Abstract

There is a national expectation in Australia that ICT will be used to increase student engagement with learning. With increased ICT use comes increasing claims of engagement but only limited research to demonstrate that engagement has occurred. In a pilot project to integrate ICT into learning at an independent K-12 school in regional NSW, teachers and pre-service teachers were teamed with university lecturers to co-investigate student engagement. Co-planned and implemented ICT-supported learning experiences for students in Years 3 to 11 covered a diversity of ICT applications and curriculum areas. The research involved longitudinal data collection recording the level of engagement of students. Critical to this research was the development of relevant criteria to measure engagement. The research team met to develop a shared understanding of three dimensions (behavioural, emotional and cognitive) of engagement and to negotiate a set of criteria to measure engagement. This paper presents details of the unfolding shared understanding of engagement, of the negotiation process necessary to produce an agreed set of criteria, and of the criteria produced. The co-development of the criteria proved to be a rewarding learning experience for all the researchers and to be a fitting preparation for the in-class data collection.

Introduction

Student engagement with learning is now an accepted component of school learning environments. The Australian Ministerial Council on Education, Employment, Training and Youth Affairs (MEECTYA, 2004) expects one key return on online curriculum content for economic sustainability to be students who are engaged and motivated. To achieve this teachers must (MCEETYA, 2005) select learning activities, tools and resources that motivate and engage students, and integrate information and communication technology (ICT) to engage students in a variety of new dimensions such as thinking and working creatively, and creating new knowledge. The need for teachers to provide evidence of ‘return’ on the investment in ICT for learning, leads to the necessity for teachers to be able to report on student engagement. The following is shared as part of an introductory experience undertaken by a motivated group of teachers to identify and measure engagement.

A school-university partnership was formed in regional New South Wales to facilitate the innovative use of ICT to support learning and to promote student engagement in learning. A joint project was designed to determine what student engagement looks like when ICT is used to support learning. Teamed as co-researchers, teachers from the school worked with lecturers and pre-service teachers from the university to co-plan and implement ICT-supported learning sequences and to research student engagement during the implementation. The focus of this paper is the unfolding shared understanding of engagement that occurred during the negotiation process that was necessary to produce an agreed set of criteria to be used for the project.

First, engagement is defined and relevant background information about the project is provided. Second, the project workshop, negotiation process and resulting engagement criteria are described. Finally, reflections from the co-researchers are shared to stimulate ideas for future research.
Engagement with Learning

Engagement focuses on the connection between the learner and the activity and is usefully defined as ‘energy in action’ (Russell, Ainley & Frydenberg, n.d.). This definition operates at two levels involving first, the connection between the learner and the school environment and second, the learners’ attitudes, interest and self-efficacy in particular learning situations. Originally, this definition evolved from a definition of ‘motivation’. To facilitate a better understanding of engagement, motivation should be thought of as being ‘about energy and action’ (Russell, et al., n.d.). This places a motivation focus on the reasons for behaviour, i.e., the psychological processes involved when students are in a learning situation. Engagement is more likely than motivation to be affected by learning experiences and relationships with people involved with those experiences. Students who are motivated are not necessarily engaged and teachers need to be able to design learning environments that will engage students. For a more a more detailed explanation of engagement see Reading (2008).

Three distinct types of engagement: behavioural, cognitive and emotional, described by Fredricks, Blumfeld and Paris (2004) after an extensive review of publications, provide a useful framework for developing indicators of engagement. Behavioural engagement involves: positive conduct, e.g., adhering to classroom norms, absence of non-disruptive behaviours; involvement in learning tasks, e.g., effort, persistence; and participation in school-related activities, e.g., athletics, governance. Emotional engagement involves: affective reactions in the classroom, e.g., interest, happiness; affective reactions to the teacher, e.g., liking, respecting; and identification with school, e.g., belonging, valuing. Cognitive engagement involves psychological investment in learning, e.g., desire to go beyond the requirements, preference for challenge; inner psychological investment, e.g., desire to learn, desire to master skills; and self-regulation, e.g., use of metacognitive strategies, evaluating cognition when accomplishing tasks. The three types of engagement are “dynamically interrelated within the individual” (Fredricks, et al., 2004, p. 61), which might confuse criteria development.

Pedagogies that integrate ICT are claimed to have the potential to not just enhance but to transform learning (MCEETYA, 2005). The British Education Research Association (BERA) undertook a professional review of research and found that increasing pupils’ motivation and engagement was one of three major contributions that the use of ICT made to learning (Higgins, 2003). Benefits of using ICT for increasing engagement have been claimed in many studies but few provide measurable evidence of engagement, with many claims based on informal observations. To assist teachers in reporting on student engagement a manageable method is needed to measure engagement in the classroom. This, together with a better understanding of engagement, will assist teachers to design engaging learning environments and to foster their desire to measure and report on engagement. A variety of indicators, and related measures, of engagement were proposed by Reading (2008).

Project background

This project was initiated by a non-government K-12 school in response to a need, expressed by teachers, to explore student engagement when ICT was used to support learning. The aim of the project was to measure student engagement during ICT-supported learning activities. Teams of teachers and pre-service teachers were established for six different Year groups (3, 5, 6, 7, 9, and 11), with each team being facilitated by a university lecturer as a critical friend. The curriculum focus for each Year team varied and ranged from Year 3 editing films that reported on their investigations of the school community, to Year 11 developing Wikis to present their investigations of terrorism groups. An online learning community and face-to-face workshops were developed to facilitate communication between the co-researchers who were guided through a cycle of awareness raising, planning, implementation, evaluation, and reporting. During the planning phase engagement criteria were developed to be included in the data collection instruments. This paper reports on the negotiation process that involved the team of co-researchers coming to an agreement on the criteria to be used for the research. Detailed results from the full project experience will be available in a later publication.
Team of co-researchers

The research was designed so that each teacher, pre-service teacher and lecturer involved in the project had a co-researcher role. All too often university-based researchers design research that uses rather than includes teachers. In such situations the teachers have no or limited say in research design, may or may not be actively involved in the data collection itself, and are given the final report to read with no opportunity for input. The co-researchers for this research were actively included in most stages of the research. Their shared responsibilities ranged from planning the research instrument, to checking the ethics application, collecting the data and reporting findings in conference and/or journal publications.

The research team comprised 29 co-researchers. The two principal researchers, a teacher and a lecturer, negotiated the overall research project design and selected the teachers, pre-service teachers and lecturers to be involved. Each of the six Year teams brought together one class teacher with two pre-service teachers and a lecturer as critical friend. There were eight teachers involved across the six different Year teams because two of the classes were team-taught. The teachers self-identified as educators who wanted to increase the use of ICT in learning to improve student engagement.

Twelve pre-service teachers were selected from the university. After in-class offers of involvement, the pre-service teachers who submitted an expression-of-interest were interviewed to determine suitability. Those selected were more than competent academically, in their professional experiences in schools and in their interest in using ICT to support learning. Those placed with Years 3, 5, 6 and 7 were studying Primary Education while those with Years 9 and 11 were studying Secondary Education majoring in Mathematics and History, respectively, to suit the relevant teachers’ disciplines.

Seven lecturers were selected, one for each Year team, except for the Year 9 team that had two lecturers because of conflicting commitments that did not allow total commitment from one. The lecturers were involved directly in ICT Education, Mathematics Education or Teaching and Learning at the university. The lecturers were matched with Year teams depending on their interests and the focus to be taken by the teacher(s) involved.

Planning workshop to develop engagement criteria

A one-day planning workshop early in the project allowed this large team of co-researchers to develop a shared understanding of engagement and to develop one set of criteria and measures that would be appropriate for use with the students of diverse age-range in the Year groups involved. Research instrument design is a critical step in research and having those who were to implement the instrument involved in its development facilitated the research process.

There were four main workshop activities. First, co-researchers were introduced and research ethics requirements outlined. Second, the collaborative online environment planned for communication was introduced by having the co-researchers record and share their initial ideas about engagement. Third, the Year teams met to plan their ICT-supported learning activities. Finally, engagement criteria were negotiated and research instrument decisions finalised. Throughout the day Wiki and Blog tools in the online environment were used to record planning notes and co-researcher ideas.

The following discussion focuses on the final workshop activity, in particular the negotiation of engagement criteria. Some research method details were shared with the co-researchers before the negotiation process began: (i) measurement to be across three dimensions; (ii) measurements to be taken for each student during five different lessons spread throughout implementation; (iii) each measure to be recorded on a five-point Likert scale; (iv) teacher to record three measures; (v) two pre-service teachers each to record three measures; and (vi) each student to self-report on three measures. The co-researcher responsibility was to agree on the engagement criteria and related measures that could be used for the teacher, pre-service teacher and student recording of engagement.
Negotiation process

During the negotiation process co-researchers worked together towards a shared set of criteria. The three steps in the process were: (i) brainstorm indicators of engagement; (ii) sort indicators into three dimensions; and (iii) refine indicators into criteria and related measures. Negotiation was a necessary component of every step in the process on two levels. First, negotiation took place within the Year teams between teacher, pre-service teacher and lecturer, all of whom brought different perspectives to the discussion. Second, negotiation took place between the Year teams to come to a consensus about one set of criteria and measures that could be used across all six Years. This negotiation helped the Year teams share ideas and move towards a common understanding of what was to be measured.

The brainstorm indicators of engagement step began with an introduction to engagement provided by the principal researchers. Then, each Year team was asked to record a few indicators that demonstrated that their students were engaged in their learning. Each team was asked to limit the number of indicators to be shared with the other teams. This, plus the need to agree on the wording of the indicators, was a first step in the negotiations.

The sort indicators into three dimensions step began with an expansion of the definition of engagement into the three dimensions: behavioural, emotional and cognitive. Explanation included the following elaboration. Typical behavioural engagement criteria include: conduct (e.g., adheres to rules), participation (e.g., fulfills role in ‘group’ work), and work involvement (e.g., pays attention to learning). Typical emotional engagement criteria include: affect (e.g., enthusiasm for ICT, interest in the learning activities), and relating to schoolwork (e.g., like to use ICT). Typical cognitive engagement criteria include: self-regulation (e.g., transition between activities), instructional discourse (e.g., asks authentic questions), and higher-order thinking (e.g., synthesis of ideas).

Then, each team shared their indicators with the whole group by assigning each indicator to the appropriate dimension (behavioural, emotional or cognitive) on suitably labeled wall space. The unfolding picture of each dimension was thus displayed for all co-researchers to view. After some cross-team negotiation about the placement of specific indicators, the following was produced: behavioural - high levels of participation, student persistence, asking relevant questions; emotional - students/teachers are excited, sufficiently interested in the task that teacher intervention goes unnoticed, enthusiasm for study; and cognitive - asking questions, going beyond what is expected, independent learning, have a real product, students pose their own extensions to problems, ownership, students will become more active in their learning. For one indicator, demonstrate knowledge in a different way, a group consensus could not be reached and so the indicator was displayed halfway between behavioural and cognitive. Noticeably some indicators were expressed as noun phrases, e.g., ownership, while others were expressed as verb phrases, e.g., asking questions. The process of allocating the indicators to the appropriate dimension created interesting discussion and helped the co-researchers to develop a better understanding of each dimension.

The refine indicators into criteria and related measures step was a complex intertwining of: (i) converting indicators to criteria; (ii) proposing measures relevant for each criterion; and (iii) deciding whether each criterion would be most relevant to be measured by the teacher, pre-service teacher or student. The criteria developed needed to be relevant and suitable to be measured in the classroom.

Engagement criteria

The outcome of the negotiation process was an agreed set of criteria and three data collection forms for use by teachers, pre-service teachers and students respectively. Each form had three criteria, one for each dimension: behavioural (B), cognitive (C) and emotional (E), along with related measures.

The Teacher Data Collection Form included: Persistence (B) - finds ways to overcome problems during learning; Attitude (E) - positive attitude to tasks, teacher and peers; and Independent Learning (C) - actions contribute to learning goals. For each measure the five-point Likert scale was: (i) never,
(ii) rarely, (iii) sometimes, (iv) mostly, and (v) always.

The *Pre-service Teacher Data Collection Form* included: Positive conduct (B) - adheres to rules and follows regulations; Affect (E) - shows enthusiasm and/or excitement; and Self-regulation (C) - undertakes activities without direct teacher intervention. The five-point Likert scale was the same as for the teacher form.

Teachers noted that students would not necessarily be using ICT in every lesson, even though the learning activity was designed to incorporate ICT use. Thus, on the teacher and pre-service teacher forms a column was added to record whether each student was using ICT during that particular lesson.

The *Student Data Collection Form* included three criteria based around effort (B), interest (E), and thinking (C). This was a self-report form and so particular care was needed with the design. To simplify completion the criteria were arranged into three questions, each with five-choice responses demonstrating an increased level of the measure. The three questions, followed by their five choices were: (i) How much effort did I put into my learning? - I didn’t put in any effort; I didn’t put in very much effort; I put in some effort; I put in lots of effort; I put in as much effort as I could; (ii) How interested was I in what I was learning? - I was not interested at all; I was a bit interested; I was interested; I was very interested; I was really interested; and (iii) How hard did my brain have to work when I was learning? - My brain did not have to work at all; My brain had to do a little bit of work; My brain had to do some work; My brain had to do a lot of work; My brain had to work very hard.

Finding criteria and related measures that would suit students across all the age groups involved from Year 3 to Year 11 was difficult, especially for the student self-reporting form and much discussion was involved, especially about wording for the criteria about the brain having to work hard. Some interesting decisions made, after discussion, during this final step of the negotiation process included: (i) discarding a cognitive criterion, ‘asking authentic questions’, because it would be difficult to measure; (ii) moving ‘actions contribute to learning goals’ from behavioural to cognitive; (iii) discarding an emotional criterion ‘enthusiasm/excitement’ because there was no agreement on how that would be demonstrated and thus measured; and (iv) discarding a cognitive criterion, ‘response to content’, because it was too vague. By the close of the planning workshop there was general consensus that the forms created were appropriate for the data collection and would assist in securing data that would provide a detailed view of the level of engagement of each student across the three dimensions.

**Reflection**

A mid-project workshop provided a good opportunity for the co-researchers to reflect on the previously-developed engagement criteria and the data collection forms. This was an important follow-up as part of the negotiation process. Feedback provided included: (i) perhaps a four-point Likert scale should be used because the “always” level was very difficult to code; (ii) the ‘attitude’ criterion was difficult to measure because a student could be positive to just one or two of ‘tasks, teacher or peers’, rather than all three; and (iii) it was difficult to find time to complete the form in shorter lessons because of the pressure of also needing to compete the lesson requirements. Feedback about the student form included suitability of the language and positive reactions from the students.

Reflections on engagement entered into the project Blog showed that there were other indicators of engagement that the co-researchers were using as part of their language to describe students including: (i) full of enthusiasm; (ii) given a lot of freedom and using it quite effectively; and (iii) getting a bit carried away with ideas. This helped to confirm that the negotiation process had broadened the co-researchers’ perspectives on engagement.
Conclusion

For the principal researchers the best indication of the success of the negotiation process was the level of professional discussion during the planning workshop and the high quality of the criteria produced. For the co-researchers this negotiation opportunity provided a chance for professional conversation about how engagement could be described and measured when ICT supports learning. For the teachers and pre-service teachers this was an opportunity to develop skills as researchers. For the pre-service teachers this provided an opportunity to work alongside teachers in the classroom without the pressure of a formal professional experience situation that brings a strong focus on classroom management.

Given the success of the negotiation process, the authors would strongly recommend that other schools consider offering their teachers an opportunity to link with universities and in particular, pre-service teachers, in a co-researcher arrangement to promote professional investigation of ICT in learning. It is also hoped that the detail provided about the criteria developed will help teachers who want to instigate their own action research to measure engagement within ICT-rich learning environments. Finally, it is anticipated that the analysis of the results from the data collected using these criteria will inform future research into whether particular dimensions of engagement are stronger than others when ICT is used to support learning.

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References