

“The game is in the tutorial”: an evaluation of the use of an e-portfolio for personal and professional development in a medical school

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An e-portfolio system was introduced into the personal and professional development curriculum at the University of Western Sydney School of Medicine (UWSSoM) during 2011 and 2013. Adopting the methodology of Design-Based Research and an interpretive framework informed by Activity Theory we developed a set of educational design principles based on the analysis of the use of the e-portfolio system by students and tutors. These principles contain a range of insights applicable to the local context and may also be of interest to curriculum designers working in other domains.

Keywords: medical curriculum, personal and professional development, e-portfolio, learning design principles, activity theory, design-based research

Introduction

Digital technology plays an important role in the delivery of curricula in medical education. From simulation to learning design, technology continues to be used innovatively in the medical curriculum to facilitate student engagement and participation in learning activities. An e-portfolio can enable educators to facilitate learning opportunities that are longitudinal in nature with a focus on learning designs concerned with the process of learning over time. To encourage an emphasis on learning as a formative process, an e-portfolio system (PebblePad) was used to facilitate the delivery of the Personal and Professional Development (henceforth, PPD) curriculum of a medical degree. In this paper, this system is evaluated and educational design principles arising from this evaluation are developed. It builds on previous work conducted in the same context (Mason, Langendyk, & Wang, 2013).

In this study we collected quantitative and qualitative data. The methodology of Design-Based Research (henceforth, DBR) is adopted and reflects our interest in research that is iterative in nature and embedded in practice. An interpretive framework based on Activity Theory (henceforth, AT) is used to assist in the interpretation of the data and to help shape the educational principles that have emerged from the study.

The curriculum and student context

The UWSSoM was established in 2007 and is one of the newest medical schools in Australia. The students in the five year undergraduate medical degree are mostly high-school graduates and a small percentage of mature aged students have either had previous careers or graduated in different disciplines. There is an equitable balance between male and female students.

The curriculum of the School of Medicine is structured around four themes: PPD, patient care, scientific basis of medical practice and health in the community. The four curricular themes, together with their associated graduate outcomes, communicate the vision and the values of the medical school to the students, staff and associates of the school and the wider community. A combination of modalities is used to deliver these themes from classroom-based tutorials, campus-based ‘conference’ weeks and immersion in various types of clinical environments.

One of the functions of the Australian Medical Council (henceforth, AMC) is the accreditation of Australian medical schools. All medical schools are required to conform to curriculum requirements specified by the AMC. One of these is the need to include a PPD component in the curriculum. PPD is a component that is taught throughout the course and this paper focuses on the delivery of the PPD curriculum during the first two years.

PPD has two major tasks in medical education. The first is to encourage students to take an active and questioning approach to their developing professionalism. The PPD curriculum is designed to give students specific opportunities to reflect on how their professionalism is being shaped by their experiences in medical school and to develop, articulate and justify their own ideas about medical professionalism. The other main task of the PPD curriculum is to present students with opportunities to explore a wide range of perspectives on issues that are relevant to professionalism but which tend not to get adequate focus in the rest of the busy and full medical curriculum. The PPD theme is underpinned by graduate outcomes which encompass the professional capabilities, values and responsibilities which are expected of medical graduates from the UWSSoM and these are outlined below.

1. Displays and reflects on, appropriate professional attitudes and values.
2. Works effectively and cooperatively as a member of a multidisciplinary team and as a member of the health care system.
3. Engages in self and peer evaluation, lifelong learning and teaching.
4. Recognises own personal, physical and emotional needs and is aware of the pathways available for assistance.
5. Engages in scholarship of the arts and humanities to interpret the diverse human experience of health, illness and medical care.

Development of the new PPD curriculum in 2011

Medicine is dominated by the scientific paradigm which exerts a powerful influence on students' conception of medicine as a profession and, hence, on the development of students' professional identity (Waldstein, Neumann, Drossman, & Novack, 2001). The PPD curriculum focuses on the subjective and the sociocultural dimensions of medicine. It is frequently denigrated as "soft" by students and staff alike. Although it is now a required component of medical school curricular, PPD still struggles for legitimacy in the medical curriculum. We call this the *negative discourse of PPD*.

Three years ago, aiming to overcome student negativity, the curriculum design team undertook significant curriculum reform for the first two years of the course. The curriculum is now delivered via fortnightly tutorials during which students are encouraged to engage in discussions and collaborative activities which focus on the philosophical, ethical, legal and political issues relevant to the practice of medicine. The tutors' role is to facilitate student exploration and discussion of the topics rather than act as context experts.

Assessment has been significantly altered to reflect a pedagogical commitment to collaborative learning and the provision of frequent feedback to encourage student development. Assessment consists of a variety of individual and group based formats such as reflections, research essays, class presentations and creative responses and students are offered a choice regarding topics and formats of assessment. Student work is graded satisfactory or not satisfactory and if their work is not yet satisfactory on initial submission they are provided with opportunities for remediation and resubmission. There is, therefore, a strong emphasis on qualitative feedback and student development and this aligns with the overall aims of this component of the medical curriculum.

Introduction of PebblePad

The learning management system (henceforth, LMS) at the University of Western Sydney (henceforth, UWS) is the platform through which content is delivered to students as well as functioning as the system for the delivery of various types of blended learning environments. It does not include, however, a portfolio component that can function as a mechanism for longitudinal assessment and the provision of formative feedback from tutors on student learning. This absence was therefore seen as a major barrier to its use as the system to deliver the PPD curriculum. As the new PPD curriculum was being developed, however, it became clear that the affordances of the university's LMS would not be able to satisfy the type of formative engagement on the part of tutors with students that was envisaged in the new curriculum. The search for an alternative platform to deliver the curriculum serendipitously coincided with the university's decision to adopt, in trial mode, a well-known UK-based product, PebblePad. The affordances of PebblePad such as collaborative mechanisms and interactive repositories were leveraged and learning designs were developed that aimed to encourage students to reflect on their professional identity as medical students and their role as future medical practitioners.

During the integration of the curriculum with the e-portfolio system several tutorial sessions were held with tutors in order to familiarise them with the technology and its use in the context of the various learning activities. Hands-on, face-to-face sessions were also held with the students during the tutorial sessions in order

to introduce them to some of the features of the application that they would be required to use throughout the course.

With the introduction of an e-portfolio system in the curriculum the team faced the educational design challenge of the integration of new software with an evolving curriculum. They also faced a potentially more obdurate barrier in the form of the *negative discourse of PPD*.

In the following section we will outline the trajectory that the research took as we aimed to explore the role of new technology in the PPD curriculum.

2011 – 2013: The first research phase

Technology in the PPD curriculum: an iterative approach

The methodology that is being employed in this research is informed by the methodology of DBR. This is a tradition that can be traced back to the early 1990s and since then has been used to inform a range of studies in a wide spectrum of content areas including domains such as educational technology and teacher education (Anderson & Shattuck, 2012). The key ideas in this approach include an iterative approach to the research process, an understanding of research as an embedded process set in authentic contexts, the importance of ongoing theory development and an interest in exploring the practical and generalizable design principles as they are implemented in real-world contexts (Wang & Hannafin, 2005).

Although largely successful in improving student learning outcomes, particularly in school-age children, it is unclear whether DBR is meeting one of its main aims, namely, the idea of the simultaneous development of theory and practical design principles (McKenney & Reeves, 2013). Understanding how theory informs practice is one of the main aims of this research and in the next section we will show how we have explored this relationship in the context of the introduction of an e-portfolio in the PPD curriculum.

Student feedback

In order to evaluate the use of PebblePad during its trial implementation the university required the trial centres to conduct surveys of student experiences. As a result, two online surveys were conducted in November 2012 and May 2013. The following two graphs are student responses to the question “On a scale of 1 -5, with 1 being very easy and 5 being very difficult, how easy did you find it to use the PebblePad application?” As can be clearly seen, students in both years experienced uniform difficulty in using the application.

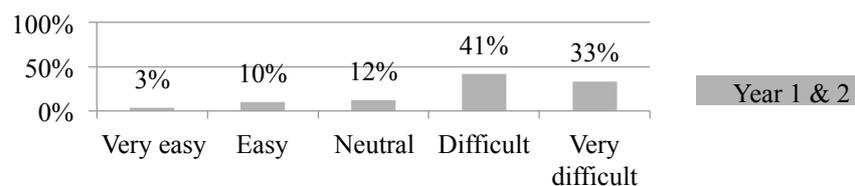


Figure 1: May 2012 survey (n=69; response rate=27%)

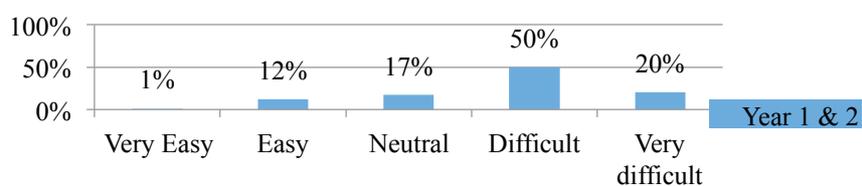


Figure 2: November 2012 survey (n=90; response rate=37%)

Given the existence of the *negative discourse of PPD* and the fact that the student experience of PebblePad was uniformly negative, the curriculum design team became interested in exploring the reasons for students’ critical attitudes and experiences. The link between the sociocultural forces that shape student perceptions towards PPD and their use of technology in a contested curriculum took the form of a question, namely, “Is the critical

reception of PebblePad driven by the negative discourse of PPD?” This question, together with the development of a conceptual framework to frame an understanding of technology use within a broader set of sociocultural forces informed by AT, represented the next phase of the research process.

Is the critical reception of PebblePad driven by the negative discourse of PPD?

In order to address this question a paper-based survey was conducted in August 2013. The survey was handed out and completed during tutorial sessions and this ensured that response rates were significantly higher (response rates were greater than 90%) than the earlier online-based surveys. Students in both years responded with similar rates of negativity compared to the surveys that were carried out in the previous year and in a separate question it was clear that the value of PebblePad to their PPD studies was minimal. Most interestingly, however, students were very positive towards the PPD curriculum particularly in the way in which it framed the practice of medicine beyond the biomedical dimension. The survey results in figures 3-5 are shown below.

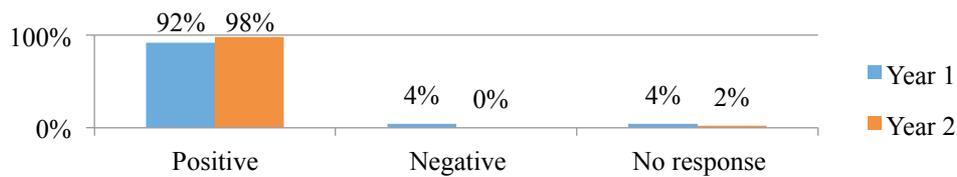


Figure 3: In what ways does the PPD curriculum contribute to your learning to be a health professional?

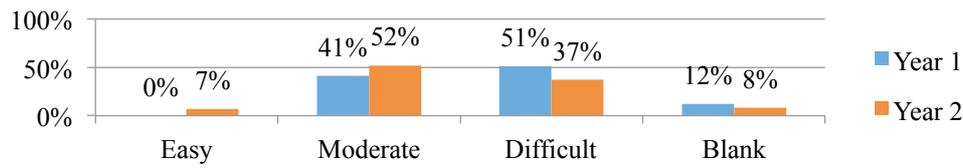


Figure 4: PebblePad is easy to use.

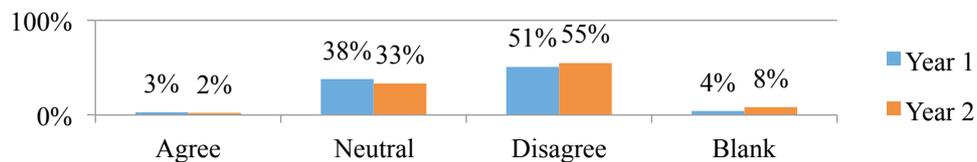


Figure 5: Your use of Pebble helps you in engaging with PPD?

In response to the question *your use of Pebble helps you in engaging with PPD?* (Agree, neutral, disagree) students were also given the opportunity to provide a written perspective on the value of PebblePad to their PPD studies. Interpretation of students’ responses using thematic analysis led to the emergence of two broad categories, namely, *the interface as a barrier to learning* and *redundant technology*. These categories contained a set of six and eight sub themes respectively and the direct quotes from students that follow are highly representative of student perspectives in both years 1 and 2 on the challenges of using PebblePad and the generally positive attitude to the PPD curriculum. The challenges that students faced are reflected in a set of responses that were categorised under several sub themes. For example, the difficulties most students faced with the interface and the subsequent practice of using alternative technologies figured prominently in student responses. Due to its complicated interface PebblePad was perceived as a complicated drop box rather than a tool for engaging with the curriculum and for ongoing formative professional development. As a result, students used alternative technologies such as Facebook for engaging in collaborative learning opportunities with their peers.

Figure 3 has been included to indicate the uniformly positive student attitude to the role of PPD in the formation of their future roles as medical practitioners and this has been given a numeric value. The thematic subtlety of responses to this question is indicated below.

[PPD] teaches students things that are not included on the scientific basis of medicine...the other stuff. (year 2 student)

[PPD] helps us to engage with wider social issues such as that of asylum seekers, which helps develop an interest in these issues and motivates us to want to contribute to their resolution. (year 2 student)

The results of the second paper-based survey are instructive because they strongly suggest that negativity towards the PPD curriculum was not the factor that drove students' critical attitude towards PebblePad. Other factors such as the difficult and unorthodox interface and the lack of technical support from tutors might also have played a part in the negative user experience. Another contributing factor might have been that PebblePad was embedded in the PPD curriculum and not used in PBL, the core and foundational part of the course. Feedback from tutors teaching in the first and second years of the course was also sought and two focus group sessions were held with tutors in June 2013 with first and second year tutors. A complete thematic analysis of these focus groups is currently underway but some initial themes have begun to emerge after the initial interpretation of the data. For example, some tutors were challenged by the new technology whereas others understood how to competently navigate the unorthodox interface. The capacity to effectively work with the new system, in other words, was mixed. Importantly, however, there is the suggestion that the educational benefits of the curriculum are located at the level of the interaction that occurs during face-to-face tutorial sessions and this is captured in the following quote:

The profound benefits are the engagement in class getting consensus, affirming some of the things that we've reflected on, opening up new perspectives... that's the benefit of that exercise. That's just putting the cards on the table so you can play the game. And the game is in the tutorial. (year two tutor)

The central focus of the face-to-face teaching and learning might also be disrupted if the requirement to learn new technology became the main goal.

We don't want it to end up about just using Pebble and submitting and assessment. We want to still centre around their professional development. You don't want the tutorial time eaten up by the logistics of using a system and all of that. (year 1 tutor)

The suggestion here is that a misalignment existed between the educational goals of the curriculum and the tool that was employed to facilitate the delivery of these goals. This insight will be expanded on in the following section where AT is used to illuminate some of the tensions that emerged during the implementation of the curriculum.

Activity Theory

There are two dominant approaches to understanding learning in the educational literature; theories which consider the individual as the unit of analysis and sociocultural theories in which the individual is inseparable from their social and cultural context (Salomon & Perkins, 1998). The individual focus emphasises knowledge acquisition and skill development as commodities which can be transferred from one context to another. Although this conception may be useful to explain some learning events, it has inadequate explanatory power for complex learning environments organised around collaborative group activity using technological tools (Bleakley, 2006). Therefore we have selected AT, which is situated in the sociocultural paradigm, to analyse the disturbances in a learning environment by the introduction of an e-portfolio.

Sociocultural theories view learning as individual participation with others in a specific social and cultural context and mediated by particular technological and psychological tools. Knowledge is constructed through the process of participation in a community, and distributed and embedded across the members of the community and the tools that they use (Hickey, 2003). Knowledge development is the result of interaction between people and things in particular situations and is therefore highly contextually dependant. Learning is not seen as an accumulation of discrete knowledge and skills, but rather as increasing involvement within a community. Hence, learning from this perspective can also be viewed as a process of transformation and identity construction as the participant develops their role/s in relation to the goals of that community (Blåka & Filstad, 2007). It is beyond the scope of this paper to differentiate between various sociocultural theories, however AT has a particular focus on learning as a tool mediated activity, where tools which extend human mental and

physical abilities can be psychological (e.g. language or discourse) or technological (e.g. e-portfolio) (Nardi, 1996).

There have been a number of iterations of activity theory since it was first developed from the educational principles outlined by Vygotsky in the early part of the 20th century (Engeström, 2001). Subsequent generations of AT extend the foundational triangular model (subject, tools, object) which demonstrates the cultural mediation of individual action, to focus on joint practice which is driven by a shared motive which meaningfully contributes to the function and culture of society (Roth & Lee, 2007). This was necessary given the understanding that the individual cannot be understood apart from the community of which they are a member. To accomplish the shift from the individual to the communal as a unit of analysis, the triangle has been extended to include the interacting and interdependent elements of community and the rules and division of labour which govern and mediate individual and collective action (Engeström, 2001). To account for the historicity of communities and their activities, the triangle must be considered as three dimensional. Activity cannot be understood without consideration of the forces that have been historically influential and formative (Engeström, 2001). The final principle added to activity theory is the heuristic tool of dialectics to address social transformation. Contradictions and instability within and between activity systems represent historically accumulating structural tensions that can contribute to the dynamics of change.

An AT model of the introduction of PebblePad during the PPD curriculum

Identification and analysis of how contradictions and paradoxes impact on learning activities enable educators to identify and target areas of the curriculum that require revision. The tensions and contradictions that emerged during the introduction of PebblePad are schematically represented below and the sites of tension are represented by arrows. The descriptive characteristics of the model are expanded on below and the insights gained from using AT as an optic for the interpretation of our research findings are then discussed.

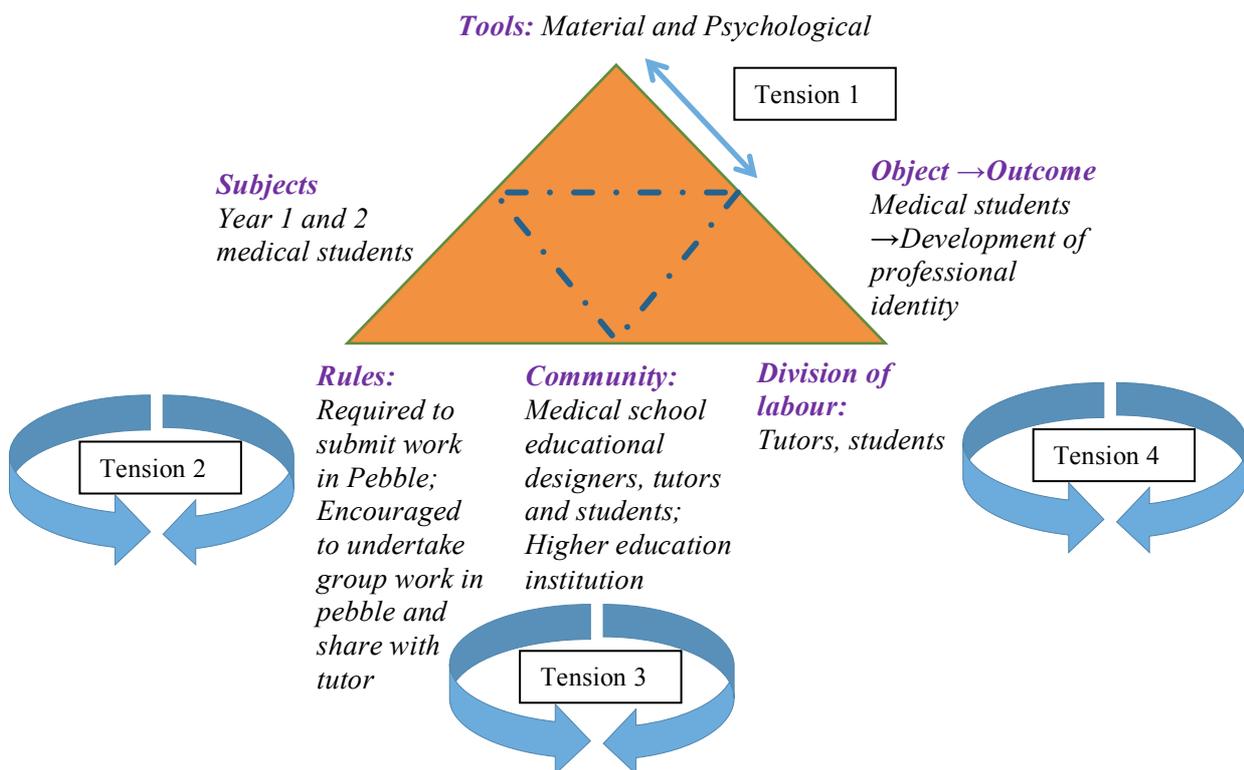


Figure 6: An AT model during introduction of PebblePad in PPD curriculum

A range of material and conceptual tools were used by staff and students. Material tools included PebblePad and various forms of communicative tools such as email and Facebook. Conceptual and abstract tools included discourses such as the *negative discourse of PPD* and the emerging use of a common medical language shaping the formation of professional identity.

Tutors and students represented the most important agents in the teaching and learning environment. In their role as assessors tutors provided feedback to students and facilitated student learning. The students constructed knowledge through a combination of collaborative learning and self and peer assessment. For the most part a flat hierarchical structure existed between student and tutors despite the tutors' role as assessors.

Some of the outcomes were anticipated and desired such as the development, in both years, of professional identity through the alignment of learning activities and assessment with the thematic outcomes of the curriculum. At least two outcomes were neither anticipated nor desired. For the most part students tended to choose alternative technologies (such as Facebook) in order to conduct their collaborative work consistent with the object of the development of professional identity. As a result, tutors did not have access to the ideas that were being developed by students and were therefore not in a position to offer formative feedback. This in turn led to PebblePad being used as a drop box or repository for the products of learning rather than as a medium for the development of progressive knowledge construction and learning.

Tensions in the system

Tension 1: Tools and objects

It became clear during this period that learning how to navigate the interface of PebblePad sometimes became a goal in itself. The tool itself became the object and this disrupted the original intention of using the tool to facilitate learning and to provide feedback. This led to frustration on the part of the student cohort and to levels of stress and a feeling of 'time wasting' associated with learning how to use the tool. This sense of frustration is captured in the following quote:

We spend most of the time trying to figure out how to upload things correctly. Could be doing more useful things. (year 1 student)

Lack of trust in its capacity to offer value to the learning experience was another consequence of the unintuitive nature of the interface.

[PebblePad was] difficult to use, not intuitive, opens lots of windows, unsure if assignment is submitted. (year 1 student)

Tension two: Rules

Students were required to use the technology but found it unintuitive and difficult to use. Although they needed to submit their work via PebblePad the relatively flat structure in the division of labour between students and tutors created opportunities for students to practice alternative modes of collaboration. However, this subversion of the rules also meant that opportunities for the provision of feedback to students were compromised. The way in which students subverted the rules is captured below.

It's confusing for students and tutors and we ended up emailing tasks anyway in case it didn't work. (year 1 student)

Tension three: Community

Tensions at the community level resulted from the university's competing goals and the financial resources available to pay the tutoring staff. Since PebblePad was adopted as a trial product the resources available to support the technology was minimal and this shifted the burden of the delivery of technical support to the curriculum design team. This had the unintended consequence of consuming valuable face-to-face tutorial time. The lack of financial resources available to pay tutors to meet the educational imperative of the provision of ongoing, progressive feedback also created a source of tension between the educational goals of the curriculum and the practical reality of its implementation. These insights extend our understanding of institutional and educational tensions that have been documented in other contexts (Yamagata-Lynch & Haudenschild, 2009).

Tension four: Division of labour

Using PebblePad was a challenging experience for both tutors and students as evidenced by the following quote from a year 1 student.

It's too difficult to use, no-one knows how to use it including tutors. (year 1 student)

One of the consequences of this was that tutors felt they were not in a position to offer technical support and this in turn affected their capacity to provide ongoing feedback to students as the provision of feedback tended to be focussed on the final assessable product. This reinforced the perception that PebblePad was a system for uploading products rather than a system for the development of professional identity through receiving progressive feedback.

Educational design principles

The adoption of a design-based approach to the current research has allowed us to emphasise the importance of the iterative nature of the current research and to focus our attention on the development of educational design principles that have emerged during the interpretation of the data. The use of AT has enabled us to develop an understanding of the highly distributed effects which result from the introduction of new technology into the PPD educational setting, and which have also been recognised in other educational environments (Kennedy et al., 2009; Kennedy et al., 2008). In the following section we will distil some of these insights into a set of educational design principles that are applicable to our local setting but whose relevance might extend beyond the scope of the current context.

Technology must be intuitive and easy to use

Tools are made an object of consciousness only when they fail to perform (Roth & Lee, 2007).

PebblePad proved itself to be a difficult and complex system and the main consequence of this was that the educational goals of the curriculum became overshadowed by insecurity surrounding its use which resulted in its diminished role in the delivery of the PPD curriculum.

In order to address this fundamental problem, PebblePad was withdrawn and in its place students are now required to use the university's LMS for the submission of assessable items. The assessment of the curriculum has been modified with less focus on summative assessment and more on the development of each student through an assessment rubric focussing on verbal interaction during the tutorial. A technological tool is no longer being used as the medium through which the formative relationship between students and tutors will take place.

Playing to tutors' strengths: the "game is in the tutorial"

The strength of the tutorial system is based on the interactions that occur in the classroom setting and PPD tutors are experts at facilitating tutorial activities. Formative development arises from feedback received in this context and not from feedback associated with summative items uploaded to an e-portfolio or LMS. It is important to integrate the provision of feedback within the structure of the learning activity and not treat it as a separate item since this is likely to diminish its value in context of the formative development of students (Nicol & Macfarlane-Dick, 2006).

A flat structure works best

Positive teacher-student relationships in the context of higher education is important for meeting learning outcomes (Hagenauer & Volet, 2014) and it is clear that a flat structure between tutors and students created the space for students to flexibly pursue their learning and move outside the boundaries inscribed in the rules associated with learning activities. A flat structure ensured that the object of the activity or the educational goals of the curriculum remained the focal point for the learning activities.

We need you: the university is an important ally

Institutional support is needed to support the integration of new technology in the PPD curriculum. The relative lack of support from the university added a *technical* support function to the set of roles carried out by the curriculum design team and tutorial staff. This added pressure generated a set of distributed effects on the ability of the tutors to adequately and effectively facilitate the curriculum. Institutional support, therefore, is crucial for the successful implementation of educational designs that incorporate the use of new technology (Kennedy et al., 2009).

Educational design is more than curriculum design

The tutors that teach in the PPD curriculum are casual and part-time workers and this represents a trend in the Australian higher education sector (Kimber, 2003). The tight integration of PebblePad in the curriculum required tutors to provide ongoing feedback *outside* of the tutorial context but the nature of their employment placed constraints on their capacity to carry this through. Educational designs, therefore, also need to be responsive to the employment profiles of those who are required to deliver them.

2014 and beyond: The second research phase

The findings from our research have informed the current curriculum design since PebblePad has been decommissioned and replaced by the university's LMS. Student feedback has also been used to modify some of the assessment characteristics of the current curriculum. During the second research cycle, a combination of the university's LMS and other technologies (Padlet and Wordpress, for example) will be used to deliver the curriculum and a further round of surveys and analysis of survey feedback will take place towards the end of the year. Analysis of this data will be used to inform and shape the subsequent educational design of the PPD curriculum.

Conclusion

During 2011 and 2013 an e-portfolio system was introduced into the PPD curriculum at the University of Western Sydney School of Medicine. In order to arrive at an in-depth understanding of the user experience and explore our role as agents in the introduction of technology to support the goals of the curriculum we initiated a quantitative and qualitative research study informed by the methodology of Design-Based Research and an interpretive framework based on Activity Theory. A set of educational design principles that resonate with findings from various sources and our own local context were then developed. These principles have been used to develop the current shape of the PPD curriculum. The analysis of data emerging from subsequent research cycles will form the basis of modifications to the curriculum over time.

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