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From Kansas to Queensland: Global learning in preservice elementary teacher education

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Abstract

Communication of information between groups of humans has been extended through out history progressing from smoke signals, drum beats, message couriers, post, telegraph, telephone and now the ICT. The time between the utterance of a message and the reception of that message has progressively decreased. We are now able to communicate relatively cheaply, simultaneously sharing and responding to ideas and thoughts on a scale never previously possible. Although the technology exists to make possible easy access to people in all parts of the world, we still lack understandings of the aspirations and sensitivities of other cultures with whom we can communicate. This project supported pre-service elementary teachers in two countries – Australia and the United States – to engage in collaborative learning through Internet communications. The purpose of the project was to develop greater understanding of other's cultures, and practices in teaching elementary students. Students attending an Australian preservice primary science methods course were matched with a cohort of undergraduate preservice elementary student teachers from a university in the United States studying an integrated mathematics science methods course. Over a six-week period the students engaged in the computer-mediated communication and were encouraged to learn about mutual cultural practices and primary/elementary science education in both countries. The outcomes demonstrated that students involved in the project benefited from an array of different and enriching learning experiences. Students benefited through enhanced understanding of the teaching of science and an appreciation of the common problems confronting science education in both countries. However, there was little engagement in debate or discussion of individual differences and the cultural context of each other's country even when opportunities presented themselves. Nevertheless, the on-line tasks provided the pre-service teachers with the experience and confidence to engage their own students in similar global learning initiatives when they become teachers.

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Introduction

This presentation provides an overview of a project conducted over two years in which we attempted to engage preservice elementary/primary teachers of science in a global learning experience intended to explore issues in the teaching of science in two countries. We were particularly interested in the development of their understanding of curriculum and pedagogical practices ameliorated by cultural contexts.

At university, students are confronted with the escalating flow of information about new approaches to curricula and new theories of learning. Most preservice teacher education courses discuss issues of student centred learning, constructivism and strategies that are supportive of these approaches and where possible implement such approaches (Gibson, Alagic, & Haack, 2002; Watters & Ginns, 2000). For many prospective teachers these reforms in teaching challenge their own experiences of learning, their practice teaching experiences, and their own beliefs about teaching and learning. In particular, their classroom experiences remote from universities rarely reinforce what the theory-oriented university instructors are proposing. Preservice teachers rarely engage in critical analysis of teaching and learning situations, and hence, their experiences perpetuate the status quo. In their formal university courses, preservice teachers are introduced to contemporary ideas and theories and often encouraged to reflect on the social, cultural issues of teaching – for example the meaning of scientific literacy and the purpose of science. These reflections are often developed in individual ways based on personal prior experiences shaped by their own cultural contexts. Devoid of opportunities to examine these assumptions in practice, there is superficial engagement with these ideas in a social context (Luft & Patterson, 2002). Indeed, students frequently question the views presented in their courses, as they are often un-related to what happens in schools. Without opportunities to engage in analyzing classroom situations through “educational scholarship and theoretical analysis” (Mason, 2000, p. 21), little progress will be made towards developing reflective practitioners (Zeichner, 1983).

Compounding the uncertainties facing preservice teachers is the realization that the students they will be educating are growing up in a world of uncertainty. The predictability of the future is far less certain at this time in history than probably any time in the last century. Daily events attest to the rapid change in world politics and stability. Further, issues of sustainability and global climate are key issues in the curriculum, which paint a gloomy future for students of today. Sharing perspectives and learning to communicate with fellow preservice teachers in other institutions in different cultural settings should foster the development of knowledge and understanding about their culture and to initiate self-reflection on their own assumptions, beliefs and practices both as citizens within the society and as prospective teachers.

To address this issue an Internet based learning community was established (Gibson et al., 2003). In this article, we examine the effectiveness of this community in engaging students in knowledge building and reflection on their beliefs about science teaching pedagogy in elementary schools. We begin with a briefly examine the literature concerned with communities of learners and especially attempts to develop these through electronic or internet based approaches.

Learning communities

The effectiveness of learning or knowledge building communities has been well documented (Bereiter & Scardamalia, 1993; Lave & Wenger, 1991) and draws

theoretically upon a sociocultural perspective of learning and cognitive development (Vygotsky, 1978). Learning in a community is a process of *cultural apprenticeship* whereby novices observe and interact with experienced members and hence become socialized into the community (Lave, 1991a). Extension to virtual, on-line or Internet mediated communities, or e-communities, is emerging as an effective strategy to expand opportunities for the development of knowledge building communities (e.g. Collis, 1998; Jonassen & Land, 2000; Marx, Blumenfeld, Krajcik, & Soloway, 1998; Palloff & Pratt, 1999).

Characteristic of such *e-communities* is the engagement by members in computer-mediated discourse, debate, explanation, justification and argumentation about matters core to the community's interest and through this process reflective thinking is stimulated (e.g. Bonk & King, 1998; Duffy & Cunningham, 1996; Ferry, Kiggins, Hoban, & Lockyer, 2001; Oliver, Omari & Herrington, 1997). Such a context acknowledges that learning is "an evolving process in which socially situated individuals attempt to make sense of new information by relating it to familiar contexts and existing conceptions" (Macdonald & Twining, 2002 p. 603). Asynchronous on-line interactions enable a process of reflective interaction (Harasim, 1989). Without verbal and non-verbal cues there is less likely intimidation by dominant participants and because there are less time pressures, participants are able to reflect on postings or contributions by colleagues before responding. Hence contributions are more considered and in-depth (Warschauer, 1997). However, the establishment of a community required an element of provocation where potentially diverse and culturally dependent assumptions could be challenged. Most students attending preservice teacher education programs share a common background culture and have experienced similar educational histories. They are already professionally socialized into teaching although at this point in their careers could be termed "peripheral participants" (Lave, 1991b). By establishing a community comprising students and staff from two institutions on different continents, we hypothesized that there would be a rich and diverse set of beliefs to reconcile. However, we acknowledge that the style of contributions might also be culturally dependent as recently highlighted by Kim and Bonk (2002). Nevertheless, the opportunity to engage in actions that fostered critical and analytical reflection challenged by peers whose assumptions are influenced by different cultural and socio-political perspectives is worthwhile.

Purpose

The aim of this study was (a) To exchange experiences in learning to teach science in elementary/primary schools, and (b) to develop a more internationalised perspective on teaching and learning.

Background

In contemporary times, prospective teachers are not only increasingly likely to be employed globally, but they also need to develop international perspectives and cultural sensitivities among their own students (e.g. Carnoy & Rhoten, 2002; Merryfield, 2001; 2002; Nordgren, 2002). For many undergraduate and graduate preservice teachers, only limited attention is usually given to national and international perspectives in their courses. There is a basic assumption in many programs that students will teach in the local state educational jurisdiction. Exchange programs exist but only impact on a small proportion of students as they are costly for both the students and the institutions. Hence, traditionally the emphasis during their course has been on using almost exclusively curricula materials produced by the local state or district authorities. This view might have been valid in the past. However, with the increasing internationalization of education, it would now seem

prudent to prepare students to be able to teach anywhere in our global village. In recent years, teacher shortages in the United Kingdom, United States and New Zealand for example, have seen increasing mobility of education graduates.

The term globalization has been used to refer to trends in higher education that in turn have cross-national implications. The other term sometimes used synonymously with globalization is the term internationalization which is considered to refer to the specific policies and initiatives that deal with global trends (Altbach, 2002). International concern exists among many about the direction of economic globalization and the impact the multinational corporations, unaccountable to democratic processes, will have on the distribution of wealth and power (e.g. Cavanagh & Mander, 2002). Porter and Vidovich (2002) consider that globalization is about the connection of cultures and the integration of economies that involve international networks. According to Carnoy and Rhoten (2002) the main resources for globalization are increasing knowledge and information. Given that schools and universities are international enterprises (Turner, 2000), Carnoy and Rhoton claim that research has shown that among US tertiary students there is a remarkable lack of familiarity with world issues, geography and cultures. In addition, these authors reported that from a survey of some US academic faculty, only 45% agreed that further steps should be taken to internationalize the curriculum. Although similar data are not available from Australian sources, historically Australians have been inveterate travellers with estimates that at least 5-10% of the population is travelling and working outside the country at any one time. Travelling broadens the mind but as national economies depend on international perceptions derived through contact it is imperative that greater awareness of cultural norms is developed early in life. Global learning can empower people and communities to retain control over their local economies and cultures and resist the excesses of economic globalization.

University students of today are relatively more mobile, discerning and critical of their educational experiences. To enable quality learning, new and powerful ways need to be developed to support teaching. Computer mediated conferring opens up potential for students to become independent and self regulated learners (Peters, 2000) and removes national boundaries on the context of learning. To grasp this opportunity, teaching staff need to develop the necessary skills to facilitate the development of on line learning communities (Laurillard, 2002; Salmon, 2000).

Theoretical framework

Although the purpose of this study was to achieve a more global perspective among preservice teachers the major strategy was to engage students in learning through electronic communication. Thus the study was influenced by Salmon's (2000) model of online teaching and learning, which describes a sequence of phases in supporting on-line learning. This sequence begins with a phase described as "access and motivation" and progresses through "on-line socialisation", "information exchange", "knowledge construction" and finally "development". The early phases of this model require substantial scaffolding until eventually students become autonomous and spontaneous in their use of the technology to learn. In this process, students develop the technical competence to engage in on-line discussions; establish identities within the confines of a new literacy; break the ice by sharing neutral information until they are confident and trusting to collaborate around mutually beneficial tasks; and eventually develop autonomy to engage in spontaneous communication.

The study is also influenced by literature on internationalization some of which is described in the background. The core debate centers on the necessity to develop

international perspectives and cultural sensitivities among students (e.g. Carnoy & Rhoten, 2002; Merryfield, 2001; 2002; Nordgren, 2002).

The study

The global learning project was implemented over two years with groups of approximately 60 students each year from a major metropolitan university in Queensland, Australia and a similar cohort of US preservice teachers from a major university in Kansas (Alagic, Gibson & Doyle, 2004; Gibson, Alagic, & Haack, 2002; Gibson et. al, 2003a; 2003b). The preservice primary teachers from Queensland were either 3rd year undergraduates in a four-year course or graduates in their 2nd and final year of a graduate or baccalaureate course. They were studying a primary science education unit that focussed on teaching theory and methodology. In the first year of the project, each preservice teacher from the Queensland institution was matched with a student from the Kansas institution and weekly asynchronous e-mails were established between the pairs. In the second year, the project adopted a commercial online management software package using threaded discussion forums. Preservice teachers were clustered into groups of approximately five members. Generally, there were three Kansas preservice teachers matched with two Queensland preservice teachers. Participants did not have access to other group's discussion forums. Guidelines to scaffold communication and issues to explore were embedded into the instructional design of both groups' courses. Staff from both institutions supported this process through regular asynchronous e-mail communications, tele- and video-conferencing.

Data sources included field journals of instructors, observations of weekly classroom discussions reporting on communication, transcripts of e-mail messages, open-ended surveys and focus group interviews conducted at the conclusion of the semester. Analysis of the data from the e-mail exchanges, discussion forums, interviews and in-class whole group discussions was completed using interpretative methods. Transcripts were read, coded and examined for patterns and outcomes using constant comparative strategies (Strauss & Corbin, 1990) to support or refute hypotheses. The validity of data interpretation was increased by having three faculty and two graduate research assistants individually read and categorize the contents of all student e-mails. Similar approaches were used with interview data.

Results

The period over which communication occurred was limited by the circumstances of timing of the respective courses, namely six weeks. During this time in the first year there were issues of a technological nature to be resolved. These included misdirected e-mails, and institutional firewalls. Many of these issues were resolved in the second year of the project when communication was facilitated through the electronic learning software provided by a commercial software corporation. There were also issues of student perceptions of the purpose and value of the initiative. For example, in the first year participation was not directly assessable for Queensland students whereas it was for Kansas students. These impacted on the alacrity with which students participated and the stages that they reached in Salmon's model of e-learning. This was resolved in the second year when Queensland students were required to include a reflection on the global learning experience as apart of an assessable portfolio. Kansas students were provided with a range of topics to explore with their Queensland counterparts whereas the Queensland students were provided with greater flexibility in choosing topics of interest.

In the second year of the project, postings to the discussion forum ranged from between 10 to 50 from each institution. The contributions from the Kansas students tended to be more frequent reflecting the development of relationships within their own cohort. In contrast, the Queensland students tended to already be familiar with each other and on a number of occasions one student made postings on behalf of the group. A strategy to encourage students to develop a name for their group generated good social interaction, although in some instances this was claimed to waste time when agreement could not be achieved. A second strategy to generate social interaction was to encourage students to introduce themselves and to reflect on their previous experiences of learning science. Many indicated an aversion to science or negative experiences in learning science either in elementary/primary school or in high school. This sharing of anxiety and awareness of common experiences fostered a number of discussions about ways that they will improve experiences for their own students.

The Kansas students were provided with a number of key questions to probe whereas the Queensland students were encouraged to explore general issues relating to the teaching of science based upon the lectures and tutorial sessions. The different approaches raised some concern among students but also affirmed the desire of some participants to have more structure. That is, some preservice teachers preferred opportunities to explore a range of issues whereas others suggested they needed topics to be regularly posted by instructors.

After settling on a group name and resolving issues about how science should be taught, the preservice teachers discussed a range of topics some initiated by the Kansas group and others by the Queensland group. For example, they argued the value of experiential and kinaesthetic learning in science. They discussed issues related to constructivism, children's prior knowledge and approaches to probing prior knowledge. The Queensland participants also explained details of the Australian curriculum and how different topics are organised into Key learning areas. In return, Kansas preservice teachers contributed information about the national science standards and how those relate to state and local standards. Some of the Kansas preservice teachers had learnt about cooperative group work and shared their knowledge about particular strategies and provided references. An exchange discussing the advantages and disadvantages of ability grouping was a feature of one week's forum. Classroom management, questioning strategies, equity, integration, and teaching level preferences were canvassed by a number of groups. In many instances, student drew upon discussions held in formal workshops and their own personal experiences to provide substance to the discussions. Few students cited authorities or literature to defend ideas and there was only sporadic evidence of students researching topics before contributing to discussions.

Students strongly endorsed the advantages and value of the global learning initiative. They argued that the experience was beneficial for at least four reasons. A cluster of responses identified a range of positives extending from a metacognitive focus to a very practical reflection on learning content. That is, (a) some argued that the experience helped them to think more about their own learning, (b) others saw it as an opportunity to share and discuss content, (c) others saw the exercise as useful information exchange on different systems and cultural practices and (d) an appreciation of the value of global learning and associated technology for primary and elementary students.

Thinking about learning: A theme, emerging from a number of students' comments in focus groups, e-mails and from the survey data, was that discussions helped them to think more about their own learning. This theme is exemplified by comments such as:

GLP (Global Learning Project) has helped my understandings by providing a neutral person who you can bounce ideas with and discuss opinions etc. This is harder to do with someone in your class because they have been given the same perspective as you have. (Queensland student)

From my e-pal, the main thing I think I have learned is to not be afraid to try something new or to meet someone new. I was very nervous about having an e-pal, but so far, it has turned out to be awesome, and I am glad that I was forced to do it. I probably would not have done it if I had a choice, so I am glad I was pushed to do so. (Kansas Student)

A Queensland student, concluded at the end a long email reflecting on the experience that the interactions:

Helped stimulate my thinking about science issues and general classroom issues also my plethora of teaching strategies and ideas have increased due to everyone's contributions

Other similar comments indicate that a neutral person provided a source of independent authority, who endorsed the content and approaches being adopted by the instructors in the respective courses. This theme also reflected a sense that students in both countries faced similar anxieties about teaching science and the opportunity to express these anxieties appeared to be cathartic. However, there were a small number of students who found that it was impossible to engage deeply in discussions in such a small time in groups of 4-5 students.

Broader range of content: Other students saw the experience as an opportunity to explore a broader range of topics to discuss in teaching. These discussions focussed both on methods of teaching science and scientific concepts. A majority of the respondents stated that it gave them an alternative perspective on the teaching of mathematics and science. For some, however, they saw similarities between the US and Queensland approaches to science teaching. These views are captured in the following responses:

We've talked over constructivist ideas and given each other suggestions about teaching and talked about experiences we've had teaching children. (Queensland Student)

I have also learned that I have a lot to learn about science. In his last e-mail he was talking about doing a lesson about how many Joules are in peanuts, and I don't even know what a Joule is. I have a lot to do still before I become a teacher. (Kansas Student)

This has assisted me in understanding that, even though in different countries, we both have the same views on teaching science.

Students exchanged resources and ideas for teaching a range of topics in both mathematics and science.

Cultural awareness: Extended discussion and debate about values, assumptions and issues confronting individual cultural perspectives was not evident. There were however, exchanges that addressed individual student's interests and knowledge of each other's cultures at a surface level. For example, information about personal relationships, sport and lifestyle was common as detailed in this student's comments:

After e-mailing back and forth a few times with my e-mate, I can say that I now know a little bit about Australia and the lifestyle they live there. They too go to college for 4 years to get a bachelor's degree. They also have education degrees in early childhood, primary, and secondary. One project that we are both doing is designing a unit made up of 4 lesson plans. Away from the subject of school, I've learned what netball is and how you play it. My e-mate is really good at it and her sister also plays it. Her sister represents Australia doing it, which I thought was really cool. (Kansas Student)

Similar surface details about lifestyles and practices were evident in transactions relating to US universities identifying with “mascots” a practice unknown in Australia. In a discussion of the teaching of mathematics, the teaching of the metric system generated debate among the US students and revealed a number of naive assumptions about the use of the metric system internationally. Indeed, one Australian student thought she was teaching the “English” system and described her understanding of the system as the “English Metric System.”

A potentially useful exchange occurred in one group that was engaged in a discussion of the value and nature of science. Although the exchange was short it did provide an opportunity for one student to express some valuable thoughts about the public perception of science. In this exchange, John an obviously socially conscious student, discusses critically the attitudes in the US towards energy use and the sustainability of our planet, “we no longer want to live in such a way as to be thoughtful or even very responsible, but we see “science” (that is technology) as this magical, bottomless bag of tricks, that will always come to our rescue just before calamity strikes.” He previously described teaching as a profession “under a very critical microscope”. His comments did not generate any substantial debate other than a suggestion that global learning could involve students discussing environmental issues and generate more “global scale thinking”.

Value for primary and elementary students: Emerging from the data were suggestions that this approach would be valuable in schools:

Children could engage in a similar international virtual community, as most of the interaction would take place during school time. Therefore the communication would happen on a regular basis.

Indeed, students frequently made comments about the transferability of their experience to their own future classes. One student claimed that the experience had increased her confidence to use technology and replicate this process with her own students. Another identified the importance of linking students as “pen pals”. Several students suggested that they correspond next year when they have their own classes and attempt to link their students.

The perception also communicated was that establishing online communication in schools with students would be easier than the preservice teachers’ experiences. Issues of convenience, value and recognition for participating in the program were limitations to the successful implementation.

Conclusions

Although there were the expected “teething” problems, evidence did emerge that students were enriched by the experience and that global learning networks can serve as a catalyst for collaborative critical inquiry. The commitment to engage in collaborative discussions varied among groups with some committed to exchanging ideas well beyond the six week

period and sharing addresses so that they might continue collaborating when they were in their classes with their own students.

The Salmon model was a useful framework to guide the development of the interaction (Alagic, Gibson, Doyle, 2004). Access was relatively facile in the second year and students generally approached the interaction with expectations of useful outcomes. The students identified strongly with the issue of teaching science and a desire to provide more stimulating experiences than they had as students in elementary or primary school. The task of selecting a group name was an effective icebreaker enabling exchanges that revealed a number of cultural idiosyncrasies and language differences. Most students engaged in on-line socialisation interspersed with discussions of issues and indeed in some instances where there were personal issues provides comfort and support. Higher-level engagement of information exchange, knowledge construction and deep learning were evident. The short length of time to engage in discussions was acknowledged by students as a limitation. However, at least ten percent of students either exchanged personal contact details to enable further communication after they graduated.

However we observed that the final stage (Stage 5) of the Sampson model did not fully describe the most advanced student behaviours. Leaders emerged from Stage Four with significant contributions to knowledge construction, and subsequently explored options of implementing similar projects with their own students. This display of leadership led us to further analyze data for elements of autonomous learning and to propose a modified computer mediated communication model (MCMC) which are explored elsewhere (Alagic, Gibson & Doyle, 2004).

The global learning project reinforces Graziadei's (2000) claim that access to sophisticated technology is not essential for engaging in intercultural learning networks. We remain strongly committed to the concept of providing global perspectives of primary and elementary science education for our preservice teachers as we believe that ultimately they will be better prepared to teach primary aged children anywhere in our global village. The participants also recognised, in the reflections on their experiences in this project, the value of internationalisation of education for their students in years to come. This study was conducted between societies that share similar but not totally the same global perspectives and cultural practices. The commonality of language, heritage and social norms certainly facilitated communication but also possibly inhibited discussions about social and cultural issues. The experience provides a base for expansion to non-Western societies at a time when global uncertainty and instability is at a critical level. Our research focus is now on developing and understanding the issues related to this challenge.

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