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Drawing upon 'real' classrooms to create a 'virtual' learning environment: investigating what makes a virtual classroom an authentic learning space

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Drawing upon 'real' classrooms to create a 'virtual' learning environment: Investigating what makes a virtual classroom an authentic learning space

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Abstract
It is widely accepted that well designed multimedia environments can provide an alternative to real-life settings without sacrificing the authentic context (Herrington, Oliver and Reeves, 2003). Advances in educational software allow for the development of software that supports users as they engage within the virtual context as they view real-life events with opportunity to slow-down, accelerate and review pertinent sections. ClassSim, an online computer-based simulation, was developed by a team of researchers (Ferry, Kervin, Cambourne, Turbill, Hedberg and Jonassen) to support pre-service teachers in understanding the work of a teacher in a Kindergarten literacy classroom.

ClassSim software was informed by Herrington, Oliver and Reeves' (2003) design elements for authentic learning environments. The process of capturing classroom experiences from the field and transferring the essential elements into the design of the software to represent an authentic learning environment is described in this paper. Also the paper explores the views of practitioners from current, real Kindergarten classrooms as they experience the virtual classroom context as presented in ClassSim. These two avenues explore how literacy teaching is represented and reflected within the learning experiences encapsulated within the virtual environment and how this connects with classroom reality.

The paper also examines the virtual ClassSim environment, and how it represents the complexity of actual Kindergarten classroom environments. In particular, the similarities and differences between the virtual ClassSim environment and the actual Kindergarten classroom environment are explored. Furthermore, the reported research makes suggestions about how the virtual environment could be more representative of actual classroom reality. Two fundamental questions that frame this inquiry include:

1. How realistic does a simulation have to be in order for it to be regarded as authentic?
2. What features of the simulation engage users to think deeply about the complexities of their classroom experiences?

Introduction

Classroom learning environments are complex in nature. Teachers are called upon to make many difficult and intricate decisions as they operate within these environments. Indeed, teachers make "…literally thousands of decisions every day" (Eby, Herrell & Jordan, 2006 p. 3) and while it may not be possible to reflect upon each decision, it is necessary for teachers to have inbuilt mechanisms to support them to implement appropriate solutions to the problems and puzzles that confront them and their students everyday.

The virtual classroom (ClassSim) reported on in this paper aims to support pre-service teachers for a targeted purpose; it intends to be useful and relevant to pre-service teachers in their immediate tertiary situation and subsequent professional lives. The resource responds to the research into pre-service teacher education that argues that often universities do not prepare beginning teachers effectively for their entry into the teaching profession and pre-service teacher education courses often present a fragmented and decontextualised learning experience (for example, House of Representatives Standing Committee on Education and Vocational Training, 2007; Ramsey, 2000; Entwhistle, Entwhistle & Tait, 1993). Such research claims that many learning experiences in pre-service teacher education make it difficult for beginning teachers to retrieve knowledge from their university experiences when they are required to apply it in classroom situations. This happens because there have often been minimal previous links between the theory and the practice (Kervin & Turbill, 2003; Bransford, Sherwood, Hasselbring, Kinzer, & Williams, 1990). While these findings encompass a broad range of teacher education institutions, the development of the software was targeted to respond to the observed needs amongst pre-service teachers within one university.

Throughout the development of the simulated learning environment consistent effort was made for the software to be a tool to support pre-service teachers in connecting the theory of their studies to the reality of classrooms. Ramsey (2000) in his review of teacher education in New South Wales recommended that pre-service teachers receive quality classroom-based experience supervised by an accredited teacher mentor. Further, he emphasised that just providing more extensive classroom-based experience was not guarantee of quality experiences. Darling-Hammond (1999) has also highlighted this issue and conceded that school-based practical experiences often consist of a series of isolated, decontextualised lessons prepared and implemented according to the requirements of the supervising teacher. The creation of a learning environment that would provide additional classroom based experience within a focused and structured virtual environment, that could be deconstructed with the students to support their developing understandings, was the focus in the development of the software.

Such rationale when coupled with Herrington, Oliver and Reeves' (2003) assertion that many researchers and teachers now accept that well designed multimedia environments provide an alternative to real-life settings without sacrificing the authentic context, provided the context for the development of this software. Advances in educational software have demonstrated that it is feasible to create a motivational simulation that supports pre-service teachers by providing them with tools that allow them to view the effects of their decisions within a virtual classroom context (Aldrich, 2004). A simulation allows its users to participate in the creation of a virtual-classroom world; make decisions like a teacher would have to, and then view and reflect on the effects of a multiplicity of classroom management decisions and teaching decisions. The development and use of a classroom-based simulation is one way to support the range of learning strategies incorporated within teacher education programs.

Developing ClassSim as an 'authentic learning environment': connecting the 'virtual' with the 'real'

ClassSim, an online classroom based simulation, was designed to enable pre-service teachers to interact with a virtual classroom environment as they assume the role of the teacher. With the support of a large grant from the Australian Research Council entitled: *Investigating a classroom simulation designed to support pre-service teacher decision making in planning and implementing literacy teaching* (DP0344011) a team of researchers (Ferry, Kervin, Cambourne, Turbill, Hedberg and Jonassen) created iterative designs of the software. Two key avenues, each of which will be explored, guided these designs.

Throughout the development of the software the challenge was to make it an 'authentic learning environment' as elements of 'real' classroom environments were incorporated within the 'virtual'. Guidance from the literature was sought and Herrington, Oliver and Reeves' (2003) review of the literature, which identified nine design elements of situated learning environments, became the framework directing the software design. This framework was continually reviewed as design elements were considered within the software development.

While these design elements guided the process, trials of the software were conducted after each iterative design. Since 2004, more than 500 pre-service teachers studying within the Faculty of Education at the University of Wollongong have engaged with the software. An overview of research trials conducted is reported in Table 2. Data collected and analysed from each student cohort provided the researchers with considerations to take into subsequent versions of the software as the design principles for 'authentic learning environments' were further explored.

Year	Pre-service teacher cohort	Number of students involved
2004	First year students enrolled in alternate teacher education program	24
2004	Fourth year Bachelor of Education students	20
2005	First year student enrolled in alternate teacher education program	24
2005	First year Bachelor of Teaching students	187
2005	Third year Bachelor of Teaching students	40
2006	First year Bachelor of Teaching students	180
2006	Third year Bachelor of Teaching students	180
2007	First year Bachelor of Teaching students	185

Table 1: Overview of pre-service teacher use of ClassSim

Design Element 1: Provision of authentic contexts that reflect the way that knowledge is used in real life

The virtual classroom within the online simulation is representative of a 'typical' Kindergarten classroom. Drawing upon considerable classroom-based ethnographic data, coupled with recent Kindergarten teaching experience, the researchers began to consider what a two-hour block of time, focused on literacy teaching, may 'look' like in the classroom.

Teachers were invited to construct narratives, drawing upon the stories from research and personal professional experiences, to reveal the intricacies and complexities

within Kindergarten learning environments. These narratives captured the depth of learning theory, philosophy and rationale to reveal a framework to showcase and explore the reality of Kindergarten classrooms. Barth (1990) writes, "…with written words come the innermost secrets of schools" (p. 66). Representing these within the simulation environment would enable pre-service teachers to be both exposed to and able to interact with the richness of these experiences.

To do this, the narratives were dissected to identify key events within Kindergarten classrooms, decisive decision making points and opportunities to explore the story in connection with theory. This then became the framework for the flow of the series of events to be revealed within the virtual Kindergarten classroom simulation. This is represented in Figure 1.

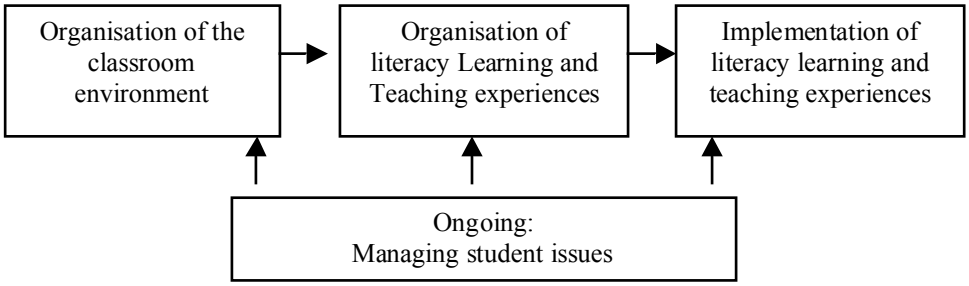

Figure 1: Basic flow of the simulation

Pre-service teacher education is frequently criticised for its presentation of 'abstract' knowledge, often removed from the reality of the classroom. Focusing the virtual environment on the teaching of literacy was responsive to the reported difficulties many pre-service teachers experience with the classroom application of abstract and compartmentalised knowledge (Hoban, 2005, p.8.). When in the real classroom environment, teachers need to be able to integrate and apply theoretical knowledge and understandings with what they do in the classroom. Therefore, it seems appropriate for the virtual environment to encourage users to make decisions similar to those 'real' teachers make every day. Using the basic flow identified from the teacher narratives, connections were able to be made within the simulation between the story and the theory as we made explicit connections between what was happening in the virtual classroom and references to text books, department policies and additional readings.

To further strengthen the connections between the 'real' and 'virtual' learning environments, classroom artefacts were incorporated within the simulation to add further authenticity. Digital photographs portraying images of Kindergarten classrooms were identified as a powerful medium to do this.

Figure 2: Inclusion of digital photographs within simulated environment

After a number of trials with the software had been conducted, the second and third named researchers visited different Kindergarten classrooms and had 'real' children engage with the range of different teaching and learning experiences that were incorporated within the software. This provided opportunity to further refine and develop these components of the simulation in view of the feedback received from the children and their teachers. But, more importantly, these experiences also provided samples of student work product that were representative of each of the episodes. These were incorporated within subsequent versions of the software to further increase authenticity for the pre-service teachers.

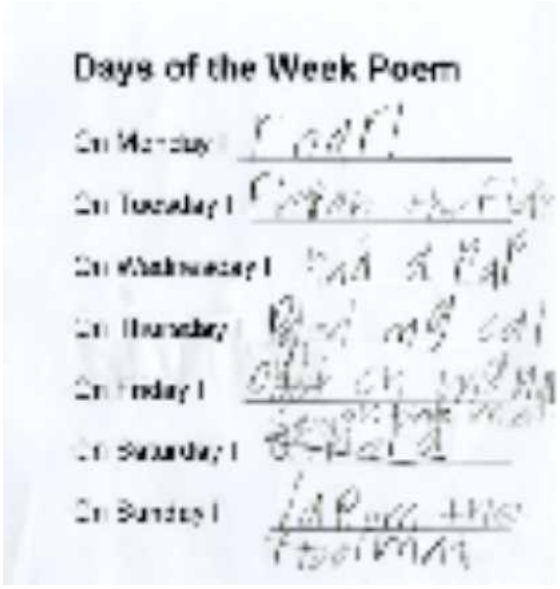

Figure 3: Work sample example within simulated environment

Design Element 2: Authentic activities; access to expert performance or advice

As described in the discussion of the first design element, teaching and learning experiences incorporated within the simulation were collected from real classroom examples. In the introduction of new teaching and learning experiences within the

virtual environment, the user is able to access 'teacher thoughts' pertaining specifically to that episode. Such commentary was developed to provide pre-service teachers with access to expertise from someone in the field.

Figure 4: 'Teacher thoughts' within the simulated environment

The need for the user to respond to student issues is a constant theme throughout the software. As way of making sense of how individual students, and the class as a whole, are responding to classroom events at specific times, the Quality Teaching Framework (DET, 2003) guides these sections. The framework is used to describe in detail what is happening at that time, given previous decisions, according to the three dimensions of pedagogy: intellectual quality, quality learning environment and significance.

Figure 5: Student update organised according to the NSW Quality Teaching Framework

At each of these points the user is able to access commentary provided by an expert for that child at that particular point in the simulation for each of the dimensions.

Also, the user is able to see a rating of where on the continuum that particular child may be, along with a visual image representing what that child may look like at that time. Time was spent developing more than forty facial expressions for each individual child within the virtual classroom. This stemmed from awareness that often the first indication teachers get as to how engaged a student is, is from looking at their face. With that in mind, the development of a visual representation seemed appropriate to accompany the descriptive written commentary.

Design Element 3: Expert performances and modelling of process

The simulated Kindergarten teacher provides a model of teaching practice representative of a wide data pool and range of professional experiences that emerged from the development of narratives. The opportunity for the users to interact with these expert stories and examples of teaching process provides for a rich data base for commentary, analysis and reflection. In trials of the software, many users have engaged in specific analysis of the virtual teacher. This, when coupled with other classroom examples and theoretical understandings, provides a solid platform of understanding for our pre-service teachers as they consider the work of a teacher.

The interwoven nature of the teacher stories within the one environment enables the user to explore different options at key points within the simulation. Teachers have a unique style and way of interacting with their class. The ability for the decisions made by the user to impact upon not only the teaching and learning experiences offered, but also the interaction of the teacher with students in the virtual class, provides example of the different pathways teachers take to support student learning. This is a difficult concept for pre-service teachers to understand. Having them work within a virtual environment, where their tutors intimately know the different pathways, provides a common context within which to unpack and explore this.

Design Element 4: Multiple roles and perspectives

Initial plans for the early versions of the software explored the idea of enabling the users to select and assume a role within the classroom (for example, as the teacher or an individual student). However as the targeted audience (pre-service teachers) became more refined, and the rationale for the development of the online simulation was considered further, it was considered more meaningful to develop the software where the user assumed the role of the teacher.

As the teacher within the virtual environment, the user is regularly asked to make decisions about issues around classroom organisation, management and teaching and learning experiences. The decisions the user makes guides their course throughout the simulation. Some decisions may appear fairly inconsequential, but may later impact upon what happens in the classroom. An example of such a decision involves the users decision as to whether they will remain in the classroom or walk through the playground prior to the formal school day beginning. If the user selects to remain within the classroom they are able to finish last minute preparations for the days lessons. If the user selects to walk through the playground they are able to detect a bullying situation between two children within the class and deal with this before the day begins. Teachers may argue support of either of these options. The different options within the simulation have been included not to show one as being right or

wrong, but to encourage the pre-service teachers to consider the various ways their decisions and actions can impact on what happens in the present and future within the classroom.

The role of a classroom teacher is more than just teaching. The simulation also includes a number of random events requiring the user to make management decisions. These decisions have been designed to illustrate the often unpredictable nature of classrooms and to further exemplify the impact that these can have upon the teacher, the students and the quality of experiences and subsequent student work product. The occurrence and frequency of these random events is unknown.

In addition to this, the software also has capabilities for the user to monitor and track individual students, who are reflective of the diverse nature of classrooms, as they engage with the classroom environment organised and facilitated by the user as the virtual teacher. There are also opportunities for the user to view a narrative summary of the class as a whole. This was a feature we built into later versions of the software as a result of feedback from pre-service teachers who expressed a need to have an overall picture of how things were going. Further discussions with actual teachers also revealed the importance of that overall perspective of the classroom.

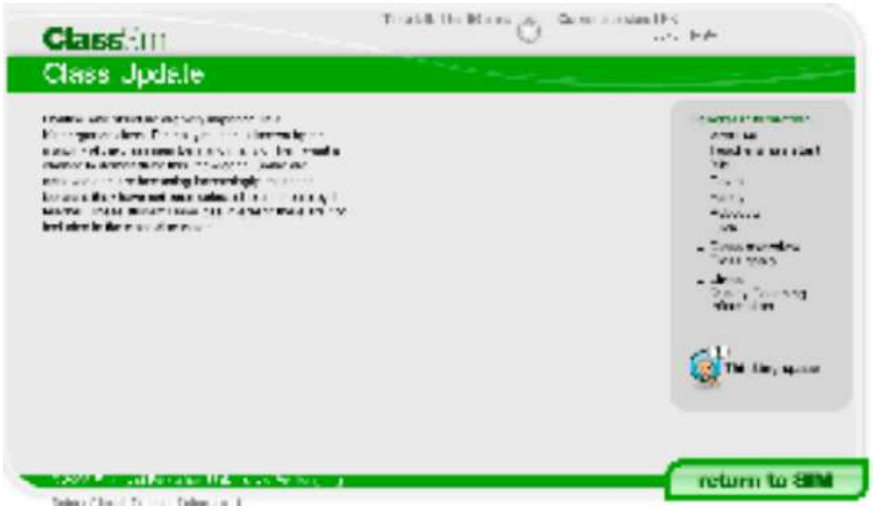

Figure 6: Narrative commentary on the whole class

Design Element 5: Support for the collaborative construction of knowledge

Just-in-time support is offered throughout the virtual environment through the inclusion of summary sheets that feature links to core subject textbooks, mandatory departmental policies (NSW), classroom artefacts and relevant web references. These links take the user to organised information sheets about specific areas that relate to what is happening within the simulation at that time. As the software was developed for pre-service teachers, these pages feature links to sources relevant to their immediate professional situation.

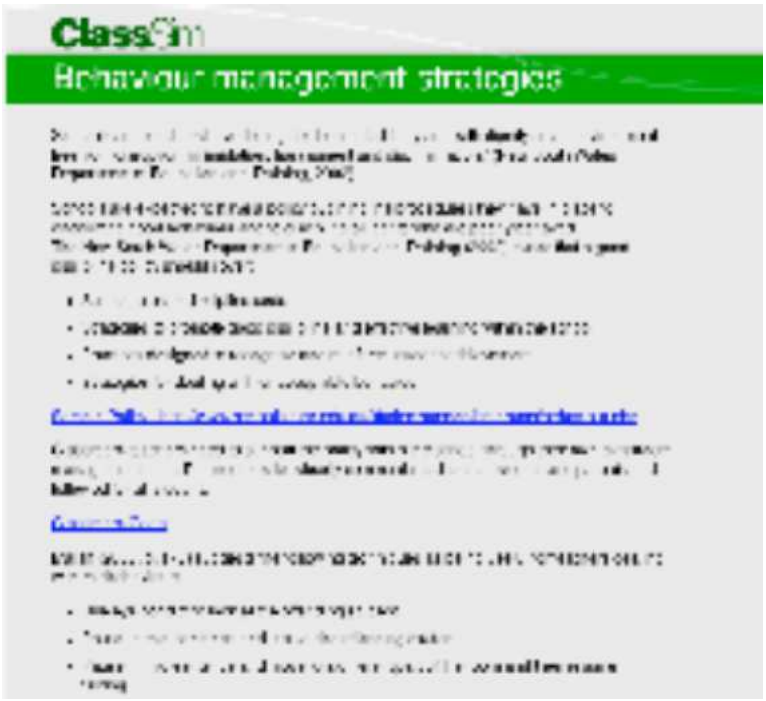

Figure 7: Example of 'just-in-time' support

Design Element 6: Reflection so that abstractions and generalisations can be formed

The need to be a reflective practitioner is consistently emphasized by 'real' teachers and a consistent theme within the literature (McLeod & Reynolds, 2007). The embedded thinking space within the virtual environment provides opportunities for the user to reflect on what has happened in the simulated classroom and plan, articulate and justify future decisions as they occur. This cognitive tool was developed to provide avenue for more formalised reflection. Pausing and reflecting is not a natural process for many pre-service teachers. Including a tool that was continually accessible, with prompting questions to think about, was one way to encourage articulation of thoughts, rationale for decisions and notes for future reference amongst the pre-service teachers that interacted with the virtual environment.

Figure 8: The 'Thinking Space'

Design Element 7: Tools that enable tacit knowledge to be clearly articulated

The thinking space provides opportunity for the user to articulate their understandings at decisive points. Earlier trials of the prototype saw many users taking physical notes from the summary sheets. At this time we observed the thinking space did not allow the users to fully build upon their tacit knowledge. Subsequent versions of the software slightly changed the nature of the 'thinking space' into a more 'notebook' form, where the user was able to cut and paste from summary sheets into a notebook facility which they can later print for their records, in addition to their own notes recording thoughts, rationale for decisions and questions to follow up.

Our data has revealed that notes generated within this space have been used to support the development of assignments and to also stimulate reflective comments while on actual practicum experiences.

Design Element 8: Scaffoldings and coaching by the teacher at critical times

Information about what the teacher is thinking is available to the user throughout the running time of the simulation. These screens were designed and included in each version of the software to allow the user to enter into the 'mind' of a teacher to begin to see why they make the decisions they make (Figure 4 provided example of this). This coupled with the support materials and opportunity to formally reflect on what is happening within the thinking space, supports pre-service teachers at critical decision points.

The contained environment of ClassSim, where each of the options and possible outcomes of these are known to tutors, has enabled support for the pre-service teachers as they deconstruct the virtual environment to inform their understandings of the real classroom context. It is difficult for university tutors to deconstruct actual practicum experiences as typically they were not at the site and did not see or experience what the pre-service teacher describes. This unfamiliarity often makes it difficult to meaningfully scaffold the pre-service teacher as they make sense of the

experience. The virtual environment, however, provides a common experience that allows for scaffolding and coaching at critical times.

Design Element 9: Authentic assessment of learning within the tasks

The software has been included as a key learning experience within core subjects focused on curriculum and pedagogy in the first and final years of the degree structure. The focus that is taken for each of these levels is remarkably different. In the first year subject, the software is used as a way to prepare pre-service teachers for their first real school based visits. Our experience with first year students has shown that the very nature of classrooms often makes them an overwhelming environment for pre-service teachers at the beginning of their studies. Having the opportunity to 'play' and 'explore' the virtual environment gives them scope to understand the complexity of the environment, and gives us time to begin to deconstruct key elements with them. We have found this then gives them a lens through which they can view their actual classroom based experience. Alternatively, final year students have used the software as a way to articulate what they know about the nature of classrooms and the role of a teacher, and a mechanism to identify areas for future professional learning. They have demonstrated ability to make significant connections between what they have experienced across their school-based experience (including the simulation), the role of a teacher, and where their 'gaps' in knowledge and understanding are. In both these instances, pre-service teachers are provided with continued access to the software through a URL and data shows that many of them continue to revisit the simulation after these structured subject experiences.

Critiquing ClassSim as an 'authentic learning environment': 'real' teachers examine the 'virtual' environment

Throughout the process of developing the ClassSim software different teacher experiences, their classrooms and their students, were examined to provide the framework for and the detail within the virtual classroom. The interaction of the pre-service teachers with the software and their feedback further informed the software development as data collected from trials were analysed and fed into iterative designs. It became evident to the researchers, that it was timely for the software to be viewed and critiqued by 'real' teachers to further inform the study, particularly in relation to the authenticity of the presented learning environment.

To facilitate this process, six 'real' teachers were invited to interact with ClassSim as they explored parallels between the virtual environment and that of their experiences within actual Kindergarten classroom environments. These teachers were invited to participate in the research during a professional learning experience facilitated by a literacy professional association, run external to their school contexts. An overview of each teacher who participated in this research is presented in Table 1.

Teacher	Qualifications	Years of Experience	Grade/s taught	Current grade
Samantha	Bachelor of Education (Honours)	3 years	K & 1	K-1

Jennifer	Masters in Education (by research)	16 years	All grades from K-6	Not currently teaching
Kate	Bachelor of Education (Honours)	2 years	K & 5	5
Georgia	Masters in Education (Special Education)	3 years	1 & 3	1
Rachel	Bachelor of Education (Honours)	1 year	K-6 (casual basis)	Casual Teaching K-6
Susanah	Masters in Education	25 years	K-6	2

The experiences, comments and process of interaction for each teacher were captured through individual case studies. Each teacher was interviewed individually to identify specific demographical information. Time was then scheduled for the teachers to interact with the software at mutually convenient times. Originally it was anticipated that these sessions would occur with groups of teachers. However, only two teachers scheduled times together to work with the software and the researcher. The other teachers all scheduled an individual time. As the teachers interacted with the software, they were encouraged to use the software's embedded tool, the 'thinking space', to capture their personal beliefs and reactions throughout the running time of ClassSim. During these times the first named researcher observed each teacher. Observation notes and 'thinking space' entries were analysed by the researchers to identify specific questions for subsequent semi-structured interviews.

Observations as the teachers engaged with the software

Each of the participants appeared to access and begin to interact with ClassSim in similar ways. They all took time to read and gain in-depth knowledge of the three introductory features of the simulation; the general classroom situation, information particular to the teacher and the targeted students through accessing the students' profiles. All participants appeared to see the importance of these features as they spent extended periods of time reading and comprehending each of them, especially in relation to the five targeted students' profiles. After these initial pages within the software, each of the six participants revealed varied approaches to exploring the rest of the ClassSim software.

Some common trends appeared as the participants utilised ClassSim and engaged in decision making processes. When the participants were faced with a decision, prior to them answering it, they were observed to revisit the information available to them through the summary sheets as well as access and write in their thinking space. The participants were observed to be clicking 'back and forth' several times (from the additional information, to the decision and to the thinking space) before any decision was made. There was a single random event which all six participants were faced with and needed to respond to. In this situation the participants did not access any additional information, nor did they hesitate or wait before they responded to this decision. This decision was in regards to letting Gavin go to the toilet. Not one

participant denied his access to the toilet. At this time, one participant asked, "does he wet his pants if you don't let him go?" I hope so because that's a very likely case in a kindergarten classroom situation like this."

The selection of episodes among the participants, to guide the teaching and learning experiences within in the literacy block, were quite diverse. Each participant demonstrated their understandings of teaching literacy and preference towards a diverse range of literary experiences. As such, they ordered their own selected literacy learning experiences (episodes) in completely different ways. However, there was a single distinctive comment in which was made at different intervals throughout the literacy experience. This comment based on the notion that the 'usual' learning experiences in which they (the participants) would generally incorporate into a daily literacy block were not present or offered for them to select and undertake. It was through the interview process in which this notion could be further explored to reveal exactly what learning experiences were absent.

Although each of the six participants demonstrated an individual and unique method to 'tackling' the simulation, there were comparable trends which appeared throughout each participations interaction with ClassSim. Every participant regularly accessed the 'student updates', particularly to inform a decision they were required to make. Accessing this information appeared to support each participant to gain insights into the student's reactions to the decision (and its subsequent consequences) made. The participants also accessed the additional support information, such as the summaries. However, the extent to which each of the participants appeared to utilise these summaries varied greatly; some participants read them carefully, others were observed to skim them. Another aspect of ClassSim, which was used by all participants, was the opportunities to listen to the teacher's voice over. This tool served as an additional way for the participants to gain further insights into how the teacher is conducting both the class and its associated learning experiences, through verbal communication.

Analysis of 'thinking space' entries

The ways which each participant accessed and utilized the embedded tool, the 'thinking space', proved to be of greater differentiation. Some participants wrote less than 250 words, while others wrote in excess of this. Analysis of each of the six participants' thinking spaces privided insights into a variety of different critical aspects of teaching, which proved to be quite contrasting with each other.

All six participants raised issues in relation to the teacher's aide. Participants questioned how a teacher's aide was present for such a long period of time (20 hours per week) as well as what the teacher's aide was doing during the running time of the ClassSim software. One participant stated, "20 hours for a teacher's aid! That's like having two teachers in the one classroom almost all the time!" During ClassSim the user is presented with an image where the students are seated on the floor and the teacher's aide is sitting with them listening to the teacher. At this time, one participant declared, "the teacher's aide should not be sitting on the floor with the students listening to me talk, but should be active and doing something more productive…I'm not always sure what the teacher's aide is doing."

Several participants questioned what time of the academic year it was in the virtual Kindergarten classroom. One participant acknowledged, "my decisions would be a lot different, depending on the time of the year it is." The participants described that having this information would determine their decisions in relation to behaviour management, the general running of the classroom, and decisions they were faced with during the episode selection phases. At a decision point in the software, a participant was observed to stop and comment to the researcher, "this decision is tricky. I mean if it was the beginning of the year, I would definitely undertake handwriting using the worksheets, while if it was late term 3/term 4 I would be modeling handwriting and asking students to use their handwriting books…"

The inclusion of parent helpers within the virtual classroom was something that all participants commented upon. Issues focused on at these times included the difficulties and/or complications of parent helpers within the classroom as well as general comments in terms of their relationship with parents. One participant described, "this (parent helpers) is a mixed bag…"if they are good they can come but if they are dodgy and their mobile phones ring then no, I don't want them to come." Another participant wrote in their 'thinking space',

> "My frustration about parent help stems to the motivation of the parent… their purpose becomes evident very quickly once they are in the room. Parent helping is not a social activity for parents to catch up on the local gossip, nor is it the place to make plans for trips to the park etc. Similarly, it is not the place for the parent to spend some quality time with their child (although I am very happy for the parent to help their own child within the context of the same help being provided to others). It is also not appropriate for parents to 'supervise' the teacher and the goings on of the classroom. I guess you can say I am a bit of a skeptic about parent help – it sounds quite negative, however, I always had parent helpers in as a classroom teacher and will continue to do so…"

Other statements aimed to justify their (the participants') decisions in relation to using/not using parent helpers during specific times of the literacy block, with a participant explaining that, "Parent helpers would not be invited in during modelled writing as they would be in the classroom for reading time…". Another described, "in my first year of teaching, I found it extremely difficult to initially make the parents happy. Although I was a targeted graduate, they didn't care. All as they were concerned about was the fact that I hadn't done this before….they would come see me at 9am after the bell went and while all the students were in the classroom expecting to discuss things then and there." This appeared to be an issue that the participants responded to with clear connections to their own varied professional experiences.

Comments made by the teachers in semi-structured interviews

All participants acknowledged that the ClassSim was representational of the actual kindergarten classroom environment. One participant articulated, "the decisions that the teacher makes (during the ClassSim) impact on different students differently." The analysis of collected data from the six participants revealed that they appeared to find limited discrepancies in the ClassSim that they felt were inappropriate or not representational of the daily running of an actual kindergarten classroom environment. A participant described, "all the decisions in which they (as a teacher) were faced with and were required to answer, were continually evident in an everyday kindergarten classroom." However, one participant acknowledged, "it could not entirely represent the classroom reality because every classroom is different, but more

importantly, each teacher has the opportunity to develop rapport and relationships with the students, something that a simulated environment would not allow…These relationships are what allow the teacher to make certain decisions and to design certain experiences." Another participant explained, "it's the little things in the ClassSim that make a difference…such as the blunt pencils and the lack of scissors." She further explains, "these are all decisions that teachers are faced with every day in a classroom and without knowledge, exposure and previous experiences with these decisions, the consequences of these decisions could result in the making or the breaking of the lesson/learning experience….They are critical and are things that are not taught in lectures at university but are continuously evident throughout the ClassSim."

The different professional experiences of the participants seemed to indicate some conflicting evidence particularly with the timing of the actual literacy episodes. Two of the six participants strongly argued that the timing of the episodes were not reflective of actual kindergarten literacy learning experiences. They both exposed similar arguments with one of them stating, "There is just no way that one could possibly complete a handwriting episode in the time given. From my experiences, a kindergarten class would take close to double that time to successfully complete it."

The participants each identified further learning experiences that could be included in the available options within the literacy block episode selection. A common trend amongst these suggestions was the inclusion of a specific 'phonics' focus. One participant described, "phonics is undertaken in my classroom every morning for 10-15 minutes," another acknowledged, "our school has implemented the Jolly Phonics program, so we practically teach a new sound every day". The inclusion of phonological awareness within daily learning experiences in a Kindergarten classroom appeared paramount in daily literacy experiences for these teachers.

Each of the six participants clarified that they, from their teaching experiences, could put a child's name to each of the five targeted students.' One participant described, "I remember everything about each of the five children. I don't remember much else that I was asked to do throughout the simulation, but I clearly remember the students and explicit details relating to each of them. I think this because…actually I know this is because I could relate to them so closely that I could put at least five names to every one of these targeted students." When further questioned, the participant acknowledged, "oh and I could put students' names of all ages to these targeted students, not just students at a kindergarten level, but students of all ages." It became evident that the targeted students were representative of the range of children within these teachers' experiences of current classrooms.

Concluding comments: How representative is the virtual environment of classroom reality?

This paper aimed to share our insights into two questions:

1. How realistic does a simulation have to be in order for it to be regarded as authentic?
2. What features of the simulation engage users to think deeply about the complexities of their classroom experiences?

To respond to these, we have described the creation of the virtual environment in consultation with Herrington, Oliver and Reeves' (2003) design elements for authentic learning environments, the lessons we have learned from pre-service teacher interaction with iterative versions of the software and reflections from current practitioners who have engaged with the virtual classroom.

Our research has revealed that ClassSim is an effective learning experience to showcase the complexity of the classroom environment. The identification of a target audience for the software has supported its development as we are acutely aware of the localised issues that face our teachers, the mandated curriculum and policy documents they are expected to use and use this knowledge to provide an experience that is meaningful, appropriate and authentic to their needs. In addition, the opportunity to work through classroom experiences that peers have also experienced provides opportunity for learning to occur within a community of practice. The ability to schedule its use within core subjects has enabled us to promote the resource and support users as they engage with the scenarios it presents. The practitioners who engaged with the software acknowledged the detail and appropriateness of the scenario and were able to identify specific design features that they felt captured the intricacies in the work of a teacher.

Resources housed within the simulation software were consistently identified by the pre-service teachers and classroom practitioners to be appropriate. Data indicates that users are able to vicariously experience both the teacher and student's experiences while engaged in typical classroom experiences within the virtual classroom. As the scenarios are bound within authentic stories, supported by necessary resources and classroom artefacts, we have observed that pre-service teachers not only use them during scheduled periods, but revisit and reflect upon these after formalised interaction with the software. The preference of the classroom practitioners to engage with the visual images and audio files of the classroom environment support the rationale for the development of these features to contribute to the authentic learning environment.

Our data has consistently shown that interaction with the software supports the preparation of our pre-service teachers for classroom reality. We have frequently heard participants acknowledge the complexity of the role of the teacher and the need to consider so many things within the simulated environment they had not previously considered. Further, our data shows that students enter actual classroom environments after using the simulation with greater awareness of the many facets that make up the multifaceted classroom situation. The teachers further reinforced this finding with their observations of the authentic nature of ClassSim given their professional experiences. However, we also acknowledge that within this environment there is significant opportunity to increase authenticity with more options, resources and consideration of fine details the teachers alerted us to.

We are justified in claiming that the success of this simulation software is due the fact that the pre-service users can see that ClassSim is relevant to their current and future working lives. Therefore is has a relevant purpose. As a result the majority of the pre-service teachers who have used ClassSim have demonstrated motivation to engage with it for sustained and frequent periods of time and to make extensive use of the resources offered within the software program. Indeed, the teachers too, felt it

was a worthwhile experience for them to engage with as they explored the intricacies of the profession and the experiences that have helped to shape their own professional identities.

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