# Fostering communities of practice during the creation of an online classroom-based simulation

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Working with and managing a team can be a challenge in any project development. This paper reports on how a team of researchers, an instructional designer, programmers and graphic artists worked within a community of practice, as simulation software was created and further developed. The simulated classroom represented in this software was designed to enhance the initial practicum experience of pre-service teachers. The teaching of literacy skills in primary schools framed the pedagogical focus of the software – one of the priority areas within primary schooling. We report on how research associated with each iteration of the simulation prototype software helped team members to develop understandings of each other's role in the project. Initially the instructional designer, content experts and researchers led the development process, and other members were more like legitimate peripheral participants. Over time, all members of the team developed into legitimate participants, and formed a viable community of practice as ways to support initial teacher education were examined. We describe the processes we use to help all members of the design team enter the communities of practice through the opportunity to understand the context and purpose of the project.

Keywords: simulation, pre-service teacher education, communities of practice

## Introduction

A community of practice is defined as a group of people who together accumulate and share their collective learning (Wenger, 2002). Often a 'communities of practice' approach is seen as a way to cultivate or nurture new knowledge by sharing existing tacit knowledge within an organization. During this project two distinct communities of practice emerged: one involved the pre-service teachers who engaged with the simulation software and the second involved the design team as the software was developed and refined from the research conducted with the students. However, these communities did not operate in isolation as common members from both communities provided links that facilitated the progressive development of the five iterations of the simulation.

Initially the instructional designer, content experts and researchers were leading the development process, while the other members (programmers and graphic artists) were more like legitimate peripheral participants. Over time, the other members of the team developed into legitimate participants, and formed a viable community of practice as new ways to support initial teacher education were developed. We believe that the research associated with successive iterations of the simulation prototype software not only helped team members to more fully understand each other's role in developing and improving the simulation – it also allowed the collective knowledge of the community to be more effectively used. Further the processes we used to help all members of the design team to become fully-fledged members of the community of practice is an important outcome of our research.

Thus the development and implementation of the online classroom simulation software reflected the increased understandings of the 'team' as they refined it by looking to the users, the input of team members and the literature for guidance.

## Background to the ClassSim project

This project was grounded within our belief that the development of a classroom-based simulation is one way to support the range of learning strategies incorporated within teacher education programs (Aldrich, 2004; Queen, 1984). Limited research is reported on simulations in teacher development, but advances in gaming software, particularly those which involve players creating worlds (e.g. The Sims), have

demonstrated that it is possible to create a simulation that can support pre-service teachers' professional learning (Sottile & Brozilk, 2004).

The intended audience of the simulated classroom was pre-service teachers enrolled in their first year of a primary teacher education degree, with the vision of enhancing their understanding of the work of a teacher in a lower primary classroom. A focus on the teaching of literacy skills in primary schools underpinned the software; this was considered appropriate as it is one of the keys to success in schooling (Cambourne, 2001). The simulation we developed supported users 'working' within the role of a teacher. The embedded tools provided within the simulation were designed to stimulate the pre-service teachers to acknowledge their preconceived ideas about the work of a teacher, and to reflect upon these as they developed new opinions and ways of thinking about the role of the classroom teacher.

The following research questions were devised to gain an understanding of the practical problems that the simulation was to address.

1 What does the current research say about the planning and organization of literacy lessons in lower primary school classrooms?
2 How can pre-service teachers experience this knowledge in ways that encourage them to reflect on their current experience and access additional knowledge?
3 What design affordances could best support the development of a community of practice amongst users?

Academic members of the research team who had recent classroom experience and access to considerable classroom-based observation data responded to question 1. They analysed a considerable volume of classroom-based data as they looked at literacy practices. In addition an extensive literature review on this topic provided direction for the software development. To respond to Question 2, the researchers developed teacher scripts of classroom learning events, designed to depict the research from Question 1. At the end of this stage we had a shared understanding of the practical problem and possible approaches; however, we needed to develop possible solutions within a theoretical framework. One of the most relevant articles we discovered was a review by Herrington, Oliver and Reeves (2003). This review identified nine design elements of situated learning environments, and the challenge for us was to operationalize as many of these as we could in an online simulation.

## Reflection on the process

In total, five prototype versions of the simulation software have been trialled with cohorts of pre-service teachers. Our research findings from the implementation of the software have consistently shown that the opportunities provided in the software to slow down or accelerate classroom events, revisit and reflect on critical decision points and replay events in the light of new understandings helped pre-service teachers develop an understanding of the complexity of classroom interactions. It appears that these design features provide pre-service teachers with time to think critically about complex teaching situations, which relied on their ability to identify and respond to the virtual children's experiences. Further, their experience with the simulation enabled them to appreciate the complex role of the teacher, specifically the impact of subtle decisions that experienced teachers made during lessons**.** This contributed to the process of enhancement of self-efficacy and supports the findings reported by Thompson and Dass (2000) about the benefits of engaging in simulation experiences.

We believe that the conditions associated with the trials of the simulation supported the development of a community of practice amongst the participants. As each pre-service teacher engaged with the simulation, they showed that they were developing informed insights into the nature of classrooms and the work of a teacher. When they solved a problem, they often shared their experiences with peers – much like users of online games do. For example, when they encountered a decision point, pre-service teachers were able to talk with others about what they had done and the perceived implications. At other times they paused the simulation to discuss appropriate approaches to emerging challenge. The provision of time to work with the software individually, and then collaborate with others, positioned the pre-service teachers in such a way that they could begin to argue their beliefs, and challenge conflicting positions in an informed way. This is similar to findings reported by Brozik and Zapalska (2003) although the context in their case was different.

Each trial of the prototype was conducted in a multimedia computer laboratory that could hold up to 24 users. The programmers, graphic artist and instructional designer were located in the adjacent room, and could easily be called upon to fix 'bugs', observe interactions, and make comments to researchers during the scheduled trials. The whole design team was involved in the trials, and all members were able to see the impact of their work on the users. After each trial, the data from thinking spaces, observer notes and follow-up interviews, were collated and analysed as previously described. These were summarised and taken to a follow-up meeting with all team members.

The follow-up meetings commenced with a brief presentation of the summary and then all members were free to contribute. At the end of each session, plans were developed for the design of the next prototype discussed. Most of the time was spent in clarifying our understanding of what the users learnt, and how the design features contributed to this. Frank and open discussion about our future visions for the software helped all members to appreciate the unique contribution that each member was making to this project, and to further clarify the short-term and long-term goals of the project.

For example during the second iteration of the simulation we debated about whether to include animated graphics and sound to reinforce key concepts about student response to user selected actions. The instructional designer asked probing questions to elicit the purpose of these features, and how we thought this would enhance user understanding and conceptual development. Then the programmers and graphic artists explained the process of developing these, and the form they would take. We then explored the strengths and weaknesses of the different options, finally selecting the simplest approach that could achieve our goals.

## Conclusion

During this project, repeated use of the simulation motivated many of the pre-service teachers to develop into small communities of practice (Lave & Wenger, 1991) to share their knowledge and experiences. They were involved in a process of interaction with others to produce and establish meaning among peers. From a situated cognition perspective, their learning occurred in a social setting through dialogue with others in the community. It becomes a process of reflecting, interpreting, and negotiating meaning among the participants of a community.

Members of the design team also formed a viable community of practice but it was for a different purpose. We feel that it was important that the following general principles were met in order for this community of practice to be viable:

1 Meetings were chaired by the instructional designer who provided opportunities for all members to share their knowledge and understandings.
2 The instructional designer communicated to all members that the collective expertise of the team was important for the success of the project and that everyone's expertise was valued.
3 Design modification decisions were based on real data that team members had gathered. This involved members of the team working with the users of the simulation. There was no dispute over the authenticity of the data.
4 The research data was used to help members of the team to understand how interaction with the simulation assisted user learning.
5 As the project evolved, the instructional designer ensured that members could see that their expertise was having a positive impact on its success.
6 Team members received multiple opportunities to demonstrate and/or publish articles about their work.

We acknowledge that many of these conditions are not new, and are similar to those expressed by Wenger (2002). However, we believe that is important that the leadership role of the instructional designer was a crucial factor in the success of this project. We conclude by stating that, in our experience, a community of practice does not just happen – it has to be formed, nurtured and continually reviewed. It is the responsibility of those empowered to lead such a community to ensure that the conditions that are conducive for the formation of such a community, are present and put into operation. The role of the instructional designer is seen as someone who leads the process of analysis of learning needs and goals

and the development of a delivery system to meet those needs. But this role also requires the instructional designer to lead a team that develops into a viable community of practice.

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