

Having a go: Looking at teachers' experience of risk-taking in technology integration

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Published online: 6 March 2015

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Abstract Risk is an integral part of change. Technology-related change in teachers' practice is guided by confidence engaging in and beliefs about integration. However, it is also affected by how teachers feel about taking risks, experimenting and change. This paper presents a theoretical framework of affect and emotion to understand how teachers experience and take risks in technology integration. The emphasis of this approach is on how individual teachers cope with risk and how it relates to learning. To illustrate the use of this approach, one teachers' experience with technology integration over 3 years in an Australian one-to-one laptop program is presented. Analysis of their experience using technology and experimenting through emotions of anxiety and happiness reveals the development of specific coping strategies to support integration. Successful coping strategies resulted in decreased concern about using new technologies in teaching and increasingly positive beliefs about student learning through technologies. Implications for supporting change and experimentation are discussed.

Keywords Teacher beliefs · Risk-taking · Technology integration · Emotion

1 Introduction

'Change requires tremendous sophistication as well as some risk taking' (Fullan 2007 p. 2). Adopting new digital technologies and related teaching practices still presents significant change for many teachers and continues to cause considerable uncertainty and anxiety (Ertmer and Ottenbreit-Leftwich 2010). While access to digital technologies in classrooms has significantly increased, and some teachers have readily adopted digital technologies, many more have not (Lim et al. 2013; Perrotta 2013; Wang et al. 2014). Teachers' uncertainties about integrating digital technologies have consistently focused on professional confidence using new tools and the resulting quality of student

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learning (Ertmer et al. 2012; Fullan 2007; Zhao and Frank 2003). Research in the area of risk analysis has identified that people who feel negatively about a choice, that it is too risky or outcomes are too uncertain, are unlikely to choose it (Slovic and Lofstedt 2000; Västfjäll et al. 2014). To support wider adoption of digital technologies and related teaching practices it is necessary to address and reduce teachers fears and uncertainties about technology integration (see Ertmer et al. 2012).

This paper argues that teachers' concerns about technology integration are about confidence using technology and beliefs about teaching and technology; but it is also about how teachers *feel* about taking risks and experimenting in their practice. The importance of risk-taking in change and technology integration has been noted in research (e.g., Ertmer and Ottenbreit-Leftwich 2010; Mueller et al. 2008), but its actual role has not been widely examined. By examining risk taking it is possible to better understand teachers' experiences, technology-related choices and why adoption and change continue to be limited in the classroom.

However, to do this, analytic tools are needed to examine risk-taking. While there is a large body of quantitative research (e.g., questionnaires) looking at risk-taking, there are few approaches for qualitative analysis (Hawkes and Rowe 2008). This paper presents a combined theoretical framework of affect heuristic (see Finucane et al. 2003) and appraisal theory (see Lazarus 1991, 2006). Similar frameworks have been used previously to analyze teachers' talk about technology integration (Howard 2013) and their emotions (Van Veen and Slegers 2006). In the current research, this framework is applied to examine one teacher's risk-taking and experimentation related to technology integration, to identify areas of uncertainty and risk. This is done through analysis of 3 years of interview, focus group and classroom observation data. The data was collected as part of a major four-year mixed-methods study of a large-scale secondary school technology initiative in Australia, the Digital Education Revolution in New South Wales (2010–2013; DER-NSW). While this is a large study, in this paper we aim to demonstrate initial use of the framework to examine risk-taking, which will be applied to the full data set in future work.

Findings will contribute to the growing body of knowledge about teachers' values, beliefs and experiences in technology integration. Specifically, results will contribute to our understanding of teachers' decisions relating to technology integration and how these may change. Findings begin to unpack some of the uncertainty and risk teachers experience, but will also highlight how these can be addressed to encourage technology-related experimentation and change for more teachers.

2 Background

In education, there have been few studies specifically addressing teachers' experiences with risk-taking (see Howard 2011, 2013; Le Fevre 2014; Ponticell 2003; Short et al. 1991). However, outside of education, risk research is 'one of the most lively areas of theoretical debate in social and cultural theory in recent times' (Lupton 1999 p. 1). In the following section, we first present brief discussion of risk, followed by what is currently known about teachers' risk taking and specific considerations of technology integration.

2.1 Risk

Risk is the possibility of unwanted results or costs resulting from behaviour. When the term ‘risk’ is used as a concept, individuals are often talking about *perceived risk* (Lupton 1999). Perceived risk is an estimation of possible risk, what *might* happen and what a person believes to be at stake (Rohrman et al. 2000 p. 15). Perceptions are based on a combination of personal past experience, information available at the time, as well as individual and group values and beliefs. It is also deeply embedded in culture and context (Douglas and Wildavsky 1982).

Perception of risk guides decision-making and choices of action (Slovic et al. 2004), but has little to do with the actual consequences of behaviour and more to do with a *feeling* of risk (Finucane et al. 2003; Slovic et al. 2004; Västfjäll et al. 2014). People take risks because they feel there will be a gain; they do not take risks when they feel the cost is too great.

2.2 Risk and teaching

Risk perception is domain specific and directly related to *perceived benefit* of an activity or task (Weber et al. 2002). There have only been a handful of studies examining teachers’ perceived risk and risk-taking in educational change (see Howard 2011, 2013; Le Fevre 2014; Ponticell 2003; Short et al. 1991). Studies have addressed different change initiatives, but identified similar perceived risks. Ponticell (2003) and Le Fevre (2014), two key studies in this area, both employed the psychology of risk-taking framework in their work. This framework is based on the themes of loss, significant loss and uncertainty. It is underpinned by the constructs of reasoning, perceptions and emotion (see Yates et al. 1992).

Using this framework, Ponticell’s (2003) one year study found that teachers participating in a school-within-a-school teaching initiative were uncertain if students would perform well on standardized tests, and they experienced loss and significant loss in relation to relationships with peers outside of the program. However, they valued the new program and were therefore willing to accept these uncertainties, losses and risks. Le Fevre (2014) demonstrated similar perceived risks within a school literacy initiative. Interviews showed that teachers experienced uncertainty in knowing if that students were learning using new literacy methods, and they were also concerned students may not ‘learn as well’ (Le Fevre 2014 p. 60). However, in Le Fevre’s study most of the teachers felt the risks were too high, as a result 11 of 12 teachers did not change their teaching. One teacher in the program did change their practice. She had perceived the same risks as the other teachers, but she did not believe they were *as risky* or that the loss was as significant (Le Fevre 2014). Instead, she felt empowered by the possibility of improving her practice. She was open to change and had a ‘willingness to take risks’ (Le Fevre 2014 p. 63).

These findings are important, however the psychology of risk framework, in its focus on dynamics of rational and emotional components of risk taking, potentially lacks sensitivity to the actual dynamic of the two. Slovic et al. (2004) have shown that emotion is a stronger mediator of risk taking than rational decision making. Indeed, Ponticell (2003 p. 21) identifies that ‘emotion and gain, which appear to be embedded in the constructs of loss and significance of loss, need to be further identified and studied.’ In the context of technology integration, looking carefully at emotion is

particularly important, as teachers commonly experience anxiety when using new technology tools (see Celik and Yesilyurt 2013; Hackbarth et al. 2003) and teachers can feel shame and loss of morale if they feel they are not meeting expectations of classroom teaching (Hall 2013). These are strong emotions that need to be appropriately accounted for in teachers' perceptions of risk and decisions about technology integration.

2.3 Risk and technology integration

The perception of risk is domain specific and related to a specific task or activity (Weber et al. 2002). Research has shown that teachers' perceived usefulness of technology is related to the belief that it is consistent with existing teaching values (e.g., Zhao and Frank 2003; Ertmer et al. 2012). Baylor and Ritchie (2002) described those who value change as having an *openness to change*. They defined this as a 'predisposition for trying new instructional innovations, the belief that they can take risks in teaching' (Baylor and Ritchie 2002 p. 399). Their survey of 94 teachers' openness to change in technology integration demonstrated that those scoring highly on 'openness to change' were more likely to have higher technological competency and stronger positive beliefs about the impact of technology in students' learning. Similar findings have been identified in Howard's (2011, 2013) research where teachers who were more likely to take risks using technology were more confident using digital tools and troubleshooting technology problems. Teachers who were less likely to use technology also reported high anxiety and low confidence; they were also likely to value digital technologies in teaching (Howard 2011, 2013; also Mueller et al. 2008). Importantly, teachers less likely to use technology felt risks of technology failure, such as a lost internet connection or software not loading, were too great and gains in learning too small. Those who were more likely to use technology perceived the same risks, but they felt negative impact on student learning was minimal and that students benefited from technology use (Howard 2011). Similar to the teacher in Le Fevre's (2014) study, these risk-taking teachers also placed a high value on change and improving their teaching practice.

The perception of risk and belief that one can take risks are biased by emotion and strongly affect decision-making (Slovic et al. 2004). This is of particular importance in technology integration, as many teachers experience significant anxiety about technology use (Hackbarth et al. 2003; Wilfong 2006). Research has identified that teachers who use technology are more likely to experiment in their practice and that they are likely to hold more student-centred beliefs about teaching (Becker 1994; Ertmer et al. 2012; Mueller et al. 2008). In the following sections we explore relationships among confidence using technology, beliefs about its use in learning and risk-taking.

3 Approach and methods

3.1 Theoretical framework

In the current study, we build upon Baylor and Ritchie (2002) work to explore teachers' risk-taking in technology integration. Risk is examined in relation to how teachers *feel*

about technology and change in teaching and learning, using a combined affective response (Finucane et al. 2003) and appraisal (Lazarus 1991, 2006) framework. How teachers' feel about technology integration will be analysed in relation to two known key factors of integration, confidence using technology and beliefs about teaching (see Ertmer and Ottenbreit-Leftwich 2010; Inan and Lowther 2010; Mueller et al. 2008).

First, when a person is confronted by a risk, to be simplistic, they will feel good or bad about it. Good or bad feelings about a risky choice or situation are termed an *affective response* (Finucane et al. 2003; Slovic et al. 2004). This is an emotional response. When an individual has a positive affective response to something, such as doing something they like, they will perceive it as lower risk. A negative affective response, something they do not like, will result in higher perception of risk. The higher the perception of risk, the less likely a person is to engage in that activity.

Emotion is the appraisal of beneficial (positive) or harmful (negative) person-environment relationships (Lazarus 1991). Lazarus' theory of appraisal provides a way to observe differences that characterise positive or negative emotional reactions (Smith and Kirby 2009). This approach has previously proven useful in analyzing teachers' emotions (e.g., Howard 2013; van Veen and Slegers 2006). Negative emotions underlying appraisal are anger, fright-anxiety, guilt-shame, sadness, envy-jealousy, and disgust (Lazarus 1991 p. 217). Positive emotions are happiness/joy, pride, love/affection, and relief (Lazarus 1991 p. 264). According to Lazarus, appraisal occurs in two stages. First, in primary appraisal (in the heat of emotion) people evaluate the relevance of a situation to themselves. *Core relational themes* of primary appraisal are perceptions of harm, loss, or threat and benefit (p. 87). Secondary appraisal is an assessment of knowledge, options and strategies. Secondary appraisal has three components: blame or credit, coping potential and future expectancy. Not all emotions reach secondary appraisal. Considering the sequence of appraisal outlined by Lazarus, it suggests that the psychology of risk-taking framework (Yates et al. 1992) would indeed be unable to fully assess perception of risk, as emotion occurs before rational thought, rather than the two being parallel components of perceived risk.

For an emotional response to occur a goal must be present and the behaviour must be *relevant* and *congruent* to the individual's well-being (Smith and Kirby 2009). Goal congruence is whether the situation is consistent with an individual's goals. Goal relevance and congruence, primary and secondary appraisal are presented in Table 1.

The more relevant, or important, a situation is to an individual the stronger the emotion. In this paper, to simplify the analysis, we focus on two underlying emotions:

Table 1 Emotions, core relational themes and appraisal

| Observable emotion | Affective response | Primary appraisal relevance/congruence | Core relational theme | Secondary appraisal |
|--------------------|------------------------|--|--|---|
| Anxiety | Negative (higher risk) | Positive/Negative | Uncertain existential threat (cost/loss) | (No role) Credit/ Blame Coping potential Positive future expectancy |
| Happiness | Positive (lower risk) | Positive/Positive | Gained or are gaining what we desire (benefit) | |

Anxiety (negative affective response/ higher risk perception) and Happiness (positive affective response/ lower risk perception). For appraisal to result in anxiety, an individual may feel a situation is relevant to them (important) but not congruent (consistent) with their goals. Research has shown that computer anxiety has a large impact on whether individuals' decide to integrate technology in their teaching (see Hackbarth et al. 2003; Wilfong 2006).

'Happiness' represents a situation that is important and congruent with an individual's goals. Teachers reporting high technology use are likely to believe that it supports students' learning outcomes and their own practice (see Ertmer et al. 2012; Mueller et al. 2008). A secondary appraisal may then result in positive future expectancy, such as learning gains or higher student engagement. In the following sections, we explore affective responses of Anxiety and Happiness to technology integration.

3.2 Data collection

Data used in this analysis was drawn from a 4 years evaluation of an Australian Digital Education Revolution in the state of New South Wales (DER-NSW). The program was part of a federal government's federal technology initiative aimed at promoting innovative uses of technologies to underpin all Australian students' learning (Department of Education Employment and Workplace Relations 2012). The program provided all full-time secondary teachers and every Year 9 student in a government school with an individual laptop, between 2009 and 2013. Students kept the same laptop until they graduated from school.

The DER-NSW program was evaluated using a mixed-methods explanatory design, in two phases: (1) online questionnaires exploring secondary teachers, 2010 Year 9 students and parents' access, capabilities and beliefs of technology, (2) five school case studies for deeper investigation of change and integration. Data were collected between 2010 and 2013. The evaluation of this program addressed four research questions. The question related to this paper is: how did the DER-NSW program influence teacher pedagogy? Specific research questions guiding the current analysis were: (1) how does teacher confidence integrating technology in the classroom relate to risk-taking in technology integration?; and (2) how do teacher beliefs about teaching and learning relate to risk-taking in technology integration.

3.3 Sample

This paper focuses on one teacher from the Phase 2 case study data. Case studies included teacher ($n=7-8$) and student ($n=7-8$) at five schools and were conducted over 3 years (2010–2012). While the DER-NSW was a large study, we have chosen to focus on data from one teacher to pilot use of the framework to examine risk-taking in technology integration. This teacher was chosen because they reported an overall positive experience with technology integration. Her experience is considered 'positive' because she felt her teaching had changed in some way between 2010 and 2012 and she took risks. Le Fevre (2014) recommends analysis of teachers who are willing to take risks to more clearly define aspects of risk-taking. The analysis presented in this paper illustrates use of the theoretical framework to examine

teachers' experiences in technology integration through interviews, classroom observations and analysis of student assessment task, triangulated with the three school focus groups, over 3 years.

3.4 Instruments

The two phases of the data collection, online questionnaires and case studies, addressed the same topics, asking teachers to reflect on: The DER-NSW program, issues of confidence technologies, beliefs about teaching, beliefs about technology integration and issues of school culture and leadership. Each school case studies included interviews and focus groups, and were conducted annually at each of the five schools. Interviews and focus groups each lasted one hour. The focus group and interview schedules were semi-structured using a combined typical and critical incident design, which prompted participants to discuss specific experiences illustrating beliefs, values, decisions and choices (see Flick 2000). Structured classroom observations looking at use of technology in teaching were conducted in 2010 and 2011. In 2012, samples of 'high achieving' student work illustrating technology use were selected by the teacher and discussed in the interviews.

3.5 Analysis

The combined framework presented in Table 1 was used as a basis for theoretical coding of conducted full interview and focus group transcripts. At the first level, transcripts were coded for expression of confidence using and beliefs about technology. Analysis of emotion in relation to these factors was undertaken at the level of core relational theme, as they identified harm, loss, threat or gain within primary appraisal (Lazarus 2006). This allowed for perceived risks and risk taking to be identified. Secondary appraisal was examined through comments of blame, coping strategies and future expectancy. Data was independently coded by two researchers. Inter-rater reliability was conducted to ensure consistency of analysis and discrepancies in the analysis were discussed until 100 % agreement was achieved.

4 Results and discussion

In the following section we present an analysis of one teacher's positive experience with technology integration over 3 years (2010–2012). The teacher is identified as Emma. Each year will be discussed in relation to her confidence using technology, her beliefs about technology in teaching, her risk-taking and her experience with technology integration.

4.1 Year 1: Engaging in risk-taking

Emma was a mid-career History teacher at a rural Australian high school (Years 7–12). In 2010 she expressed minimal personal interest in using computers. She reported using computers for administrative tasks and used her interactive white board (IWB) a 'few times a week.' Classroom observation confirmed use of the IWB and paper hand-outs.

She felt confident performing familiar tasks, but wasn't comfortable using the DER-NSW laptops or other new technologies:

I wouldn't say I'm extremely comfortable but... my skills are good for what I need to do. They're not fantastic... I don't have that real technical skill to fix things or even to know, oh so did I press the wrong button there.

Emma discusses uncertainty about her ability to use technology, but this did not limit her from using it:

I mean I'm willing to have a go at doing things, but I always have some kind of technical glitch. Just like a little tiny thing that I don't understand, and then I think 'oh my god' and I have to get the kids to help me, but I'll still have a go and do it.

In her primary appraisal Emma identified 'glitches' as a threat, which resulted in mild anxiety. Anxiety results from conflict between relevance and congruence of goals. Technology 'glitches' would be inconsistent with teaching goals, in that they take up time and are believed to lead to students disengaging (Howard 2013). However, she also clearly valued experimentation, illustrated through her prioritization of 'having a go.' In her secondary appraisal she identified getting 'the kids to help' as a coping strategy. Coping is separate from emotion and *follows* a stressful situation in secondary appraisal. It allows individuals to manage emotion in a situation, to make the situation more congruent with their beliefs and increase their ability to handle the situation (Lazarus 2006). This coping strategy allowed her to continue teaching while drawing on student expertise to deal with potential glitches.

This suggests that Emma has a positive affective response to experimenting and changing in teaching, not technology use. This is reinforced by her reflection on teaching:

I think most teachers like to change and update and continue to develop right up to the end of their teaching careers. I think that it's really important that in teaching... [we] have ...freedom and flexibility and [we are also given the opportunity to] experiment.

Her comments suggest that change was highly relevant to teaching goals. This suggests Happiness through congruence of teaching goals and change. Positive affective feelings would result in low perceived risk. This finding supports Baylor and Ritchie's (2002) that teachers 'open to change' will take risks. This also mirrors beliefs of Le Fevre's (2014) risk-taking teacher. In regard to learning, Emma felt the students benefited from using more varied technology resources and the 'whiz bang effects' engaged students, but the actual volume of information students were receiving was less than through other methods of instruction. She did not feel technology use improved learning outcomes. However, Emma did feel her use of laptops and other technologies was 'changing the way I will think, it has already impacted on the way I am teaching.' However, she did not feel her underlying approach to teaching or pedagogy was changing.

4.2 Year 2: Increasing confidence

Valuing change is a strong motivator for experimenting with technology in teaching (Ertmer et al. 2012) and would widen what Emma felt was possible in the classroom (see Windschitl and Sahl 2002). After a year, Emma self-reported a qualitative 50 % increase in her use of technology in teaching. She was using the IWB in every lesson, emailing colleagues and marking on the computer, as well as performing some personal tasks. She felt her technology use was changing. A new electronic role and grading system in the school motivated her to ‘open the laptop more.’ In the classroom, she was setting online research tasks and PowerPoint presentations, and using digital learning objects in her teaching. Classroom observations confirmed she continued to regularly use the IWB and some interactive digital objects embedded in SmartNotebook. Over the year, she adopted new teaching preparation strategies for using technology:

In the morning, I log on to the DER computer. I switch on the board. Then I’ll load up the different programs maybe from my thumb drive, that I’m going to [use in the day]. I open those up, have those sitting down in the dock, ready to go. If I’m going to Internet sites then I’ll go on and get the sites and again, have them sitting down ready to use, and then I will use it that way throughout the course of the day for the lessons.

She reflected on anxieties of the previous year and her coping strategies:

Last year I had a lot of trouble...sometimes the image wouldn’t go from the computer to the Smartboard... because people come in and change different things, if they’ve used it [it doesn’t work]. So, now I’m much more comfortable. And, you know, I was always worried that something would happen and I wouldn’t be able to get the image up on the board.

I had a computer tech guy write down and explain to me how to go into the small little box there, and how to send it to the board...I wrote that down in my daybook... now I’m much more comfortable. I can actually do that now without looking at the instructions...that used to be my biggest worry.

These excerpts provide insight into Emma’s secondary appraisal and how she coped with uncertainty. The issue of projecting the screen image on the IWB and accessing internet sites may seem small, but it is an essential function of teaching. In the focus groups, teachers identified if screen projections or web pages cannot be reliably accessed they would not use the internet or the IWB. Emma had previously identified asking the students for help with ‘glitches’ (2010). Here, she has specifically asked the ‘tech guy’ for help using the IWB and developed strategies to prepare for technology use, to minimize uncertainty and risk while teaching.

As one becomes more confident performing tasks, they will take more risks (Krueger and Dickson 1994). Emma’s use of technology and risk-taking did become more

complex and varied. At this time, Emma wanted to include more ‘laptop and visual stuff’ in her teaching. This is illustrated through one of her lessons:

In terms of something completely different, I set a task for Year Eight History where we watched a couple of programs from YouTube on performing Aztec sacrifice, we looked at a Spanish account of performing Aztec sacrifice, and the kids had to make a cartoon sequence [in a PowerPoint] of how to perform an Aztec sacrifice. So, they had to have a list of ingredients that you would use and divide it up into steps and some of those responses, and they were quite visual, they were excellent, and they were outstanding and their level of knowledge of the process was quite detailed.

Her comments suggest a more positive affective response to technology use and increasing congruence between technology use and students’ learning, where previously she was motivated by her value of change and experimentation. In 2010, Emma felt students were simply more engaged when using technology, but that knowledge acquisition was less. In the Aztec task, Emma felt the students’ visual presentation and level of knowledge was ‘excellent,’ suggesting possible shift in beliefs and stronger congruence between technology use and goals.

She also expressed the belief that students were visual learners and using technology supported how students liked to learn. However, she identified that preparing to use these resources ‘took hours,’ was ‘time consuming’ and also presented new risks, as illustrated in her reflection on a less positive experience:

The information was excellent from the TaLe [NSW department online learning tools] site, but the TaLe site crashes... quite often they can’t get onto TaLe when they’re all trying to get on at the same time. [The other day] we had to abandon the last part on frescoes and art work, and go back and do it from – how we’d used it previously, because we were running out of time, again, it was a time constraint. You can’t afford a 20 min period in a lesson that’s 50 min, where they’re not doing anything but trying to get on.

The main point in this reflection is the risk of technology being unreliable. Emma’s primary assessment, upon reflection, was one of resources being congruent with learning goals. However, she saw the cost of lost time as a threat to students’ learning. In her secondary appraisal, Emma blamed too many users trying to access the system, which is something she has no control over. Unlike using the IWB or other technologies, her coping strategy here was to reverting to a known reliable, but non-technology, strategy. In the focus groups, teachers all identified the need for a ‘non-technology’ back-up plan when teaching, as a ways to minimize the risk of unreliable digital tools and resources.

The decision to revert to a non-digital approach, or not, is an important coping strategy and a key part of teachers’ technology practice. Improving lesson preparation and asking peers for help builds Emma’s technological knowledge. This contributes to her feeling prepared to teaching with technology and builds her confidence in handling different problem situations (see Smith and Kirby 2009). This suggests a ‘virtuous circle’ of establishing coping strategies, feeling more confident and continuing to

experiment. Part of that feeling of confidence is certainly is having proven teaching strategies to fall back upon.

Emma's combined coping strategies helped to reduce uncertainty and anxiety experienced in the previous year. The risks were still present and new risks arose, but coping strategies provide a way to minimize potential costs of lost time and students being off task. Emma felt regular use of the IWB and the laptops was resulting in a wider variety of resource used in her practice. She also felt her communication with students had changed. She was emailing them, which she had previously not done, and had started providing electronic feedback on assignments. Ultimately, she still did not feel her teaching had fundamentally changed.

4.3 Year 3: Shifting beliefs

In 2012, when asked to rate her confidence using technology, Emma gave herself a 9 out of 10 for creating teaching resources and 'general everyday things.' For more sophisticated tasks, such as formatting work or photo editing, she gave herself a 2. Emma reported that the IWB continued to be her main strategy for instruction. She used it for all lessons. Tasks she was setting for students were growing increasingly sophisticated. She was having students make short videos, photo stories and PowerPoint presentations for assignments. Interestingly, she was experimenting with student tasks incorporating Adobe Photoshop and Prezi. She did not know how to use either of these two programs. Interestingly, she did not believe she needed to know how to use the technology for students to use it:

I don't mind going into classroom and telling the kids 'I don't know how to do this but I'm sure you'll be able to work it out' or have not a great deal of knowledge myself but because they are so good that doesn't worry me. I won't not do something because I can't do it – I mean I couldn't make a Prezi, but my classes make them.

Emma's primary appraisal resulted in no feelings of anxiety. Previously, she would have identified uncertainty and possibly worried about her ability to use new digital tools. In this example, she has continued to employ her coping strategy of having student help. She has broadened its application from 'glitches' to supporting more complex tasks and even underpinning the learning. Her statement, 'I won't not [sic] do something because I can't do it,' reflects her strong value of experimenting in teaching. This practice illustrates the virtuous circle of Emma's experience with technology integration. Her success and ability to cope with new technologies has resulted in more experimentation and risk taking. The perception of risk has been completely eliminated in her strong belief in students' capacity to 'work it out' and positive expectation that students will benefit.

Emma's teaching showed other evidence of change. She had designed a new long-term internet research task about World War I for her Year 9 students. This task comprised a range of online resources, such as soldier diaries and audio with authors, and several formative assessment points, such as small presentations and written tasks. Students had to work to a timeframe and submitted formative assessments via email at

the end of each lesson. Overnight she provided them with electronic feedback for the next lesson, which they would integrate into their work.

The use of continuous formative feedback is likely to have grown out of her increasing use of email to communicate with students. It suggested not only increased use of email, but also a shift to a more collaborative working dynamic between teacher and student (Ertmer et al. 2012; Warschauer et al. 2014). This project also provided students with an opportunity to manage their own work processes and demonstrate understanding through a wide range of media and assessments. This reflects a change in her use of technology tools, suggests a more student-centred teaching practice (Windschitl and Sahl 2002) and focus on development of students' critical skills (Ertmer et al. 2012; Hennessy et al. 2005). While findings suggest Emma's teaching had significantly changed, she did not feel her fundamental conception of teaching had altered. Rather, she believed *how* she taught had changed:

I think there's been a change in the nature of teaching. If I think about the women that I used to teach with who were really good teachers – if they came back and had to go into a classroom today, they would be going 'What? Oh my God' – like a different universe almost. They'd still be great teachers, but what we have to use now in our teaching has certainly changed hugely.

Emma felt 'good' teaching was the same. Her beliefs continued to reflect alignment of technology use with conceptions of 'good' teaching and learners' needs (Windschitl and Sahl 2002). While her fundamental beliefs about teaching may not have changed, positive beliefs about the relevance and congruence of technology with teaching goals and learning grew stronger. This suggests increasing happiness related to technology integration.

5 Implications and conclusions

This paper has illustrated use of the affective and appraisal framework through an analysis of Emma's technology integration over 3 years (see Table 2).

In relation to the research questions, findings suggest: (1) coping strategies can increase confidence taking risks and integrating technology and (2) positive beliefs about change in teaching support risk-taking in technology integration. Table 2 outlines Emma's experiences with and beliefs about technology integration. Most of the initial risk perceived by Emma resulted from uncertainty about technologies' reliability. Her experience using technology over the 3 years illustrates how teachers engage in more experimentation as they gain confidence (Ertmer et al. 2012; Windschitl and Sahl 2002). In this case, it was confidence solving problems while teaching, which has been identified in other research has a significant issue (e.g., Howard 2011). On a deeper level, confidence was more about the ability to cope with stressful situations, through which risk-taking becomes possible (Lazarus 2006; Smith and Kirby 2009). This suggests implications for teacher development and integration strategies and increasing focus on problem solving, in relation to pedagogy and/or technology tools. Interestingly, strategy and where it is useful will need to be investigated further.

Table 2 Emma's emotions, core relational themes and appraisal

| Observed emotion | Affective response | Primary appraisal relevance/ congruence | Core relational theme | Secondary appraisal |
|--|--|---|--|--|
| Technology use, anxieties: <i>technical glitches, images on IWB, unpredictability</i> | Negative (higher risk): <i>low confidence and uncertainty using technology</i> | Positive relevance: <i>supports learning and teacher experimentation</i> Negative congruence: <i>unable to solve problems in the classroom</i> | Uncertain existential threat (cost/loss): <i>worry and time</i> | Coping potential: <i>strategies to use students as support, support from IT, notes to self</i> |
| Technology use, happiness: <i>supports experimenting and change, evidence of improved student learning</i> | Positive (lower risk): <i>openness to change</i> | Positive relevance: <i>supports learning and experimentation</i> Positive congruence: <i>aligns with values and beliefs of 'good' teaching and visual learning</i> | Gained or are gaining what we desire (benefit): <i>good teaching, student learning</i> | Positive future expectancy: <i>developing beliefs about student learning</i> |

In regard to beliefs about teaching and learning, Emma's initial use of technology stemmed from her strong value of change and experimentation, not motivation to use technology. This finding is in agreement with research identifying that teacher change is motivated by beliefs about learning and conceptions of quality teaching (see Ertmer and Ottenbreit-Leftwich 2010; Fullan 2007). Emma's openness to change motivated her to work through anxieties, identify coping strategies and take risks. While Baylor and Ritchie (2002) believed having an openness to change was a personality trait, risk taking can be defined by a group or culture (Douglas and Wildavsky 1982). Not every teacher will be open to change, but risk-taking can be encouraged through developing a culture of change and experimentation in a school (Fullan 2007). By encouraging risk taking as a group, positive feelings about risk taking would be increased and perception of risk would be decreased.

Ultimately, this study has illustrated the use of the analytic framework to examine teacher experiences in technology integration. Specifically, using this framework it was possible to identify what Emma was worried about and the uncertainties of technology integration (e.g., Ertmer et al. 2012), as well as *how* she addressed these issues through various coping strategies. Emma was open to change and exhibited happiness about experimenting in her practice, but not all teachers hold the same beliefs or values. Teachers' technology-related anxieties would need to be addressed, before coping strategies could be created. Findings suggest providing specific support, such as a peer, to minimize issues of technology reliability while teaching would be an important place to start. Further analysis of the DER-NSW case studies will be conducted to better understand the relationship between risk-taking and coping strategies. Specifically, how coping strategies might form for teachers who are less open to change.

While providing insight into risk-taking in technology integration, findings presented in this discussion are limited in that they focus on only one teacher's experience. However, use of the analytic framework has provided a view of teachers experience in technology integration, particularly the importance of coping strategies. This approach provides an approach to understanding how teachers may feel about technology integration and risk taking. This is needed to understand how teachers can be supported to cope with uncertainty and risk – as risk taking is at the heart of change.

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