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Practicum as Nexus: Using student voice to improve digital pedagogy within ITE

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ABSTRACT

A digital dilemma has emerged in Initial Teacher Education (ITE) in which student teachers' (STs) confidence and competence to use actively digital pedagogy has been undermined by a mismatch between digital expectations and the reality of programme experience. This mismatch has a potentially negative impact on a ST's ability to develop confidence in using digital technology as a pedagogical tool. The image of the self-aware, proactive, and confident 'digital native' as graduate is fading. Instead, at least some graduates may be digitally underprepared or even unwilling to face what one graduate described as an "alien invasion of technology". This 'invasion', which is considered too advanced to understand, seeks to take over educational pedagogy. It typically surpasses the digital ability of both associate teachers (ATs) and STs.

This article presents the perspectives of graduating ITE Primary and ECE students from two New Zealand based ITE providers, firstly, about their experiences within their programme of study and how this supported the development of confidence in using digital technology as pedagogy, and secondly, how ITE providers can intervene to prevent the development of the kind of digital mismatch which may undermine student teacher confidence and competence. As a result, two models that potentially can empower practicum experience as the nexus for developing a ST's digital pedagogical confidence for professional application. The first model, 'Practicum as nexus for digital intervention', engages a whole course strategy for ITE to empowering practicum as the nexus for the development of digital pedagogical confidence. The second linked model provides an approach ITE could use to create space in coursework and practicum to safely develop digital pedagogical confidence.

Keywords

Digital confidence; pedagogy; initial teacher education; practicum; student teacher

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(pp. 47–61)

Introduction

A digital dilemma has emerged in Initial Teacher Education (ITE) in which student teachers' (STs) confidence and competence to actively use digital pedagogy has been undermined by a mismatch between digital expectations and the reality of programme experience. This mismatch has a potentially negative impact on a student teacher's ability to develop confidence in using digital technology as a pedagogical tool. The image of the self-aware, proactive and confident 'digital native' as graduate is fading (Bennett, 2012; Bennett & Maton, 2010; JISC, 2014; Smith, 2012). Instead, at least some graduates may be digitally underprepared or even unwilling to face what one graduate described as an "alien invasion of technology" at the conclusion of their ITE (Kim, Choi, Han, & So, 2012; Smith & Greene, 2013; Zhang, Tousignant, & Xu. 2012). This 'invasion', which is considered too advanced to understand, seeks to take over educational pedagogy. It typically surpasses the digital ability of both associate teachers (ATs) and STs; leading to a loss of what Gilbert (2013) calls 'networked expertise' within coursework and practicum space, further compounding the ability of a ST to develop the digital pedagogical confidence they assume their professional practice will require (Chai, Koh, & Tsai, 2013; Gilbert, 2013; Jones & Healing, 2010; Kim et al., 2012.). The result being "though technology integration into teaching and learning has been promoted for many years, beginning teachers and pre-service teachers continue to feel inadequately prepared to effectively integrate technology into teaching" (Lee, Smith, & Bos, 2014, p. 2).

Literature review

With an emphasis on key phrases such as 'developing digital pedagogical confidence in student teachers, pre-service teachers, and ITE', a search of the EBSCO database was undertaken of educational journal sources from 2009 to 2017 to elicit an understanding of the positions developing within the literature regarding this subject. The majority of the literature found on this subject tends to come from Asia-Pacific, American, and British contexts.

The first observation that emerged was that a different understanding of 'digital' appears to create a mismatch between ITE digital approaches and ST expectation (Liu, 2011; Highfield & Papic, 2015; Nilsson & Driclj, 2010). With ITE focusing on an understanding based on the idea that digital pedagogical confidence is developed by student exposure and use of digital tools, while ST expectation has focused on an acute awareness of what Jones and Healing, (2010) describe as a "superficial understanding of digital technology" (p. 352) and subsequently are looking to their ITE to take the lead in growing their understanding. In a nutshell, STs come to ITE expecting to be given what they need, while typically ITE providers assume that the ST brings this foundational understanding with them. This leads to what Voogt, Erstad, Dede, and Mishras (2013) point to as a significant gap between ST visions of educational best practice and what actually takes place within real educational contexts. Traditionally, the term digital has been defined as a skill, to be mastered and then attached within ITE to existing pedagogical approaches (Lee et al., 2014). Gilbert (2013), however, now argues that the term digital defines more than just a skill, it's a form of knowledge, thinking and doing. The literature shows the ST enters ITE with an expectation that fits more in line with being digital and expect their ITE to meet this need. They expect that digital learning with professional relevance will be embedded, modelled and scaffolded across all coursework and practicum learning opportunities (Akkonyunlu & Yilmaz, 2011; Beetham & White, 2013; Duncan-Howell, 2012; Killen, 2015; Kumar & Vigil, 2011). Typically, ITE has relied on a traditional definition that emphasised what Smith and Greene (2013) describe as a "drill and skill programs" (p. 123) in the use of specific technology with a learner-centric emphasis. This leads to the inclusion of singular technology skills based courses, often modelled by a select number of coursework educators, focused on learning digital skills but not engaging shifts in pedagogical thinking (Divaharan, Lim, & Tan, 2011; Kay, 2010; Lei, 2009; Smith & Greene, 2013, Zogheib, 2015). The emphasis in this approach is on being a competent user of singular digital technologies or skills rather than being able

to effectively engage and integrate as part of their teaching practice (Chen & Zhan, 2012; So & Kim, 2009; Yeung, Lim, Tay, Laim-Chiang, & Hui, 2012).

ITE has focused on preparing the stereotype of the 'digital native' to participate, shape, and lead digital pedagogy (Donnison, 2009; Zhou, Zhang, & Li, 2011). However, the literature now shows the majority of STs do not fit or identify with this definition (Corrin, Bennett, & Lockyer, 2010, White & Le Cornu, 2011). This stereotype develops an expectation that the ST, on entering ITE, would naturally react, adapt, and create with digital confidence (Bennett, 2012; Bennett & Maton, 2011; Duncan-Howell, 2012; Gu, Zhu, & Guo, 2013; Guo & Petrina, 2008; Somyürek & Coşkun, 2013). These attributes reflect global expectations highlighted by Corrin et al. (2010) that "the high levels of technology use in a young person's life should translate directly into their use of technology for academic purposes" (p. 648).

This mismatch presents an emerging picture of a digitally disconnected, often unsupported ST not proactively engaged in building the digital pedagogical confidence for their professional practice (Beetham, 2014; Killen, 2015). STs tend to be misunderstood by teacher educators who see them as 'digital natives' when they identified better as digital strangers or visitors (Czerniewicz & Brown, 2013; White & Le Cornu, 2011). The literature points to factors such as access, interest, and engagement of being as, or even more significant, than singular descriptor of age (Bennett, 2012; Brown & Czerniewicz, 2010; Jelfs & Richardson, 2013; Kennedy, Judd, Dalgarno, & Waycott, 2010; Somyurek & Coskun, 2013). Even those STs confident in social media applications have been shown to lack the confidence to use digital technology for active application in education. This is an idea supported by Smith and Greene (2013), who argue that "while today's college students may be familiar with social networking sites, digital music and video sharing, they are not as familiar with many of the opportunities technology offers to enhance and provide quality K-12 instruction in a classroom setting" (pp. 121–122). Overall, within ITE, this has contributed to the development of a mismatched reality in which the ST has not been supported to grow the digital pedagogical confidence they believe the profession expects them to have at graduation (Hedberg, 2011).

The literature also points to a parallel reality that teacher educators in both coursework and practicum contexts lack digital pedagogical confidence (Greener & Wakefield, 2015; Krumsvik, 2014; Smith & Greene, 2013). This lack of modelling impacts the ability of the ST within an ITE context to grow digital confidence (Davies, Mullen, & Feldman, 2017). Research shows many ATs are ill-prepared or even unwilling to participate in the development of STs' digital pedagogical confidence within practicum space (Gu et al., 2013). Most often this results from their own lack of digital pedagogical confidence, creating a dilemma where they become reluctant to integrate, model and use digital pedagogy in their professional practice. As a result, ATs modelling can reinforce to the ST a reliance on traditional pedagogical methods rather than a willingness to engage with digital approaches (Buadeng-Andoh, 2012; Romeo, Lloyd, & Downes, 2012). This reluctance or inability to engage with digitally confident ATs or coursework educators has been shown to frustrate many STs, who instead of finding digital mentoring, in fact, experience an institutionally reinforced disconnect that in reality had a negative impact on the growth of their digital confidence (Maslin, 2014).

The literature identified the existence of a disconnect between ITE intention and ST expectation in regard to how digital pedagogical confidence is developed and supported. This finding, which raises a number of significant questions for ITE in terms of where STs themselves best see space with their ITE study for their digital pedagogical confidence to be developed, supports the undertaking of this study. There is a need to listen to ST voice to identify their expectations for the nature of this space, approaches and ITE engagement which they believe will lead to their ongoing development of their digital pedagogical confidence. This study addresses these important issues.

Methodology

The constructivist methodology for this research was inspired by Charmaz's (2006) approach to grounded theory, which scaffolds a responsive journey from data analysis to the development of a new model (Taber, 2013). When embarking on the study, the researchers had a sense of direction but in keeping with grounded theory, the final direction of the research was able to be responsive and strongly influenced by initial participant voice. This contributed to clarifying our understanding of the core problem to be researched and questions that needed to be engaged from the participant voice (Chong & Yeo, 2015).

The initial phase (Maslin, 2014) identified the need for ITE to take a more intentional and direct role in supporting the development of digital pedagogical confidence and preventing the 'digital dilemma' which stunts student teacher digital pedagogical development. In keeping with grounded theory, we then engaged further with the literature from which Killen's (2015) concept of 'a metaphorical walled garden' and Gilbert's (2013) 'networked expertise' emerged as concepts which would guide the study's phase two. In fact, these were influential in the development of the two models that emerged from phase two and are reported here.

Data was collected through an anonymous online survey consisting of a mixture of 5-point Likert scales and open short answer questions. Year 3 Primary and ECE STs at Bethlehem Tertiary Institute and Laidlaw College were invited to participate. Thirty-one responded positively generating a 50 percent student response rate from the potential sample group. The open survey questions were designed to gain insight into STs' expectations for, and perceptions of, their own digital pedagogical confidence at the conclusion of their ITE and how different aspects of their ITE had contributed to the development of this insight.

Firstly, the survey examined their pre-course expectations, asking them to reflect on their digital expectations before they engaged in ITE. Secondly, the survey examined ST in-course expectations and questions focused on engaging their reflections of their digital experience during their ITE course of study. In particular, did their experience meet their expectations? If a mismatch was found, what impact did it have on their ability to engage with active digital pedagogy? Thirdly, the survey was designed to gauge STs' immediate post-programme conclusions of changes in their growth in their digital pedagogical confidence over the course of their study. Within this STs were asked to consider how programme structure, course design and support frameworks could be proactively engaged by ITE to prevent a mismatch between ST expectation and reality of experience occurring.

Analysis of the quantitative data was done using the statistical programme SPSS. ANOVA tests were run first to explore differences in the sample. Non-parametric methods (Mann-Whitney U-test and/or Wilcoxon R-test) were used to confirm the significant differences between sub-sample groups identified in the ANOVA analysis. Simple descriptive data regarding means and standard deviations of responses on each survey question were tabulated, and following that, a univariate correlation analysis was undertaken. Further exploration of the possible patterns in the data using multivariate analysis was considered, but not undertaken, as the nature of the study did not require it, and the sample size was too small to proceed with confidence with such tests.

The qualitative data related to ST feedback was analysed using an inductive thematic approach. The aim was to use the flexibility and accessibility afforded by this research analysis methodology to give "voice to experiences and meanings of that world, as reported in the data" (Braun & Clarke, 2012, p. 59.) Braun and Clarke (2006, 2012) and Clarke and Braun (2013) suggest that this methodology is pivotal in effectively presenting the rich characteristics and patterns evident within the data in a way that is relevant and applicable to a wider audience beyond just an academic sphere. An inductive thematic analysis was chosen as this meant that the codes and themes developed emerged from the raw student voice data. This data was collected using Google Forms and then read with general trends and ideas from the data being noted as general comments. These general trends and ideas were then

analysed and grouped into what Creswell (2014) describes as 'major', 'unique' and 'leftover' categories, with emergent themes being identified and tagged for coding. The data was then reanalysed and coded focusing on the major themes, with the intent of identifying major inter-relationships, connections and points of difference between the individual responses. These responses were then categorised and used to interpret the data and develop the theoretical model which is the focus of this article.

Limitations

Any survey is always at risk in the sense that STs will interpret questions differently. Some of our questions ask students to recall their expectations at the outset of their studies nearly three years beforehand. It is likely these recollections were less accurate than they would have been if they had been asked the questions at the commencement of their study programme. Due to the small overall sample size (N=31) these findings should be treated as exploratory rather than generalisable. While standard statistics have been used in the analysis, the small sample size means these figures should be treated with caution. Non-parametric statistical analyses appropriate for small samples have also been used and in all cases were supportive of the tentative findings presented here.

Differences in the sample

Based on one-way ANOVA analysis there were some small differences in the sample, firstly between ECE and primary respondents and secondly Bethlehem Tertiary Institute and Laidlaw College respondents. Compared to primary students, ECE students generally had a higher overall expectation of how well coursework would support digital confidence ($F = 4.27$; $p = .02$; mean (ECE) = 4.0; mean (primary) = 2.9). They also had a generally more negative outlook on how well practicum experiences modelled digital pedagogy ($F = 3.95$; $p = .03$; mean (ECE) = 1.6; mean (primary) = 3.0). Bethlehem Tertiary Institute students rated the digital integration in their coursework and assessment more highly than Laidlaw College students ($F = 6.11$; $p = .01$; mean (Bethlehem Tertiary Institute= 3.47); mean (Laidlaw College) = 2.67). On all other variables, there were no significant differences between ECE and primary students, or between Bethlehem Tertiary Institute and Laidlaw College students. The descriptive and correlational analyses that follow, therefore, treat the sample as one group.

Findings

Table 1 shows the overall rating of the 5-point Likert scales used (where 1 is highly negative and 5 is highly positive) showed that students were moderately positive about and held moderately positive expectations regarding issues of digital confidence when they began their training. ST reflections on their actual experiences during their training showed a less positive pattern. Despite this, their attitudes and beliefs about digital preparedness were more strongly positive at the end of their training, and they viewed their training as moderately positive. Soberingly, there is no statistical difference in their self-rating of digital confidence between the 'before' and 'after' ratings.

Table 1. Descriptive Statistics from Quantitative Survey Questions

		Mean	S.D.
Thinking about when you began your training…	How important did you think digital technology would be in becoming a 21st Century educator?	3.77	1.02
	What expectation did you have of your ITE in developing the digital skills needed to be a confident user of digital pedagogy?	3.29	1.01
	How confident were you of your own digital ability to adapt and engage with digital technology as a pedagogical tool?	3.35	1.02
	What level of expectations did you have that your practicum experiences would support the development of the digital confidence needed to be a competent user of digital pedagogy?	3.29	0.9
	What level of expectations did you have about how coursework and assessment experiences would support the development of the digital confidence needed to be a competent user of digital pedagogy?	3.16	0.86
Thinking about your training itself…	How well did your practicum experiences integrate the use of digital pedagogy?	2.87	1.23
	How well did your practicum experiences model the use of digital pedagogy?	2.77	1.12
	How effective were your interactions with associate teachers in supporting your understanding of how to use digital technology as an educational pedagogical tool?	3.06	1.21
	How well did your practicum experiences meet your expectations in relation to the need to confidently integrate digital pedagogy into your professional practice?	2.87	1.02
	How well did your coursework, including assessment experiences, integrate the use of digital pedagogy?	3.06	0.96
	How well did your coursework, including assessment experiences, model the use of digital pedagogy?	2.87	0.96
	How effective overall were your interactions with course educators/lecturers in supporting your understanding of how to use digital technology as an educational pedagogical tool?	3.16	0.82
	How well did your overall coursework, including assessment experiences, meet your expectations about the need to confidently integrate digital pedagogy into your professional practice?	3.03	0.91
Thinking about where you are at now…	How important do you think digital technology is in becoming a professional 21st Century educator?	4.45	0.85
	How confident are you now at the conclusion of your Initial Teacher Education in engaging with digital technology as a pedagogical tool.	3.52	0.93
	How well do you believe your Initial Teacher Education experience overall has prepared you for the digital realities of the 21st Century educational context in which you will teach?	3.26	0.93

In order to explore questions regarding the mismatch between expectations and experience, a correlational analysis was undertaken (see Table 2). The patterns of correlations provide evidence that students experience different aspects of their ITE distinctly. There is a cluster of significant correlations amongst those items relating to practicum and another cluster around those items relating

to course work, which allows meaningful reference to 'practicum' and 'coursework' as distinct constructs from the respondents' perspective. Further, there are almost no significant correlations between the experiences of practicum and coursework, supporting the inference that these are experienced as distinctly different aspects of the overall ITE experience.

Table 2. Correlational Analysis of Responses to Quantitative Survey Questions

	ITE preparation effectiveness	Digital confidence (POST)	Importance of dig. tech (POST)	How well coursework expectations met	Rating of Lecturers	Coursework expectations	Rating of coursework modelling	Rating of coursework integration	How well prac expectations met	Rating of AT	Rating of practicum modelling
Digital confidence (PRE)		0.47		0.38	0.41	-0.45					
Practicum expectations			0.39							0.38	
Rating of practicum integration		0.56*	0.41	0.45	0.58*				0.78*	0.68*	0.87*
Rating of practicum modelling		0.37	0.36		0.48				0.85*	0.75*	
Rating of AT		0.36		0.51*	0.53*		0.35	0.45	0.65*		
How well prac expectations met		0.46		0.36	0.42						
Rating of coursework integration	0.5*			0.64*	0.49*	-0.37	0.73*				
Rating of coursework modelling	0.53*			0.65*	0.54*						
Rating of lecturers		0.5*	0.37	0.62*							
How well coursework expectations met	0.62*	0.65*	0.5*								
Importance of dig. tech (POST)		0.5*									

N.B. All correlations significant at p>.05 have been omitted. Correlations significant at p<.01 are marked with an asterisk (*).

It is also clear that practicum experiences contribute most strongly to digital confidence. Neither coursework integration or coursework modelling show a significant relationship with digital confidence, while all four practicum related items do correlate significantly, with the rating of practicum integration (of digital pedagogy) displaying a highly significant correlation of $r = .56$ ($p < .01$). Further, the lack of any significant correlation between any of the practicum related items and the overall rating of ITE preparation effectiveness indicates that STs appear not to be connecting their practicum experiences to the perceptions they have of their ITE provider. This is not necessarily a

concern, but it does emphasise the distinctiveness with which students experience different aspects of their overall ITE experience[i].

There are two individual correlations that warrant further attention. There is a negative relationship between digital confidence at the outset of studies and the expectation held about the way coursework might contribute to digital preparedness ($r = -.45$; $p < .05$). This suggests that the higher a STs initial confidence, the lower their expectations are about how well the course will prepare them digitally. Digitally confident students do not perceive that ITEs are likely to offer them much in this space. Conversely, less confident students have higher expectations about what ITE will contribute. Similarly, those who had higher expectations initially rated the integration of digital pedagogy into their coursework less positively, while those with lower expectations thought more positively about that aspect of their ITE.

The central observations that can be distilled from the study's quantitative data are as follows:

1. Digital confidence is clearly linked to practicums (and not to coursework).
2. Students clearly experience coursework and practicums as separate things.
3. Students associate their ITE experience with coursework, not practicum.
4. Confident students do not expect their ITE to equip them digitally.
5. The students' experience of ITE did not build their digital confidence.

This study included both quantitative and qualitative questions (see footnote[ii]). While there was variability in both the ratings given by respondents and the nature of their qualitative responses to the questions asked, the overwhelming themes emerging from the qualitative analysis supported and extended the findings drawn from the quantitative data.

The quantitative findings also showed STs did not identify as 'digital natives' or connect to the notions of digital self-development associated with this stereotype. A sobering connection was that while ST awareness of the significance of digital pedagogical confidence grew, their overall ability to engage in this did not, which created the potential of a greater disparity upon graduation. A common plea within the data was the repeated voicing of "please do not assume that we come with great IT".

The question of where STs felt the ITE could best intervene saw practicum emerge as the nexus where digital confidence was engaged, supported, and facilitated. However, results also showed STs did not experience this nexus with practicum space as they often experienced disengaged digital practicum space and support. Linked to this, the ST data found that coursework was disconnected as a space in which digital pedagogical confidence was developed. One respondent commented on how they had been able to read about the pedagogical use of digital technology in real-life context but had not seen it used within their course learning. They commented, "I have not seen digital literacy modelled here in Tauranga (ITE), but I have read about [it] in length about some centres in Auckland who do use it confidently with the children." Another reflected that ITE needs to "integrate it more and require us to explore more technologies".

STs also encountered coursework educators and ATs who were unable or unwilling to lead, model, and support the growth of digital pedagogical confidence meaning the 'networked expertise' STs expected to engage across ITE contexts did not exist or was not recognised. This is clearly reflected in the response of one ST who commented that "lecturers don't model the use of cool tools so we don't know about it or get exposed to it until we have a job or are in PD". Another responded that "the whole time that I was there, there were only two lecturers who showed us things to do with technology". This lack of connection to confident professional digital expertise was also reflected in ST comments about ATs. One voice implored the ITE to "encourage the ATs in it. My final AT was

[i] This perceptual distinctiveness is important in supporting the validity of the model that is constructed later in this paper.

[ii] Online Survey**:** Link to online survey form

the school trouble shooter and was amazing which is where all my growth occurred. My other AT despised it as it took extra unnecessary time".

STs saw VTs (visiting tutors) having an underutilised role in intentionally being able to facilitate digital confidence of STs. This was due to their potential ability to firstly, facilitate and develop digital collaboration between AT and ST during practicum, secondly, act as a bridge between coursework and practicum learning space, and finally, play a mentoring role, especially if the AT is unable to. This was reflected in comments such as "it would be helpful to have the visiting tutors give specific feedback on the use of ICT". This meant that if the AT was not able to provide such the VT could at least partly compensate for this. The VT was also seen as a vital bridge for the student teacher in being able to influence and shape the overall shape of the practicum experience. This was expressed by a number of STs who concluded that the VT should "talk to associate teachers before we go into class to ask if they use technology for anything else but the roll" and be active in "encouraging the AT to grow in this area".

Reflective practice also emerged as a key, but often absent, foci in how digital pedagogical confidence could be developed on practicum. ST responses described an ITE context where digital assessment outcomes were often not evident. A strong disconnect emerged, with one ST reflecting, "I feel our assignments are not in line with the type of digital technology being used in the real world and we have hardly touched on using it". STs also saw that deliberate inclusion of digital pedagogical outputs as practicum outputs were vital in ensuring that there was a digital focus point within all practicum no matter the digital strength or focus of the practicum context. This is reflected in ST comments such as "having a task in the practicum folder would be a way for students and ATs to grow in this area". Another emphasised the importance of directed and intentional engagement with digital technology during the course of study and subsequent reflective practice by saying:

> I think students need to be presented with digital technologies and wrestle with the pros, cons and establish a strong pedagogy within it. And now as I enter a fully digital school I still want to thinking [sic] through my pedagogy and critique it before I begin teaching in 2015.

Discussion

From the analysis of the ST feedback two models were created. They both show how ITE potentially can intervene to create the context STs feel best developed the digital pedagogical confidence they assume the profession expects. The first model 'Practicum as nexus for intervention' (Figure 1) and the second model 'Scaffolded development of digital confidence across coursework and practicum space' (Figure 2) both provide an action plan that course planners can follow to build the digital pedagogical confidence of STs, ATs, VTs, and coursework educators by creating safe, scaffolded and interconnected digital experiences.

The first model (Figure 1) proposes a potential pathway of intervention that ITE could use, starting within section one to create the nexus practicum space or metaphorical walled garden STs identified best supported the development of digital pedagogical (Killen, 2015). The model focuses on developing ST digital pedagogical confidence within section one by deliberately intervening to ensure STs are engaged and supported in safe practicum space that will develop professional digital pedagogical confidence. Larose, Grenon, Monia, and Hasni (2009) and Merç (2015) clearly reinforce how critical it is that ITE take a stronger role in ensuring student teachers are able to see the integration of modelled digital technology practised in classroom contexts. In the short term, ITE initially should undertake a survey of potential practicum schools and map the extent networks of expertise and metaphorical digital garden spaces exists within practicum schools. These results would then be able to be used to ensure a more effective spread of placements and identify areas in which the ITE could target professional development and support to develop increased digital pedagogical confidence being assessable for practicum placement. The long term benefit of this approach would be

the development of enough practicum space so all STs would be able to have at least one practicum that is engaged within such a space; a factor both the literature and ST data show is the potential nexus of digital growth but currently some seem to miss engaging in altogether (Frey, 2008).

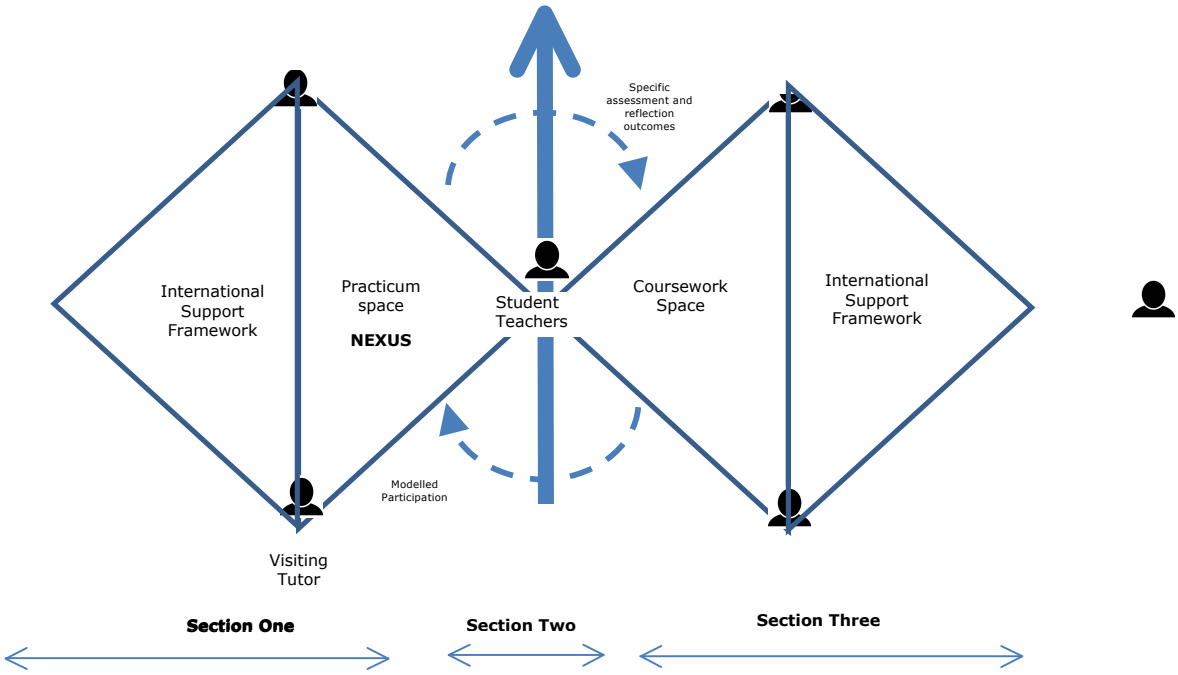

Figure 1. Practicum as nexus for digital intervention.

Section one of the model ensures ITE creates an intentional professional support framework behind practicum space that targets the growth of ATs' and VTs' digital pedagogical confidence. The aim of this framework is to ensure practicum space is able to provide the ST with the 'networked expertise' connection, mentoring, and support they expect (Nilsson & Driel, 2010). ITE could potentially begin such a support structure by providing ATs with examples of modelled best practice and providing online practicum support when they have STs on practicum. This could showcase how digital pedagogies can be modelled and embedded into enriched teaching and learning outcomes, showing clear ways they can scaffold ST learning already engaged within coursework space. This would, over time, widen the amount of practicum space available to an ITE provider to assist the STs' growth of digital pedagogical confidence.

The model cyclically connects coursework and practicum via section two so digital pedagogical confidence is continually scaffolded and supported from an ST's entry into ITE until their exit at graduation. From coursework to practicum this is via a foundation of 'modelled participation' embedded within section three coursework in which digital pedagogical confidence is intentionally modelled, embedded, played with, and reflected on. The aim of this being to prepare the ST with a pre-existing level of digital pedagogical confidence they can take with them into the nexus of practicum space (Norsworthy, 2008). To achieve this outcome, coursework space would be supported by an intentional professional support framework aimed at developing the digital pedagogical confidence of coursework educators and promote the development of digital assessment outcomes that model professional practice (JISC, 2017). The cyclic links would then return from practicum space to coursework space via intentional digital practicum assessment outputs which emphasise digital pedagogy outputs and reflection. Outputs, as shown in the literature can directly influence a ST's continued future integration of this in their professional practice (Liu, 2011). This intentionality could potentially make use of the media of blogging, micro teaching and the use of ITE supported Bring Your Own Device (BYOD). Creating a context in which all practicum space can still have positive

digital engagement and outcomes for STs is essential (Andersen & Matkins 2011; Harris, Bruster, Peterson, & Shutt, 2010; Viseu & Ponte, 2012).

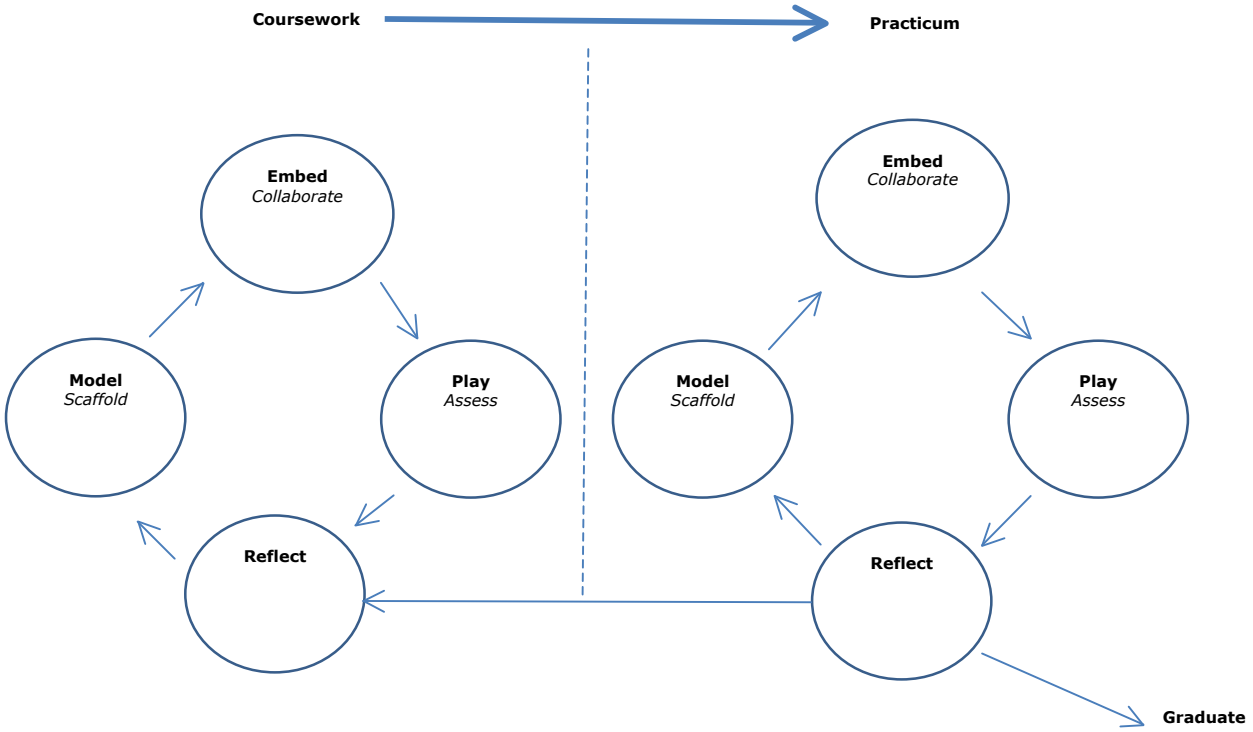

Figure 2. Scaffolded development of digital confidence across coursework and practicum space.

This second model (Figure 2) proposes a pathway to develop a connected cycle to scaffold the growth of digital pedagogical confidence within all ITE learning that can then be connected into further learning and practice. Each coursework cycle creates an active pathway for the ST that seeks to scaffold intentional spaces within both coursework and practicum that engage them in growing their digital pedagogical confidence. This is done by creating a pathway through a series of connected metaphorical walled gardens or safe spaces that build the STs' understanding of how to use a digital pedagogy through to a point where they are confident to use it within their professional practice (Killen, 2015). The first space sees the ST engage with either coursework educators or ATs modelling the use of digital pedagogical confidence in their professional practice. Secondly, the understanding developed by this modelling is further engaged by embedding examples of practice within a ST's coursework to reinforce the pedagogical use of a digital skill, tool or thinking process. Thirdly, space is then created that enables the ST to play with the digital technology and pedagogy, giving them a safe space to take the lead and apply it to a professional outcome of their choice (Killen, 2015). Finally, space is provided for the ST to critically analyse and reflect on key learning from this to feed forward into future course engagement and professional practice. This model supports Killen's (2015) argument that "confident modelling … by lecturers re-emphasises the professional value" and that this "works best when aligned with opportunities for students to practice and become proficient themselves" (para. 25). A cycle of professionally focused digital connection and integration is created that potentially could support the development and growth of confidence with digital pedagogy quickly. Both of these models assume development of ITE confidence through a commitment to modelling 'best practice'. ITE would develop a framework of professional development for their teacher educators to ensure they are able to model within their own practice what STs are expecting to engage. For example, at one of the authors institutions this is being targeted intentionally though a KPI related to course educators modelling specific digital pedagogies for students in each paper that is

taught. Course educators are supported in being able to do this through regular engagement with professional development and peer-to-peer mentoring.

Conclusions

Overall, the feedback from the student data gathered in the research correlated with the emerging picture in academic literature of a mismatch between ST digital expectation and the actual reality they experienced in ITE in being able to find the support frameworks needed to develop digital pedagogical confidence for professional practice. A range of challenges emerged, including disconnected learning space, a lack of intentional digital space and ineffective methods, and all contributed to the development of this mismatch that often left STs digitally disempowered rather than confident at the conclusion of their study.

The data gathered showed STs had strong insights for ITE to consider if the negative implications of a digital mismatch were to be averted in the future. Insight that Beetham (2014) points out that if listened to and constructively applied can develop solutions that are "better for everyone" (para. 11). Firstly, of particular note was the idea that ITE focus on developing practicum space as the nexus in which digital pedagogical confidence could be best supported. Secondly was the importance of reconnecting to the STs' coursework space as a context in which digital pedagogical confidence could also be grown. Finally, and perhaps most interestingly, the insight that ITE support the digital pedagogical confidence of VTs by considering the role STs saw they could play in developing and sustaining a nexus connection for both STs and ATs in practicum space.

To promote further discussion and consideration of these perspectives, two models were developed that offer potential pathway approaches in which ITE can create and continue to grow a ST's digital pedagogical confidence. The first model develops a pathway that ITE can follow to directly identify, grow and place STs in practicum spaces where there is a nexus of networked expertise in which the ST is confidently and safely supported in growing their digital pedagogical confidence in a professional context (Gilbert, 2013). Alongside this nexus space the model also creates a framework of intentional professional development to grow and support the number of metaphorical walled gardens and networked expertise that ITE is able to engage with and connect a ST to within practicum and coursework space (Gilbert, 2013; Killen, 2015). Consequently, ITE can engage and connect a ST towards digitally confident practicum and coursework experiences. The second model presented develops a scaffolded pathway of digital pedagogical confidence that ITE could apply within both coursework and practicum spaces to empower networked expertise (Gilbert, 2013). The model develops a pathway of spaces that educators and STs can follow to facilitate learning that incorporates connected cycles to engage modelling, embedding, playing and reflective practice of digital pedagogy.

Of interest now is what difference, if any, the implementation of these models would make to the growth of the ST's digital pedagogical confidence. A potential intervention based study could be engaged to see if these two models can be effective in practice. Also of interest is the widening of the research data to include examination of feedback data from ATs, VTs, and coursework educators to see if their responses correlate or diverge from the responses of the ST. This would potentially allow for an even fuller picture to be built around how ITE can best develop digital pedagogical confidence.

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