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Reflective Blogging as part of ICT Professional Development to Support Pedagogical Change

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Abstract: Reflection is considered an inherent part of teacher practice. However, when used within professional development activity, it is fraught with issues associated with teacher confidence and skill in reflective action. Coupled with anxiety generally associated with technological competency and understanding the nature of blogging, constructive reflection is difficult for teachers. This paper focuses on the reflective quality of school teachers' blogs. It describes teachers' perceptions and engagement in reflective activity as part of an ICT professional development program. Reflective entries are drawn from a series of blogs that are analysed qualitatively using Hatton and Smith's (1995) three levels of reflection-on-action. The findings suggest that each level of reflective action plays a different role in enabling teachers to transform their ICT pedagogical beliefs and practices. Each role is defined and illustrated suggesting the value of such activity within ICT professional development, consequently reshaping what constitutes effective professional development in ICT.

Introduction

In Australia both Commonwealth and State Government consider Information Communication Technologies (ICT) in education a priority. The Building the Education Revolution (Australian Government DEEWR 2009), the Australian Government's National Building, Economic Stimulus Plan (2009), the National Curriculum (ACARA, 2009) the National Secondary Schools Computer Fund which is part of the Digital Education Revolution (Australian Government DEEWR, 2008) together form an interconnected base which is seen by policy makers as central to ensuring innovative uses of technologies underpin all students' learning. These reforms are directing a move towards one to one student computer-device ratios across Australia. Compounding this is the fact that success with regard to technology integration has been based on how extensive or prominent the use of it has been in schools rather than on whether the teacher has been able to utilize it for 'new', 'better' or more 'relevant' learning outcomes (Moyle, 2010). If we want to reap the rewards of the enormous technological investment in Australian schools and help teachers to respond to changing tools and teaching environments and engage in different pedagogical ways that are effective for student learning outcomes we need to reconceptualise both the intentions and approaches to professional development.

Professional development has long been considered an instrument to support change in teacher practice. It has long been advocated that professional development in ICT should move from a 're-tooling' approach, which focuses on up-skilling in the latest software or technological application, to enabling teachers to engage with their 'hearts and minds' (Watson, 2001). This deeper more complex 'hearts and minds' approach sees teachers' engagement in ICT professional development described in the literature as a focus on issues

of pedagogy and context rather than on the technology skills (Blocher, Armfield, Sujo-Montes, Tucker & Willis, 2011); as a building of teachers' confidence in change rather than evidence of competence (Loveless 2008); a development of teachers' metacognitive skills (Phelps Graham & Thornton, 2006) and as a philosophical or re-visioning of ICT in learning (Karagiorgi & Charalambous, 2007).

Fisher, Higgins and Loveless (2006) drew these ideas together in what they called a 'renaissance', a request for a cultural change in the teaching profession, directing teachers to be critical change agents who redefine their pedagogical practices to deal with learning in a rapidly changing world. Such a redefinition of practice requires teachers to exercise discretionary judgement, engage with moral and social purpose, work within collaborative cultures, focus student learning on high task complexity and seek continuous learning (Hargreaves & Goodson, 1996). These principles must underwrite and be activated within ICT professional development if we are going to move from retooling teachers to enabling them to transform their practices.

The lasting appeal of Schön's notion of the reflective practitioner (Schön, 1983), the flexible and responsive nature of the action research spiral (McTaggart, 1997) and the value of teacher-as-researcher creating new pedagogical knowledge suggests that teachers who adopt reflective and investigative approaches to teaching can transform their own pedagogical assumptions and practices. Inquiry based professional development that draws on action research methods situates professional learning within the classroom context. Watson and Wilcox (2000, p. 58) suggest that "making sense or constructing meaning of one's professional world complements and enhances the body of objective and technical information". Reflective action is one technique considered to contribute to sense making particularly in complex situations such as developing pedagogy that transforms learning with ICT. Reflective action defined by Dewey (1933, p. 9) is the "active, persistent and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and the further consequences to which it leads". Dewey's seminal work on reflective thinking and Schön's (Schön, 1983; 1987) application of this work to the reflective practitioner foregrounds the inherent role of reflective practice in teacher professional development programs (Cady, Distad, & Germundsen, 1998; Clarke, 1995; Korthagen, 1993; Neapolitan, 2000; Yost, Senter & Forlenza-Bailey, 2000). In the past there has been discussion that reflection brings automatic calls in the improvement of teaching (Gore, 1987; Korthagen, 1993; Zeichner, 1987) and studies that claim such reformation of practice lack substantive evidence (Calderhead & Gates, 1993; Russell, 1993). What is presumed, among these scholars, is that reflection is beneficial to teaching practice in that it can improve teaching and provide a lens through which re-conceptualisation of practice recurs. In light of this premise, this paper investigates the role of written reflection as a central process in a 'hearts and mind' approach to ICT professional development.

Methods to Framing the Research

This paper reports on one aspect of a research project that had as its goal the development of a transformative model of teacher ICT professional development likely to enable teachers to change their pedagogical beliefs and practices to engage with digital literacies. The project was supported by funding from the Australian Research Council, a coalition of schools as industry partners, and an Australian University. The Suncoast Cyberschools, is a group of ten regional primary and high schools interested in ICT and its demand for new teaching strategies. Sixteen teachers across the ten geographically removed schools participated in the year long professional development program. One or two teachers from each school volunteered to participate based on personal interest. At each school there

was a school based leader who took on the role of supporting the classroom teacher with their inquiry. The leaders provided both mentoring support and managerial aspects of the project. At any time in the project teachers could withdraw without penalty.

Teachers' classroom inquiries were the focal professional development activity. Teachers were required to investigate the implementation of an ICT application in regard to their pedagogical practices and student learning outcomes. Table 1 provides the Inquiry Questions developed by each teacher. Teachers were engaged in various professional activities to support their classroom inquiries such as meetings with their school-based leader (onsite coordinator of the project), individual planning sessions with an outside expert, an online discussion forum and personal blogging through blog entries. The online forum and blog entries were tools used to connect teachers and develop a community of learners as schools were geographically removed.

Teacher	Leader	Inquiry Question
David	Cherry	How can the internet be used as a tool to enhance multiliterate student learning outcomes? What teaching strategies can I implement that will ensure students will use that internet productively? What learning activities will empower students' use of the internet?
Elspeth		How can students be supported when creating an electronic picture book using the theme 'Program Achieve'?"
Darren	Nicholas	How can my pedagogical practice through the use of information and communication technologies enhance student multiliteracy outcomes, within the context of a whole school musical production?
Immogen	Ivy	What strategies need to be employed to promote effective/productive ICT practices that encourage intellectual demand and recognise difference and diversity?
Megan	Harry	What are the effective teaching and learning strategies I could use to help students understand the power of multimodal presentations?
Kim	Harvey	How can I integrate word processing and publishing software to enhance student's understanding of selected genres?
Unwin	Kevin	How can ICT enhance student multiliterate outcomes flowing from the next phase of the Rainforest Project? How can my pedagogical practices impact on students' multiliterate outcomes flowing from the next phase of the Rainforest Project?
Kate Michelle	Kelly	What learning model will best enable students to present an artistic finessed media presentation that incorporates music and sound and is both informative and engaging? How do we ensure that the learning model suits our learning environment and that students can transfer their new learning/s into different contexts?

Table 1. Teachers' Inquiry Questions

Reflective writing was considered the major form of reflective action within reflection-on-action (Schon, 1983), that is, reflection before or after teaching. Each teacher was encouraged to maintain written and diagrammatic reflections in a blog. Teachers were provided with support material that provided a framework for reflecting after teaching (5R framework- in Bain, Mills & Lester 2002). School leaders at each school were asked to work with their teachers and support their reflective writing to stimulate discussions and the building of relationships online by commenting on each other's blogs. It was a mandatory requirement for all teachers to write a weekly blog.

Two facets of reflection are examined here, firstly teachers' perceived value of reflective activity and secondly, the role of written reflection in enabling change in pedagogy. Two methods were used to examine data. In relation to examining value of reflection, data drawn from teachers' final interviews and reports were analysed using the constant

comparative method (Glaser and Strauss, 1967) through the use of NUD*IST computer software. Themes drawn from this data will be discussed.

With regard to the role of teachers' written reflections, Hatton and Smith's (1995) levels of reflection were employed as an analysing framework. The three types of writing that are characterized as different kinds of reflection are: descriptive reflection; dialogic reflection; and critical reflection. All names used in the data reported in this paper have been replaced with pseudonyms. Ethical clearance was approved for this research by the Institutional Ethic Committee (ref. no: CTL/02/03/HREC) and all teachers gave their informed consent to participate in this research.

Results

It was found that one teacher, Megan, out of the sixteen teachers kept a reflective blog that demonstrated consistent reflection over the year implementation of her classroom inquiry project. Four teachers provided spasmodic entries, mainly at the beginning, which tapered off over the implementation phase, while the other teachers' writing would be considered by Hatton and Smith (1995) as record keeping and could not be considered reflective. Similar results can be found in other adult educators' reflective blogs (Holt, 1994) where teachers' lack of understanding on how to reflect limits their reflective writing abilities.

The perceived value of reflective writing and the role of reflective writing as a central process in ICT professional development will each be discussed respectively.

Perceived Value of Reflective Writing

The perceived value of reflective writing stated by teachers ranged from being 'highly-valued' encapsulated in this excerpt from Megan's final written report- "*The most outstanding benefit of this Inquiry Project was the development of my reflective portfolio. This allowed me a deeper understanding of my own teaching style and ultimately, greater effectiveness as a teacher*" to being 'non-valued' in a statement given by Harvey in his final interview as "*I don't know whether it's a man's thing or not...It's just not me*". The major themes that emerged from the data on teachers' perceived value of reflection was a lack of understanding on how to reflect.

As previously stated Watson and Wilcox (2000, p.58) heralded the perceived value of teacher's sense-making, however they also qualify that it "may emerge as chaotic, subjective, and tentative" in form. Such unstructured, uninhibited thought-work by teachers may suggest a lack of validity or of limited potential to the inexperienced reflective practitioner. What to write in the reflective blog and then what to do with these reflections were issues raised by the teachers. The following interview excerpt provides a teacher's honest response to maintaining a reflective blog. The following account given by Unwin's provides insight into teachers' personalities and predispositions for reflective writing:

Unwin: I just don't do it. What I would like to do now would be to, and I think because this inquiry thing was such a different way of doing things I've ever done before, it took me a while to get fair dinkum about it. I still couldn't get the blog. I did make a valiant effort to write something down. I think I've probably done half a dozen entries of typed and written notes, but having said that if I was going to do it again I'd probably be happier because I can see now the value of writing stuff down because Kevin [teaching partner] would come up to me and ask me a question and if I'd written stuff down painstakingly I could have said yep, its there, and this is what I did and this is the way we did it.

Whereas, if you commit it to memory you can't do it. So in terms of keeping the blog for that matter, that's one positive that's come out of it because if I were asked to do something like this again then I would do it much more readily.

Unwin's admits that he "*find[s] it difficult to reflect and write*". His difficulty with writing in a reflective manner is evident further along in Unwin's explanation of reflective practice. Reflective writing to Unwin is similar to recordkeeping indicated in his description of "*writ[ing] stuff down painstakingly*" and stating that "*this is what I did and this is the way we did it*". As explained previously, recordkeeping has no analytical elements. This indicates that Unwin does not understand how to write reflectively.

A teacher's valuing of reflective writing was found to be linked with a lack of guidance. There was no formal training provided to teachers. Teachers were asked to reflect on what was happening each week with regard to their classroom inquiries and were given the 5R framework as support material (Bains, et al., 2002). This framework provided five categories for reflection- reporting, responding, relating, reasoning and reconstructing. Additionally, questions and prompts to stimulate thinking were provided in initial project documentation and throughout comments on blogs by outside professional development expert who did the initial Inquiry project planning with each teacher. The following interview excerpt presents the quandary that a teacher found himself in, trying to help his teaching partner reflect:

Kevin: I need your advice on something Sarah. It's about keeping the blog up to date ...I feel that if I insisted on it he might be intimidated and jack up. That's a big part of the project isn't it? I might give him the key days and say we'll go and catch up because he reads mine. There might be some stuff that I can give him for those few days to catch up because he always remembers what's happened.

The guidance provided by Kevin indicates his understanding of reflection as descriptive or as a form of record keeping, the first level of Bain's 5 R framework. This is evident in Kevin's comment "*... those few days to catch up because he always remembers what's happened*". Also the idea that Kevin and his teaching partner '*catch up*' on reflections indicates a lack of understanding of the developmental or informing capacities of reflection.

In summary, the perceived value of reflection was inhibited by teachers' limited understanding of how to reflect in the written form. Both a personal lack of reflective writing technique and a lack of guidance was evident in the data. However, it is important to examine the role of written reflection as a transformational tool within ICT professional development if a teacher is able to engage in reflective action through written reflection. This paper now turns to examining the role of written reflections to identify how reflection supports teacher change in pedagogy.

The Role of Reflective Writing

Megan's reflective blog is examined here to ascertain the role of written reflection in improving teaching and providing a critical lens through which pedagogical beliefs and practices could be transformed. Megan's reflective blog was chosen, as she was the engaged systematically in reflective writing throughout the professional development program. Written excerpts are provided as complete entries. Megan at times chose different backgrounds for her blog pages and sometimes took photos of her written planning and posted these to her blog. To keep the sense of Megan's learning journey, written reflections are analysed in chronological order so that these types of reflections can be examined for their potential 'in situ'. Linkage between type of reflection and the role it plays in improving and or supporting teachers in transforming their beliefs and practices is emphasised. A short background on Megan's classroom inquiry precedes an analysis of Megan's written reflective blog.

Examining Reflective Activity- Descriptive, Dialogic & Critical

Megan's classroom investigation was titled EnviroSMART using a state government project, Comalco Green and Healthy Awards as impetus. This project required the students in her year four class (9 year olds) to investigate and develop a school environment management plan. ICT applications were used to collect data, develop the plan and to demonstrate the value of the proposed plan to the school and its wider communities. This was Megan's fourth year as a teacher. She had been transferred to this school at the beginning of the school year. The planning sequence for the EnviroSMART project is illustrated by Megan photo posted to her blog in Figure 1.

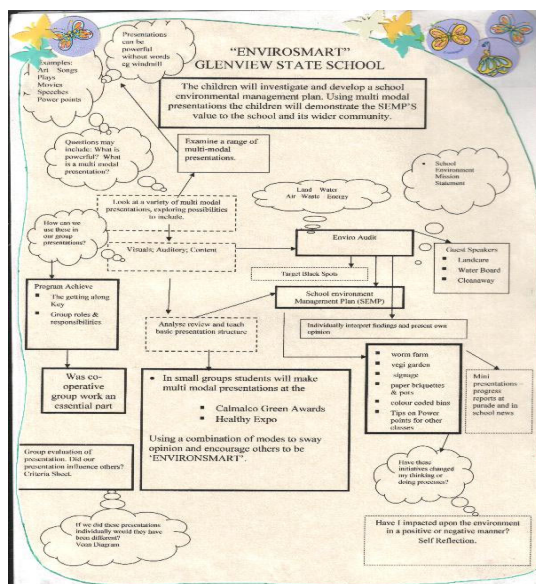
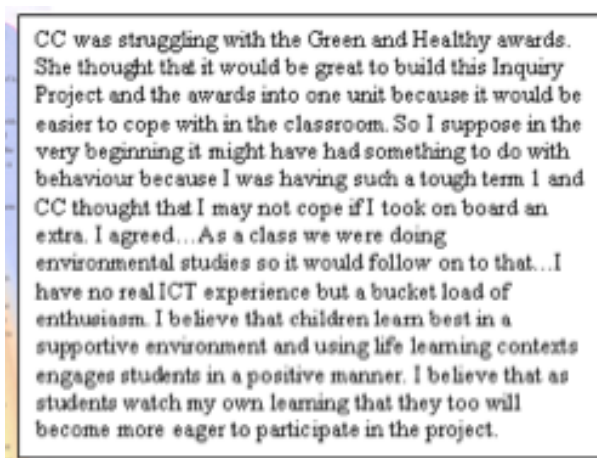


Figure 1 EnviroSMART project plan

Descriptive Reflection- First Level of Reflection

Reflection that is concerned with giving a range of reasons for action based on personal judgment is classified by Hatton and Smith (1995) as descriptive reflection. It is considered a more easily mastered and more commonly utilized form of reflection. Megan's blog is full of descriptive accounts of events and happenings that occurred during the teaching day. These descriptive accounts, like those described previously in Unwin's recordkeeping account, are not considered by Hatton and Smith (1995) as reflective. Rather descriptive accounts often serve to establish the context for descriptive reflection that deals with alternate reasoning. However, an early entry in Megan's blog deals with reasoning as evidence of descriptive reflection, as she validates her involvement in the Inquiry Project. The descriptive reflection section is provided here ('CC' is a term Megan used to refer to her school Principal).

Figure 2. Megan's reasoning for involvement in Inquiry Project



CC was struggling with the Green and Healthy awards. She thought that it would be great to build this Inquiry Project and the awards into one unit because it would be easier to cope with in the classroom. So I suppose in the very beginning it might have had something to do with behaviour because I was having such a tough term 1 and CC thought that I may not cope if I took on board an extra. I agreed... As a class we were doing environmental studies so it would follow on to that... I have no real ICT experience but a bucket load of enthusiasm. I believe that children learn best in a supportive environment and using life learning contexts engages students in a positive manner. I believe that as students watch my own learning that they too will become more eager to participate in the project.

Megan provides a number of reasons for being involved in the Inquiry Project. From a professional viewpoint she validates the idea of the Inquiry Project serving two purposes. One purpose being a directive from the Principal who is needing someone to take on the Green and Healthy Awards, which links in with her curriculum position as it is a “*follow on from environmental studies*”. Secondly, Megan justifies from a personal viewpoint, stating that behaviour issues in term one may have indicated that “*it would be easier to cope with*” if the Green and Healthy Awards become the unit of work to be investigated in her classroom. Megan continues to reason with becoming involved in the professional development activity through statements on personal beliefs about how children learn that are congruent to providing a real life context. Other reasons include professional growth opportunities especially noting ICT and the development of teaching strategies. Both professional and personal reasons are acknowledged by Megan to instigate action.

Through descriptive reflective passages, Megan explores and analyses her own professional practices, seeking what she considers as possible best practice. She writes in the first week “*Although I have a basic concept of what and when to teach- its HOW that remains a little foggy*”. A substantive concern that Megan expresses throughout the implementation of her Envirosmart project is on behaviour management. As the focus of the Inquiry Project is investigation of pedagogical beliefs and practices associated with ICT and digital literacies, and as Megan discloses that her first term experience with integrating powerpoint exposed a number of behaviour management issues, powerful precipitants for reflective action were created. Clarke (1995, p.255) identified “precipitants”, that is “those things that precipitate or initiate reflection” as an essential component of the process of reflection. The following descriptive reflection (Figure 3) demonstrates how Megan begins to reason about her pedagogy that is focused on behaviour management issues.

The other significant aspect to stand out this week was the difficulty in getting children's to cooperate. This reluctance is highlighted during brainstorming sessions whereby the children forget to follow the classroom rules. Some children were reluctant to follow the instructions that I had given. I realise that this may be because I am new to the classroom and thus I have not yet established my 'standing' within the classroom environment. I am not familiar with them and it takes time to develop a rapport. With out this rapport some children will balk at my attempts to

'rapport-rapport'

Figure 3. Megan's behaviour management issues

Megan describes a brainstorming activity using Inspiration software. Class behaviour was poor. As Megan values this type of teaching strategy and use of technology she reasons with the children's response by blaming herself for not establishing a productive rapport with her students. At this initial stage she is looking inward and analysing her own performance. Her current focus is on behaviour management rather than on learning outcomes. This focus changes in the following weekly reflection as she describes initial activities that her students are involved in (Figure 4):

The children enjoyed the 'enviroaudit' activities. Being able to work outside, interviewing and assessing our school has been an exciting and enjoyable series of lessons this week. They seem to enjoy the rating part of the exercise. They love finding other classes doing the wrong thing environmentally.

Figure 4. Envirosmart activities

In this section of her reflection, Megan begins to explore the educational value of the Envirosmart project. Her class used iPads to record interviews and capture photos of environmental activity. Her grounds for success with the enviroaudit activities derive from notions of relevance and connectedness developed in pedagogical strategies that make learning meaningful (Levin & Wadmany 2006). She states specific characteristics within the activities that the children enjoyed, therefore making conscious connection between student learning outcomes and her pedagogical beliefs and practices. Megan's investigation of effective teaching strategies also occurs when activities are not as productive as in the following reflection on ICT activities within the project (Figure 5):

The research on the net is proving difficult for quite a few children. I am not sure why this is. I will continue to revisit this during the next few weeks. The signs are also proving allusive for some children, struggling to find their artistic flair. I will try other ways of encouraging them to stay on task..

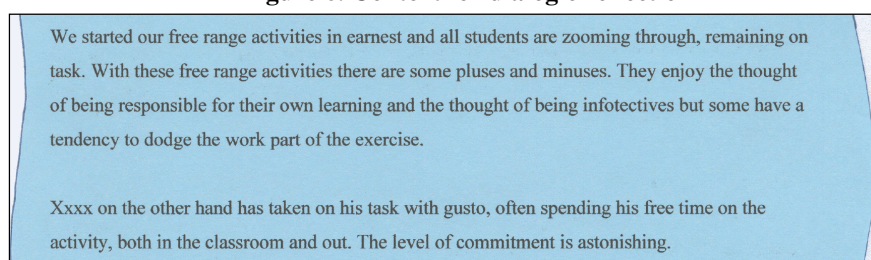
Figure 5. ICT activities

Even though Megan does not describe the teaching practices that were being used in supporting children's research on the internet or in the designing of signs, she is making conscious the connection between effective teaching practice and learning outcomes through descriptive reflection. She begins to express her reflection in a more dialogic manner towards the end of this written section by proposing the purpose of seeking different strategies that may encourage better learning outcomes. This tends to be evidence of the reflective capacity of Megan's written blog. The most common type of reflection is descriptive which provides a leverage for dialogic reflection that Megan chooses or does not choose to pursue, as found in the second level of reflection.

Dialogic Reflection- Second Level of Reflection

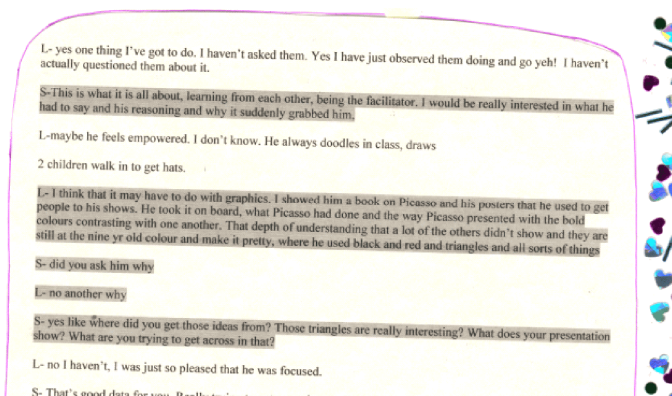
The reflective act of exploring possible reasons and alternative solutions of an action is expressed by Hatton and Smith (1995) as dialogic reflection. It is a reflective discourse with oneself. At this level, the problematic nature of professional practice is acknowledged and a speculative examination of why things occur the way they do provides meaning. As illustrated through descriptive reflection, Megan begins to make conscious connection between her pedagogical beliefs and classroom practices. These descriptive reflections provide context for dialogic examination. However, this is often not advanced, as illustrated in the following excerpt in Figure 6:

Figure 6. Context for dialogic reflection



The idea for the free-range activities came from Megan reading literature about the integration of technologies in the classroom. The principle that underwrites free range activities seeks to empower children to make choices in their learning and acknowledge the digital culture of children today (McKenzie, 1998). In this excerpt Megan is exploring the potential of students' self-directed learning as she mentions "*pluses and minuses*" with reasons based on her personal judgment. This indicates a descriptive reflection. What is significant is the last two sentences in which a revelation is made that child Xxxx [a label established by Megan to preserve the child's identity] who usually is a behaviour problem, engaged with a level of commitment that was found to be "*astonishing*". This descriptive account enabled Megan to acknowledge the potential of such a learning and teaching experience. However, the potential for a more insightful analysis of why [Xxxx] responded the way he did was not acted upon through dialogic reflection.

Megan's inability to look deeper into why children are responding in a particular way to a teaching strategy was made evident to her during a planning meeting. This planning



meeting occurred approximately mid-way through the implementation phase of the EnviroSMART Project. In this meeting, the outside expert took on the role of a critical friend and consistently asked Megan probing questions to help her look more deeply into circumstances occurring in her classroom. The transcript of the meeting was emailed. The following excerpt (see Figure 7) from the transcript of the planning meeting was found to be highlighted and posted on her blog, indicating the importance to Megan of this consciousness raising opportunity.

Figure 7. Highlighted transcript of planning meeting

In this excerpt of the transcript, Megan was describing the engagement in a learning task by a child who was considered a behaviour problem. Megan is reflecting descriptively, providing details of the task and the child's level of engagement. Throughout the planning meeting Megan was asked to consider why such engagement was occurring, with direct statements of "did you ask him why?" ('why' being emphasised) with connection to Megan's pedagogy made through discussion of the impact of teaching strategies on student learning outcomes. Megan acknowledges a number of times, that her response to a child working productively is to "just observe them doing and go yeh!", which supports the descriptive reflective writing found in her blog. However, when consistently probed for an examination of why this child is working productively, Megan vocalizes a dialogic reflection that presents her analysis of the reason for engagement, beginning with "I think that it may have to do with graphics...." Megan also demonstrates an understanding of the power of such reflection towards the end of this excerpt by responding with "no, another why" indicating that she realizes the value of unanswered probing questions about her pedagogy. Glimpses of dialogic reflection can be found in Megan's blog following this meeting, when she reflects back on a learning activity to explore why things went well. The last two sentences of this excerpt (see Figure 8) illustrate the beginning of dialogic reflection:

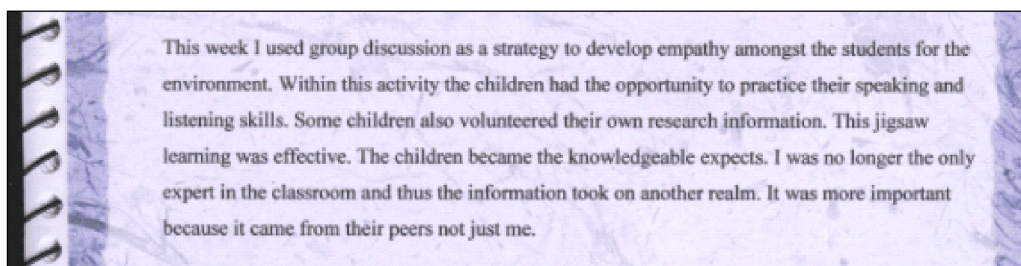


Figure 8 Example of dialogic reflection

In this excerpt, Megan is exploring her personal beliefs about how children learn and validating the use of a teaching strategy that supported her role as a knowledge facilitator.

She was discussing with herself why such a strategy was engaging student dialogue, in a manner that reinforced the benefits of this teaching approach. This process of exploring and examining what works and why it works is a powerful shaper of pedagogical beliefs and practices. Pedagogy illustrated through such discourse Megan expressed as “*children became knowledgeable experts*” and “*information took on another realm*” indicates development of a mindset consistent with effective integration of ICT and digital literacies (Ertmer & Ottenbreit-Leftwich 2010, Al-Zaidiyeen Mei & Fook 2010).

As established the depth of Megan’s reflective capacity at a dialogic level is minimal with greater conceptualization being achieved when direction is provided by a critical friend. Towards the end of Megan’s classroom investigation she reflected on her EnviroSMART unit of work in a diagrammatic fashion which she photographed and posted to her blog (see Figure 9). This diagram illustrates an application of dialogic reflection, as it demonstrates Megan stepping back and mulling over tentative reasons for success. The use of arrows is pivotal in this reflection to identify the critical facets that impacted learning. The EnviroSMART unit focused on development of persuasive language in combination with multimedia elements that together make a powerful presentation. Megan identifies the value of catering for all abilities and social skills by placing these statements in the centre of the diagram from which arrows emanate. Following the arrows downwards, the identification of focusing on different types of presentations using four different applications of ICT to cater for differing student learning needs is identified. This central flow is of greatest importance in her reflection, as other possible reasons for success explored to the right hand side and along the bottom, validate this core approach. This reflection identifies some of Megan’s new pedagogical beliefs and practices that have emerged as a result of participating in the ICT professional development program. These can be identified as providing children with a real world context for learning, catering for divergent needs of students, empowering and facilitating student self directed learning and the application of ICT in learning activities that have relevance and connectedness to students.

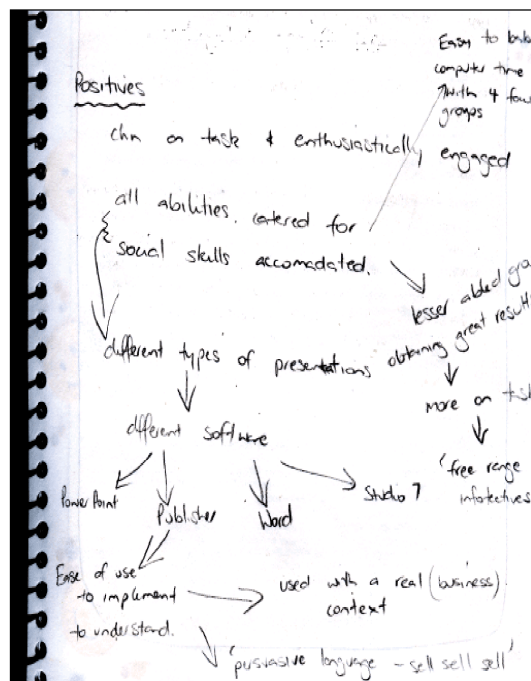


Figure 9 Reflection on Megan’s EnviroSMART unit

Dialogic reflection, though not as prevalent or as in depth as it could potentially be, enabled Megan to shape her pedagogical beliefs and practices through the exploration of

action within her classroom. While descriptive reflection enabled her to make conscious the connections between her pedagogical beliefs and actual practices, it served more as a justification exercise. Dialogic reflection moved Megan into the realm of examination and exploration of teaching strategies, thus having a greater possibility to help shape and transform her pedagogical beliefs and practices. The final level of reflection-on-action described by (1995) as critical reflection is now addressed.

Critical Reflection- Third Level of Reflection

Considered a more complex form of reflection than descriptive or dialogic, Hatton and Smith (1995) place the critical perspective at the higher end of their developmental sequence, as it requires metacognitive skills and an acceptance of a particular ideological framework. In essence, it involves reason giving for action, which takes account of broader historical, social or political contexts.

Evidence of critical reflection can be found spasmodically through Megan's reflective blog. Megan analysed her performance drawing on broader social notions of the teaching profession for the development of her conceptual understanding of teaching and her place within it. This type of reflective discourse has potential to impact her pedagogical beliefs and practices as it builds an understanding of the realities of teaching in the classroom. The following excerpt (see Figure 10) provides a snippet of the thoughts that are constructing Megan's identity as a teacher:

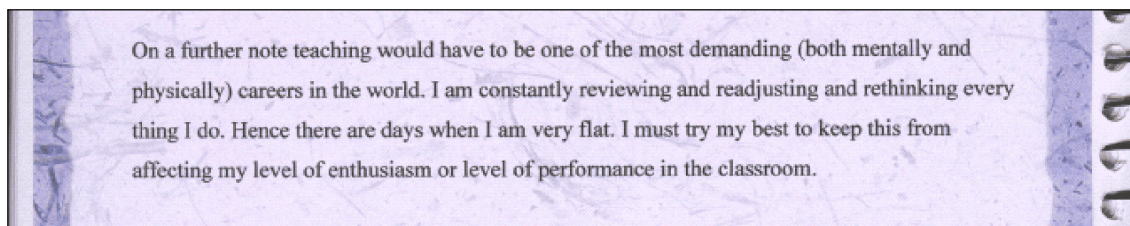
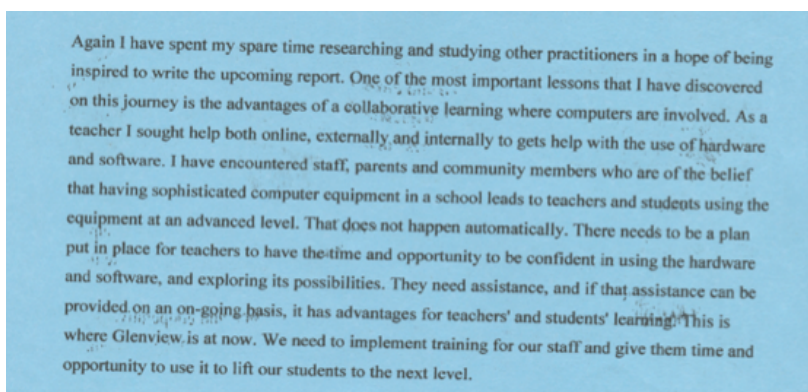


Figure 10. Megan's identity as a teacher

In this excerpt Megan is drawing on sociocultural norms that define a teacher. She reasons with these notions to reform her construct of a teacher by stating that it is "*the most demanding (both mentally and physically) career[s] in the world*". She then draws on this belief to validate the pedagogical practices she needs to implement and maintain in her classroom. Evident in this excerpt is a transformation of Megan's concept of a teacher from an existing sociocultural and historical image to an evolving concept that is responsive to her classroom experiences.

Further exploration of this evolving conceptualization is evident as Megan reflects more broadly on her learning as an outcome of participating in the Inquiry Project. As noted, critical reflections, like descriptive and dialogic reflection are evident spasmodically throughout Megan's blog, rather than found in a sequential order. In any weekly reflection, one or more of the types of reflections can be found. The following complete weekly reflection found in the middle section of Megan's blog, indicates that she drew on critical reflection to make meaning as required rather than towards the end of her blog when it would be more likely for broader statements or summative conclusions to be made. The complete weekly reflection is provided (see Figure 11) to illustrate the blog entry position [week 5] and the section, which demonstrates critical reflection is enlarged:



Again I have spent my spare time researching and studying other practitioners in a hope of being inspired to write the upcoming report. One of the most important lessons that I have discovered on this journey is the advantages of a collaborative learning where computers are involved. As a teacher I sought help both online, externally and internally to get help with the use of hardware and software. I have encountered staff, parents and community members who are of the belief that having sophisticated computer equipment in a school leads to teachers and students using the equipment at an advanced level. That does not happen automatically. There needs to be a plan put in place for teachers to have the time and opportunity to be confident in using the hardware and software, and exploring its possibilities. They need assistance, and if that assistance can be provided on an on-going basis, it has advantages for teachers' and students' learning. This is where Glenview is at now. We need to implement training for our staff and give them time and opportunity to use it to lift our students to the next level.

Figure 11 Critical reflection

Through critical reflection Megan comes to an understanding about ICT professional development, its purpose and design for supporting her and her colleagues' professional development at her school. Megan draws on her own beliefs and experiences in coming to the realisation that what "*I have discovered on this journey is the advantage of [a] collaborative learning where computers are involved*". From this new perspective she confronts the outward ideals about ICT expressed by staff, parents and community member summed up as: sophisticated computer equipment equals sophisticated use in classrooms. Megan confronts this with the statement: "*That does not happen automatically*". Megan then articulates the purposes and processes she believes to be most effective for ICT professional development. At this critical level, Megan is reconstructing her understanding and developing future action plans.

In summary, the most common type of reflection found in Megan's written blog was descriptive. In this context descriptive reflections provided opportunities for dialogic reflections that were more often not actioned. In Megan's case, dialogic reflection was found to require direction or support from a critical friend. However, capability for this form of reflection was indicated. All three types of reflection were found throughout Megan's blog such that a critical or dialogical reflection occurred at any point, often embedded within descriptive reflection that was found to give rise to the other types. Data support the notion of a developmental sequence of reflection starting with the more simplistic descriptive form, as this was found to be the most prevalent, whereas the more demanding types of reflection, dialogic and critical, were evident in emergent form.

Each type of reflection played a different role in enabling Megan to transform her pedagogical beliefs and practices. The role of descriptive reflection was that of a connector, making conscious the links between Megan's pedagogical beliefs, current teaching practices and student learning outcomes. At this level, Megan was concerned with issues of best practice and intrinsically driven motives. The role of dialogic reflection was that of a shaper, where these conscious connections between beliefs and practices were examined and explored, enabling her to transform her pedagogical beliefs and practices. At this dialogic level, Megan was able to identify specific strategies and practices that were successful or not successful in enhancing her students' learning and in this way, shaping her beliefs and future pedagogical practices. Lastly, the role of critical reflection was that of a positioner, placing Megan in the role of a professional teacher and providing a lens through which to critically evaluate her professional role from the inside and outside. This broader lens helped her re-conceptualised her image as a teacher which instigated an alignment with and validation of her pedagogical beliefs and practices. Written reflections were found to play a substantial role in enabling a teacher to transform her pedagogical beliefs and practices as part of an ICT professional development program.

Conclusion

This paper has explored the perceived value and role of written reflection as a central process within ICT professional development to move our conceptualisation from a retooling approach to one that engages teachers with their hearts and minds. The results indicate that if a teacher understands how to reflect in the written form, reflective action plays a significant part in enabling them to change their pedagogical beliefs and practices as part of an ICT professional development program. Each type of reflection can play a different role in enabling a teacher to transform their pedagogical beliefs and practices. The role of descriptive reflection can be that of a connector, the role of dialogic reflection can be that of a shaper, and the role of critical reflection can be that of a positioner. Lack of guidance and support were found to affect reflective action in this research context.

Reflection provides the tools and processes for teachers to engage with new ideas. It provides the conscious acknowledgement of time for teachers to think critically about, reason with and examine what is actually happening in their classrooms, enabling change and future action. Reflection as a professional learning activity within ICT professional development can provide teachers with a means of actively transforming their practice to respond to changes brought by ICT. No longer can we consider ICT professional development on the basis of enabling teacher competency with new technologies. A focus on pedagogy through teacher analysis of their ICT beliefs and teaching practices is more likely to enable a pathway to reformation of practice. Reflective action in the written form has a significant role to play in professional development pathways.

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