD

Whilst many frameworks, models and methods were suggested throughout the literature, there was little consensus as to which would be the most effective model for PD in Digital Technologies.

2.3 Accountability

Accountability has been discussed in the literature as an element that could make PD more effective (Gerstein, 2013; Desimone & Stuckey, 2014). Dingle et al. (2011) suggested monthly follow-up meetings, and Desimone and Stuckey (2014) suggested accountability

through submitting videos and reflections. Prestridge and Tondeur (2015) considered how accountability might be used to measure the success and efficacy of the PD, but did not detail how this might look. Desimone and Stuckey (2014) also commented on using "accountability pressures in order to further the development of teachers who have shown the least behavioural change during the early stages" (p. 10). Although there were many suggestions for an effective accountability model, no one model was highlighted as the most effective.

Gerstein (2013), Glass and Vrasidas (2007), Carlson and Gadio (2002), and Robles (2006), discussed how rewards or incentives could motivate teachers thus making PD more effective. However, the definition of these "rewards and incentives" ranged from monetary bonuses to digital badges, to certificates, to recognised qualifications, making it difficult to identify which of these would be effective or even able to be actioned. Desimone and Stuckey (2014) stated that "previous studies have shown that power exerted through the pressure of rewards or sanctions can alter teacher behaviour, but such changes are usually not as long-lasting as behaviour changes that result from self-motivation or buy-in" (p. 14). Similarly, Robles (2006) argued that "although group rewards may motivate some teachers, individual rewards may increase competition among staff" (p. 20).

Some of the literature emphasised the need for teachers to implement an action in their classrooms and to have the chance to reflect and receive feedback based on their actions. The New Zealand Post Primary Teachers' Association (NZPPTA) (2011) described how an action research framework can create the necessary conditions for involving "participants making or implementing change rather than just investigating an issue" (p. 16).

2.4 Content and relevance

There was no specific content mentioned that was seen to be required in a Digital Technologies PD programme. Carlson and Gadio (2002) pointed out that there are always "ongoing discussions and divergent views regarding the content required for teacher professional development in the use of technology. Indeed, differing economic, social, cultural, educational, and technological realities require different approaches" (p. 122).

However, most of the literature generalised the need for a clear focus on skills, pedagogy and integration. Gilmore (2008), and Hill (2008), discussed the need for multiple, varied and extended opportunities for learning. The Ministry of Education (2006) suggested that PD programmes focus on “effective teaching, ICT literacy, and understanding the potential of ICT to support learning across the curriculum” (p. 11). Prestridge and Tondeur (2015) suggested focusing on “pedagogy, not tools” (p. 200), and similarly “providing technical skills training to teachers in the use of technology is not enough. Teachers also need professional development in the pedagogical application of those skills to improve teaching and learning” (Carlson & Gadio, 2002, p. 119). Robles (2006) acknowledged that whilst the PD content may need to include basic skills teaching, “for the most part, it involves learning the pedagogical and collaboration skills” (p. 9). Desimone and Stuckey (2014) suggested three different types of content that PD typically covers: content knowledge, instructional behaviour, and adaptive planning and decision-making. These authors commented that “ultimately, the key to sustainable professional development might not be putting stable practices in place but rather helping teachers become adaptive planners capable of making good decisions over time” (Desimone & Stuckey, 2014, p. 13).

To a lesser extent, various factors such as discussions, professional readings, observations, reflecting in a journal, watching videos, and visiting other schools and classrooms were also suggested as possible PD content (Paez, 2003). Experts modelling (either in teacher classrooms or in a video format) was highlighted by Timperley et al. (2007), and Dede et al. (2006) to be an effective strategy, but only if teachers understood the theory underpinning the modelling. This is further supported by Higgins, Tait-Mccutcheon, Carman and Yates (2005) who stated that it is “important to manage the introduction of classroom activities with discussion of the underlying core principles” (p. 73) and suggest a ‘co-teaching’ approach to modelling.

There was a strong emphasis from the literature that effective PD must be based on teachers’ needs, context and interests (Desimone & Stuckey, 2014; Stoll, Harris, & Handscomb, 2012). Robles (2006) asserted that “effective professional development uses evaluation to ensure that each activity is meeting the needs of the participants and providing them with new learning experiences” (p. 22). Likewise, Borko (2004), Robles (2006), and Hill

(2008), indicated the need for a clear needs assessment phase at the beginning of any effective PD. Deluca et al. (2012) described the needs of adult learners to be more context-based and authentic to their daily lives.

Further to this, much of the literature highlighted the need for the PD content to link to both student outcomes and curriculum objectives (Paez, 2003; Desimone & Stuckey, 2014; Glass & Vrasidas, 2007; Hill, 2008; Dingle et al., 2011; Timperley et al., 2007). Carlson and Gadio (2002) went on to discuss how content should include linking curricular objectives to tech-based activities, which suggests that PD must be seen as relevant to teachers and what they do in their classrooms with their students. Timperley et al. (2007) asserted the need to maintain the student perspective and continue to relate to the classroom and current realities of teachers in the school. Also, Gilmore (2008) linked successful PD with strong policy support, and similarly Deluca et al. (2012) emphasised identifying policy priorities as an important step in designing effective PD.

Within the content of the PD, much of the literature highlighted the use of action research, inquiry or a project-based model to link content into the classrooms of the teachers. Many of the researchers that highlighted the efficacy of action research in a successful PD programme. (Deluca et al., 2012; Gerstein, 2013; Gilmore, 2008; Glass and Vrasidas, 2007; Hill, 2008; Kinley, 2015; and Paez, 2003. Prestridge and Tondeur (2015) described the process involved “teachers planning, implementation and analysis of their own mini-research project, termed ‘Action Learning Project’ where ICT was designed to be a central tool in the learning phase of the curriculum unit” (p. 203). Robles (2006) commented on the effectiveness of the action research, stating that it gives “teachers the time and opportunity to try new things, to reflect upon their experiences and learn from others, thus realizing how technology can improve student learning and achievement and becoming, with technology, capable of much more” (p. 13).

2.5 Communities of learning and collaboration

The presence of learning communities and peer collaboration as essential factors in effective PD was identified by many (Borko, 2004; Carlson & Gadio, 2002; Deluca et al., 2012; Gilmore, 2008; Glass & Vrasidas, 2007; Hill, 2008; Paez. 2003; Robles, 2006; Stoll et al., 2012; Timperley et al., 2007). There were various suggestions about how this could look within the PD. Borko (2004) suggested a sustainable model whereby teachers teach each other, and Hill (2008) discussed a model where an external facilitator works with a core group of teachers who then work with other teachers school-wide. An online community, as opposed to face-to-face communities of learning, was suggested by Dingle et al. (2011), Steiner (2004), and Prestridge and Tondeur (2015). The Ministry of Education (2006) discussed how teachers could use "online communities of practice to strengthen collegial support, professional dialogue and reflective practice" (p. 11).

Despite no agreement in the literature about how these communities might look or form, there was a consensus that the collaboration between teachers that happens as part of these communities of learning is crucial. An important aspect of these communities, in whichever form they take, is their collaborative nature and as sites of "mutual learning" (Glass & Vrasidas, 2007, p. 89). Herro (2015) described the need for a "participatory culture" (p. 117) whereby members are actively contributing to and supporting each other. Significant weight was given to the importance of professional discussions. Discussions may involve teachers articulating what they have learned (Paez, 2003), critically examining their teaching (Borko, 2004), discussing student data (Gilmore 2008), sharing best practice (Herro, 2015) and sharing both negative and positive experiences (Carlson & Gadio, 2002). Goos et al. (2007) specified that "teachers need time and opportunities to discuss pedagogical and curricular issues with supportive colleagues as they attempt to implement new practices" (p. 26).

2.6 Support and facilitation

One of the crucial factors agreed on by the majority of the literature for successful and effective PD was providing a sustained programme with "ongoing support during the school year" (Burko, 2004, p. 6). Gerstein (2013), Glass and Vrasidas (2007), Carlson and Gadio

(2002), Desimone and Stuckey (2014), Paez (2003), and Hill (2008) all agreed with including consistent guidance, assistance or support in some form. Although what this looked like in practice varied and some literature did not detail what might need to happen to provide this kind of support.

The need for a mentor, coach, buddy, critical friend or facilitator in the PD was highlighted frequently in the literature. Goos et al. (2007) did mention 'informal' PD that occurs between teachers, and Kinley (2015) suggested using "frontrunners" or early adopters to inspire and support others. Robles (2006) described a model that involves "teachers mentoring other teachers in integrating ICT in teaching and learning" (p. 10). Goos et al. (2007) suggested pairing teachers up rather than working through the PD as individuals. Hill (2008), Robles (2006), and Goos et al. (2007) illustrated how developing and fostering teachers' leadership of PD could be used as a model for PD delivery. Glass and Vrasidas (2007) stated that "distributed leadership supports and values teachers' agency in driving educational change" (p. 100).

There was debate as to whether PD should be facilitated 'in-house' or by external sources or experts. Overall the literature seemed to lack evidence of an 'in-house' method as essential to effective PD. However, a study of two PD initiatives by Hindle, Marshall, Higgins and Tait-McCutcheon (2007) emphasised the benefits of having an 'in-house' facilitator. They stated that "the success of the in-school facilitation model for teachers was the immediate access they had to their facilitator, the wealth of knowledge their facilitator had about their school, and the willingness of the in-school facilitator to model effective strategies and ideas" (p. 2).

Literature supported engaging with external expertise (Glass & Vrasidas, 2007; Prestridge & Tondeur, 2015; Timperley et al., 2007; Carlson & Gadio, 2002). Paez (2003) and Gilmore (2008) suggested hiring external experts. Stoll et al. (2012) recommended that external expertise should be connected to the teachers' workplace and daily teaching. Dede et al., (2016) Garet et al., (2001), and Desimone and Stuckey (2014) highlighted the need for expert modelling in classrooms. Timperley et al. (2007) described how in some cases not all expert-led PD is effective and questioned whether PD would be sustained once the expert PD finishes. Deluca et al. (2012) suggested there be expert input but the PD should not be

expert-led. Similarly, the NZPPTA (2011) highlighted that teachers who were responsible for PD in their school context should “have access to support, generally externally” (p. 12)

Whether the support was internal or external, Borko (2004) stated that “the studies suggest that the facilitator is crucial to the success of the PD programme” (p. 10). Despite this claim, Timperley et al. (2007) discussed how little research has been done to investigate the role of the facilitator, stating “rarely were providers and what they did to promote teacher learning the subject of investigation” (p. xiv). Hindle et al. (2007) highlighted interpersonal skills and strong content knowledge as prerequisites for effective facilitation. Higgins et al. (2005) discussed the importance of a ‘contextually responsive orientation’ to PD whereby the facilitator carefully responds to the teachers and or students that the PD is for.

Another crucial element to the success of PD was having support from administrators or school leadership (Desimone & Stuckey, 2014; Ministry of Education, 2006; Dingle et al., 2011; Kinley, 2015; Robles, 2006). This support could be creating the necessary conditions for PD to take place (Stoll et al., 2012) or providing adequate financial or time resources (Hill, 2008). Carlson and Gadio (2002) described how “administrators need to ensure that teachers have adequate time to participate” (p. 123), and should allocate budgets to support the cost of both PD and equipment to support the implementation of the PD.

2.7 Barriers

Alongside the potential effective factors noted in the literature, there were also a number of barriers to designing and implementing successful and effective PD. One of the biggest barriers highlighted by most literature was the demand, constraint and requirement of time. Specifically, a one-off workshop-style model proved ineffective (Paez, 2003; Dingle et al., 2011; Timperley et al., 2007; Robles, 2006; Glass & Vrasidas, 2007; Carlson & Gadio, 2002). Further to this, the literature recognised that when PD is not allocated sufficient time, or the PD is not sustained over an adequate amount of time, it can create a significant challenge to the efficacy of PD (Timperley et al., 2007). Glass and Vrasidas (2007) highlighted that “time is the biggest barrier” (p. 92). Similarly, Dingle et al. (2011) stated that “teachers may struggle if they do not have sufficient time to work with the practices” (p. 89).

There was also significant discussion in the literature about teachers' attitudes and beliefs towards PD (Gerstein, 2013; Dingle et al., 2011; Desimone & Stuckey, 2014; Gilmore, 2008; Hill, 2008; Deluca et al., 2012; Prestridge & Tondeur, 2015). Hindle et al. (2007) described "changing teachers' beliefs and teacher resistance as a difficulty" (p. 3). They further explain how some teachers were indifferent or "felt threatened by professional development" (p. 4). Hill (2008) explained how PD can sometimes force teachers to change and examine their deep-held beliefs and conceptions about teaching. Dingle et al. (2011) discussed the need for teachers to have a willingness to change and embrace new techniques. Deluca et al. (2012) reported that teachers may hold negative perceptions based on previous PD experiences they have had. On the contrary, Desimone and Stuckey (2004) explained how if the PD design and facilitator implementation fail to recognise that "teachers differ from one another in many ways … depending on their previous knowledge, their level of experience and other factors" (p. 5), then PD could have either no impact or a negative impact on teachers

Other barriers highlighted by the literature were the potential for parental community resistance (Goes et al. 2007) and organisational constraints such as timetabling and resourcing (Herro, 2015; Paez, 2003; Hill, 2008). Deluca et al. (2012) also mentioned how other school-wide priorities, such as assessment and events, can often impede on the energy and time needed to fully participate in PD. Finally, Kinley (2015) and Glass and Vrasidas (2007) discussed that PD that is focused specifically on tools or skills with no connection to the integration with teachers' programmes can have adverse effects on PD.

2.8 Summary

In summary, this literature review has considered literature from different areas of PD, but mainly within the context of e-learning or Digital Technologies. The review of the literature suggests many different factors that influence the efficacy of PD, which can be summarised as accountability, content and relevance, communities of learning and collaboration, and support and facilitation. Within these factors, there are variations of how each factor might be actualised, and this could potentially help or hinder the design and implementation of

successful and effective PD. Alongside this, the literature review highlighted some potential barriers to PD, such as time demands and pressures, teachers' attitudes and beliefs, and resourcing and organisational constraints.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This small study focused on teachers' perceptions of Digital Technologies PD conducted in a medium-sized primary school in a provincial town in New Zealand. It involved seven compulsory PD workshops and a further five optional workshops. This PD was preceded by an initial questionnaire investigating teachers' perceptions of their confidence, competence and knowledge in Digital Technologies, as well as their perceptions of the factors that make PD effective. After the PD, the initial questionnaire was followed up with two further questionnaires (the second and final). These questionnaires asked teachers how their perceptions about their confidence, competence and knowledge in Digital Technologies had changed due to the PD, and their perceptions of the factors that made the PD experience effective. The final questionnaire explored teachers' perceptions of the transferability and relevance of the findings from the research. Alongside these, semi-structured interviews were conducted with each participant after the PD to explore their perceptions further.

The study draws on a practitioner research framework and an interpretivist paradigm to investigate teachers' experiences of PD in Digital Technologies, to ascertain the key factors that influence the efficacy of Digital Technologies PD.

Three questions guided the study:

- What are the recommended factors for the design and implementation of effective PD as identified by the literature?

- What are teachers' perceptions of the key factors of the design and implementation process for effective PD in Digital Technologies for a New Zealand primary school?

- What are teachers' perceptions of the transferability and relevance of the findings for the recommended factors for effective PD?

3.2 Theoretical framework

My research is situated in an interpretivist paradigm: "the central endeavour in the context of the interpretive paradigm is to understand the subjective world of human experience" (Cohen, Manion & Morrison, 2007, p. 21). This paradigm best suited my study as I was aiming to capture the perspectives of the teachers who worked through my PD programme and the experiences I had as its designer and facilitator. This approach acknowledges a world where "reality is multilayered and complex" (Cohen et al., 2007, p. 21).

My study is a form of practitioner research, which can be defined as research done by practitioners themselves, usually with the aim of evaluation and improvement (Campbell & McNamara, 2004; Creswell, 2014). It is a "commitment to systematic questioning of one's own teaching as a basic development ... and to test theory in practice" (Stenhouse, 1975, p. 143), which (in this case) is my development as a PD designer and facilitator, and examines the teaching of teachers. I will be working to make improvements in how Digital Technologies PD is designed and implemented in one New Zealand primary school, with the overall aim of providing insights into how the findings might transfer into other New Zealand primary school. This aim aligns with Menter, Elliot, Hulme, Lowden, and Hall (2011) who emphasised assessment and improvement as a key component of practitioner research.

Similarly, an action research framework underpinned this research. I was an employee in the context I carried out my research in, with my goal being to contribute to the profession, both inside and outside of my school. Stenhouse (1979), quoted in Busher and Harris (2000), argued that action research should "contribute not only to practice but to a theory of education and teaching which is accessible to other teachers" (p. 143). This concept is explored in research Question Three. As I had ongoing access to the site, positive relationships and a level of trust amongst the participants, it was best suited for me to carry out an action research model. Potential drawbacks of this method included the possibility that participants did not genuinely share their experiences, as they might not want to hurt my feelings, and also my personal biases.

Coleman, Lumby, and Middlewood (1999) emphasised the importance of the researcher's unique role in the project "where the researcher does not maintain a distance but seeks involvement leading to mutual learning and understanding" (p. 9). Therefore, I too was part of the research as I evaluated and critiqued my actions as a leader in making decisions about the design of the PD and sharing the findings. Similarly, Cohen et al. (2007) commented on how "participatory action research does not mean that all participants need to be doing the same. This recognised a role for the researcher as facilitator, guide, formulator and summariser of knowledge, raiser of issues" (p. 301). A participatory action approach allowed me to take on the role of PD facilitator and the teachers to take on the role of participants in the PD.

3.3 Participants

All 13 teachers at the school took part in the seven compulsory PD sessions as expected by the principal and management. The option was then offered to all teachers involved to become a participant in the study. The potential participants were invited to a meeting where the involvement and requirements of the study were discussed. They were given information sheets, consent forms and five days to consider and return the signed forms to ensure that participation was voluntary. If a teacher did not want to be a part of the study they did not need to return the forms by the designated date. Eleven out of 13 possible teachers opted to take part in the study. Once participants were confirmed, they were assigned pseudonyms to

protect anonymity. Consent and participant information sheets are included in this thesis as Appendix A. Participants were notified of the right of withdrawal, which allowed them to withdraw from the study up until the data analysis was undertaken. I advised participants of this closing date in an email, which gave them one weeks notice of the final withdrawal date.

3.4 Procedures

First, I met with the school leadership team to discuss the school's Digital Technologies vision, learning goals and PD opportunities for staff for the upcoming year, as per my job role. We discussed how the PD would align with the school's goals and also the possible timeline of the PD.

My next step was to design the PD for implementation. I consulted the literature to find out what research and other sources said about which factors make for effective PD in Digital Technologies and looked at other PD topics such as mathematics and assessment as documented in the literature review. I then consulted participants, using the first questionnaire (Appendix B), to gain an understanding of how they felt their knowledge, competency and confidence rated in reference to Digital Technologies. In addition, they were asked to rank a given list of factors (in Appendix B) they believed would support their learning and that should be incorporated into the PD to make it effective, as well as to add any comments or suggestions in relation to this. I synthesised and used these initial findings from the questionnaire and the literature to design and plan the PD. I went back to the leadership team to present my findings and the PD plan. They supported my idea to dedicate some of the fortnightly staff meeting time for the PD, as suggested by participants and literature.

I implemented seven fortnightly 20-minute PD sessions into our compulsory staff meeting with a focus on the Digital Technologies Curriculum. I also offered five optional sessions called 'Techie Breakies' which were 30-minute sessions before school on the alternate weeks, which focused on digital fluency and the use of technology tools. Participation in these varied but on average there were 5 or more participants at each Techie Breakie.

After all the PD sessions and workshops were complete, I distributed the second questionnaire (Appendix C), which was identical to the initial questionnaire. This time the questionnaire attempted to measure the participants' change in perceptions of their own knowledge, competence and confidence in Digital Technologies as well as the factors that did support and enhance the efficacy of the PD for them. Following this, I interviewed all participants about their experiences. Each interview lasted approximately 10-15 minutes at a time and location of the participants choosing. The participants were asked to elaborate on the factors they found effective and why, as well as any other comments or experiences they would like to share related to the PD. The questions for these interviews are attached in Appendix E.

Early the following year, I distributed a final questionnaire which investigated perceptions of the transferability and relevance of the findings for the recommended factors for effective PD. I asked participants if they believed the findings were worth sharing, how they would suggest I could share the findings with the wider education community, and whether they believed that other educators should participate in this PD (see Appendix D).

Following this collection of data, I was then able to analyse the data, re-consult the literature and write the thesis, as well as plan out ways I could share my findings based on the participants' suggestions.

3.5 Instruments and data collection

Qualitative researchers "typically gather multiple forms of data, such as interviews, observations, documents, and audiovisual information rather than rely on a single data source. Then the researchers review all of the data, make sense of it, and organise it into categories or themes that cut across all of the data sources." (Creswell, 2014, p. 238). The instruments used to collect data to address the research questions and aims were interviews and questionnaires. The initial questionnaire was given to participants before the PD workshops commenced. The second questionnaire was given after the PD workshops. The final questionnaire pertaining to the last research question was also distributed after the PD workshops. Whilst these questionnaires collected data in a quantitative form, the comments

section on all questionnaires allowed participants to give further information about their opinions and experiences. The interviews were conducted after the PD workshops and after the second questionnaire was completed. The combination of these instruments resulted in both quantitative and qualitative data. Coleman et al. (1999) recommended this approach describing a “flexible approach to gathering data” which involves “complementing a questionnaire, with a more in-depth qualitative research approach. For example, the combination of a... questionnaire with detailed semi-structured interviews might provide an opportunity of obtaining a large amount of quantitative data, as well as rich qualitative data” (p. 12).

3.5.1 Questionnaires

The advantages of a questionnaire, as explained by Cohen et al. (2007), are the reliability of data and as it is not face-to-face it can encourage participants to be more honest. It is also time-efficient. However, some disadvantages can be missed questions, misinterpretation of questions without an avenue for clarification, or misinterpretation of responses by the researcher (Mehra, 2002; Hinds, 2000). The questionnaires aimed to investigate teachers’ experiences of the PD and the effect on their competence, confidence and knowledge. The final questionnaire aimed to investigate the perceptions of the transferability and relevance of the findings for the recommended factors for effective PD. The initial, second and final questionnaires are included in this thesis as Appendices B, C and D, respectively.

The initial questionnaire was administered to gather an understanding about research Question Two of this study: “What are the key factors of the design and implementation process for effective PD in Digital Technologies for a New Zealand primary school?” This enquired into the teachers’ current perceptions about factors that made for effective PD. Additionally, this questionnaire also sought to measure and assess their current capabilities and confidence in Digital Technologies. The questionnaire was composed of four questions that required the participants to rank their digital understanding, confidence, competence and fluency on a scale of 1-5 (1 being the lowest and 5 being the highest). Further to this, participants were asked to rank 15 different factors that were identified by the researcher

from the literature as having contributed to effective PD. Participants were asked to allocate a 1, 2, 3 (1 being no impact to 3 being high impact) based on their personal perception as to whether the factor or element would support them in the Digital Technologies PD context. This questionnaire data was also used to guide me in the PD design and implementation.

The second questionnaire contained the same questions as the first questionnaire and was distributed after all PD sessions in order to record any changes in teachers' perceptions of questions asked in the first questionnaire. This allowed for a direct comparison, as suggested by Hinds (2000) between the data in the first questionnaire and second questionnaire. Further to this, several months after the PD conclusion, I distributed a final questionnaire which addressed research Question Three: "What are teachers' perceptions of the transferability and relevance of the findings for the recommended factors for effective PD?" Participants were asked to rank the value of the findings of this study on a scale of 1-3 (1 being not useful, 2 being somewhat useful, and 3 being very useful). This questionnaire also asked participants to suggest ways, formats or avenues through which I could share these findings with the educational community, the overall efficacy of the PD, and whether or not they believed other teachers would benefit from this PD.

3.5.2 Semi-structured interviews

Drever (1995) described semi-structured interviews as a flexible tool, useful for small-scale studies. Semi-structured interviews allow for flexibility in terms of asking open-ended questions, varying the order of questions, and allowing for clarifying and delving deeper into points of interest. Interviews are "intended to elicit views and opinions from the participants" (Creswell, 2014, p. 239). Therefore, the interviews I conducted sought to investigate the experiences of participants and their perceptions about effective PD and the factors that contributed to this. During the interviews, participants were asked to give their experiences and opinions about factors on the questionnaires, as well as further comments on their experiences of the PD. The interviews aimed to inform research Question Two of this study: "What are teachers' perceptions of the key factors of the design and implementation process for effective PD in Digital Technologies for a New Zealand primary school?" The questions in the interviews were on the topic of some key factors that emerged from the second

questionnaire and literature asking participants to unpack why they thought these were important and any further insights into these factors.

Consideration was given to the participants' busy schedules, so I aimed to keep the interviews succinct as well as allowing participants to choose the time and location of the interview as suggested by Bell (2010). Interviews were audio-recorded as a preference in order for me to be able to focus on the flow of the interview and ensure it would be recorded accurately (Cohen et al., 2007). To the best of my ability, I tried to keep biases towards the opinions of participants as neutral as possible in order to record ideas without bias. Cohen et al. (2007) emphasised that bias could be a disadvantage when using interviews as a research tool. It was even more imperative to be mindful of this considering my position in having formed collegial relationships with the participants before the study. Interviews were then transcribed by me, word for word, and then, as suggested by Creswell (2014), this was made available to the participant to check and read for accuracy.

3.6 Data analysis

Both qualitative and quantitative data were collected and then subsequently analysed. Cohen et al. (2007) stated that qualitative data analysis involves "in short, making sense of data in terms of the participants' definitions of the situation, noting patterns, themes, categories and regularities" (p. 461). Meanwhile, quantitative data deals with "numbers and anything that is measurable in a systematic way of investigation of phenomena and their relationships" (Perumal, 2014, p. 88), but according to Bryman (2012) both methods are about searching for and making sense of patterns.

3.6.1 Questionnaire data analysis

After the completion and collection of the first questionnaire, data pertaining to teachers' perceptions of confidence, competence and knowledge was organised into a table. The grid view allowed for trends and patterns to be identified and participants' responses to be compared. The data gathered at this stage was used to inform the planning and

implementation of the upcoming PD and was then used for comparison with the end of PD data.

After the completion and collection of the second questionnaire, the data from this was then added alongside the first questionnaire responses. I calculated an average change in score for each participant. Following this, I searched for major number changes, or negative changes, or no changes as points of interest. Alongside this, I used the average scores to allocate participants into a group according to their self-identified ability, and this allowed me to see patterns and shifts as a result of the PD. Then the comments were analysed using the same coding method as the interviews but initially, these comments were used to guide, plan and reflect on the PD.

The second part of both questionnaires pertained to the ranking of 14 factors as identified from the literature as being important factors for effective PD. These rankings were analysed to look for any notable or unusual changes in the rankings. The ranking scores were then added, and the average rating of each element was found and then compared with the initial and end results.

The final questionnaire sought to address research Question Three: “What are teachers’ perceptions of the transferability and relevance of the findings for the recommended factors for effective PD?” The data was analysed by creating a summary of the responses in a graph form, and the open questions were recorded in a table and answers grouped into categories that were similar in theme. For each questionnaire, a summary of the findings was then written.

3.6.2 Interview data analysis

I used a thematic analysis approach to analyse the collected data. Braun and Clarke (2006) describe a theme as “something important about the data in relation to the research question and represents some level of patterned response or meaning within the data set” (p. 10). After transcribing the interviews from the audio-recordings, I spent time thoroughly reading through all interview transcripts and also re-listening to the audio-recordings to get a sense of

the interviews as a whole, as suggested by Byrne (2017). I then followed Braun and Clarke's (2006) six-phase framework (set out below), noting that it does not always follow a linear pattern.

Phase 1: Familiarising yourself with your data
Phase 2: Generating initial codes
Phase 3: Searching for themes
Phase 4: Reviewing themes
Phase 5: Defining and naming themes
Phase 6: Producing the report.

After coming up with over 60 possible codes from the interviews, which highlighted repeated words, ideas or interesting comments, I sorted them into potential overarching themes in a table. As Braun and Clarke (2006) suggested, "It may be helpful at this phase to use visual representations to help you sort the different codes into themes" (p. 19). For example, data relating to 'increments', 'bit by bit', 'broken down', 'manageable steps', 'manageable chunks', 'providing a starting point', and 'having structured time to play and trial' were grouped to form the overarching theme of 'Structure'. Then quotes from individual participants relating to each theme were grouped into the overarching themes, and also separated to have one page of quotes from each participant broken into the overarching themes to get an overall sense of how the thematic data of each participant could be related.

Following this, these documents were printed and re-read to look for links and relationships. The aim was to categorise data into significant themes related to the purpose of the study and answer the research questions. Alongside this, another aim was to highlight the links between the literature review and findings in the data.

The findings were eventually put into five key themes: Accountability, PD Content and Relevance, Collaboration and Support, Structure and Time. Most of the data fell into one or more of these categories. There was some cross-over between certain responses that linked to more than one category, often for differing reasons. These categories were then analysed for the writing of the results chapter.

It is also important to note that the interview data and the comments section of the questionnaire data were also coded and viewed qualitatively together to ensure that the data was viewed as a whole. Cohen et al. (2007) warned that “the great tension in data analysis is between maintaining a sense of the holism of the interview and the tendency for analysis to atomize and fragment the data” (p. 368). Therefore, it was important to keep revisiting and re-reading the interviews, questionnaire comments and subsequently reviewing and refining the codes to ensure I was focusing on the study as a whole and consistently relating it to my research questions.

3.7 Validity and reliability in mixed-methods research

It is important to consider the validity of the tools used in the research. Bryman (2012) referred to validity as the “issue of whether an indicator (or set of indicators) that is devised to gauge a concept really measures that concept” (p. 171). Both questionnaires and interviews allowed for both quantitative and qualitative data to be captured, centred around the research questions. I thought carefully about the wording and planning of these questionnaires and subsequent interviews and also consulted with the school's senior management team and my supervisor. This consultation helped ensure that the instruments used would provide the data needed to answer the research questions and also best fit the context in which I was researching.

Reliability refers to the “consistency of a measure of a concept” (Bryman, 2012, p. 169), meaning researchers must examine how the instruments used to collect data are consistent and relate to the aims and questions of the study. For the questionnaires, I used a Likert scale with an explanation of the meanings, e.g. “1: very low understanding/very low confidence” to “5: very confident/high level of understanding”. I also provided definitions of keywords in the questionnaire, e.g. “Competence: your own personal skill level of how you use and implement digital tools and ideas”. This provided significant stability in the research, as the questions and definitions of the key terms were identical in the first questionnaire at the start of the PD and the second questionnaire at the end of the PD. These definitions are

on the questionnaires attached in the Appendices. Also, alongside this, it is important to keep in mind that “although reliability and validity are analytically distinguishable, they are related because validity presumes reliability” (Bryman, 2012, p. 173).

When considering the interviews as a tool, and the data from those interviews, there is always the possibility of researcher bias when conducting interviews. Cohen et al. (2006) discussed that “we, as researchers, are part of the world that we are researching, and we cannot be completely objective about that; hence other people’s perspectives are equally as valid as our own, and the task of research is to uncover these” (p. 134). The main steps I took to mitigate this risk was to have questions to structure the interview and to follow during the interview. I also tried to keep the questions neutral, i.e. “What was your opinion of the action research component of the PD?” as opposed to “Did you find the action research component helpful?” I also audio-recorded and transcribed interviews word for word in order to minimise the risk of misinterpreting, or mishearing, or forgetting participants’ responses.

Bryman (2008) examined external validity and questioned the extent to which the findings of the research can be generalised to contexts outside the study context. The use of the literature findings as a starting point garnered many different perspectives and factors from previously researched PD. This meant that the factors I based my study and PD design and implementation on were in line with the current body of research and knowledge of effective PD practice. Part of my study and research was to gain teachers’ perspectives on the transferability and relevance of the study's findings in order to add to the body of knowledge and research in this area. Due to the small nature of the research in one school context, it is important to consider whether the findings would be valid in another school context. Whilst Mutch (2005) argues that it is not possible to replicate a study in another environment and achieve similar results, I hope to add value to the pool of research and knowledge about teacher PD and more specifically in a New Zealand primary school context.

3.8 Ethical issues

As with any research involving human participants, there must be ethical consent from them and ethics approval granted by Unitec. There are several issues I needed to consider at all stages of this research (Creswell, 2014; Bryman, 2012).

3.8.1 Access and permission

It was recommended by Cohen et al. (2011), Creswell (2014), and Mutch (2005), to have permission granted to gain access to the research site by a person of authority. As I am a member of the staff on the site, with access to it and to the participants by default, before carrying out practitioner research, I felt it imperative that I seek permission from the principal and senior leadership team. It was important that they fully understood what it would entail, so they could decide whether it would be appropriate for the staff to have the opportunity to take part in the study.

Another ethical aspect I needed to consider was participant consent and understanding. Mutch (2005) stated that “participants in your research should be fully informed about the purposes, conduct, and possible dissemination of your research and should give their consent to be involved” (p. 78). It was important that participants knew it was voluntary to be a part of the study and also what was involved. In order to ensure possible participants were fully informed, I held an information meeting, handed out hard copies of participant information (Appendix A), and gave them the opportunity to ask any questions as well as time (five days) to consider it. I also offered a withdrawal clause which allowed participants to withdraw, even after agreeing to be a part of the study, up to a specified date. There was also a process that participants could follow for dispute resolution, which involved meeting with and notifying the principal if there were any concerns, and this was offered throughout the research process.

3.8.2 Confidentiality and anonymity

Due to the small size of the study, confidentiality and anonymity were of ethical concern. Confidentiality can be defined as preventing the identification of individuals in order to protect their privacy (Bryman 2012), whilst anonymity refers to where no one (not even the researcher) can identify the participant (Cohen et al., 2011). In my research, I was unable to guarantee full anonymity, but all efforts were made to ensure the confidentiality of the participants were protected.

Participants were asked to choose a pseudonym to use for all aspects of the study. This was known to me as the researcher so I could compare data from the questionnaires. However, the pseudonyms were not known to other participants, and steps were taken to ensure the pseudonyms and any identifiable traces were not able to be linked to the identities of the individuals. Participants were also informed that whilst there would be no names or traceable details that would make them individually identifiable, there would always be the risk that because my name would be on the thesis links could potentially be made to the school.

Due to using interviews as a tool, it was not possible to keep them anonymous, but I was able to keep them confidential. I did this by using the pseudonyms chosen by the participants and shortened them to initials to make them less identifiable. Also, I did not discuss participants' responses with other staff members. Cohen et al. (2011), and Bryman (2012), suggested that participants have the opportunity to check and validate their responses before the information is used. I did this for all participants' interviews and questionnaires and made sure they had an opportunity to have a copy of all of their questionnaire and interview responses. Another way to ensure confidentiality was to remove any other identifying factors that participants referred to in their interviews, such as class numbers or the names of other teachers.

3.8.3 Conflicts of interest and bias

As the researcher and facilitator of PD, there was a potential conflict of interest and a possibility that my perspective might be biased. Mehra (2002) stated that “personal beliefs and emotions can't always be kept aside when engaging in qualitative research projects” (p. 12). In order to mitigate this risk, the data was looked over by my supervisor to check for any potential bias and for guidance in avoiding bias. Alongside this, the data could potentially reflect on my professional status as a facilitator, positively or negatively. The participants knew that I wanted the PD to be successful, and as we are colleagues with good working relationships, they may have wanted to avoid hurting my feelings or giving critical feedback. Therefore, it was important to consult my supervisor to ensure that the risk to myself and the validity of my research was minimised. As I am not in a position of senior leadership, and do not have any role in performance or pay reviews, this harm was also minimised. I made it clear to participants that my research was about finding the best outcome for teachers and I was interested in any outcome. I also made sure to double-check my assumptions personally and with my supervisor, as recommended by Mehra (2002).

CHAPTER FOUR: PROFESSIONAL DEVELOPMENT WORKSHOPS

4.1 Planning and design of the PD workshops

In my role as Digital Technologies leader, I needed to provide professional learning on the Digital Technologies Curriculum and digital fluency skills to support and grow teacher capacity in this area. All sessions were to be implemented and facilitated by myself.

Through teacher feedback and findings from literature, I was able to gain insight into what factors I needed to use to maximise the potential efficacy of the PD. The content was derived from conversations with teachers, teacher surveys, the school’s vision and personal experience and knowledge. The workshops aimed to enhance teacher capability, confidence

and knowledge about the Digital Technologies Curriculum and digital fluency as it related to their workflow and use in their teaching and learning programmes.

4.2 Explicit factors used in the PD

The factors that I explicitly used in the design and implementation processes were: hands-on activities, a step-by-step structure, a blended learning approach, using existing school structures to embed the PD (such as using staff meeting time and assemblies to promote Digital Technologies), linking to relevant goals and visions (such as the implementation of the Digital Technologies Curriculum in 2020), an action research framework, a template for reflection and planning, discussions within the PD sessions, a recognised accreditation certificate, the use of buddies, consultation with senior leadership and teachers to get a shared understanding and input into the PD to suit the needs of the teachers, introducing activities teachers could use in their classroom, and sending out communication to remind teachers of expectations and timeframes.

4.3 The PD workshops

I implemented seven fortnightly compulsory staff meeting sessions and offered five optional sessions. Compulsory PD sessions were approximately 20-30 minutes long and embedded into an already scheduled staff meeting time. The optional sessions were 30 minutes, took place in the mornings before school and as mentioned were called Techie Brekkies. The workshops were designed around teachers' suggestions, findings from literature, and recent developments in education technology research.

Table 1

Schedule of the PD Sessions

Schedule of PD Sessions		
	Compulsory PD Sessions	**Optional PD Sessions**
Week 1	Digital Curriculum- the Why and What	
Week 2		Seesaw: Beginners guide
Week 3	Digital Passport: Computational Thinking Part 1	
Week 4		Seesaw: Activities and beyond
Week 5	Digital Passport: Computational Thinking Part 2	
Week 6		Hapara: Teacher Dashboard 101
Week 7	Digital Passport: Designing and Developing Digital Outcomes	
Week 8	Let's Play! Rotation	Google Docs: Tips and Tricks
Week 9	Action Research- what might this look like in the classroom?	
Week 10		Google Forms: Collecting feedback and student snapshots
Week 11	Action Research sharing back and thinking forward	

Compulsory Session 1: Digital Curriculum- The Why and What

Aim of the session: For teachers to understand why the Digital Technologies Curriculum is important in education and to understand its two strands.

Overview of the session: I discussed and shared key findings from recent research about the need for students to learn and engage with Digital Technologies in the context of the way technology is used in our world today and the future of jobs. Then teachers explored the new progress outcomes of the new Digital Technologies Curriculum, unpacking the vocabulary

and then signing into the online learning platform ‘Digital Passport’ through the MindLab (2018).

Compulsory Session 2: Digital Passport - Computational Thinking Part 1

Aim of the session: For teachers to understand the first progress outcome ‘Computational Thinking’ in more depth and explore examples and activities teachers could use in the classroom.

Overview of the session: The group watched a short video from the Digital Passport. I then supplemented with discussions, resources and examples. Teachers engaged in some activities that could be used in class as examples of how to teach computational thinking such as the ‘hot dog coding game’.

Compulsory Session 3: Digital Passport - Computational Thinking Part 2

This session was a continuation of the previous session with the same aim.

Overview of the session: Teachers brainstormed and discussed possible ideas for the classroom in different curriculum areas such as maths and literacy. Teachers explored and trialled using a robotic mouse, which is designed to teach young students computational thinking, as well as using the online coding platform ‘Scratch’.

Compulsory Session 4: Digital Passport - Designing and Developing Digital Outcomes

Aim of the session: For teachers to understand the second progress outcome ‘Designing and Developing Digital Outcomes’ in more depth and explore examples and activities teachers could use in the classroom.

Overview of the session: The group watched a short video from the Digital Passport, which I supplemented with discussions, resources and examples. Teachers discussed and unpacked Ministry of Education exemplars and made links to current classroom practice.

Compulsory Session 5: Let's Play! Rotation

Aim of the session: To introduce teachers to a range of tools that could be used to teach the Digital Technologies Curriculum.

Overview of the session: Teachers watched an initial demonstration of how to use a Makey Makey to create a piano out of bananas and playdough. Teachers had the opportunity to rotate through a series of hands-on activities such as Ozobots, Scratch, Makey Makey and the robot mouse.

Compulsory Session 6: Action Research - What Might this Look Like in the Classroom?

Aim of the session: To pull together all of the last five session's learning and discuss how it might look in each teacher's classroom. Teachers had to plan an action research to complete.

Overview of the session: Teachers worked in buddies to complete their action research plan to implement in their classroom. There was discussion, sharing and feedback given between teachers, buddies and me.

Compulsory Session 7: Action Research - Sharing Back and Thinking Forward

Aim of the session: To reflect and share back on the action research teachers had trialled in their classroom, and to discuss and brainstorm our whole school approach for the Digital Technologies Curriculum in the following year and beyond.

Overview of the session: Teachers discussed the action they had completed in their classroom. They reflected and shared on what went well and what they would change and how it related to the Digital Technologies Curriculum. We then discussed "where to next?" and "what will the Digital Technologies Curriculum look like at our school for next year?"

Optional Session 1: Seesaw - Beginners Guide

Aim of the session: To introduce teachers to the basic features of the online learning journal portfolio, Seesaw.

Overview of the session: Teachers were shown and had the opportunity to create their classes on Seesaw and to explore how to sign in. I set up a simulation where teachers had to log-on like a student and post something to see what it would be like from the students' side. Then we explored the teacher interface and how to approve posts and navigate the site. Time was made for questions and discussion.

Optional Session 2: Seesaw - Activities and Beyond

Aim of the session: To introduce teachers to some more features of the online learning journal portfolio, Seesaw, such as the Activity Library.

Overview of the session: Teachers were shown, and had the opportunity to explore, the Activity Library, learn how to save and make activities, and assign activities and review them. I set up a simulation where teachers experienced both the student and teacher interfaces for activities.

Optional Session 3: Hapara - Teacher Dashboard 101

Aim of the session: To introduce teachers to some features of the Hapara Dashboard.

Overview of the session: Teachers were shown and had the opportunity to explore the Hapara Dashboard settings and features with support from me, and had opportunities to ask questions and discuss.

Optional Session 4: Google Docs - Tips and Tricks

Aim of the session: To share some time-saving tips and tricks when using Google Docs.

Overview of the session: Teachers were shown and had the opportunity to learn how to make hyperlinks within a Google Doc in their planning, understand different sharing settings, and

how to organise Google Docs on their Drive with support from the me. They also had opportunities to ask questions and discuss.

Optional Session 5: Google Forms - Collecting Feedback & Student Snapshots

Aim of the session: To learn how to create Google Forms.

Overview of the session: Teachers were shown and had the opportunity to learn how to make a Google Form to send to parents to collect information and permission for school trips. They explored how to collate and sort the data on a Google Sheet. They learned about the settings and sharing permission on the Google Form and Sheet. They also were shown an example of how I used Google Forms in the classroom to survey student understanding and group students into reading workshops. They had support from me and opportunities to ask questions and discuss.

CHAPTER FIVE: RESULTS

5.1 The initial and second questionnaires

The initial questionnaire, as described in the methodology chapter, was administered at the beginning of the PD to gather data about participants' initial perceptions of their Digital Technologies confidence and competencies, as well as their opinions on what factors would support them in the upcoming PD. This is represented by the data in the 'start' row. The second questionnaire was administered at the end of the PD to gather data on how their perceptions of their own Digital Technologies confidence and competencies had changed in regard to the PD experience, as well as any factors that they felt best supported them in the PD. This data is represented in the 'end' row.

Table 2

Questionnaire results 1. Raw Data.

NAME *experienced teacher refers to more than 5 years of teaching experience		**Rate your understanding of the new digital technologies curriculum**	**Rate your confidence in digital teaching and learning**	**Rate your competence in digital teaching and learning**	**Rate your digital fluency**	**Overall combined score**	**Comments** **Start**: Are there any other suggestions, comments, or ideas that you have the will support you best during the next phase of digital professional development? Are there any other suggestions, comments, or ideas that you have that will make the PD more effective during the next phase of digital professional development? **End:** Are there any other suggestions, comments about what has best supported you during the PD this year with Toni? Are there any other suggestions, comments about what has made the PD more effective during the PD this year with Toni?
RB Male Teacher Experienced	Start	1	1	1	2	5	-
	End	2	2	3	3	10	Really enjoyed makey makey session- a great hands on session- any activities we could take back and do with our own class was really helpful You were really motivating and have been consistent with all the help you have given. Techie breakies, staff meetings and the ideas you've emailed us have been great. I like the idea of hardcopy notes for an activity just as a reminder for activities if something goes wrong.
SO Female Y1 Teacher	Start	1	1	1	2	5	Having a 'go to page' to ask questions. Check points with a deadline to keep me on track
	End	5	5	4	4	18	Open conversations, ok to take it at my level Toni is always available. She models the Digital Curriculum all the time. Helps problem solve. Gives clear steps for all abilities to follow. Toni has made everything simple and easy to understand.
EM Male Experienced Teacher	Start	2	4	3	5	14	Hands on practical activities that I can use with my class works best for me
	End	3	4	4	5	16	Incidental learning opportunities where I have learned from a more experienced user of technology (Toni) Eg learning about google site and google forms. I feel that Toni has upskilled me through leading by example. I have seen wheat she is doing with her class and in most cases have wanted to use the same concepts with my class. Her enthusiasm and her own practice have helped motivate me.

DB Female Experienced Teacher	Start	2	3	3	3	11	"Must dos" , having to get stuck in, try it out and report back Getting hands on and familiar with resources we can use in class
	End	4	4	4	4	16	Your passion, availability to help and offer support. THe staff meeting focus assured completion and doing it together. The action research made it happen. There is time to understand and practice before implementation. Your high energy approach and provision of hand on resources.
CK Female Experienced Teacher Senior leadership	Start	1	3	3	4	11	Practical ideas to integrate the new curriculum EG. literacy during procedural writing. More ipads, robotic mice for all classes, ongoing PD and tasks to follow up.
	End	4	3.5	4	4	15.5	The fact that it is going to be an essential part of the programme in 2020 is very motivating!
JA Female Experienced Teacher Senior Leadership	Start	2	3	3	3	11	Having skills introduced then using them right away to reinforce! This worked really well with google forms. Seeing examples of learning activities. Trialling new ideas with my class. Knowing its manageable eg having the digital award focus. Not doing too much too quickly- learning in manageable 'chunks"
	End	4	4	3	4	15	Toni's enthusiasm and the expectation that we follow up and complete tasks on the digital passport. Whole staff had the same expectations of them. The practical sessions where motivating we could see how the kids would be motivated. Toni also had considerable expertise which gave me confidence to ask questions. Toni's approachability and positive manner and positive response to questions.
DP Female Experienced Teacher	Start	1	2	2	2	7	Have been really impressed with how easy it has been. Maybe a buddy within the school to collaborate /share some ideas with. Loved that we got a certificate- recognition. An en product.- posting on Seesaw etc.
	End	3	4	3	3	13	Doing as a team and within staff meetings. Techie breakies were good- sorry I didn't attend them all sometimes there were 'pitched' at a senior level. The way you accepted where we were at. We weren't judged for not knowing-open to questions. The hands-on activities were great.
BJ Female Experienced Teacher	Start	1	2	2	2	7	Buddy teacher- excellent idea- or like try one new thing a week. Having resources- EG: more ipads to use for class sessions. Great job toni- support is wonderful.
	End	4	3	3	3	13	Toni- you were a star-and made it all happen- thanks. Ipads- class set or a pod so I can book the pod for a certain time. Also by making it more explicit means there's no excuses, like it actually happens- like PE or assembly.

AG Female Experienced Teacher	Start	2	3	3	3	11	No comments made
	End	4	4	4	4	16	The 'hands on' activities introducing what is available. Ongoing advice and ideas through the year when things become available ef Digi breakouts and the Seesaw library. Tonis enthusiasm and attitude is transferable to everyone. She chooses ideas we can all try and that the children will enjoy. I am certainly more confident and eager to try more.
RM Male Experienced Teacher Senior leadership	Start	1	3	2	3	9	Dedicated time to discuss and learn Looking art explanles of implementation in schools
	End	3	4	4	4	15	n/a (DIDN'T FILL IN BACK SIDE OF SHEET)
JC Female Experienced Teacher	Start	1	2	2	2	7	Having Toni come in to our class to demo digital stuff would be great Having more hands on PD sessions
	End	3	3	3	3	12	Great to have techie brekkie with Toni to go over Seesaw- lots of great new ideas. Was very beneficial to have Toni come in to model how to use seesaw with the class. She showed me things I hadn't yet done which was great. Having Toni do PD at staff meetings and making them hands on so we could have a go and know what to do, so we could then teach it. Knowing that Toni was there for us to answer any questions.

5.1.1 Shifts in participants' confidence, competence, knowledge and understanding

As shown above, all participants' scores showed they had ranked themselves lower overall at the beginning of the PD and higher at the end of it. One participant shifted their confidence and competence by 13 points from the start of the PD to the end and this was the greatest shift. The lowest participant shift was a score of 2 points. The average shift across all participants was 5.5 points, which shows that all participants felt they had improved in response to the PD.

Out of a possible maximum allocation of 20 points, the table below summarises the number of participants who fell between certain ranges on the scale before the PD and after it. It shows that all participants, except JA, went up at least one ability bracket. When comparing

JA's change in scores, it moves from 11 initially to 15 at the end of the PD, which still shows a significant shift within a single bracket.

Table 3

Participant shifts in Digital Technologies confidence, competence, knowledge, and fluency.

Overall Participant shifts for confidence, competence, knowledge, and fluency					
		0-5- *Emerging*	6-10- *Developing*	11-15- *Advanced*	16-20- *Proficient*
Before	**Specific participants:**	RB, SO	DP, BJ, RM, JC	EM, DB, CK, JA, AG	
	Total no of participants:	2	4	5	0
After	**Specific participants:**		RB	JA, DP, BJ, RM, JC	SO, EM, DB, CK, AG
	Total no of participants:	0	1	5	5

Whilst all participants increased in their overall scores, some participants in some specific areas showed no increased shift. For example, CK noted no increase in her digital fluency, which remained at 4. JA noted no increase, with her competence in digital teaching and learning remaining at a 3. Similarly, EM noted no shift in his confidence or digital fluency remaining at a 4 and 5, respectively. When examining this lack of increases, it is clear that these participants ranked themselves highly in these areas initially (either a 3, 4 or 5), which is towards the "very high level of confidence and understanding" end of the scale. Overall, each of these participants did make increases in other areas of digital teaching and learning, such as their understanding of the Digital Technologies Curriculum.

Interestingly, participants' understanding of the Digital Technologies Curriculum was the lowest-rated area. All participants rated themselves either a 1 or 2 initially, signalling a very low understanding of Question 1, which referred to their understanding of the Digital Technologies Curriculum. In other areas, the participants' responses varied with a ranking of 1, 2, 3 or 4. Only one participant, EM, ranked themselves a 5 for one question of the questionnaire (digital fluency).

5.1.2 Comments and suggestions from the first questionnaire

The comments had some striking similarities in terms of what they wanted the content of the PD to be e.g. having “hands-on activities” was a factor that was recommended by three participants. Similarly, a number of participants suggested having factors that involved an action such as “checkpoints” (SO), “tasks to follow up” (CK), “trialling new ideas with my class” (JA), “try one new thing a week” (BJ), and “must-dos, having to get stuck in, try it out and report back” (DB). This emphasised that teachers wanted something to take away and do with their classes outside of the dedicated PD time. In addition, five participants expressed that they wanted activities that were “practical ideas” (EM & CK) and “examples of learning activities” (JA) they could “use in class” (DB). This helped inform me about what to include in the PD.

Another important suggestion was having a buddy or collaboration partner or group as part of the PD. DP mentioned she would benefit from “a buddy within the school to collaborate/share ideas with”, which was also supported by BJ. This idea of collegial collaboration was echoed by RM, who thought “discussion” was important. Two participants shared their need for more resources to support their learning, such as more iPads in the classroom.

5.1.3 Comments and suggestions from the second questionnaire

Similar themes emerged in the second questionnaire that were discussed in the first, such as practical resources and hands-on sessions as emphasised by four participants. On a similar thread, three participants highlighted that having activities to take back and do with their class was important. The frequency of these two factors being mentioned increased from the first questionnaire to the second questionnaire. There were six indications of factors that related to collegiality, including DB and DP stating how “doing it together” and “doing it as a team” was important.

A factor that was not raised in the first questionnaire was the qualities the I, the facilitator, had. Many participants remarked that the “enthusiasm” (EM, JA, AG) of the facilitator was

important and also their “passion” and “high energy” (DB). JA described “approachability and positive manner” as motivating and supportive. Similar to this, two participants detailed facilitator availability to help (DB, SO, RB) was crucial and the importance of “open communication” (SO), and being able to ask questions (DP, JA). This data is further synthesised and discussed in the collaboration and support chapter with the interview data.

In terms of the types of sessions, the use of staff meeting time was commented on as a positive factor by five participants, with JA noting that it meant all staff had the “same expectations”. Three participants also recognised the opportunity of the optional Techie Brekkies as a useful professional learning time.

A thread that continued through both questionnaires was accountability. In the initial questionnaire the need for some sort of “follow-up” was noted by six participants, and in the second questionnaire five participants continued to emphasise the importance of needing to “follow-up and complete tasks” (JA). Similarly, DB described how the “action research made it happen”.

Other factors that emerged about the PD was that it was relevant, easy to understand, that they had time to understand and time to process new learning. Participants also made some suggestions that could have been helpful in the PD such as a “go-to page” to ask questions (SO) and “hardcopy notes” (RB), as well as some more modelling in participant classes. Two participants commented on the need for more devices in their classrooms.

5.1.4 Ranking of the factors

Further to this, participants were asked to rank factors that had been identified from the literature as being of potential importance to teachers for effective PD. This data was used for both research purposes, and to also give myself as the designer and facilitator of the PD programme some guidance on what the teachers would like to see in their PD programme. The table below shows how individual participants ranked the factors, then the average score, the factor calculated at the start of the PD and then at the end of it. An ‘x’ symbol in the table denotes that the participant did not rank that element.

Table 4

Questionnaire results 2. Raw Data.

Element 1- not important 3- very important	**Start or end of PD**	**Participant**											Raw score	Average scores
		RB	SO	EM	DB	CK	JA	DP	BJ	AG	RM	JC		
Discuss and reflect on new learning/ Having discussions with colleagues in the sessions about the content.	Before	2	x	1	3	3	2	3	2	3	2	2	23	2.3
	After	3	3	2	2	3	3	x	2	3	x	3	24	2.6
Have a go at some of the digital curriculum tasks/ hands-on activities in the sessions	Before	2	3	3	3	3	3	3	3	3	3	3	32	2.9
	After	3	3	3	3	3	3	3	3	3	x	3	30	3
Construct our own digital tasks based on what we have learned	Before	1	3	2	3	3	3	3	2	3	1	2	26	2.3
	After	2	3	3	3	2	3	3	1	2	x	3	25	2.5
Be given examples of what we can use in our classes	Before	3	3	3	3	3	3	3	3	3	2	3	32	2.9
	After	3	3	2	3	3	3	3	3	3	x	3	29	2.9
Read and discuss professional readings	Before	2	2	1	2	3	2	2	2	1	2	2	21	1.9
	After	2	2	1	1	2	2	2	1	1	x	2	16	1.6
Having a teacher buddy	Before	2	3	1	3	3	3	2	3	2	2	2	26	2.3
	After	2	1	2	2	2	3	3	3	2	x	3	23	2.3
Having the facilitator or another teacher come in and model/work with you in your class	Before	3	2	2	3	3	3	3	3	3	2	3	30	2.7
	After	3	2	x	1	3	3	3	3	2	x	3	23	2.5
Be given small independent weekly tasks to complete after our sessions to reinforce learning	Before	2	2	2	2	3	3	2	3	3	2	3	27	2.4
	After	2	3	x	1	3	3	3	2	2	x	3	22	2.4

Reflect in a journal or online forum	Before	1	2	1	2	2	2	2	2	2	1	1	18	1.6
	After	1	2	1	1	2	2	2	1	1	x	1	14	1.4
Be given readings to do at home	Before	1	2	1	1	2	2	2	1	1	1	1	15	1.3
	After	1	2	1	1	2	2	1	1	1	x	2	14	1.4
The structure: short chunked 20minute sessions in a staff meeting rather than be an 'extra' on top	Before	3	2	3	3	3	3	2	3	2	3	3	30	2.7
	After	3	2	3	3	3	3	2	2	2	x	3	26	2.6
Having ongoing support from the facilitator	Before	3	3	2	3	3	3	3	3	3	3	3	32	2.9
	After	3	3	3	3	3	3	3	3	3	x	3	30	3
Having access to the resources and videos in my own time	Before	2	3	3	3	3	2	2	2	3	1	3	27	2.4
	After	2	3	2	3	3	2	2	2	3	x	3	25	2.5
Support from the principal and other senior leaders	Before	2	2	1	2	3	3	2	3	3	2	2	25	2.2
	After	2	1	2	2	3	3	2	2	2	x	2	21	2.1

The following factors were ranked the highest: ‘hands-on activities’ (2.9), ‘being given examples of what we can use in our classes’ (2.9), and ‘having ongoing support’ (3) in the first questionnaire. Both hands-on activities and ongoing support received rankings of 3 in the second questionnaire, and examples in classes remained at 2.9. This demonstrated how important these factors were to participants both before and after the PD.

The biggest change increase was “discuss and reflect on new learning/having discussions with colleagues in the sessions about the content”, which increased by 0.3 from 2.3 to 2.6, and “construct our own digital tasks based on what we have learned”, which increased by 0.2 from 2.3 to 2.5, placing them in the bracket closer to 3. This data suggested that these two factors were concluded by several participants to have been significantly important and effective after experiencing them in the PD.

There was no change in the overall ranking of “being given small independent weekly tasks to complete after our sessions to reinforce learning” and “having a teacher buddy”, which remained at 2.4 and 2.3, respectively. This suggested that these factors were viewed as somewhat important to participants before the PD and then after it.

“Be given readings to do at home” (1.3), “read and discuss professional readings” (1.9), and “reflect in a journal or online forum” (1.6), garnered the lowest scores at the beginning of the PD. The latter two also decreased in their overall rankings to 1.6 for “read and discuss professional readings” and 1.4 for “reflect in a journal or online forum”.

The following factors were ranked within the continuum of 2 after the PD:

- The structure: short chunked 20-minute sessions in a staff meeting rather than be an 'extra' on top (2.6)
- Having access to the resources and videos in my own time (2.5)
- Having the facilitator or another teacher come in and model/work with you in your class (2.5)
- Be given small independent weekly tasks to complete after our sessions to reinforce learning (2.4)
- Having a teacher buddy (2.3)
- Support from the principal and other senior leaders (2.1).

These comments and rankings supported and guided me as to how to design and tailor the PD to suit the needs of the teachers and participants. It also began to highlight some of the factors that would make for effective PD and which ones might potentially have a negative impact if used.

5.2 Semi-structured interviews

In the methodology chapter, I described how the interviews were carried out and subsequently analysed to identify patterns and themes. The following key themes emerged from the data: accountability, structure and time, PD content and relevance, and collaboration and support which closely linked to the themes that emerged from the literature.

5.2.1 Accountability

Accountability can be defined as “the obligation of an organisation or an individual to account for activities and/or outputs or outcomes to stakeholders, providing transparency” (New Zealand Government, p. 1). In this context, I define it to be the PD-related work that teachers do and are expected to do (activity, follow-up, action) outside of the allocated PD time. As explored in the initial questionnaire, participants highlighted the need for accountability activities related to the PD. I created opportunities for accountability by using an action research model, a blended learning model, embedding accountability through existing school structures, and providing reminders and support about upcoming deadlines and expectations.

The action research activity involved participants planning, within the PD time, an action or activity related to Digital Technologies that they would then do with their class and share back in the next session. This aimed to create accountability for the participants because it was specific in asking them to complete a task or action, and also by having a set date on which we would come back and share. DP commented that the action research “really committed you to doing something”. Most participants found the action research to be a supportive measure because there is always so much to do in teaching. EM discussed how being given timeframes within the action research was helpful because “knowing we had two weeks to complete it … so for me having timeframe kept me accountable because we're all busy and there's so many things going on”. Other participants echoed this sentiment:

“Action research actually made us do it. You know you always say you’re planning on doing it and then sometimes you just don’t get time and this has made me do it”. (JC)

“The other thing was the action research activity - just actually formalising it, so saying actually right I have to do something, what am I going to do and then having to report back, so it actually happens”. (DB)

Many participants commented that this framework made it feel easy, manageable and achievable. A comment was made about how this action research framework even motivated the more hesitant participants: “I was surprised by some of the more reluctant participants

who actually took to that action research and the accountability to it" (RM).

A key part of accountability was having factors of it embedded through pre-existing school structures. Many participants commented that having regular staff meetings throughout the year that were dedicated solely to Digital Technologies PD meant that participants knew "it was always coming around", so it was "consistently in your head" (RB). A factor mentioned was the communication from me (the facilitator) about dates, times and expectations for actions to be completed. EM described how because there was clear communication, he knew that he would "need to plan for that this week because I need to talk about it next week".

As a result of this, some team leaders were adding it to their agenda items in their team meetings and communicating their expectations, as well as the timing and dates. JC mentioned her team leader would email them and RB says that his team leader "kept him on the ball". Participants commented that this kept it at the forefront of their minds. Alongside these embedded factors, there was a time in assemblies dedicated to the celebration of Digital Technologies learning, as well as the school hosting a Digital Technologies information evening for parents. Some participants (SO, DP) commented that this showed how Digital Technologies was being embedded throughout the school, which made them feel as if it was important and valued.

Another aspect of accountability was the collegiality, collaboration and buddy support. There was an aspect of accountability that was viewed as collective accountability, both to others and to the students, to engage in the PD and Digital Technologies content. Many said that having a PD session during staff meetings. and the expectation that everyone was doing it, was motivating and kept them accountable. DP said she enjoyed the collegiality because "I was doing what everyone else was doing". Similarly, DB explored the idea that "you all go through it together" and because "it was compulsory it was part of what we already do … It got everyone on board". RB commented on the benefit of having a buddy:"I think having a buddy really makes you do it; if there is someone else there to say 'hey what are you doing?', then it keeps you going" (BJ). This sense of collegiality was important.

The content for part of the PD was a blended learning approach, which used face-to-face interaction with the facilitator and a set of videos and quizzes completed online in the staff meeting PD sessions and was then followed up at home. On the completion of this, participants were awarded a certificate. RM commented that the “accreditation was motivating because you had an outcome, and you had to finish it to get the certificate”. Similarly, AG spoke positively of the link between wider teacher expectations and “the accountability of the accreditation because we have to have evidence to show for our registration nowadays”. BJ, JA and DP also highlighted these comments.

The majority of participants spoke positively about the factors of accountability. Three participants expressed their desire for more accountability. SO wanted more homework tasks to make time in the meetings for the discussion of the homework and more embedding of discussions into the syndicate meetings. DB discussed having more ways of “following it up” to make sure you are “covering it”, as did CK, who wanted more accountability. CK suggested a framework for accountability where “you are given a task, a date and someone comes and checks”. Many of these accountability factors intertwine with the structural design of the PD, collaboration and support, as well as the time and timing of the PD.

5.2.2 Structure and time

It was clear from the interviews that having the PD during already allocated time within our pre-existing staff meeting time was important and well supported. Nine out of 11 participants discussed the positive impact of having the PD as part of the existing staff meeting time. SO indicated that they “wouldn’t have done it” [learning about the Digital Technologies Curriculum] if it wasn’t in the staff meeting time. JA and JB stated that having the time allocated to it and building it into the current time was important for several reasons, the main factor being that it means time is given to complete the learning in the Digital Technologies Curriculum. EM says “I feel like that is working smart - let's do it in the time we’ve got, rather than put another thing into our own time. Anything that is not a double-up is good”. JA and SO specified that they particularly benefited from having the time to reflect, discuss and learn from others built into the PD time. AG mentioned that “time is so important these days - you have to keep us interested - keep it snappy”.

Alongside this, as our staff meetings are naturally built into the school schedule up to eight weeks in advance, it meant that participants knew when and how it was happening. EM described how having it at the staff meetings was important “because we're all busy and there's so many things going on, so if you don't make it high profile enough then you can forget about it; so having it on the Monday staff meetings each week meant it was coming around”. RB discussed the consistency of the PD as a positive element.

Another structure I put into place was providing quick 20-minute sessions every two weeks before school - the Techie Brekkies. I provided some breakfast, and the topic of content was a Digital Technologies theme that participants had either asked for or that was relevant to them at the time. EM stated that by “providing many different opportunities, you're going to get more buy-in than doing it just one way”. Two participants acknowledged that they liked the Techie Brekkie model, so it is important to consider how to offer different types of structures to meet different needs.

Within the staff meetings and the Techie Brekkies, it was important to consider the structure of these sessions. Participants praised the “step-by-step” nature of the sessions where it was “short, sharp and sweet” (JC). They liked how it was incremental and broken down into manageable steps, which also intertwined with the themes of content and relevance.

Throughout the PD, I created, used and provided different types of frameworks to support participants. One such framework was an action research model framework, also named the GROWAR framework. Eight out of the 11 participants mentioned that this was a positive factor and was helpful. DB discussed that formalising it meant she was more likely to implement something in her classroom. RB said that the framework was motivating for him. SO discussed how the framework made her more reflective and she was able to think deeper about her practice. EM liked how it scaffolded them through it and meant everyone knew what to do. One participant said that she felt the action research framework was a good starting point, but at times it did seem a little repetitive with the detail it had in it. So it would be important to keep in mind that sometimes too much structure may make it feel too prescriptive and not allow for enough autonomy. Participants felt that this framework made the PD manageable and achievable.

RB, JA and JC discussed having reminders and follow-ups in their syndicate team meetings (another existing school structure) and that it was also helpful to “keep us on the ball”. This was not something I had deliberately implemented as part of my PD, but the leader of one of the syndicates did this of her own accord, and it was mentioned as a motivating factor by the members in her team. I think this would be an important element to consider in the design - having time in team meetings to discuss or keep the topic at the forefront.

There was discussion amongst participants about the time required outside of the PD to be dedicated to either work to follow-up with from the PD, or to action anything from the PD. Several participants stated they felt like there was “nothing extra” or “lots of homework” or “use personal time”. DB mentioned that having allocated time already built into the school time made it feel manageable as it was not something that you would have to go home and do. It was not “another thing on top of our teaching preparation”. SO reported she found it hard to find time to meet with her buddy outside of the allocated PD time. RB discussed having no motivation to do the Digital Technologies learning in their own time.

Conversely, SO wanted more homework but acknowledged that this might not suit everyone, whereas JA enjoyed having access to resources in her own time. Along similar lines, the use of a buddy system and having a facilitator providing resources, as discussed in the collaboration and support paragraph, helped participants save time. CK, RB and AG commented on how “splitting the work or “each person takes a piece of the collective” work meant time was used much more efficiently. AG and EM described how having the “expert” facilitator find and curate resources saved the time it would have taken them to do it independently.

A criticism that was raised by five participants was the timing in the year or term. In my context, having the PD in Term 3 and Term 4 “wasn’t great” as it coincided with writing end of year reports and the general feeling in Term 4 is one where teachers “don’t want to take anything new on” (CK). RM described this time of year as “difficult”, and BJ suggested that “around those busy times just sticking to staff meetings where you facilitate those discussions is best”. This further emphasised that discussions were seen as an important element in the PD.

A factor that four participants mentioned as potentially having a negative impact on their experiences of the PD was to do with professional readings (either within or outside of the PD time) due to the amount of time it would take. AG said they had no time for this, CK said: “readings can make people feel overloaded”. Furthermore, RB commented about the element of reflecting in a journal or in an online forum by saying “that is not really me. The time that it takes... like once you finish all your teacher work the last thing you want to do is sit down and do that”.

5.2.3 PD content and relevance

One factor mentioned by all participants was the need for the PD sessions and workshops to be ‘hands-on’ in some way. DB discussed how “getting hands-on and seeing the possibilities was really motivating and that it’s achievable'.' BJ suggested starting with the practical hands-on activities “like a motivator” to get staff “excited”. Similarly, JA and RM both commented on how the hands-on practical activities were exciting. JC and RM commented that it took down some barriers having the time to play with technology themselves. Another important factor praised by participants was that in doing the hands-on activities themselves they were able to see what it would look like in the classroom and how it would work with their students.

Six participants indicated that it was important to see examples of what could be done in the classroom and that was applicable and transferable to their students. CK specified that “having those sessions with you where you gave us examples and activities that I could then take away and do” was achievable and manageable. DB stated “I could see the connections all the time”.

Five participants acknowledged the element of modelling. Modelling, in this case, referred to the teacher or participant watching someone demonstrating the tool or concept with the students in their class. RM and JC said they would find this “powerful” and JC and BJ suggested more modelling as part of the PD. CK discussed how modelling would lead to more personalised and individualised help as opposed to a “one-size-fits-all” approach.

Alongside the hands-on practical activities, the data showed that it was important for the content to be relevant to the participants and teachers. “The ‘why’ was important - I mean it's not motivating unless you know the why” (CK). RM said the PD was relevant because “our kids are pretty tech-savvy and if we want to hook these kids in we need a really strong and rich Digital Technologies programme”. Three participants referred to the Ministry of Education expectation that the Digital Technologies Curriculum would be implemented in classrooms by 2020, so it was important to have “time to trial and learn” (DB). CK emphasised that “the fact that it is going to be an essential part of the programme in 2020 is very motivating!” The PD also coincided with a local event called the ‘Digi Awards’, which required teachers to work with students to produce a short film, animation, graphic design or photography essay to enter into the competition. This meant the PD had relevance as it supported the teachers to develop the skills they could use when preparing their students for this competition (RB, SO, JA, RM).

With reference to relevant content, it was also important to consider the relevance to the year levels they taught. JA indicated that the PD provided activities and examples relevant to all levels and that “across the board, we all got a picture of what it all looks like … it is something we do at all ages; it just looks different”. BJ, who acknowledged that she found some of it “over her head” and “probably didn't relate because it involved older children”, also found it helpful to have the “big picture” and that the “balance was ok between junior and senior”. AG mentioned that the hands-on use of the junior robots “suddenly brought them up and onboard” (meaning the junior teachers). DP acknowledged that “there's no way you can cater for everyone's needs and all kids’ needs” emphasising that teachers and students have diverse learning needs.

Participants commented on the content that they found to be most useful and helpful. RM stated that the content was engaging and that teachers were “drawn to it”. RB noted that “something basic” where you could “just pick up one or two things was great”. SO liked how “it was good to reaffirm some of the stuff I know or learn little tricks”. AG stated “there was always something in there for me” and that they are “using Seesaw [an online sharing

platform for students] far more … I actually went away and implemented it in my classroom". JC liked how the content was "things you can use in your classroom straight away - like the Seesaw stuff - I was doing it before but I haven't used the library/activities, whereas now I'm doing it!" JA suggested some more content in "internet searching - more use of Tobys (an online website collection), vetting the use of internet searching- so the kids are not like unfettered searching on YouTube without teacher supervision".

In the PD I used a blended learning approach, which was a combination of face-to-face learning in our meetings and online videos. Four participants expressed that this was effective. EM commented that "the videos were worthwhile in terms of framing the key teaching points and the continual references to the outcomes made them more likely to go into my brain". DB affirmed that "it was a good mixture of like you talking to us, watching a bit of a video, trying something out; wasn't all video or go home and watch the video". JA liked having access to the videos and resources in her own time.

In contrast, four participants spoke negatively about the videos. BJ found the videos "a bit above me". SO thought that I did not need to go over each video in every staff meeting and the teachers should have watched them before the meeting. JC found them a little "boring at times", and DP got more out of the hands-on sessions than the videos, stating "it's hard to imagine or see what you really do from the videos".

As a result of completing all of the videos and accompanying quizzes, participants were awarded a certificate and accreditation by a recognised institution called the MindLab. Seven participants acknowledged that this accreditation was motivating for them. CK noted that for them specifically having a certificate "didn't make much difference" and JC said "it was just part of what we had to do".

An element that was not included as a mandatory part of the PD, but as an optional component, was professional readings on the topic. Five participants noted this to be demotivating. EM detailed that professional readings are "full of vocabulary and jargon and I'm more of a hands-on person, but that's not to say that you won't find people who benefit

from professional readings". Similarly, AG said that they find them difficult because it is hard to find the time and "it's hard to then put it into a context. Participants were also encouraged to voluntarily reflect on the PD in the pre-established online journaling system required for school-wide appraisal. This factor was also viewed similarly as the professional readings as time-consuming, demotivating and not as useful as some of the other factors in the PD.

5.2.4 Collaboration and support

Nine of the 11 participants discussed how my disposition and approachability in the role of the facilitator was important in effective PD. It was important that the facilitator was "enthusiastic", (EM, DP, HA, AG, JC) "passionate" (JC, DB), "positive" (DB, JA, JC), "knowledgeable" (DP, JA) and available for support and questions (DB, SO, JC, JA). DB highlighted that I was "high energy … something positive, exciting, something to look forward to". It was clear that participants valued the facilitator providing ongoing and consistent support (BJ, AG, RB), including ongoing communication (EM). JC commented that an effective facilitator "makes it enjoyable for us because you're passionate about it." A factor that was mentioned as a byproduct of myself as both a teacher in the school and facilitator was "leading by example" (EM, JA) and modelling the Digital Technologies Curriculum at all times (SO). This was a benefit of myself as the facilitator, working on-site and it is acknowledged that this may not always be available as an option in other PD programmes.

Another factor that influenced the efficacy of the PD was the need for the participants in the programme to feel safe and not judged. DP stated that "you were not judged for not knowing" and this made it "non-threatening". This gave participants "confidence to ask questions" (JA, DP, JC). Similarly, SO described how it was important the facilitator "gives clear steps for all abilities to follow" and to make it "simple and easy to understand". AG explained how "taking away the 'risk' to get started" allowed some barriers to come down for some more reluctant teachers.

A crucial piece found to make PD effective was the element of collegiality which DP describes as a "team approach". RB, CK and DB found it "motivating" knowing that the whole staff was in it together. JA describes how there were the same expectations across all staff

within the sessions about what needed to be learnt and completed. Akin to this, seven participants commented on how having a buddy was a positive element. Buddies were formed based on the class levels taught. For example, JA and DB both taught the same levels and their classes were geographically close on the the school grounds. Participant data highlighted that having a buddy meant there was accountability, problem-solving support and time saved on planning. AG enjoyed learning from a “more advanced” buddy when they collaborated. DP indicated that having a buddy meant “it really committed you to doing something because you were working on the same thing” emphasising the link between collegiality and accountability. DB described how she and her buddy “sat down and planned it together”. BJ commented that having a buddy “kept her going” when times got busy or when she had questions.

Conversely, there were some negative aspects to the buddy element. SO indicated that having a buddy that was not very technology savvy and focused made it difficult. CK discussed how she did not use her buddy as she felt more comfortable going to someone who knew more than her buddy, commenting that “I think sometimes you can be put in a buddy group but naturally you go to people who you know”. Similarly, both CK and JA went to other teachers for support instead of their buddy due to the geographical location, described by JA as the ease of just going to the teacher next door. Some participants commented that at times it was easier to come straight to me as the facilitator because of my approachability and expertise (JA, AG). SO found it was hard to find a mutual time to collaborate with her buddy.

An important element that was deliberately scheduled into the PD sessions, and strengthened by the use of the buddy element, was time for discussions. Six participants mentioned this as important and effective. JA and RM highlighted that having time to reflect, discuss and share back was important. JA commented that discussion enabled people to “inject new ideas and solutions”. RB, JC and EM found that through discussions, they were able to learn from colleagues. BJ suggested that around times where it was busy, like report writing, just “facilitating discussions” was the most effective course of action during these times.

SO explained that the discussions continued outside of the allocated PD times in informal situations also. Furthermore, discussions within syndicate meetings were important for some participants (JA, JC, RM, RB). This took place in two out of the three syndicates and was not a requirement of the PD. JC described that “knowing that our whole team was doing it and all focusing on the same thing, and at our team meetings, we have been chatting about it too”. RB detailed that “having a driver in your syndicate definitely helped”. SO discussed how she would have liked to see more sharing back and discussion about the Digital Technology content in her syndicate meetings. This emphasised how this element could have been deliberately included as part of the PD, in consultation with senior leadership, to ensure further support and thus the efficacy of the PD.

This connects with another element that was discussed - senior leadership buy-in and support. Senior leadership refers to the principal, assistant, deputy principal and syndicate leaders. As well as having syndicate leaders driving further learning relating to the PD in their syndicate meetings, it was important for participants to know that the principal was supportive. SO commented that “ I think knowing they supported it and knowing that you could go back to your class and try things with them onside, makes a big difference”. DP affirmed this by discussing the promotion of the Digi Awards at assemblies, the time and effort that went into hosting the parent evening and the allocation of time in the staff meetings. These actions showed that Digital Technologies was being valued and supported across the school. RM and BJ reported that the purchasing of devices such as robots and Makey Makeys to support the implementation of the digital activities showed it was valued and important enough to be allocated resources such as time and money.

Several participants had suggestions that would further increase the efficacy of the PD. DB and CK requested ongoing accountability once the PD had finished. RB asked for a hard-copy tip sheet as a visual reminder of some of the learning done in the sessions rather than all online. Two participants suggested a type of online forum to “jot down ideas and questions” (SO) like a “help log” (BJ).

5.3 Final questionnaire

The final questionnaire sought to find out teachers' perceptions of the transferability and relevance of the findings for the recommended factors for effective PD. This questionnaire garnered 10 out of 11 participants' responses.

First, participants were asked to rank from 1-3 (1- being not useful, 2- being somewhat useful, 3 - being very useful) their judgement as to whether they believed the findings of my research would be beneficial for others to know. Out of the 10 responses, eight participants believed the findings to be very useful (ranking 3), and two felt that the findings would be somewhat useful (ranking 2). Overall this showed that the participants felt others would value the findings from the research.

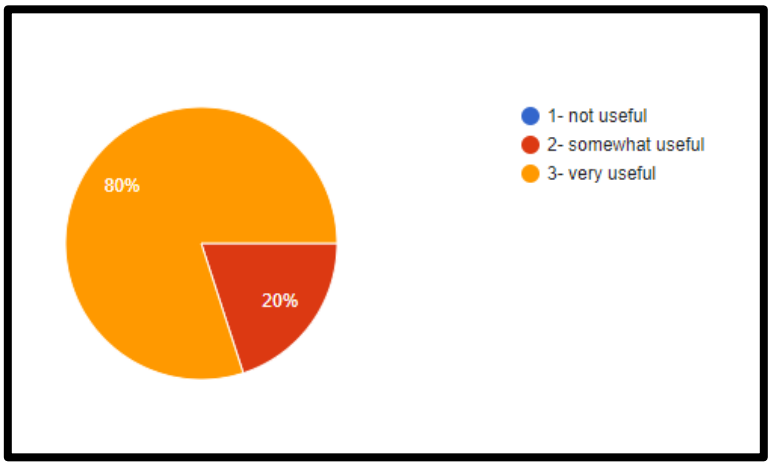

Figure 1. Participants responses to question 1 on final questionnaire.

The second question asked participants to give their suggestions on the best way to share findings with other educators. One participant suggested a simple graph form whilst others suggested a summative word form with links. Those responses implied that something like an infographic or a document that requires a short amount of time to read, as well as having supporting links for further reading or examples, would be useful. Similarly, it was suggested to publish an article in an educational magazine or journal.

The most recommended ways to share these findings were grouped as set out below:

- Workshops
- Meeting after school
- Professional learning session
- Workshop
- Staff meeting
- PD days
- Hands-on experience
- Experiencing findings in an authentic context.

This could be summarised as some face-to-face delivery is a useful mode for sharing the findings. Alongside this, a participant made the comment that I could use my “amazing ability to inspire them”, as well as a recommendation by more than two participants to “give examples that are relevant” and make it a “hands-on experience”. One participant summarised their thoughts by stating that I should share in “multiple ways depending on the accessibility of audience”, which would allow for the findings to reach a wider audience.

The third question addressed the overall effectiveness of the PD by asking them to rank the PD on a scale of 1-4. This is summarised in the graph below, with nine out of 10 participants determining the PD to be a 4 “very effective” and one participant determining the PD to be 3 “effective”.

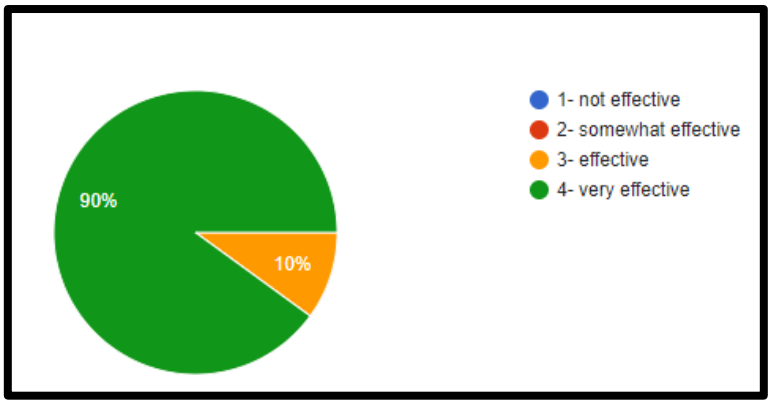

Figure 2. Participants responses to question 3 on final questionnaire.

Lastly, participants were asked if they believed other educators would benefit from participating in this PD by answering either a yes or a no. Overwhelmingly, 10 out of 10 participants voted yes.

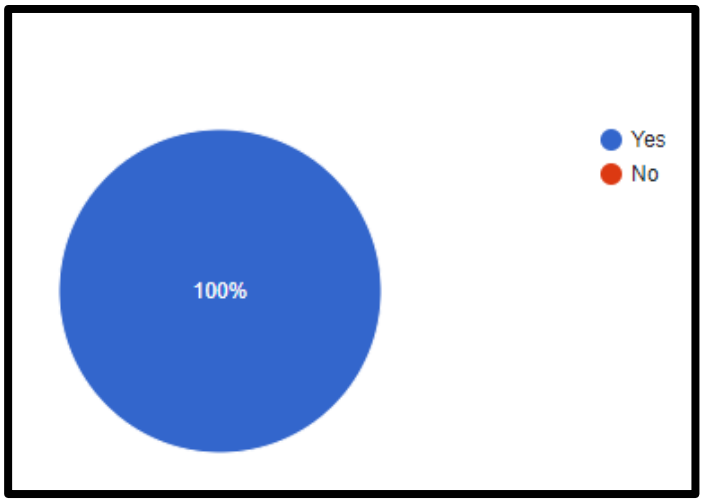

Figure 3. Participants responses to question 4 on final questionnaire.

5.4 Summary of findings

5.4.1 Accountability

Factors relating to accountability such as the action research, the time given in staff meetings, as well as follow-ups and communication from leaders had a positive impact on participants. There was also the benefit of having the PD sessions embedded into the staff meeting time, as well as Digital Technologies highlighted at assemblies and parent nights. Participants ranked the staff meeting sessions an average score of 2.6/3. Participants commented that this made the PD feel manageable, valued and kept the content and expectations at the forefront of the minds of the participants. Half of the participants felt the reward of the certificate was worthwhile and provided more accountability to finish the online course part of the PD.

Conversely, participants found that the collegial factors of the PD such as buddy support, and the compulsory nature of the PD, created collective accountability whereby the expectations on all teachers were the same. The “buddy” element had an average ranking score of 2.3/3.

There were some comments from participants discussing how they would have liked more accountability during the PD in the form of homework, and a process of monitoring that teachers were covering and completing tasks.

5.4.2 Structure and Time

The use of pre-existing staff meeting time to have the PD was well supported by the majority of the participants. This provided consistency across the term and year as well as a time allocated specifically to the discussion and development of Digital Technologies teaching and learning. One of the highest-ranking factors was “ongoing support”, which garnered an average score of 3/3. Alongside this, having the optional Techie Brekkie structure was favourable to many participants who commented positively on this option.

Most participants expressed that they were time poor and anything within the PD that saved them time such as planning during the session, or having resources, allowed them to save time and therefore made the PD more effective. The factors of “Examples of what we can use in our class” and “Having access to resources and videos in my own time” were given average rankings of 2.9 and 2.5 out of 3, respectively. However, expecting teachers to do readings and reflections in their own time was highlighted by most participants as demotivating or disengaging. This also came through in the element rankings with “Be given readings to do at home” scoring 1.3/3, “Read and discuss professional readings” scoring 1.6/3 and “Reflect in a journal or online forum” scoring 1.4/3. An important point to note was that the time of year that the PD is held is a factor to consider, as different times of a school year bring different pressures and expectations on teachers such as report writing in Term 4 when teachers are stressed, busy and tired.

The action research framework was acknowledged by the majority of the participants as a useful and helpful structure in the PD. It also coincided with the element of taking the PD step by step and breaking it down into manageable parts, which was also mentioned frequently by participants as helpful.

Other factors to consider would be embedding specific structures into the pre-existing team or syndicate meetings to reinforce Digital Technologies learning further, and reflecting on

how the facilitator could provide differentiated programmes and pathways to suit the needs of the individual teachers better.

5.4.3 PD content and relevance

The number one factor that participants found motivating, engaging, and effective was the hands-on nature of the PD sessions, which was commented on by all participants and given an average ranking of 3/3. Similarly, examples of what Digital Technologies would look like in the classroom, modelling, and providing activities for teachers to try were also beneficial to the majority of participants.

The content covered in the PD was deemed relevant, helpful and useful by every one of the participants. Some participants suggested further content they would like to have seen covered in the PD. Around half of the number of participants found the online videos helpful, and the other half found that they were either boring, repetitive or too advanced.

5.4.4 PD collaboration and support

The majority of participants discussed how the facilitator's disposition made a positive impact on the PD. It was important to participants that the PD, and thus the facilitator, created a culture of acceptance, non-judgement and allowing teachers to feel accepted at the levels they were at. Some participants noted how leading by example was an important byproduct of the facilitator being on-site.

The collegiality factors such as the “team approach” and having a buddy were mostly viewed as positive. Some participants did not use their buddy, find time to collaborate or feel that their buddy match was the best. The buddy system, whilst a positive element, would need further refining to be effective for all participants. Discussions with colleagues in the PD sessions (and also in informal settings) was found to be an important factor scoring 2.6/3 in the rankings. Furthermore, support from the senior leadership about time, money, resources and encouragement was also viewed as an important factor.

5.4.5 Overall efficacy of the PD programme

The majority of participants viewed the factors that were explicitly used in the PD as positive. Some factors had components within them that participants had differing opinions or suggestions on as ways of making the PD more effective, and some factors were, for the most part, ineffective. The overall rankings of factors from the second questionnaire aligned with the comments made by participants. The shift in participant understanding, knowledge and skills indicated that the PD was effective. Overall, participants considered the PD effective. 10 out of 10 participants believed that other educators would benefit from this PD, and all participants rated the PD to be “effective” or “very effective”.

CHAPTER SIX: DISCUSSION

6.1 Discussion of findings

Overall, participants found the PD to be effective and all of them believed that other educators would benefit from this PD programme. This suggests that the research largely achieved the aim of identifying the recommended factors for the design and implementation of an effective PD programme in Digital Technologies. This discussion reviews the key factors that led to the success of the PD and the reasons for their importance, as well as potential obstacles and avenues for future improvement. The key areas are linked to significant themes from the literature review. The key areas for discussion are time, content and activities, collaboration and support, motivation and engagement as well as the need for PD to be responsive to teachers. Alongside this, there is a discussion of the transferability and relevance of the study’s findings to the wider education community. I frequently relate my interpretations to *Teacher Professional Learning and Development: Best Evidence Synthesis Iteration (BES)* by Timperley et al. (2007), whose synthesis of 97 studies on PD is currently one of the most in-depth reviews relevant to the New Zealand PD context.

6.2 Time

Time, or lack of it, is a factor that the majority of participants and the literature commented on. Most primary school teachers would agree that if we had more time with the students, and also more time to plan and prepare, we would be able to accomplish and achieve more for the betterment of our students. Carlson and Gadio (2002) emphasised the connection between teacher motivation and time spent engaging in PD, stating that teachers are "cautious of time-consuming activities that may take away from other high-priority obligations" (p. 122). Therefore, one of the most crucial factors we must consider when designing and implementing effective PD is how to maximise and utilise the time we have.

This study found that using the pre-existing time that was already reserved for school-related activities such as staff meetings, was highly favoured. Allocating a time within the working day, allowed teachers to be present in body and mind as well for them to see it as something valued and important enough to allocate a precious resource such as time to. The study concluded that the majority of teachers did not have time outside of working hours, nor did they want to allocate personal time to extra learning. This is important, as teachers conveyed feelings about being overloaded, tired and already using their personal time for other work-related activities. Adding another expectation of time to their workloads could affect the efficacy of PD. Time-related challenges were viewed as the biggest barrier to the success of PD by the overwhelming majority of the authors in the literature (Gusky & Yoon, 2009; Paez, 2003; Dingle et al., 2011; Hill, 2008; Deluca et al., 2012; Timperley et al, 2007; Robles, 2006; Glass & Vrasidas, 2007; Carlson & Gadio, 2002; Prestridge & Tondeur, 2015; Borko, 2005; Steiner, 2004).

Prestridge and Tondeur (2015) recommended designing PD to support the flow of the school year. Therefore, another element emerging from the study was the consideration of the timing of the PD in the school year. Further to this, it is crucial to consider the timings within a term and how PD can be structured around busy and stressful times, as well as school events and happenings.

Additionally, much of the literature found that sufficient time needs to be given to the PD (Robles, 2006; Carlson & Gadio, 2002; Glass & Vrasidas, 2007; Paez, 2003; Dingle et al., 2011; Gilmore, 2008; Timperley et al., 2007; Garet et al., 2001; Herro, 2015; Desimone & Stuckey, 2014; Goos et al., 2007). This study found that allocating consistent amounts of time over a sustained period across the year was instrumental in the efficacy of PD. This aligns with the Ministry of Education (2006) and Borko (2004) who recommended that PD provide consistent and ongoing support. Whilst these factors emerged as important, Timperley et al. (2007) highlighted the need for the time to be used to provide quality PD experiences and activities:

> *While an extended time frame with frequent, ongoing opportunities to learn does seem to be generally associated with professional development that results in positive outcomes for learners, it is not in itself a guarantee of success ... what matters is what occurs within the time (p. 75).*

Similarly, this study examined particular types of activities and content, with the aim of providing quality content that added value to the teacher and their classroom programme.

6.3 Content and activities

This study used a blended 'hybrid' model of instruction combining face-to-face and online learning opportunities. This hybrid model was suggested as the most effective by Carlson and Gadio (2002) and Prestridge and Tondeur (2015). Whilst this model proved effective in this study, some participants noted that the content in the videos was either useful and helpful, or boring or irrelevant to the year levels they taught. This aligns with the findings of Grosemans, Boon, Verclairen, Dochy, and Kyndt (2014) who claimed that teachers lose interest in PD when the content does not apply to their current daily teaching. However, Stoll et al. (2009), and Timperley et al. (2007), stated the importance of leaders recognising the complexities of educational change and that the learning process of teachers is not always linear.

To add to this complexity, the synthesis of professional learning found that there "was not a single type of activity that was common to all [PD] interventions and no individual activity

stood out as more effective than others across studies or within particular categories" (Timperley et al., 2007, p. xxxvi). So, whilst there may not have been any specific activities within this study that were shown to be particularly effective, there were notable factors of activities used in the PD that emerged as instrumental. One was the need for activities to incorporate a hands-on element. Robles (2006) found research to have shown "the importance of current professional development emphasizing hands-on technology use" (p. 17). Further to this, activities needed to be directly relevant and useful in the teachers' classroom. Glass and Vrasidas (2007) discussed the need for activities to be designed to link to current curricular topics of interest that can be authentically used by teachers. Lastly, activities need to have collegial discussion integrated into them. This echoes Carlson and Gadio (2002) who asserted "the program should be highly social and cooperative, with opportunity to share experiences and combine instruction with discussion, reflection, application, and evaluation" (p121).

Almost all the reviewed literature (Digweed, 2018; Timperley et al., 2007; Dingle et al., 2011; Garet et al., 2001; Paez, 2003, Goos et al., 2007; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012) authors agreed that effective PD had factors of hands-on experiences and activities. This was noted to be particularly important in a Digital Technologies PD context by Carlson and Gadio (2002), and Prestridge and Tondeur (2015). Carlson and Gadio (2002) defined this hands-on approach as one where facilitators "provide an authentic learning environment so that teachers engage in concrete tasks within realistic scenarios" (p. 121). The PD was designed specifically to give time in the workshops for teachers to explore, play, learn and try out the technology itself, as well as being placed in the student's shoes. The study found this to be significant for several reasons. First, teachers reported that it clearly lowered some barriers and resistance that either they or their fellow colleagues had around new technology as teachers can often "feel so threatened by technology that they want to distance themselves from it rather than embrace it" (Carlson & Gadio, 2002, p. 122). Secondly, it created a culture in which teachers are not expected to know everything and can take time to play and learn. Thirdly, by experiencing some of the technology tools first-hand, teachers were able to see ways to use them in their classrooms, how they could relate to their students, and also in some cases be aware of the resourcing the school had available. Carlson and Gadio (2002) specifically supported the last point

about technology tools and resources, commenting that there is often “a lot of technology provided to schools that is never used - it sits in boxes or closets, gathering dust and becoming obsolete” (p. 125).

Having discussions as a deliberate element in the PD sessions was deemed “very effective” by all participants. This study found that discussions where teachers unpacked new learning and ideas were particularly important. Carlson and Gadio (2002) asserted that the PD “should be highly social and cooperative, with opportunity to share experiences and combine instruction with discussion, reflection, application, and evaluation” (p. 121) which aligned with the findings of this study where teachers emphasised that they learned a lot from others’ ideas and through observing others. This showed how teachers tend to trust experiences and ideas that other teachers have and are more likely to try ideas that have been tried and tested by other teachers in a similar context. Garet et al. (2001) stated that activities that fostered “active participation”, where teachers were engaged in leading discussions, sharing an idea, or demonstrating a skill, or lesson, were said to promote deeper learning.

Dede et al. (2016) discussed the importance of both the experience that teachers bring, as well as the theory, by asserting that “the richest forms of PD lie toward the middle of the continuum, combining theoretical and research-based insights with the wisdom of practice” (p. 2). The role of the facilitator in discussions was to assimilate these ideas with the new learning and theory that the PD was aiming to provide. This is supported by Timperley et al. (2007) who claimed that “negotiating meanings and debating and testing evidence of the effectiveness of both providers’ and teachers’ theories, are part of the process of achieving mutual understanding and effective practice” (p. xl).

A recent New Zealand study by O’Donnell (2018) reported that teachers “wanted professional development that provided them with strategy based practical support for implementing the change on a day to day basis” (p. 69). One of the factors in the content design of the PD from the study was to provide practical activities for teachers to use with their students that aligned with the theory of professional learning. The literature strongly recommended the “integration of theory and practice” (Timperley et al., 2007, p. xxxii) as a key feature and that teachers are assisted in translating theory into classroom practice. Guskey and Yoon (2009) found that

“virtually all of the studies that showed positive improvements in student learning included significant amounts of structured and sustained follow-up after the main professional development activities” (p. 497). The combination of providing practical activities for teachers to use and designing an action research structure for teachers to follow-up and use the activities with their students emerged as an important factor. Teachers commented on how this made the new content manageable and easy.

The action research element that was implemented in my study resonated favourably with the majority of teachers. This finding was consistent with Steiner’s (2004) findings that “individual case studies document positive changes in teacher behaviour and attitudes when teachers participate in action-research projects” (p. 10). The way the action research was structured, as well as factors that it encompassed by default, proved to be effective. The action research required several tasks of the teachers. First, it was designed to be worked on with a peer buddy. Together the teachers worked through a set of questions that challenged and unpacked their current thinking and realities, as well as having them identify any barriers or challenges. Following this, teachers were asked to discuss and design a lesson for their students using any of the ideas, concepts and tools they had learned in the preceding PD sessions. The expectation was that teachers used the lesson they planned with their students and then in the next PD session shared what they did, reflected on the action, and were given feedback from their buddy and the facilitator. During the reflections, teachers spoke positively about their actions and the impact they had on the students. Robles (2006) described how the essence is to “offer teachers the time and opportunity to try new things, to reflect upon their experiences and learn from others, thus realizing how technology can improve student learning and achievement and becoming, with technology, capable of much more” (p. 13). This response from teachers strengthens the argument for the efficacy of having an action research element in PD.

Glass and Vrasidas (2007) warned that “another difficulty stems from the reality that teachers are often asked to learn to use technological tools that become out-of-date with new development” (p. 92). In a field such as Digital Technologies, technology continues to evolve and change and develop (Carlson & Gadio, 2002). It would not be productive to create a specific list of what content should be learned in a PD programme as this content would not

only be changing regularly but also would need to suit the needs of the teachers and school context. There are many different tools and ideas relating to technology in education; it would be difficult and somewhat ineffective to attempt to distil this into a 'one-size-fits-all' list. This leads to the notion that the content must be responsive to the teachers in each school.

6.4 Responsive professional development

Timperley et al. (2007) asserted that "within any group of teachers, there are diverse professional learning needs. What needs to be learned depends on both the prior learning, skills and dispositions of individuals and groups and the demands of their current teaching context" (p. 6). In order to create high-quality and effective professional learning experiences, there must be strong links to the teachers' current needs, contexts, beliefs and realities (Mitchell & Cubey, 2003; Timperley et al., 2007; Blackboard inc., 2005; Robles, 2006, Paez, 2003; Dingle et al., 2011; Hill, 2008; Ertmer et al., 2012). This study endeavoured to do this by including teachers' as active participants in the PD design by surveying and consulting them early in the process. Through consultation with teachers, I was able to gain an understanding of their current knowledge and skill sets in Digital Technologies as well as their beliefs and attitudes, not only about Digital Technologies but about professional change and growth. Thus, aligning with the suggestions of consultation (Glass & Vrasidas, 2007; Prestridge & Tondeur, 2015) and a "needs assessment phase" (Robles, 2006, p. 27).

Alongside this, it was important to keep in mind the 'humanness' of the teachers. Teachers bring their personal set of beliefs and attitudes to the PD as well. Dunmill and Owen (2014) highlighted that "it is impossible to truly extricate personal identity from professional identity" (p. 129). It was imperative that in my role as the facilitator I spent time asking questions, listening and finding out what beliefs and experiences teachers had in regard to Digital Technologies, as a way of more deeply understanding their needs. This strategy worked to anticipate the belief of Ertmer et al. (2012) that the greatest barrier to the successful implementation of a new initiative is existing teachers' beliefs and the perceived value of the PD to their individual programmes.

Furthermore, it was crucial to accept teachers' current abilities and practices as they are "connected to the beliefs underpinning them" (Timperley et al., 2007, p. xxix). The NZPPTA (2011) outlined that facilitators must be willing to accept differing levels of commitment and motivation and that teachers have their own personal sets of strengths and weaknesses. This helped me as the facilitator to further tailor the PD to suit the needs of the teachers and it appeared to add to its efficacy.

Loucks-Horsley, Hewson, Love, and Stiles (1998), Hindle et al., (2007), and Steiner (2004), described the following attributes as important for a facilitator: skills in communication and observation, the need to develop an understanding of the teachers they are working with, and the ability to create and maintain a strong professional relationship. Whilst this study did not specifically address the element of teacher-facilitator relationships, it was part of the context by default. Hindle et al. (2007) expressed how "existing relationships between participants were a key contributor to the success of the project as partnerships had already been negotiated and respect formed" (p. 2). One finding from this study was that due to my role as a fellow colleague and teacher I had already formed collegial relationships with the teachers prior to the study, which meant I had built elements of trust and mutual respect. Timperley et al. (2007) mentioned that a beneficial relationship between the teacher and facilitator "could be characterised as positive, respectful, and mutual" (p. 77). Similarly, Deluca et al. (2012) emphasised a collaborative atmosphere of trust, respect and support.

Paez (2003) highlighted that a supportive environment was crucial to PD success. This study found three important interpersonal skills that were required from the facilitator to create a supportive environment for the PD. First, it was important for the facilitator to remain flexible. Often teachers' questions and suggestions would lead us to different areas of inquiry or tangential to what I had planned for the session. Carlson and Gadio (2002) supported this, affirming that "adapting materials to teachers' comfort level and starting points is essential" (p. 121). Following teachers' suggestions and being willing to diverge from 'the script' was an important element when facilitating the sessions.

The other skills that were found to be effective in this study were the facilitator being approachable and generous with their time and support. Being available and willing to meet

with teachers outside of the allocated PD time to talk through ideas, showing them resources or helping them plan was commented on by many participants in the study as factors that added to the success of the PD. Guskey and Yoon (2009) explained that “educators at all levels need just-in-time, job-embedded assistance as they struggle to adapt new curricula and new instructional practices to their unique classroom contexts” (p. 497). The findings in this study aligned with the notion that teachers require ongoing support in order for PD to be effective (Borko, 2004; Carlson & Gadio, 2002; Deluca et al., 2012; Desimone & Stuckey, 2014; Dingle et al., 2011; Gerstein; 2013; Gilmore, 2008; Glass & Vrasidas, 2007; Herro, 2015; Ministry of Education, 2006; Prestridge & Tondeur, 2015; Robles, 2006; Timperley et al., 2007).

6.5 Facilitator qualities

This study found that there were several factors required by the facilitator that made the PD more successful and effective. First, it was important for the facilitator to have in-depth content knowledge. (Hill,2008; Gilmore, 2008). Timperley et al. (2007) detailed that successful interventions mostly required the providers to have “high levels of domain-specific knowledge” (p. 139).

The research stated very little about the qualities needed for effective facilitation. Timperley et al. (2007) summarised this, asserting that “while we have identified the qualities of effective professional learning experiences, we have been unable to say much about the qualities of effective providers because the studies usually did not consider the matter” (p. 228). This study highlighted the potential characteristics of a facilitator that were deemed important by the participants. These qualities included being enthusiastic, positive and passionate. Linked to these qualities was an interesting finding from this study regarding the importance of fun and enjoyment in PD. This is an area often left out of previous research and literature. but is a poignant learning from this study. In combination with hands-on activities that were designed to encourage play, tinkering, exploring and fun, the facilitator made sure to keep the mood enjoyable with humour and fun. The principal of the school used in the study commented that teachers were getting excited and showed enthusiasm during

the hands-on tasks with the robotics. They were drawn to it, and he believed it “brought down so many barriers” (RM).

The literature mainly advocated for the need for external expertise for an external PD provider or facilitator (Stoll et al., 2012; Paez, 2003; Hill, 2008; Timperley et al., 2007; Gilmore, 2008; Deluca et al., 2012). Interestingly, Timperley et al. (2007) reported that “engagement of external expertise was typically necessary but didn't always result in effective PD” (p. xxvii). Goos et al. (2007) highlighted that PD could be provided informally by colleagues in the school or in a more formal workshop format, including external expertise, but there was no comment as to which would be more effective.

The findings by Hindle et al., (2007) confirmed the findings of this study regarding the importance of relationships, availability and trust. By design, this study examined the use of internal expertise. This was found to have some benefits, mainly regarding the strength of relationships the facilitator had with teachers and the ongoing and on-site availability. Therefore external facilitators coming in to work with a school would need to prioritise and take the necessary time to gain a deeper understanding of the teachers, students, day-to-day running of the school, barriers and community viewpoints as well as finding ways to solve the problem of not being physically located in the community all the time. These two advantages of being ‘in-house’ proved to add value to the PD.

6.5 Collaboration and support

“He waka eke noa” (Herd, 2016, para.1) is a Māori whakatauki (proverbial saying), which translates to mean “the canoe which we are all in without exception”. This canoe or ‘waka’ is metaphorical for a journey and “refers to the collective consciousness that affirms belonging in a group” (Herd, 2016, para.1). This collaborative intention and kaupapa (principle or policy) was used to underpin the PD. The ‘team’ approach was highlighted by many participants as being important as well as motivating. The literature strongly asserted the need for teachers to be a part of communities of learning and have multiple opportunities to collaborate with others (Kinley, 2015; Glass & Vrasidas, 2017; Ministry of Education, 2006; Gerstein, 2013; Dede et al., 2016; Robles, 2006; Timperley et al., 2007; Garet et al., 2001; Desimone &

Stuckey, 2014). In this study, teachers worked in individual ‘single-cell’ classrooms, so the collaboration factors allowed them to connect, problem-solve and share in an authentic context. This aligns with Carlson and Gadio (2002), who explained the importance of PD to “overcome teachers’ isolation, breaking down their classroom walls and connecting them to colleagues” (p. 119).

The literature agrees with the importance of the “social construction of knowledge” (Carlson & Gadio, 2002). This was found to be successfully done through collaborative discussions outlined in the results chapter 5.2.4 Collaboration and support. Further to this, teachers were paired up with a ‘buddy’ to complete the action research planning and to help support and keep each other accountable to complete the action and then share back with it at the last PD workshop. Dingle et al. (2011), Deluca et al. (2012), Garet et al. (2001), Goos et al. (2007), Prestridge and Tondeur (2015), and Robles (2006), discussed the important role that coaching, mentoring and peer-to-peer support play in effective PD but do not describe the specific attributes required for these roles to be effective. This would be an area for further study.

Further investigation into the literature that examined the role of a mentor or coach in broader educational contexts defined a specific set of attributes that are needed to be an effective coach or mentor. These attributes were to provide emotional support (Brown, Browne, Collett, Devereux & Jameson, 2013, Winans, 2008), and dedicated time (Winans, 2008; Teaching Council New Zealand, n.d; Denny, 2016), and to be able to engage in professional dialogue (Winans, 2008; Koki, 1997, Denny, 2016). The ‘buddy’ system implemented in this study did not ask teachers to take on a specific mentor/coach role, but more of a ‘buddy’ role which the Teaching Council New Zealand (n.d) defined as one where both peers were expected to provide “emotional support and handy just in time tips.”

Overall, the ‘buddy’ system implemented in this study had mixed evaluations. An important aspect to consider is the dynamics of the buddies and how buddies are formed. In this study, teachers were consulted on how they would like the buddies to be chosen, and the consensus was that it would be easiest to have a buddy in your syndicate or year level for ease of access to them for timetables as well as efficiency of planning. When examining the

dynamics of the buddy pairings, there may be similar or differing levels of abilities, which can be either supportive and increase learning or cause incompatibility and impact negatively. The system for buddy pairings is very context-specific and may require further study.

6.6 Motivation and engagement

It is important to consider the factors that encourage initial teacher engagement. Timperley et al. (2007) stated “it is not surprising that teachers, like other learners, need a powerful reason to engage with new information in sufficient depth to change their practice” (p. xxxviii). The literature suggests many ways to incentivise and enhance teacher buy-in. However, Carlson and Gadio, (2002) highlighted that motivation was mostly linked to extrinsic rewards or incentives that were tangible, measurable and guaranteed from the outset. Conversely, Timperley et al. (2007) examined the link between teacher motivation and the intrinsic reward of seeing better outcomes in student learning.

In my study, I found teacher engagement and motivation to be high due to the impending implementation requirements for the Digital Technologies Curriculum. This was a motivator for teachers to want to learn and actively participate in the PD. The motivation in this study could be viewed as a compulsory Ministry of Education directive, which Kinley (2015) called a “top-down” approach and can be seen as generally demotivating. Desimone and Stuckey (2014) similarly emphasised that teachers being “treated” with PD can cause them to participate in superficial ways as opposed to engaging in deep learning. Timperley et al. (2007) found that it was “how students were learning and responding in their existing situations that provided the catalyst for teachers to engage in professional development” (p. xxxiv). This study observed increased teacher buy-in and engagement as the PD went on because teachers became more familiar with the new learning, could make connections to their own classrooms and also, more importantly, became open to the different types of Digital Technologies learning opportunities as student engagement and outcomes improved.

Another factor that increased teacher buy-in and motivation was the support of senior leadership. This is well established by Desimone and Stuckey (2014), Timperley et al. (2007), Ministry of Education (2006), Dingle et al. (2011), Hill (2008), Kinley (2015) and Goos et al.

(2007) as an important factor that had a significant effect on the success and efficacy of any PD programme. Stoll et al. (2012) discussed how effective PD requires leadership to create the necessary conditions. Robles (2006) stated that “in fact, professional development in technology use for teachers will not be successful unless the principal is invested in the process” (p. 21). The senior leadership showed support by giving time to the PD within the valuable staff meeting time, and participating in the PD itself. Alongside this the senior leadership made time to showcase student and teacher efforts as a result of the PD in whole school assemblies. Timperley et al. (2007) described the school leaders’ role as one where they “actively organised a supportive environment to promote professional learning opportunities and the implementation of new practices in classrooms” (p. xxvii). This study proved that senior leadership and principal support was an important factor.

Alongside this, the principal was supportive in the facilitator running a digital information evening for the parent community, as well as piloting the Digi Awards programme in our school. This support from the senior leadership was not only viewed by teachers as important, but it added weight to the significance of the PD and raised the profile of Digital Technologies across the whole school community. Goos et al. (2007) commented that it is important to address the “parental and community attitudes to curriculum and pedagogical change” (p. 26). Further to this, the study aligned with the notion that “generating parent support for technology in schools is important if technology investments are to be sustained and/or expanded” (Carlson & Gadio, 2002, p. 124).

Another way the senior leadership team was supportive was through their purchasing of digital technologies equipment and resources to support the PD. This meant that teachers have adequate resources to implement the Digital Technologies curriculum and PD content. Hill (2008), Goos et al. (2007), Kinley (2015), Robles (2006), Digweed (2018), and Corkill (2018), made reference to the lack of resourcing in their research as potentially thwarting efforts of learning in PD. This was echoed by Carlson and Gadio (2002) who emphasised that for PD to be effective schools must allocate sufficient time and financial resources and “failure to invest insufficient resources in teacher training will result in failure of school-based technology initiatives” (p. 130). Similarly, the NZPPTA (2011) reported that schools must allocate time and money if PD initiatives are to be successful.

6.7 Transferability and relevance of these findings

Another aim of this study was to evaluate the transferability and relevance of these findings for the wider education sector. The study found that all participants perceived the PD would be beneficial for other teachers to participate in. Furthermore, participants all conveyed that the findings from this study would be relevant to the wider educational community. Some literature reviewed stated that transferring an exact PD model to another context would either be ineffective or not yield similar results (Carlson & Gadio, 2002; Timperley et al., 2007). However, there are many PD programmes in New Zealand currently that are offered to many different teachers and they do not differentiate for different contexts. For example, the Mindlab, who are current market leaders in digital learning, offer an online video-based 'Digital Passport' PD that has had 10,000 teacher participants (Mindlab, 2018).

The study found that the recommended best way to share these findings would be in a short infographic one-page form with supporting links and graphs or in a workshop or seminar with hands-on practical ways to implement the findings. Both suggestions echo and incorporate the findings above related to time and, hands-on activities and they are based in theory and practice.

CHAPTER SEVEN: SUMMARY, RECOMMENDATIONS, LIMITATIONS AND AREAS FOR FURTHER STUDY

7. 1 Summary of findings

The impetus for this study came from my interest in PD, my role as a digital teaching and learning leader, and also the impending Ministry of Education expectations of implementing a Digital Technologies Curriculum in 2020. The research questions were designed to investigate teachers' perceptions of what makes effective and successful PD in order to provide this for the school in which I was working. The research also aimed to provide recommendations for how similar schools or contexts could design and implement effective PD in the area of Digital Technologies. The research questions are repeated below:

1. What are the recommended factors for the design and implementation of effective PD as identified by the literature?

2. What are teachers' perceptions of the key factors of the design and implementation process for effective PD in Digital Technologies for a New Zealand primary school?

3. What are teachers' perceptions of the transferability and relevance of the findings for the recommended factors for effective PD?

The summarised answers to these questions are now provided.

What are the recommended factors for the design and implementation of effective PD as identified by the literature?

The literature review in this research suggested many factors for the design and implementation of effective PD, as well as factors that may be ineffectual.

The literature highlighted that the top three factors for effective PD are:

1. An action research/inquiry/project model
2. Explicit links between the PD and current school curricular/structures and context
3. Collaborative learning communities.

The literature argued that the top three barriers to effective PD are:

1. Teachers' attitudes and beliefs
2. That PD was not sustained over time
3. The time demand for teachers.

All factors and barriers identified have been collated in the table below, and this was done after reviewing the literature related to PD.

Table 5

Factors that contribute to, and impeded effective PD identified by the literature in order of importance

Effective Factors
Action research, inquiry, project model
Learning communities
Linked to what is already happening in schools
Ongoing support and guidance
Balance of subject matter/content/pedagogy
Peer collaboration
Support from admin/Senior team
PD is linked to student outcomes
Discussion of current practice

Matches policy/vision of school
Modelling
The PD is sustained
Sufficient time and duration allocated to it
Mentor or buddy
Teachers sharing learning/expertise
Hands on/ active learning opportunities in the PD
feedback/debriefs
Accountability systems
Recording of reflections
Fosters/distributes leadership
Needs-based
Hiring external experts
Online component
Adequate funding and resources
Teacher willingness and buy in
Record of classroom practice (video/transcript)
Classroom observations
Skills based
Addressing/acknowledgement of underlying beliefs of teachers
Multiple and varied opportunities for learning within the PD
Professional readings
Teachers having input into PD design
PD leader is crucial
Incentives
Coaching
Use of student data
Visiting other schools
Use of student data
Atmosphere of trust and respect
Learning is in the classroom
‘At own pace’ learning anytime/anywhere
Promotes teacher engagement
Specifically backed by principal
Reflection on PD itself
Shared goals within the PD
There is a catalyst or rationale to participate

Barriers
Not sustained
One-off
Time demands
Teacher willingness/motivation/confidence/ reluctance
Contextual factors (school culture, testing demands, class sizes)
Lack of attention to teachers' previous knowledge/beliefs/practice
No inquiry/follow up/project
Intellectually superficial
Competing priorities
No link between PD and current happenings/curriculum
Poor training quality
Not in a context
Lack of resourcing
Ignores andragogy
PD Content doesn't meet the needs of teachers
No discussion or feedback
Professional isolation/lack of community
Accountability demands/unreasonable expectations
Poor leadership
Disorganised
Off-site
Staff turnover
Lack of support
Whole staff not involved
Not at a good time of day/year
Fragmented

What are teachers' perceptions of the key factors of the design and implementation process for effective PD in Digital Technologies for a New Zealand primary school?

The findings of this study highlighted some key factors of the design and implementation of Digital Technologies PD that are deemed important and effective. Alongside this, the findings also pointed to areas that, with improvement, could positively impact the efficacy of PD.

This study, therefore, concludes that content and activities within the PD need to be hands-on and practical. Activities need to allow teachers time to experience and become familiar with new tools and concepts. This was the highest-ranked element by participants and commented on as one of the most valuable parts of the PD. It was also considered to bring an element of fun and enjoyment to the PD. The literature highlighted that these learning experiences should be a combination of skills and pedagogy linked to student outcomes. Having an action research element was highlighted as important to the teachers in the PD as it encouraged them to plan, reflect and transfer their learning from the PD into their classrooms.

This was closely linked with another critical aspect identified by the study, i.e. the importance of getting to know teachers both personally and professionally in order to tailor the PD and content to best suit their needs. It is imperative that the facilitator takes the necessary time to conduct a needs assessment (this was conducted in this case but not included in the study) to discern the levels of knowledge and skills of the teachers, but to also understand their personal beliefs and attitudes towards both Digital Technologies and change and growth. Similarly, teachers need a strong reason to engage with PD and to sustain motivation and engagement across the PD. There could be a number of motivations for the PD, but the focus should be on improving learning experiences for students.

The study draws particular attention to the importance of collegiality and collaboration. For PD to be effective, there must be opportunities for teachers to collaborate and draw on the knowledge and support of others. Teachers ranked ‘ongoing support’ as one of the most pertinent factors to the success of their PD experience. Having discussions within the PD was seen as an effective and valuable element that encouraged both collaboration and support. Support needs to come from their peers, the facilitator and from senior leadership. Support can be in different forms such as allocating time within a teacher’s working day for the PD, resourcing for teachers to implement activities, and being available to provide assistance and guidance when needed. When examining the buddy support element, it would be important to consider the dynamics and combinations of teachers when implementing this type of support system. No matter the type of support, it needs to be sustained and ongoing.

In addition, it is important to consider the role of the facilitator and their qualities, which adds to the overall efficacy of the PD. This study emphasised the need for strong communication skills, flexibility, and in-depth content knowledge. The participants highlighted the importance of passion, positivity and approachability. Alongside this, strong professional relationships based on trust and non-judgement were crucial.

What are teachers' perceptions of the transferability and relevance of the findings for the recommended factors for effective PD?

All participants saw the benefit in other teachers experiencing this same PD. They also saw value in the results of these findings from the study as potentially helpful to other leaders, PD providers or facilitators.

Teachers suggested a hands-on workshop type approach to sharing the findings. Alternatively, or to complement this, teachers also suggested creating a short, easy-to-read infographic type document to share the findings. These suggestions also align with the findings of this study. Teachers have limited time so the shortest and easiest way to deliver quality content would be favourable.

Some of the literature reviewed stated that transferring an exact PD model to another context would either be ineffective or not yield similar results. However, there is a hope that for those designing and implementing PD there could be evidence from this study that could be useful in their context.

7.2 Recommendations

The following recommendations have been created with direct reference to the school of study and the literature reviewed. Whilst Carlson and Gadio (2002) pointed out that success stories may not be "automatically transferable to other situations" (p. 119), the recommendations may be of interest to other New Zealand schools or Digital Technologies PD providers and facilitators who endeavour to design and implement effective PD.

7.2.1 Recommendations for the design of PD

1. PD should take place within the teacher's existing school day and staff meetings are a pre-existing recommended structure for this. This may help address the challenge of time that all teachers face. Having a 'blended model' which includes the use of technology and the face-to-face 'in person' facilitator could be a more appropriate model for Digital Technologies PD.

2. Content should be a balance of theory and practice and include hands-on activities, active discussion and time for teachers to trial activities with their students. The suggested approach for this could be an action research model. With Digital Technologies, it is imperative to have hands-on learning time and activities that can be used in the classroom immediately. Together, these factors create engaging and relevant content for the teachers.

3. Teachers' needs, beliefs, contexts and realities must be taken into account. This is because teachers are diverse and PD must be tailored with these in mind to have a more effective impact. Specifically the levels of expertise and experience can vary greatly regarding digital technologies and such new curriculum expectations.

7.2.2 Recommendations for the implementation of the PD

1. There must be opportunities for teachers to collaborate, share and work together in the PD. This helps teachers feel supported and connected. It also creates an atmosphere of trust and enjoyment.

2. The facilitator should have certain qualities and attributes to effectively deliver and implement PD. These qualities include communication skills, approachability, and passion. Strong relationships between the facilitator and teachers need to be made and maintained. Perhaps, most importantly, the facilitator needs to be responsive and flexible to the needs of the teachers in the PD.

3. There needs to be a range of ongoing supports in place to help the teachers in their learning. These supports can be a buddy, reminders, access to resources, access to guidance when needed and sustained time for learning. This helps to ensure the learning from the PD is sustained.

7.3 Limitations of the study

The findings of the study are limited. The study focused on one school context and a small number of participants. Robinson and Lai (2013) highlighted that practitioner research can be a “highly contextual nature of practice” (p. 18). Despite efforts to minimise biases, it is possible that the pre-existing relationships, as well as my being involved in other aspects of the workplace in other capacities on-site, could have affected the accuracy of the responses. Therefore, the findings are specific to this school and these teachers.

Also, the interviews could potentially be seen as a limitation because they are a snapshot at the time they were recorded, and these perspectives can often change. Due to the voluntary nature of the participants, there is a possibility that teachers who were less open to change chose not to participate, thus potentially limiting the scope of perspectives.

A final limitation of the study could be proving the efficacy of the PD. The findings were based on teachers’ perceptions and data in relation to the teachers in one school participating in one PD. The study did not examine how the PD, as a result of teacher learning, impacted the students. Subsequently, it would be hard to conclude from this study that this PD results in sustained change or impact on teachers or students in the years following the conclusion of the PD. Perhaps using specific tangible measurements or following up with a longitudinal study to see the impact that the PD has had, or whether there is still impact much later after the PD, would help gain a better understanding about its effectiveness. However, Guskey and Yoon (2009) highlighted that the “implementation of any new professional development strategy should always begin with small scale, carefully controlled, pilot studies designed to test its effectiveness” (p. 498).

7.4 Areas for further study

1. An investigation of multiple teachers' experiences of a range of PD in Digital Technologies to ascertain a broader perspective of effective factors and also a comparison of different PD models used in Digital Technologies PD in New Zealand.

2. A longitudinal study of this school, or a similar school, on the ongoing impact as a result of this PD to more fully establish its effectiveness over time and the impact on students.

3. A more in-depth examination of the specific attributes of an effective facilitator or provider. Timperley et al. (2007) supported this area of further study by stating that "rarely were providers and what they did to promote teacher learning the subject of investigation" (p. xlv).

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APPENDICES

Appendix A: Information Sheets and forms

Information for participants

Identifying factors that influence the efficacy of Professional Development of Digital Technologies for New Zealand Primary School Teachers.

The Ministry of Education has made it compulsory for all New Zealand teachers to teach a new Digital Technologies Curriculum by 2020. Yet teachers are currently dealing with many different classroom demands, and this can make it difficult to build and sustain confidence and competence with e-learning tools and programmes. As the leader of Digital Teaching and Learning at our school, I am here to support our staff in this curriculum area. I want to create an effective professional development programme for our teachers that equips them with the tools and knowledge to implement the new digital curriculum.

What it will mean for you:
As a member of staff taking part in the PD you will already be participating in the PD, giving feedback and reflecting on your own experiences. If you agree to be a participant, you agree to the information you give in surveys or comments to be used as part of my study to evaluate factors that contribute to effective PD in Digital Technologies. There will be three surveys in total (one at the beginning and two at the end). It is your responsibility to take a copy (photo or photocopy) of the completed questionnaire answer sheet before placing in the sealed box to retain a copy of the answers you have provided if you wish.

Additionally, if you agree to be a participant you agree to meet with me for a 15-20 minute interview during non-contact time, on or off-site (your choice) to reflect on and answer questions related to the PD. The interview will be recorded and transcribed, and you will be provided with a copy of the transcript.

If you agree to be a participant, you will choose a pseudonym to use, and your real name will not be used, and any information you share will not be individually identifiable or shared with other participants. Any information that may identify you will be kept completely confidential. All information collected from you will be stored in a password-protected file, and only you, the researcher and my supervisor, will have access to this information. Your information will not be used for anything other than the purpose stated above.

If you agree to participate, you will be asked to sign a consent form. This does not stop you from changing your mind if you wish to withdraw from the project. You can withdraw up until the data analysis phase (I will advise you on this date a week in advance).

Please contact me if you need more information about the project.
Toni Westcott phone: 0273572645, toniwestcott@gmail.com
At any time if you have any concerns about the research project you can contact my supervisor:
My supervisor is Professor Hayo Reinders, phone 815-4321 ext. **8017** or email wreinders@unitec.ac.nz
or speak to our principal if you have any concerns or disputes.

UREC REGISTRATION NUMBER: 2018:1043
This study has been approved by the UNITEC Research Ethics Committee from 12 September 2018 to 12 September 2019. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee through the UREC Secretary (ph: 09 815-4321 ext 8551). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

Kind regards, Toni Westcott

Participant Consent Form (teachers)

Toni Westcott Research Project

Identifying factors that influence the efficacy of Professional Development of Digital Technologies for New Zealand Primary School Teachers.

I have had the research project explained to me, and I have read and understood the information sheet given to me.

I understand that I do not have to be part of this research project. Should I choose not to participate and understand that I can withdraw up until the data analysis phase (I will be advised of this closing date advice week in advance).

I understand that everything I say is confidential and none of the information I give will identify me and that the only people who will know what I have said will be the researcher and their supervisor. I also understand that all the information that I give will be stored securely on a computer at Unitec for a period of 10 years.

I understand that my discussion with the researcher will be taped and transcribed and that I will receive a copy of the transcript.

I understand that it is my responsibility to take a copy (photo or photocopy) of my completed questionnaires to have a record of the answers I have provided before placing in the sealed box.

I understand that I can see the finished research document.

I have had time to consider everything, read the Participant Information Form and I give my consent to be a part of this project.

I understand that the thesis will have Toni Westcott's name attached to it, and this may, in some way, be able to be connected to the school and myself.

Participant Name: ……..

Participant Signature: …… Date: ……

Project Researcher: …… Date: ……

Please contact me if you need more information about the project.
Toni Westcott phone: 0273572645, toniwestcott@gmail.com
Or my supervisor is Hayo Reinders, phone 815-4321 ext. **8017** or email wreinders@unitec.ac.nz

UREC REGISTRATION NUMBER:2018:1043
This study has been approved by the UNITEC Research Ethics Committee from 12 September 2018 to 12 September 2019. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee through the UREC Secretary (ph: 09 815-4321 ext 8551). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

Appendix B: First Questionnaire

QUESTIONNAIRE 1
DIGITAL PROFESSIONAL DEVELOPMENT

Your pseudonym:_____

Some helpful definitions

Digital teaching and learning: using digital tools and programmes to enhance learning for the students, eg. Seesaw, robotics, iMovie, iPad apps, Google docs, forms, slides etc.

Digital Curriculum: Understanding how and what to do to implement the 2 main strands of the new Digital curriculum at your year level.

Digital fluency: your skills and knowledge in using tools yourself such as Google.

Confidence: your own mindset or feelings towards how you use and implement digital tools and ideas.

Competence: your own personal skill level of how you use and implement digital tools and ideas.

1: very low understanding/ very low confidence

5: very well/very confidence/ high level of understanding

1. At the start of the professional development, how would you rate your **understanding of the new digital curriculum**? (circle the answer that best fits you)

   1 2 3 4 5
   very low very high

2. At the start of the professional development, how would you rate your **confidence** in digital teaching and learning? (circle the answer that best fits you)

   1 2 3 4 5
   very low very high

3. At the start of the professional development, how would you rate your **competence** in digital teaching and learning? (circle the answer that best fits you)

   1 2 3 4 5
   very low very high

4. At the start of the professional development, how would you rate your **digital fluency**? (circle the answer that best fits you)

   1 2 3 4 5
   very low very high

5. In the table below, please rate each element either a 1,2, or 3 in order of importance of the factors you think will **make the PD more effective** during the next phase of digital professional development.
1- not important, 2- somewhat important, 3- very important

Element	Ranking
Discuss and reflect on new learning/ Having discussions with colleagues in the sessions about the content.	
Have a go at some of the digital curriculum tasks/ hands-on activities in the sessions	
Construct our own digital tasks based on what we have learned	
Be given examples of what we can use in our classes	
Read and discuss professional readings	
Having a teacher buddy	
Having the facilitator or another teacher come in and model/work with you in your class	
Be given small independent weekly tasks to complete after our sessions to reinforce learning	
Reflect in a journal or online forum	
Be given readings to do at home	
The structure: short chunked 20 min sessions in a staff meeting rather than be an 'extra' on top	
Having ongoing support from the facilitator	
Having access to the resources and videos in my own time	
Support from the principal and other senior leaders	

7. Are there any other suggestions, comments, or ideas that you have that will **support you best** during the next phase of digital professional development?

_____
_____

8. Are there any other suggestions, comments, or ideas that you have that will **make the PD more effective** during the next phase of digital professional development?

_____
_____

Please remember it is your responsibility to take a copy of this before handing it in to the box in the staff resource room if you would like to keep a copy of the answers you have provided.. Thank you :)

Appendix C: Second Questionnaire

QUESTIONNAIRE 2
DIGITAL PROFESSIONAL DEVELOPMENT

Your pseudonym:_____

Some helpful definitions

Digital teaching and learning: using digital tools and programmes to enhance learning for the students, eg. Seesaw, robotics, iMovie, iPad apps, Google docs, forms, slides etc.

Digital Curriculum: Understanding how and what to do to implement the 2 main strands of the new Digital curriculum at your year level.

Digital fluency: your skills and knowledge in using tools yourself such as Google.

Confidence: your own mindset or feelings towards how you use and implement digital tools and ideas.

Competence: your own personal skill level of how you use and implement digital tools and ideas.

1: very low understanding/ very low confidence

5: very well/very confidence/ high level of understanding

1. At the END of the Professional Development, how would you rate your **understanding of the new digital curriculum**?
   (circle the answer that best fits you)

   1 2 3 4 5
   very low very high

2. At the END of the Professional Development, how would you rate your **confidence** in digital teaching and learning?
   (circle the answer that best fits you)

   1 2 3 4 5
   very low very high

3. At the END of the Professional Development, how would you rate your **competence** in digital teaching and learning?
   (circle the answer that best fits you)

   1 2 3 4 5
   very low very high

4. At the END of the Professional Development, how would you rate your **digital fluency**? (circle the answer that best fits you)

1 2 3 4 5
very low very high

5. In the table below please rate each element either a 1, 2 or 3 in order of importance of the factors that have **made the PD more effective for you.**
1- no impact, 2- some impact, 3- the most impact

Element	Ranking
Discuss and reflect on new learning/ Having discussions with colleagues in the sessions about the content.	
Have a go at some of the digital curriculum tasks/ hands-on activities in the sessions	
Construct our own digital tasks based on what we have learned	
Be given examples of what we can use in our classes	
Read and discuss professional readings	
Having a teacher buddy	
Having the facilitator or another teacher come in and model/work with you in your class	
Be given small independent weekly tasks to complete after our sessions to reinforce learning	
Reflect in a journal or online forum	
Be given readings to do at home	
The structure: short chunked 20 min sessions in a staff meeting rather than be an 'extra' on top	
Having ongoing support from the facilitator	
Having access to the resources and videos in my own time	
Support from the principal and other senior leaders	

7. Are there any other suggestions, comments about **what has best supported you** during the PD this year with Toni?

_____
_____

8. Are there any other suggestions, comments about **what has made the PD more effective** during the PD this year with Toni?

_____
_____

Please remember it is your responsibility to take a copy of this before handing it in if you would like to keep a copy of the answers you have provided. Thank you :)

Appendix D: Final Questionnaire

Questionnaire 3
Kia ora participants, could you please give me YOUR opinion on the transferability and relevance of the findings.

USEFUL TERMS:
Transferability: the ability to transfer and show evidence that the research study's findings could be applicable to other contexts, situations, times, and populations.

Recommended/effective factors: factors that are incorporated into the PD that have been found to be effective and or positive factors in making PD effective or successful.

Effective: successful in the sense that you were learning, and then implemented things into your practice or changed your practice in some way. Perhaps it shifted your thinking.

Findings: after I have analysed all the data, these are the main factors that, based on my study and research, make digital PD effective.

1. Do you think that these findings of the recommended effective factors would be useful for others to know?
   Choose a number:
   _____ _____

   1- not useful

   2- somewhat useful

   3- very useful

   4- other… please explain

2. What would be the best way (in your opinion) to share these findings to other educators?
   _____
   _____

3. Overall, how 'effective' would you rate the Digital PD programme you were part of with Toni Westcott last year on a scale of 1-4?
   1- not effective
   2- somewhat effective
   3- effective
   4- very effective

4. Do you think other educators would benefit from participating in this PD? (Circle Choice)

Yes No Other (please explain)
_____
_____
_____

Appendix E: Interview questions

1. `Which factors of the PD impacted on your experience of it?
2. What was your opinion on the blended learning element?
3. What was your opinion on the accreditation?
4. Was there anything else that you found that made the PD effective or not effective?
5. What was your opinion on having the PD followed up at staff meetings?
6. What was your opinion on the action research component of the PD?
7. Do you have any suggestions or changes for what I should do again/or change if I was to do this PD again with another group of teachers?
8. What was your opinion on the senior leadership buy-in?
9. What was your opinion on facilitator modelling sessions?
10. What do you think has been your biggest learning/shift?
11. What was your opinion on the techie brekkie sessions (the optional sessions)?
12. What qualities do you think make an effective Digital PD facilitator?
13. What was your opinion of the buddy system?
14. What was your opinion on when the PD took place (in the staff meetings)?
15. What was your opinion on the discussion time we had in the PD?

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TE WHARE WĀNANGA O WAIRAKA

Declaration

Name of candidate: Toni-Maree Westcott

This Thesis/Dissertation/Research Project **entitled** :

Factors that influence the efficacy of Professional Development in Digital Technologies for New Zealand Primary School Teachers.

is submitted in partial fulfillment for the requirements for the Unitec degree of Masters of Applied Practice.

Principal Supervisor: _____Hayo Reinders

Associate Supervisor/s: ____Jo Mane

CANDIDATE'S DECLARATION

I confirm that:

- This Thesis/Dissertation/Research Project represents my own work;
- The contribution of supervisors and others to this work was consistent with the Unitec Regulations and Policies.
- Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee.

  Research Ethics Committee Approval Number: **1043**

Candidate Signature: .....Date: ~~25/07/19~~ 18/11/19

Student number: **1476049**

Unitec
Institute of Technology

TE WHARE WANANGA O WAIRAKA

Full name of author: Toni-Maree Brooke Westcott

ORCID number (Optional): .....

Full title of thesis/dissertation/research project ('the work'):

Factors that influence the efficacy of Professional Development in Digital Technologies for New Zealand Primary School Teachers.

School: Te Miro

Degree: Masters of Applied Practice

Year of presentation: 2019

Principal Supervisor: Dr Jo Mane

Associate Supervisor: Prof Hayo Reinders

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