Journal of the International Society for Teacher Education

Rocky Mountain Rendezvous

Trading Ideas in Teacher Education for the 21st Century

Volume 14, Issue 1, 2010

It is with much appreciation that JISTE wishes to thank the following individuals for their reviews of articles for this issue: Amir Hashmi (Pakistan), Ani Shabazian (USA), Anna Hugo (South Africa), Debra Panizzon (Australia), Douglas Warring (USA), Helene Muller (South Africa), Jacky Pow (Hong Kong), Jane MacMillan (USA.), Janet Powney (UK), June Mitchell (UK), Kareen McCaughan (Canada), Karlheinz Rebel (Germany), Lam Siu Yuk (Hong Kong), Magalay Lavadenz (USA), Marion Sanders (New Zealand), Ngoepe Mapula (South Africa), Nasir Mahmood (Pakistan), Philip Armstrong (USA), Rabab Tamish (Palestine), Rebekah Fineday (USA.), Rosemary Hunter (Canada), Tonya Huber-Warring (USA), Vic Cicci (Canada), Wally Moroz (Australia), Warren Halloway (Australia), Yuxiang Wang (USA).

JISTE is an official, refereed publication of ISfTE. The goal of ISfTE is to publish six to eight articles in each issue. Using the Seminar theme, articles in the first issue of each volume are based on papers presented at the previous seminar. Articles in the second issue are non-thematic. Points of view and opinions are those of the individual authors and are not necessarily those of ISfTE. Published manuscripts are the property of JISTE. Permission to reproduce must be requested from the editor.

JISTE is issued twice yearly by the International Society for Teacher Education. The subscription price of $US75.00 is included in the annual membership fee. Additional copies of the journal may be purchased for $US25.00. Institutional subscription to JISTE is $US100.00 per year.
To obtain additional or institutional copies email: jrb@ucsj.dk

JOURNAL OF THE INTERNATIONAL SOCIETY FOR TEACHER EDUCATION
Volume 14, Number 1, 2010

ISSN 1029-5968

From the Editor

There are two issues of JISTE per year (per volume). It is the pattern that the first issue of the volume has articles developed from papers given at the most recent annual seminar of ISfTE (International Society for Teacher Education). It follows that the articles in this issue are papers given at the 29th seminar at Weber State University (WSU) in Ogden, Utah, USA in June 2009. It is fitting that the lead article is about education and teacher education at the hosting institution, WSU.

In a brief history of the university we hear of the role that religion played in the institutional development of education in general and teacher education more specifically in Utah. Today when religion is marginalized in our increasingly secular postmodern society (but maybe more so in the West and North than in the East and South of our global community), it is a reminder to us that religion has made a significant contribution to the development of education in many parts of the world. A similar story could be repeated with local and national nuances all over the world.

The theme of the Weber seminar, "Rocky Mountain Rendezvous: Trading Ideas in Teacher Education for the 21st Century" was carried by three keynotes and a large number of papers of which the articles in this issue are but a sample. They touch on all stages of teacher education – from undergraduate through preservice professional to graduate preparation – and focus our attention on practice and research for a deeper, wider and richer level of professional expertise for the 21st century. The articles explore teacher growth in areas of critical thinking, e-learning, cooperative learning, mathematics teaching confidence, metacognitive development and learning from narrative biographies. These articles seek to share ideas about teaching skills and competencies, research approaches, professional knowledge, and changed teacher dispositions that teachers gain through their teacher education experiences. Sometimes accommodating change is a rocky experience.

In addition, the articles by Castro and Hunter address issues of educational inequity that is systemic for various reasons. Brazil's large numbers of under-educated teachers appear to be explained by economic factors. Low teacher salary and poor working conditions make the profession unattractive. Several readers will see their education systems mirrored in Castro's description. Hunter presents a more complex system of inequity attributed to factors of colonialism, racism and the hegemony of "white privilege". Her analysis and suggestions for teachers and teacher educators will resonate with any reader who works in a system that has a history of oppression in any form.

With this volume (#14) my 4-year term as editor ends. Areas of growth and changes during my term include: expanded Editorial Board membership in numbers and regional representation; introduction of occasional issues on special topics; strengthened technical support that has meant better online accessibility; new ISfTE members who have been introduced to the organization through the journal. As three members of the Editorial Board ended their respective terms the board expanded with new members from Hong Kong, Pakistan, Palestine, Scotland, South Africa, and the USA. Changes in technical support, reflected in the ISfTE website (www.isfte.org) have resulted in the journal being available online, with restricted access of the current volume to members and earlier issues open to the public.

Since the next issue (14.2) will be guest edited, I am using this space to say thanks for ongoing support from the board members, the technical team (past and present), the general secretaries (I have worked with three during my term), the reviewers who are as key to the journal as the authors and of course the readers. Two people I must mention by name are: Stella Han, my always available, computer savvy and patient assistant, and JISTE's publisher/printer, Johan Borup, who set me straight about procedures with the first issue that I edited (Vol. 11.1), and who has remained enormously supportive.

The journal continues to be international in scope with contributors and reviewers from different countries, thus bringing a global perspective to teacher education. One way of fostering this is to maintain the second issue of each volume as open, so that manuscripts can be accepted from members who are not able to participate in a seminar. During my term seminars have been convened in South Africa, Scotland, Australia and the USA. The open issue also expands beyond the seminar theme to a wider array of teacher education issues. Occasionally there is a theme for the second issue, as was the case with Vol. 12.2 and will be the case with the next issue (Volume 14.2). This is also an opportunity for expansion of ideas as the readership hears the voices of others outside of the ISfTE membership.

JISTE will thrive with your continued support.

Sybil Wilson, Canada

From the Secretary General

JISTE continues to thrive at the core of the International Society for Teacher Education (ISfTE). The journal continues to serve as a vehicle for sharing ideas, approaches and models in teacher education with our global network of member teacher educators. It is also helping the network to connect with developments, trends and challenges in teacher education in different countries of the world, and with research that informs our practice.

This particular edition offers a cursory look at samples of work that emerged out of the 29th annual seminar, June 3-9, 2009, hosted by Team Weber State University in Ogden, Utah, USA. The theme, "Rocky Mountain rendezvous: Trading ideas for the 21st century" was appropriate as seminar members and accompanying guests converged on one of the most picturesque settings in the Western mountains of the USA. In reading these articles, our membership and associates across the globe will connect with situations of teachers and contexts of teacher education that might be quite different from one another; but what will come through is that there are some commonalities in doing our work of educating teachers that bind us together: using appropriate conceptual frames to guide our research and teaching, testing pedagogical approaches, using technologies thoughtfully and appropriately, pushing to open up the boundaries of accepted practice and intractable dispositions in individuals and systems. You will learn that, taken together, these articles represent the complex disposition of early U.S. western trappers and traders and the creative strategies they employed in their quest to discover "a sense of place" and how to make a meaningful contribution as an occupant of the land. Education was one of the strategies or vehicles that they chose. So it is that we, as teacher educators are helping our teachers to help their students discover their "sense of place", and be healthy, reliable and contributing citizens of their various communities and societies.

I want to thank you who have served on the JISTE Board, others who served as peer reviewers, and those who prepared this document for print. I am asking that you continue to help us because we need your talents to enhance and sustain academic rigor and professional excellence as hallmarks of our enterprise. I want to also express my gratitude to Dr. Sybil Wilson (Brock University, Canada) who has ably managed this publication for our society over the past four years.

Collegially yours,

Forrest C. Crawford.

Weber State University Department of Teacher Education – Student Achievement: Teachers, Students, and Communities Working Together

Jack Rasmussen
and
Forrest Crawford

Weber State University (Ogden, Utah, USA) is a coeducational, publicly supported university offering professional, liberal arts and technical certificates, as well as associate, bachelor's and master's degrees. The university prides itself in its excellent teaching, extraordinary commitment to meeting the needs of students at every stage of life, and ongoing service to the community. Emphasizing its strength as a teaching college, the university's faculty and staff are noted for preparing students to understand, work, and participate as citizens in a growing diverse and global society (Weber State University Fast Facts, 2009).

Weber State University History

Fur trappers were the first whites to explore, map, and capitalize on northern Utah, USA. Weber County and the Weber River owe their names and much of their early exploration to these men. The Weber River and the county were named for the American trapper John Henry Weber. The Weber River site of Fort Buenaventura was the first Mormon settlement in Weber County in Northern Utah. In 1888 the Church of Jesus Christ of Latter-day Saints (LDS) established a general LDS Church Board of Education. The board's major goal was to combine secular and religious education, initially with the establishment of church academies and later by providing LDS religion classes in locations adjacent to public schools. In January 1889, under Principal Louis Moench the Weber Stake Academy began offering classes (Sadler, 1988).

From the very beginning of the institution a "normal course" was included for the preparation of teachers to ensure that the church and community had quality individuals prepared to teach Utah's students. The demand for quality teachers in Utah greatly increased, and Weber Academy eventually established a two-year "normal course" in 1916.

Weber became a state college in 1933 and over the next three decades Weber College grew and developed under state sponsorship. The Utah Legislature authorized the addition of upper division courses in 1959, and four years later, the first baccalaureate degrees were awarded. Weber State College became a four-year college in 1964. In 1991, the institution was re-named Weber State University (WSU). WSU now has a 400-acre campus in Ogden, Utah, with 89 percent of the buildings constructed since 1960. From 1993 to the present, the university has established several satellite campuses throughout northern Utah in response to the growing diverse and technical needs of the region.

Weber State University responds to the changing global environment through innovative and conventional instruction, public service activities, and continuous improvement of its programs. To ensure vitality for effective teaching and service, the university engages in scholarship, research, artistic expression, and other professional pursuits. The university serves as a cultural center for its region and seeks to be a leader in addressing the particular needs of its students, improving public education, and stimulating economic development through appropriate, learning-oriented partnerships with the community.

Commitment to Inclusion While Preparing Global Citizens

Pivotal to Weber State University's mission is the need to embrace and value the diversity of its members. Acknowledging the uniqueness of each individual, we seek to cultivate an environment that encourages freedom of expression. Because the University is a community where inquiry is nurtured and theories are tested, every individual has the right to feel safe to express ideas that

differ from those held by other members of the community (WSU Catalog, 2009).
While the school uses a variety of programs and curricular and experience-based approaches to achieve this aim, highly skilled and knowledgeable professionals are responsible for executing these initiatives. , All WSU students must take a minimum of three credit hours of diversity coursework to fulfill their general education requirements towards graduation. To prepare highly qualified teachers, diversity is a program strand in the teacher education professional core. Throughout the teacher education program, field experience sites are specifically chosen for the diversity (in all aspects, not just ethnicity and race) of their students and teachers.

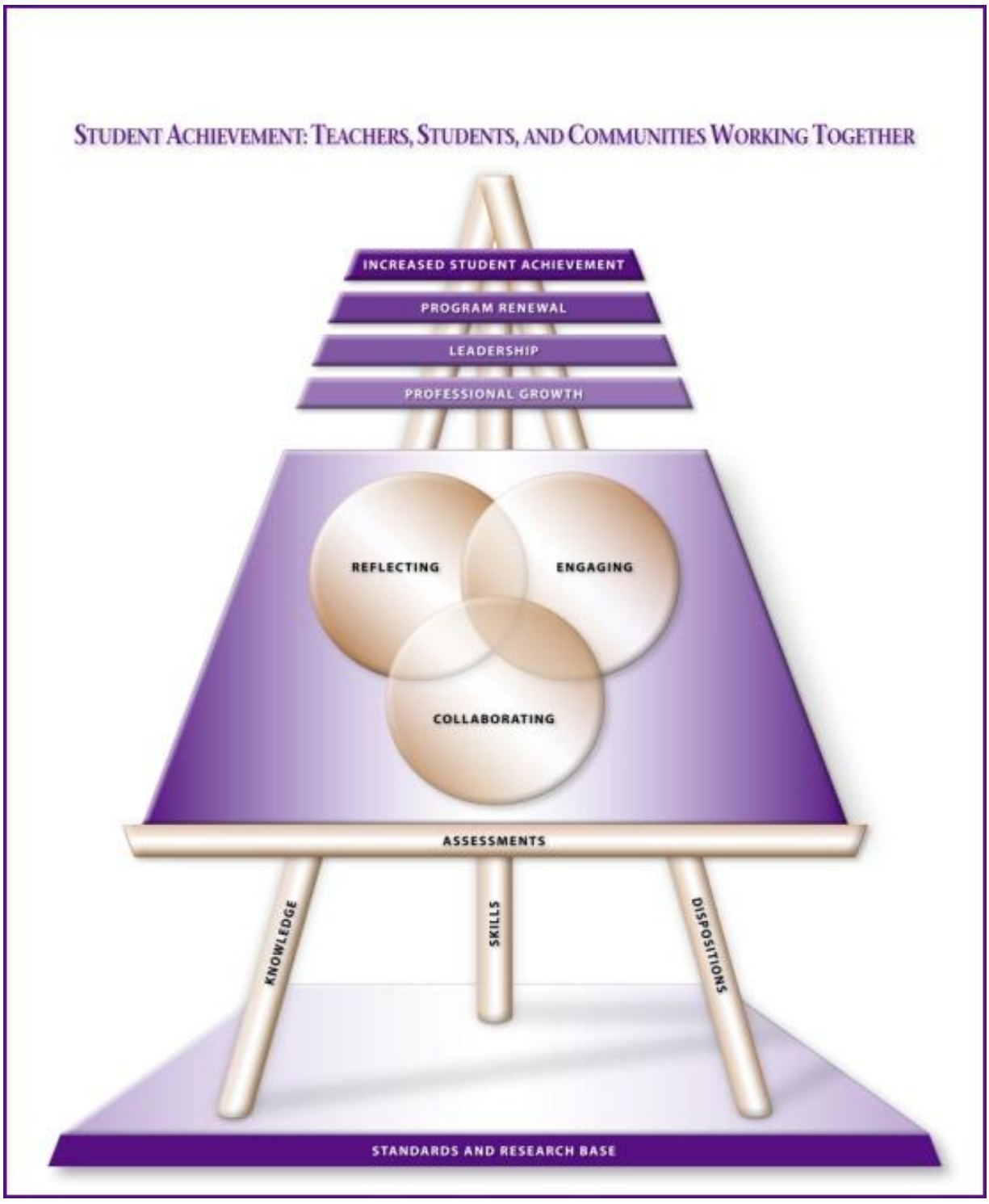
The University in general and the Moyes College of Education particularly strive to recruit diverse candidates, faculty, and staff reflective of their partnering schools and communities. However, due to the demographics of the region, these efforts do not always result in as diverse populations as desired. To stimulate these efforts, the College's WHEELS project (We Help Enterprising English Language learners Succeed) was awarded federal funding, along with similar projects that are designed to reach out to underserved communities. Funding for elements of these projects continues today.

The Department of Teacher Education

The Department of Teacher Education prepares effective educators who can demonstrate: quality pedagogy, mastery of subject-area knowledge, and professional dispositions. It also provides opportunities for continued professional development in the processes of teaching and student learning in a changing, global society. The goals of these endeavours are increased student achievement and professional growth.

The Department spearheads the actual implementation of all teacher education licensure programs. The Department's responsibilities include: (a) developing elementary, secondary, and special education professional core course requirements, (b) articulating and implementing admissions and retention policies and procedures for teacher education candidates, (c) advising teacher candidates, (d) working with the Utah State Office of Education to ensure compliance of state-mandated fingerprint/background checks, (e) recommending licensure program completers for Utah State teaching licenses, and (f) formulating an assessment/evaluation system to collect, analyze, and report candidate and program data for all teacher preparation programs.

The program's philosophical framework is "Student Achievement: Teachers, Students, and Communities Working Together." This has been visually represented by the stylized easel below showing the relationship of all the elements. Teacher as Reflective Practitioner (Reflecting, Engaging, and Collaborating) is at the heart of the program's philosophy and curriculum. Promoting candidate reflection empowers students with self-efficacy and a sense of a personal mission related to becoming a teacher. Reflecting requires individuals to spend time analyzing and evaluating. Engaging teachers foster active learning in their classrooms. Collaborating for growth enables teachers, students, and community members to work together for greater student achievement. As professionals, the department's faculty members are committed to working with teacher educators and administrators across our campus, classroom teachers and public school officials, and community members to increase K-12 student growth. Years of experience in teacher education suggest that a collaborative commitment to professional dispositions by those preparing teachers leads to greater professional and longer retention of beginning teachers. This commitment requires on-going partnership, communication, and dissemination of knowledge.



In order to operationalize the components of the framework, the department has identified the following guiding principles, implementation strategies and best practices:

- Quality teacher education programs must be based on State and National standards. The department has adopted the Utah State Professional Teacher Standards (Utah State Office of Education, 2005). Additionally, each secondary content department responsible for the preparation of candidates aligns its content and methods courses with standards from its professional organization.

- Teacher education students must be able to demonstrate effective pedagogy, mastery

of subject-area material, and professional dispositions. The department has crafted the teacher education professional core courses to model and teach effective pedagogy. In addition, department faculties work with other academic departments in the arts and sciences to ensure that students demonstrate mastery of subject-area material and content pedagogy. The department also monitors the professional dispositions of its teacher candidates each semester that they are in the program.

- Assessment, evaluation, and feedback are crucial to a teacher candidate's growth and success and for maintaining and improving licensure programs. To adequately assess, evaluate, and inform student's growth, the department has designed and implemented a data collection and dissemination plan that collects, analyzes, and shares information about the progress of teacher candidates. Faculty review data each year to evaluate the quality of their program, curriculum, policies and procedures, and students.

- Field and clinical experiences and work with professional educators and community members contribute to a teacher candidate's growth and success. The department has entered into agreements with local school district administrators to ensure students quality experiences in their school which supplement and enhance their program training. These agreements ensure the identification of sites and the placement of candidates in settings where teacher candidates work with quality teachers, work and interact with community members, and be mentored into the profession. The department also has several lab schools designated for the onsite training of teacher preparation students in their semester prior to student teaching. This allows for total immersion in the teaching profession by involvement in all aspects of a school day.

- Teacher candidates must be prepared to work with individual students and their needs in an increasingly pluralistic society. The Teacher Education Department's professional core classes include a strand for working with diverse students. As noted above, field and clinical experiences associated with the professional core focus on placements of candidates in schools where there are high concentrations of diverse students, and where there are programs shown to have a positive impact in addressing the unique needs of these students.

- The preparation and professional development of a teacher takes place throughout that teacher's career. To assist local educators with the opportunity for life-long learning and continued professional development, the college and the teacher education department work with local school districts to identify and secure grants for professional development programs.

Weber State University Department of Teacher Education recognizes the importance of not only attracting the best and brightest, but also understands that the diversity of talent and skills are found in a variety of settings, local as well as beyond our geographical boundaries. This is a nationally accredited program with faculty who strive to bring balance between affirming high academic standards and graduating well prepared citizen-educational leaders for the world.

References

Sadler, R. W. (1988). *Weber State College… a centennial history*. Ogden, UT: Weber State College,

Utah State Office of Education. (2005). *Utah Professional Teacher Standards.* Retrieved from http://www.schools.utah.gov/cert/other/eye/standards/UtahProfTeacherStandards.pdf

Weber State University Catalog. (2009). Retrieved from http://documents.weber.edu/catalog

Weber State University Fast Facts. (2009). Retrieved from http://www.weber.edu/AboutWSU/FastFacts.html

Forrest C. Crawford is the Secretary General for the International Society for Teacher Education (ISfTE). He is also professor of teacher education and serves on a variety of state, national and international civic and academic boards.
Correspondence: Forrest Crawford, EdD., Assistant to the President for Diversity, Weber State University, 3848 Harrison Blvd., Ogden, Utah, USA 84408-3848
Email: fcrawford@weber.edu

Jack L. Rasmussen is the Dean of the Jerry and Vickie Moyes College of Education. He is also the chair of the Student Success Alliance which is a partnership of the college and the seven local school districts, and is a past president of the Utah Council of Education Deans.
Correspondence: Jack Rasmussen, PhD., Dean, Jerry and Vickie Moyes College of Education, Weber State University, 1302 University Circle, Ogden, Utah, USA, 84408-1302
Email: jrasmussen@weber.edu

Challenges to Teacher Education in Brazil and Worldwide: Keeping the Dream of Bringing the Best Education for All

Marta Luz Sisson de Castro

This paper discusses teacher education from a Brazilian perspective by initially presenting some general data about the Brazilian educational system and data about the characteristics of Brazilian teachers. It explores the topic using data from two studies that looked at the conditions of work of municipal teachers in the South Region of Brazil and a case study of distance teacher education in Nova Prata do Iguaçú in Paraná. The key issues highlighted are that elementary teachers in Brazil are poorly paid, have poor working conditions and are under-educated for the important work of teaching. Improvement in conditions is needed to attract and retain good teachers in the profession.

I will talk about teacher education from the Brazilian perspective, presenting an overview of the Brazilian educational system, characteristics and education of Brazilian teachers, and data from two of my research studies on the conditions of work of municipal teachers in the South Region of Brazil. I will also speak to findings from the case study of Nova Prata do Iguaçú, a small municipality in the state of Paraná, where distance education was the delivery strategy for teacher education.

The Brazilian Educational System

The Brazilian educational system is distinguished by its huge size and its inequality. Only in the 1990's did elementary education become available for the majority of the population. In the 1990 decade the system was marked by expansion, especially of higher education; by centralization; by a strong privatization of higher education which was more than 90% (Ristoff, 2009) of the higher education offered; by pressures for teachers to have a higher education diploma; and by a change in the regulations of teacher education programs. This process created more opportunities for studies at the higher education level, but only for students with the economic means because the new spaces are offered in private and expensive institutions. In Brazil the secondary and higher education systems are very resistant to change, despite the expansion at the elementary level and the pressure for more places at the secondary level. Data from the 2007 educational census (Brazil Censo, 2007) showed very clearly the elitist character of the Brazilian system.

Table 1
Number of Students Enrolled in Each Educational Level

Program levels	Enrolment	%age of population
Doctoral	49,668	13
Master	91,996	
Some graduate work	328,043	
Undergraduate	5,250,147	
Secondary education	8,906,820	44
Elementary education	33,282,663	94

Source: Ristoff (2009)

Just by looking at the numbers in Table 1**,** we can see how the pyramid narrows from 33,282,663 students at the elementary level to only 46,668 at the highest level of the doctoral program. The system is very centralized with the Ministry of Education regulating the process, establishing norms for the curriculum at the national level, evaluating universities and graduate programs, making policy, and funding research. Despite, the National Educational Plan (2001) that aimed to enrol 30% of the age group in higher education by 2010, the numbers in Table 1 show a very different relationship between the age level population and enrolment. At the elementary level 94% of the population are enrolled, 44% at the secondary level and 13% at the higher education level. Brazil has one of the lowest levels of enrolment in higher education in Latin America. That is very hard to understand

considering its strong economic status in the region. One of the challenges of Brazilian education today is the expansion of secondary education, following the natural flow of the elementary education numbers.

Brazilian Teachers: Who they are, their Preparation and Practice

Teacher education in Brazil was marked by a tradition of preparation through Normal School at the secondary level. These programs were very selective; usually very talented young ladies were selected to go to such programs. The curriculum of the courses was very rich and comprehensive. From this model evolved the education program at the university level in the 1950's. Since that time, the discussion about teacher education and models for the preparation of teachers has been constant. The new Education Law of 1996 (Mello, 2000) discussing teacher education in the Brazilian educational context, stressed the lack of consensus about the teaching abilities and competencies necessary for classroom practice. Because of this lack of consensus, Brazilian teachers are not evaluated like other professionals; thus they do not have social validation and respect. In the historical tradition, the teaching profession in Brazil is marked more by workers' organization than by professional criteria.

Teacher education in Brazil is always changing, as it is in many countries. Today it is being redefined by the Federal government using new technologies to make the process less costly and more rapid. Moon (2008), Barreto (2008) and others discuss the implications of this process, especially if we consider the low salaries and conditions of work of Brazilian teachers. The expansion of elementary education has created the need for more teachers; that need will be even greater as the system continues its expansion to the secondary level. New legislation (Brazil, November, 2009) has made secondary education mandatory for all students. A significant proportion of Brazilian teachers at the elementary level do not have a higher education diploma. The numbers are quite large, reaching almost 50% of those teaching grades 1 to 4 and around 15% of those teaching grades 5 to 8, as you can see in Table 2. At the secondary level, the percentage is very low, but still there we found teachers without a higher education diploma.

Table 2
Number of Teachers in the System and Educational Status, According to Levels

Level of Teaching	Total number of teachers	Without Higher Education	With no Preparation
Early Childhood Education	403.919	230.518	11.261
1st to 4th grade	841.185	355.393	8.538
5th to 8th grade	865.655	129.991	518
Elementary Education	1.705.840	481.384	9.056
Secondary Education	519.935	23.726	22
Total	2.629.694	735.628	20.339

Source-Brazil. MEC/Inep. (Censo Escolar da Educação Básica, 2006, cited in Gatti and Barretto, 2009, p. 35)

In 1996, the Fund for Maintenance, Development and Value of Fundamental Teaching (FUNDEF), which provides financial aid for the education of elementary teacher, was established with the objective that by 2007 a higher education diploma would be a requirement for all Brazilian teachers. That date passed and we are still struggling with the same problem of unqualified and under qualified teachers.

Table 3
Brazilian Teachers' Workload

Elementary			Secondary
	Grades 1-4	Grades 5-8	
Teach one class	69%	43%	
Work in one School	93%	85%	87%
Teach five or more disciplines	74%		
Teach one Discipline		61%	74%
Teach five classes or more			50%

Salary and conditions of work of Brazilian teachers are not very good. When compared with other professional persons with the same level of education, the teacher's salary is the lowest. The mean salary of a teacher with higher education in Brazil was R$1335, 00[1] in 2007; that is two thirds of the salary of a nurse (R$2022, 00), half of the salary of a journalist and 27% of the salary of a medical doctor (R$4865,00) (Folha, 2009). Gatti and Barretto (2009), using as their source the 2006 data from IBGE and Pnad[2]) presented the following mean monthly salary for each educational level in Brazil: Early childhood education- R$ 661,00; Elementary Education – R$873,00; Secondary Education – R$ 1390,00. Because of this situation, students coming into education are from a low socioeconomic level, work full-time, are the first in the family to achieve higher education, and lack cultural capital (Bourdieu, 1977). They have not had the resources while growing up to acquire the educational, social and cultural knowledge that helps to position people to access many of society's opportunities for upward mobility, such as higher education. To get their education, these teachers attend night programs in education, but they have difficulties meeting the requirements of the new curriculum that ask for more teaching practice in school from the beginning of the teacher's education program. Many of them are working in other jobs while studying, so they do not have the time.

Gatti and Barretto (2009), using data from the Pnad from the year of 2006, identified 2.866.514 persons who said they were working exclusively as teachers. Of these 92.8% worked as a teacher as their main work, considering the number of hours dedicated to that activity, but for 7.2% teaching was a secondary activity. The typical Brazilian teacher is a woman thirty years of age, and teaches a single class of 35 students in one school, according to the Brazilian school census of 2007.

The secondary level teacher is more overloaded than the elementary teacher. According to the data (Gatti & Barretto, 2009), 50% of the secondary teachers are responsible for more than five classes, and 14 % of these have 10 or more classes. I have tried to show an overall picture of teachers' workload in Table 3.

An overall pattern of work, from census data for 2006 (Gatti & Barretto, 2009) is that 64% of the teachers work only one period of the day (morning, afternoon, or night) and 6% of the teachers work on the three shifts of the school day. The majority of teachers in Brazil work in just one school (81%). In São Paulo, the percentage is 79%. According to the education census of 2007 there is a shortage of secondary teachers in the areas of Mathematics, Physics, and Chemistry, and the main reason for that shortage is salaries. These professionals usually opt to work in other areas such as banking, where the salaries are better.

The majority of teachers are female (83.1%) versus 16.9% male. In early childhood education 98% of the teachers are female; in the elementary level, grade 1 to 4 the predominance of teachers with higher education diploma is 93%. In secondary education there are more male teachers (33%) but still a majority are female (67%). In relation to race, 61% of the teachers identified

[1] R$1.85 = US$1.00

[2] IBGE Instituto Brasileiro de Geografia e Estatística (Brazilian Insitute of Geography and Statistics) and Pnad Pesquisa Nacional de Amostra por domicílio (National Research of Sample of Residences)

themselves as whites, and 38.7% as non-whites, or mixed "pardos".

In 2006, a new regulation was enacted by the National Council of Education establishing new requirements for the preparation of teachers in Brazil. This new curriculum is marked by general statements but no clear description of a profile of the desired teacher. This is creating several tensions especially for the student who is working full time. Adding to this complexity is the size of the country with 5561 municipalities, each one with its educational system and regulations relating to teacher salaries and career plans. There are 26 states in one federal district.

The expansion of basic (elementary) education during the 1990's created a need for new teachers. The policy generated from the World Bank (Ascolani, 2008) tended to keep teachers' salaries at low levels. All these factors kept the teaching profession unattractive to talented people. Recent data (Folha de São Paulo, 2009) showed that the student of education is the first one in his or her family to have any higher education and that even in public education, specifically in pedagogy; the number of free spaces in higher education is the highest, at least in São Paulo compared to other regions in Brazil.

Conditions of Work of the Municipal Teacher of the South Region of Brazil

Castro's study (2009) looked at the management of municipal education in the South Region of Brazil that includes the states of Paraná, Santa Catarina and Rio Grande do Sul. Fifteen municipalities were visited, five in each state. In the first phase of the study quantitative data was collected through a survey of the Superintendents of Municipal Education in all municipalities of the South Region. Each superintendent was asked to complete a questionnaire identifying personal and professional characteristics of the Superintendent of Municipal Education: education, professional experience, selection criteria for the job of superintendent, job situation, needs for professional development, perception of the needs for professional development of their principals and teachers. The second part of the questionnaire identified the characteristics of the municipal system of education: size, number of schools, number of teachers, and percentage of resources invested in education, number of rural schools, etc. Based on the returned questionnaires (546 representing 46% of the municipalities of the South Region) five municipalities were selected in each state for the qualitative phase of the study. In this phase, the Superintendent of Education in each municipality was interviewed regarding the challenges of the administration. All relevant and available educational plans and documents were collected by the researcher. One or two schools were visited and the principal interviewed, where possible. Using that material an overview of the major challenges of the municipal administration in each municipality was constructed. One of the points of convergence of the analysis of the municipal education data was the professional development and education of teachers. The majority of the localities were following the federal policy of educating elementary level teachers using resources from FUNDEF and the other regulations that require a career plan and the public selection of educational personnel. From the data collected it was possible to look at five aspects of the requirements for the improvement of teachers' qualification and their conditions of work: teacher education, professional development, career plan for teachers, selection for the job through competitive public examination, and salary.

Teacher education. When asked about the level of education of their teachers in the municipality, the Superintendents of Municipal Education were generally very proud to say that all had a higher university diploma, and that a significant number had some graduate work. But further probing revealed that all the teachers attended a special program developed with a local institution during the weekends. For the graduate program it was the same. The municipality, and sometimes two or three small cities joined together to have a minimum number of registrants and ordered a special graduate program to be offered to them. By this method the quality of the education and professional preparation received by the elementary teachers was not ideal, but was better than nothing. The point here is that the teacher had the diploma, but it did not change his or her competencies and outlook in a

significant way. Usually, the programs for teacher education offered by an institution near the municipality, in a weekend or summer program, are very different than a regular program offered in a university.

Professional development. For professional development, or continuing education in general, the municipalities usually offered a seminar through partnerships with local or regional colleges. However, it is not common for a teacher to attend a seminar in the local municipality on a specific topic or technique, or to have study sessions divided by areas of the curriculum. The big event with well known speakers is the most frequently used strategy for professional development activities.

Career plan. The development of a career plan for teachers was considered to be one of the conditions for improving the work situation of Brazilian teachers. The data (Castro, 2008) showed that the plans developed are so conservative that they tend to impede real progress in the career. First, there is a fear at the municipal level of not having enough resources to pay for the advancements, and the law is very strict in terms of reducing salaries in the future. For a series of legal reasons, these plans have not improved teachers' salaries or working conditions. The career plans tend to be very conservative and do not offer any significant change in salary from the initial to the final phase of a teacher's professional life.

Selection through public examination. Selection through public examination is the main form of selection for jobs in the municipal education system in South Brazil. The system is expensive for the municipality because they have to prepare, administer and mark the tests, and still they are not very sure if they are selecting the best teachers. The teachers have to pass the test, but that is no guarantee that they will be good teachers in the classroom. Teacher's competitive examinations are a standard procedure in the South Region. Most of the municipalities select their teachers through this method; some municipalities are using a probation stage for teachers before they become permanent public service teachers. Recent data (Castro & Souza, 2009) showed additional problems caused by this process. Because of economic instability in the country and worldwide, the need for public service workers in Brazil increased; but the result has been little hiring in some areas. From data collected for a new project related to the conditions of work of municipal teachers in South Brazil (Castro & Souza, 2009), we learned that, in one municipality, only teachers from the outside were approved in the public examination, and that the majority of the new teachers were from other cities. This created extra cost for the municipality which had to pay for transportation. A more negative and lasting outcome is that the process excluded local teachers and thus diminished a sense of community in the schools.

Salaries. Salaries are, in general, very low and hard to change. There are some differences between the salaries for the teachers working in municipal and state funded schools. Our 2009 study identified differences between the states. In Rio Grande do Sul, the municipal teacher received better salary than the state teachers. In Paraná the situation was just the opposite, with better conditions for the state teachers. In Santa Catarina the data was not so clear depending on the region. The discussion about teachers' salaries is still a polemical issue. Many as Ioschpe (2007) argue that teachers' situation is not so bad compared to the Brazilians' working conditions in general. Data from our study indicate that, despite improvements in municipal teachers' education and career plans, salaries remained the same. If, some time ago, the idea was that teachers were badly paid but there were job openings, nowadays the situation has changed; teachers are still badly paid but there are fewer job openings. Despite criticism, we can say that low salaries keep qualified individuals away from teaching. It is also the perception that Education courses are attended mostly by students from the lower socio-economic class and that this perpetuates the low performance and poor quality in our teaching system.

Although there are improvements in the teachers' formal education, salaries are still low among municipal teachers in the South Region. The data indicate this formal education improvement still did not influence

salaries or working conditions or the quality of teaching.

Distance Education for Teachers: the Case of Nova Prata do Igua çú

During the qualitative phase of the study on the management of municipal education in South Brazil (Castro, 2007), we learned that Nova Prata do Igua çú in the state of Paran á was the only municipality that mentioned distance education as a strategy for the education and professional development of teachers. In a subsequent study we used the case study method for looking with greater depth into some aspects of the management of municipal education. We did three case studies, one in each state. In the state of Rio Grande do Sul we looked into the relationship between the university and the educational system. In the state of Santa Catarina we looked into the quality of education in the city of Joinville; and in the state of Paran á we looked into distance education, developing this case study of Nova Prata do Igua çú. Instead of a single day's visit, we spent three days in the municipality, talking to the superintendent, visiting schools, and talking with teachers. The superintendent of schools contracted a nearby institution to offer a program of "Normal Superior", in order to follow the direction of FUNDEF that all teachers should have a higher education diploma by 2007. The municipality is really small with less than 10.000 inhabitants; so it was very difficult for the teachers to attend a course in a nearby institution because of costs, distance and lack of local transportation. The teachers paid for their own course; they wanted to qualify and welcomed the preparation offered after a long period with no educational program for them at the local level.

The distance course offered was very simple, considering the technological possibilities of distance education. The course met once a week in a local school with a tutor who led the discussion of a lecture, recorded in a CD and presented via a TV screen. Tasks related to the readings were due each class meeting.

The majority of the teachers in the municipality attended the course. Following this Normal Superior course the municipality offered other graduate programs in the areas of special education, psychopedagogy, and so on. These graduate programs were offered as weekend or night courses. A significant number of teachers who concluded the Normal Superior program later attended one of these graduate courses.

When we visited the municipality in August, 2008, the diploma was not recognized because the institution that offered the course did not have the credentials to offer a distance program. So all the graduate courses which the teachers had taken could only be recognized after the higher education diploma was accepted and registered. The municipality gave the teachers the advances in their career plan, but if they were to apply for jobs elsewhere their course would not be recognized.

In our interviews with the teachers, they considered as positive points of the distance course: the opportunity to study after a long time, the need to qualify considering the requirements established by the FUNDEF, the ease of access (It was a distance course, but they met once a week in the evening at a local school.), and the printed materials they received because in the community there is no bookstore or library. The negative points identified by the teachers were: the problems with the diploma, quality of the tutor, lack of focus of the curriculum, lack of direct contact with professors. The main problem was the investment of time and resources in the course that was not rewarded by a valid diploma.

Despite all of the problems and limitations of this distance course, it seemed to have impacted the teachers and the students in a positive way. The teachers felt that the Normal Superior Course was a unique opportunity for them, after years without education, to study again; it was a wonderful opportunity; they felt motivated; they could not have done that by themselves; to attend a regular course in a local institution would be expensive and difficult because of distance and problems of transportation.

The school children of the municipality presented a very good result in the IDEB of 2007 (a Brazilian indicator of quality that combines the results of SAEB-System of evaluation of Basic Education and the number of promotions and dropouts in every school). The IDEB of Nova Prata do Igua çú in 2007

was 5.4 (Brazil, MEC, 2007). That is a very high value considering that the mean for private schools in Brazil was 5.6 for the year 2007 (MEC, 2007). Tereza Onofre School had the best performance in the municipality and reached an IDEB of 6.2, well above the national mean and a value planned to be reached in the country for the year 2022. The maximum value of the IDEB is 10.0 so the value of 6.2 is not very high, but if you compare that with a national mean of 3.47, and consider that the value proposed by OECD is 6.0, the results of Nova Prata are very good. From 2005 to 2007 the IDEB improved 0.9 for the municipality as a whole. As the municipality is small, so is the number of schools. This result was a surprise for the research team. So, it seems that even a very limited teacher education program can have a positive effect on student performance, depending on the contexts and the needs of the teachers. The reasons for the positive effects of the programs could be related to the participation of the majority of the teachers from the municipality in the course; the teachers seemed motivated to study, to rethink their practices, and to have books of their own.

The experience of this study brings new insights about the development of teacher education programs considering the diversity of the situation of teachers in a country like Brazil, and in many other countries in the world. The models of education and professional development that teacher educators may consider of quality may not have the same effect on teachers everywhere. The needs of the teachers in the particular region, and their sensibility to what is offered seem to be key factors in their motivation to access what is offered and in their responsiveness. So, diversity of programs could be one direction in the future development of teacher education. In Brazil, right now, the Ministry of Education is offering a national program in distance education to prepare the needed teachers, but this singular model for the whole country is not recommended. The data from our study has shown that different programs have diverse effects, and no single program will answer all the demands and needs of teacher education in a complex and huge country like Brazil.

Closing Remarks

The data from studies about the work in teacher education in Brazil show that education is not the best area to work in: salaries are low, conditions of work are poor, and education is not attracting the best qualified persons; so we are repeating a cycle of poor quality teachers and by extension, a poor quality public education system. The cycle has to be broken, if we want the best quality education for all now and in the future. In this presentation, using data from research, I have tried to show that even efforts to improve the situation of teachers - through education, careers plans, professional development, and selection through public competition - are not having the expected effect of improving the conditions of work of municipal teachers. Salaries and conditions of work must radically improve in order to attract more qualified individuals to the profession. Today, the students with the lowest academic performance come to education; so how can they offer a quality education for all the students at the elementary level? The programs of teacher education in Brazil have to be able to attract and retain better candidates. Because we believe that "the best education for the best is the best education for all" as Hutchins said, cited by Shorris (2000), p. 117), we want to have our teachers with the best education possible, in order for them to be the best teachers they can be. This is necessary for the quality of education in the country to progress towards a better situation, and the country must start investing more heavily in education. Improving working conditions for teachers worldwide, especially in developing countries, will have a positive effect on improving education and therefore on the quality of life of the country's population.

Education can emancipate people from hunger and ignorance.

References

Ascolani, A.(2008). Estratégias do Banco Mundial para el financiamiento em los paises latino americanos. *Revista Educação PUCRS, 31*(2), 139-156.Maio, Agosto.

Barreto, R. G.(2008). As tecnologias na política nacional de formação de professores a distância: Entre a expansão e a redução [The technologies in the national policy of distance teacher education: Between the expansion and the reduction]. *Educ. Soc., Campinas, 29*(104), 919-937. Especial Disponível em http://www.cedes.unicamp.br

Bourdieu, P. (1977). *Outline of a Theory of Practice*. London: Cambridge University Press.

Brazil. (2001). *Plano Nacional de Educação* [National Educational Plan]. Ministério da Educação e Cultura [Ministry of Education and Culture].

Brazil. (2007). *Censo Escolar da Educação Básica* [Census of Basic Education]. Ministério Educação e Cultura -MEC [Ministry of Education and Culture] Insituto Nacional de Estudos Pedagógicos- INEP [National Institute of Pedagogical Studies]. INEP.

Brazil. (2007). *Resultados dos IDEB* [Results of IDEB]. Ministério da Educação e Cultura [Ministry of Education and Culture].

Brazil. (2009). Law no 10172 of 9 of November, 2009, PEC 4-17 277/08.

Brazil. (2006). *MEC Ministério da Educação e Cultura* [Ministry of Education and Culture]/CNE. Conselho Nacional de Educação [National Council of Education].

Brazil. (2006). *Censo Escolar da Educação Básica* [Census of Basic Education]. C Insituto Nacional de Estudos Pedagógicos- INEP [National Institute of Pedagogical Studies]. INEP.

Castro, Marta Luz Sisson de. (2007). *Gestão da Escola Básica- Teorizando sobre a Prática*. [Management of Basic School- Theorizing about the Practice]. Research Report: Conselho National de Desenvolvimento Cientifico e Tecnológico [National Council for Scientific and Tecnological Development].

Castro, Marta Luz Sisson de. (2008, July). *Education, professional development and working conditions of the municipal teacher in the South Region of Brazil.* Paper presented at the Comparative Education Society of Europe. Athens, Greece.

Castro, Marta Luz Sisson de. (2009). *Gestäo da Escola Básica: Aprofundando Casos na Educação Municipal*. Research Report: Conselho National de Desenvolvimento Cientifico e Tecnológico[National Council for Scientific and Tecnological Development].

Castro, Marta Luz Sisson & Souza,Magda Vianna de. (2009). *Working Conditions of the municipal teacher South Brazil: Salary, Education, Career Plan, Selection through public examination, Professional Development.* CNPq.

Folha De São Paulo. (2009). May, 29.

Gatti, B., Barretto, A., Elba S.de Sá. (2009). *Professores do Brasil. Impasses e desafios* [Brazilian Teachers - Challenges and confrontations]. Brasilia: UNESCO.

Ioschpe, G. (2007). Professor não é coitado [Teachers are not helpless]. *Revista Veja*,12 de Dezembro, p.176-178.

Mello, G. N. de. (2000), Formação Inicial de Professores para a Educação Básica uma Revisão Crítica[Initial Teacher Education for Basic Education- Critical Revision]**.** *São Paulo em Perspectiva, 14*(1),98-110. São Paulo.

Moon, B. O. (2008). Papel das novas tecnologias da comunicação e da educação a distância [The role of new technology of communication and of distance education]. *Educ. Soc., 29*(104), 791-814. Campinas, Retrieved from http://www.cedes.unicamp.br

Ristoff, D. (2009, May). *Sistema Nacional de Avaliação do Ensino Superior* [National Evaluation System of Higher Education]. Conference at PUCRS .

Shorris, E. (2000). Riches for the Poor. *The Clemente Course in the Humanities*. New York: W.W.Norton & Company.

Note:This article is the keynote presentation at the 29th annual seminar of the International Society for Teacher Education at Weber State University, Ogden, Utah, USA. on June 8, 2009.

Marta Luz Sisson de Castro is Professor of Education at the Pontificia Universidade Católica do Rio Grande do Sul. Her main research interests are the management of municipal education, and policy analysis.
Correspondence: Dr. Marta Luz Sisson de Castro,Pontifícia Universidade Católica do Rio Grande do Sul, Rua Felicíssimo de Azevedo 1269, apto 302, Porto Alegre, RS, 90540-110, Brazil. Email: msisson@pucrs.br

Promoting Preservice Teachers' Critical Thinking in an Educational Measurement Course

Minghui Gao
and
Xu Zhao

This study investigated the effects of a teacher education course on promoting preservice teachers' critical thinking abilities. Participants (n = 124) included junior and senior preservice teachers who took an Educational Measurement course at a southern university in the United States. The Ennis-Weir Critical Thinking Essay Test was administered at the beginning and end of a fall semester and the following spring semester. The results showed that, in general, preservice teachers taking the Educational Measurement course witnessed significant growth in their ability to recognize the lack of reasons or evidence in an argument. Those who majored in language, arts and general sciences also witnessed significant growth in their ability to evaluate the irrelevance/relevance of reasoning in others' arguments.

Human beings differ from other species in our ability to think. Nickerson (1987) maintained that thinking was at the heart of what it means to be human, and that one's humanity wouldn't be fully expressed unless his or her potential for thinking was well developed. He concluded that a central goal of education was to help students learn how to think more effectively (also see Swartz & Parks, 1994). Critical thinking, as an essential component of human reasoning, is the disposition to present evidence in the support of one's conclusions and as well to request evidence from others before accepting their conclusions (Hudgins & Edelman, 1986). It is a process in which one determines the authenticity, accuracy and worth of information or knowledge claims (Beyer, 1985). Critical thinking as a concept can be traced back to Socrates in Ancient Greece and "has been a goal of education reformers throughout history" (Cassel & Congleton, 1992, p. vii). It has been considered a fundamental characteristic of an educated person, a requirement for "[becoming] contributing members of society", and an employability skill for an increasingly wide range of jobs (Facione, 2009, p. 2).

The twentieth century witnessed tremendous educational efforts to integrate the development of learners' critical thinking abilities into the forefront of education. Ennis's (1962) seminal work started a critical thinking movement which flourished in the 1980s. Critical thinking, as "a primary, yet insufficiently met goal of schooling" (Willingham, 2007, p.8), has long received wide attention among educators since the 1980s (Ennis, 1987). However, literature to date has indicated that students in general do not exhibit an impressive level of critical thinking ability, leading many scholars to suggest that teachers should play a more critical role in facilitating the development of students' critical thinking abilities (Lippman, 1980; Nickerson, 1987; Norris, 1985; Swartz & Parks, 1994; Willingham, 2007). To this end, future teachers need to develop their own critical thinking abilities (Ashton, 1988), and teacher education is obliged to facilitate the development of preservice teachers' critical thinking abilities (Ashton, 1988; Kurfiss, 1988; Walsh & Paul, 1988).

Researchers agree that all learners, regardless of social class or presumed limitations in ambition or ability, have the potential to think critically. This potential can be developed to the fullest by embedding training of critical thinking abilities in the process and/or content of instruction (Patrick, 1986; Perkins, 1987; Swartz, 1987; Walsh & Paul, 1988). In other words, preservice teachers' critical thinking can be developed either through independent critical thinking courses—the process approach (Lippman, 1988) or established teacher education courses—the content approach (Ashton, 1988). However, few schools of education have offered independent critical thinking courses to preservice teachers (Ashton, 1988; Wideen, Mayer-Smith & Moon, 1998; Willingham, 2007). This is surely not because schools of education do not want to, but because they have yet to overcome a myriad of obstacles, including an

inadequate knowledge base on the development of critical thinking, a lack of consensus on methods of evaluating critical thinking programs, conditions that require classroom management at the expense of academic instruction, and a lack of support for collaboration between liberal arts and teacher education faculty (Ashton, 1988). This situation makes it critical to investigate whether established teacher education courses can help promote preservice teachers' critical thinking abilities. The present study explored the effects of an established teacher education course, Educational Measurement, on promoting preservice teachers' critical thinking abilities. This effort stemmed from our conceptual understanding of the possible links between critical thinking abilities and the pedagogy of Educational Measurement, as detailed in the following section.

Robert Ennis's Conceptual Framework and Measurement

Fostering critical thinking ability first involves rational discernment of its essential elements. Ennis (1987) systematically differentiated 12 critical thinking abilities which were categorized into five basic areas:

> 1)Elementary clarification, including the abilities to focus on a question, analyze arguments, ask and answer questions that clarify and challenge; 2) Basic support, including the abilities to judge the credibility of a source, and make and judge observations; 3) Inference, including the abilities to make and judge deductions, inductions, and value judgments; 4) Advanced clarification, including the abilities to define terms and judge definitions, and identify assumptions; and 5) Strategies and tactics, including the abilities to decide on an action, and to interact with others. (p. 14)

Following Ennis's conceptual framework, the current study used the Ennis-Weir Critical Thinking Essay Test (henceforth "The Ennis-Weir") to evaluate preservice teachers' critical thinking abilities. The Ennis-Weir is "a general test of critical thinking ability in the context of argumentation" (Ennis & Weir, 1985, p.1). It emphasizes the abilities to detect and avoid fallacies such as equivocation, irrelevance, circularity, reversal of an If-Then (or other conditional) relationship, overgeneralization, excessive skepticism, lack of credibility and using emotive language to persuade (Ennis & Weir, 1985).

The selection of the Ennis-Weir was based on several considerations. First, the Ennis-Weir is one of the most widely accepted measures in the critical thinking movement (Walsh & Paul, 1988), and has high inter-rater reliabilities (Davidson, 1996; Ennis & Weir, 1985). Second, most critical thinking measures are multiple-choice tests that have various weaknesses such as background bias and the impossibility of knowing the reasoning behind an examinee's answer-choice (Ennis, Millman, & Tomko, 1985; Norris & Ennis, 1989). In contrast, the Ennis-Weir allows examinees to justify their responses, and the test itself presents realistic critical evaluation tasks (Davidson, 1996). Furthermore, the targeted users of the Ennis-Weir are secondary or post secondary students (Ennis & Weir, 1985). It is thus suitable for the college-level preservice teachers participating in this study.

This test itself contains a simple set of instructions and a letter (henceforth, The Moorburg Letter) written by a fictional writer, Mr. Raywift, to a local newspaper editor, arguing that overnight parking be prohibited on all the streets of the town, Moorburg. Starting with a brief introduction, the letter elaborates its arguments in eight numbered paragraphs, along with a concluding paragraph summarizing the letter's arguments. Most of the arguments are weak and suffer from various reasoning fallacies such as equivocation, irrelevancy, poor statistical sampling, and circular reasoning. Some of the arguments contain legitimate support, for example, quoting qualified experts or providing relevant reasons. Table 1 shows expected judgments about the weaknesses or strengths of each paragraph in The Moorburg Letter as well as exemplary justifications. The examinee's task is to write a response letter of eight paragraphs, presenting his or her judgments about the thinking of The Moorburg Letter, followed by justifications for the judgments. The examinee also needs to conclude the response letter with a final summary paragraph evaluating The Moorburg Letter's arguments as a whole.

Table 1
The Ennis-Weir Critical Thinking Essay Test

Paragraph	Judgments	Exemplary justifications
1	Bad thinking	Misuse of analogy, and/or incorrect use of definition
2	Bad thinking	Irrelevant reasoning
3	Good thinking	Relevant reasoning
4	Bad thinking	Circularity and/or lack of a reason for argument
5	Bad thinking	Defective reasoning and/or no reason was offered
6	Bad thinking	Insufficient sampling, and/or lack of controls
7	Bad thinking	Equivocation and/or the use of an arbitrary definition
8	Good thinking	Credibility of expert testimony

The Educational Measurement Course

Educational Measurement is a required course for the preservice teachers participating in this study. The instruction of this course is grounded on the operational framework of "Teaching for Understanding" advanced by Perkins (1992, 1993) and Wiske (1998). According to Perkins, understanding is the ability to think and act flexibly, based on one's knowledge. Teaching for understanding refers to the process whereby students' learning is facilitated and demonstrated through performances of understanding. "Learners not only obtain information and acquire knowledge, but also supplement acquired knowledge with visible understanding and practical wisdom" (Adler, 1986, p.113). Anchored in the pedagogy of "Teaching for Understanding," the instruction of Educational Measurement is built on four cornerstones: generative course topics, deliberate instructional design with clear understanding of goals, diverse performance-oriented learning experiences, and authentic on-going assessments. Students are required to attend class lectures and participate in class activities, such as discussion, mini in-class projects, and data processing. Students' understanding performances are assessed by two exams and a course project. The mid-term and final exams are based on the course lectures and reading materials. As a major instrument of "Teaching for Understanding," the course project, known as Project AiO, involves the design of a teacher-made test, an accompanying user's manual, and a technical report which elaborates and justifies the purpose of the test, its objectives, targeted grade level, guiding national or state standards, test structure, reliability, validity and administrative requirements.

Course delivery mainly includes 24 lectures and relevant activities such as using computers for data processing and topic-centered discussions and presentations. The lectures cover ten chapters: history of educational measurement, levels of measurement, basic statistics (e.g., central tendency, variability and correlation), reliability, validity, norms and percentiles, test writing, grading/scoring, item analysis, achievement and intelligence test. These lectures expose preservice teachers to learning activities such as understanding definitions (e.g., correlation), relevant reasoning (e.g., reliability and validity, difficulty and discrimination index), the importance of reasons or evidence for sound conclusions, and understanding relationships (e.g., norm-referenced scoring vs. criteria-referenced scoring). The lectures involve extensive learning and practicing activities regarding many, if not all, of the critical thinking abilities elaborated by Ennis (1987) as noted earlier. For example, according to Ennis (1987), defining terms is a key aspect of advanced clarification, and the thinking process of defining terms involves reasonable inference, conceptual interaction and application to interdisciplinary knowledge. In this sense, we hypothesized that taking the Educational Measurement course helps promote preservice teachers' critical thinking abilities. To test this hypothesis, the current study investigated the following two questions:

1. Is Educational Measurement effective in promoting preservice teachers' critical thinking abilities? If yes, what specific critical thinking abilities does it help promote?
2. Does Educational Measurement have different effects on preservice teachers of different gender and academic major?

Method

Participants

Participants in the study were 124 college students enrolled in a secondary teacher education program at a southern university in the United States. It should be noted that 132 students volunteered to participate in the pre-test, eight of whom dropped the course later. A total of 131 students volunteered to participate in the post-test; of these, seven did not participate in the pre-test due to late registration. In the end, a total of 124 individuals participated in both tests. They had no formal training in critical thinking. Of the 124 participants, 63 majored in Physical Education (PE) and 61 in Language, Arts, and Sciences (LAS). The whole sample included 62 males and 62 females. Among the 63 PE students, 38 were males and 25 were females. Among the 61 LAS students, 24 were males and 37 were females.

Data Collection

Pretest and posttest data were collected at the beginning and end of a fall semester and then the following spring semester. The pretest was conducted in the first class of the semester, before any specific content of educational measurement was taught. The posttest was conducted in the last class of the same semester. Each student received a copy of the Ennis-Weir test. Students first read the brief instruction and then The Moorburg Letter for about 10 minutes as suggested by Ennis and Weir (1985). Students then wrote down their judgments about whether the thinking in each paragraph of the Moorburg Letter was good or bad. They also wrote down their justifications for their judgments. This process took about 30 minutes, which was within the time range recommended by Ennis and Weir (1985). The collected essays were not scored until data collection was completed at the end of the second semester so that the instruction of educational measurement was not influenced by the instructor's knowledge of the participants' performances on the tests. In the duration between the pretest and the posttest, there was no specific teaching or even mentioning of critical thinking abilities in any class meeting.

Data Analysis

Our analyses of whether the Educational Measurement course is effective and how the magnitudes of its effects vary across different gender and major groups relied on comparing average pretest and posttest scores, examining t-tests, and examining effect sizes for all participants and across the different groups. Participants' pretest and posttest essays were graded using the criteria developed by Ennis and Weir (1985). Four steps were taken to increase grading reliability. First, each essay was graded by two raters independently. Grammatical or vocabulary problems were overlooked unless they made an answer incomprehensible. Second, each essay was assigned a numerical code to hide the participant's identity from the two raters. Third, the pretest and posttest essays were mixed together so that the raters did not know whether an individual essay was a pretest or a posttest. Finally, the paragraph scores and the total score for each essay were recorded in a scoring sheet developed by Ennis and Weir (1985, p.14). The two raters prepared the scoring sheet separately. Each participant's total and paragraph scores were computed by averaging the scores given by the two raters. Interrater reliability was high (r = .88). The total and paragraph scores along with students' gender and major information were entered into Excel worksheet for statistical analysis.

Results

Comparisons of participants' total scores on the pretest and the posttest confirmed our hypothesis that the Educational Measurement course promotes preservice teachers' critical thinking abilities. Table 2 shows the means, standard deviations, t-test results, and effect sizes of the whole sample and by gender and program major groups. Overall, participants' average total score increased from 8.29 on the pretest to 13.54 on the posttest, and the increase was statistically significant (t = -3.78, p = .001). The overall magnitude of the course's effect was .36, suggesting a significant increase in the participants' performances in the context of educational interventions (Coe, 2002).

Table 2
Means, Standard Deviations, t-test, and Effect Sizes of Total Scores (n = 124)

Participants	N	Pretest		Posttest		*t*	*d*
		M	SD	M	SD		
Whole Sample	124	8.29	6.73	13.54	6.96	-3.78***	.36
PE	63	6.54	6.58	11.54	7.75	-1.77	.33
LAS	61	10.36	6.61	15.91	5.28	-2.58*	.42
Male	62	4.33	1.60	12.50	2.09	-5.31***	.91
Female	62	12.25	1.58	14.58	1.97	-1.15	.55

Note. *p < .05. *** p < .0001.

It was also found that different gender and program major groups showed various extents of increase in their performances. As illustrated in Table 2, male students scored an average of 4.33 on the pretest and 12.50 on the posttest, and the average gain was statistically significant (t = -5.31; p = .000). On average, female students scored 12.25 on the pretest and 14.58 on the posttest; no significant increase was found (t = -1.15, p = .286). The effect size numbers also suggested that the course was more effective for males (d = .91) than for females (d = .55). This difference was largely due to gaps between the two groups' pretest scores instead of their posttest scores. On the pretest, female students had a much higher average score (M = 12.25) than male students (M = 4.33), and the difference was statistically significant (t = -3.10, p = .010). On the posttest, female students' average score (M = 14.58) was still higher than that of male students (M = 12.50), but the difference was not significant (t = -.766, p = .460).

In terms of program major, our analysis suggested that, on average, LAS students had a more significant increase than PE students, but the difference was largely attributable to female PE students' higher pretest scores. As Table 2 shows, PE students' average score increased from 6.54 on the pretest to 11.54 on the posttest, but the difference was not significant (t = -1.77, p = .089). By contrast, LAS students' average total score changed from 10.36 on the pretest to 15.91 on the posttest, and the difference was statistically significant (t = -2.58, p = .027). The effect size for LAS participants (d = .42) was slightly higher than that of PE participants (d = .33). To further understand this difference, the average scores of female and male PE students were separately examined. It was found that PE students' average pretest score was pulled up by female PE students' high average score (M = 12.20). After partialling out female PE students, male PE students' mean total score increased from 3.00 to 9.50, and the increase was statistically significant (t = -3.29, p = .013).

The second analysis focused on comparing participants' sub-scores on individual paragraphs of the Ennis-Weir. Table 3 displays the whole sample means, standard deviations, t statistics, and effect sizes on eight individual paragraphs. Overall, participants' sub-scores showed significant increases on the paragraphs of "relevant reasoning" (t = -2.35, p = .028) and "lack of reason" (t = -5.69, p = .000). In general, the Educational Measurement course was found to be most effective in increasing participants' scores on the paragraph of "lack of reasoning" (d = .54). It also showed some effects (d > .20) on students' scores on the paragraphs of "irrelevant reasoning," "relevant reasoning," and "credibility of expert testimony."

Our further examinations of participants of different major and gender suggested that, on average, PE students had a significant increase on the paragraph of "lack of reason" (t = -3.77, p = .003), and LAS students showed significant increases on the three paragraphs: "irrelevant reasoning" (t = -3.35, p = .007), "relevant reasoning" (t = -2.33, p = .042), and "lack of reason" (t = -4.28, p = .002). Significant increases on the same paragraph of "lack of reason" were also found in both male participants (t = -5.70, p = .000) and female participants (t = -2.93, p = .014).

Table 3
Means, Standard Deviations and t-test Results of Paragraph/Ability Measured (n = 124)

Paragraph	Pretest		Posttest		*t*	*d*
	M	*SD*	*M*	*SD*		
Misuse of analogy	0.75	1.59	1.29	1.30	-1.88	.18
Irrelevant reasoning	0.96	1.65	1.67	1.71	-2.00	.21
Relevant reasoning	0.50	1.32	1.33	1.90	-2.35*	.25
Lack of reason	0.42	1.25	2.08	1.32	-5.69***	.54
Defective reasoning	1.38	1.53	1.46	1.84	-0.18	.02
Insufficient reasoning	1.63	1.76	1.54	1.89	0.19	0
Use of arbitrary definition	1.63	1.47	1.58	1.77	0.11	0
Credibility of expert testimony	0.75	1.54	1.63	1.91	-1.72	.25

Note. *p < .05. *** p < .0001.

Discussion

This study shows evidence confirming our hypothesis in the first research question that the instruction in Educational Measurement helps promote preservice teachers' critical thinking abilities. In particular, it is effective in promoting participants' abilities to recognize lack of reason and irrelevant reasoning, areas in which they had relatively low performances at the beginning of the course. In areas such as the abilities of detecting insufficient reasoning, defective reasoning, and use of arbitrary definition, participants had strong pretest performances, and the effects of the course are very small. This finding leads us to conclude that the Educational Measurement course particularly helps preservice teachers become more conscious of the lack of relevant reasoning in an argument, a problem often less obvious than defects in existing reasoning.

This study also lends support to our hypothesis in the second research question. It suggests that while a teacher education course like Educational Measurement has general effects on preservice teachers' critical thinking ability, it may help participants of different gender and academic disciplines in different ways. For instance, male students in this study seemed to have benefited more from the course than female students who started with higher pretest scores. That said, we interpret this finding with caution, since the study does not show what factors might have contributed to gender differences in the pretest scores. Furthermore, while both PE and LAS students demonstrated an increased awareness about whether an argument was supported by reasons or evidence, LAS students also showed an increased ability to evaluate the quality of reasons or evidence in an argument. However, how preservice teachers of different gender and academic major may benefit differently from a course like Educational Measurement needs to be further examined by studies with larger samples and more resources.

Reflecting upon the design of the Educational Measurement course and its effects on preservice teachers' critical thinking, we attribute the positive outcomes to both the content of the course and the process of its delivery. As noted earlier, although Educational Measurement was not designed to focus on teaching critical thinking, it exposed preservice teachers to learning activities such as understanding basic educational and statistic concepts, examining relationships between variables, and drawing conclusions based on sound reasoning and strong evidence. These activities involved many, if not all of the critical thinking abilities elaborated by Ennis (1987).

Also, the instructional design of the Educational Measurement course followed the operational framework of "Teaching for Understanding", which is based on a "performance perspective" of understanding and oriented towards promoting students' skills such as "explaining, finding evidence and examples, generalizing, applying, analogizing, and representing the topic in new ways" (Blythe, 1998, p.12). These skills are consistent with the critical thinking abilities in Ennis' theorization. The evidence from this small study suggests that using "Teaching for Understanding" as a guiding framework for the instruction of an Educational Measurement

course facilitated the promotion of preservice teachers' critical thinking abilities.

In addition, the instructor of the Educational Measurement course has long been interested in and has explored the teaching and learning of thinking skills in general and critical thinking in particular. While the instructor did not specifically encourage critical thinking in the process of instruction, the course design, content delivery, and student performance assessment were understandably shaped by the instructor's valuing and knowledge of critical thinking. In this sense, the instructor's own knowledge of critical thinking and his explicit or implicit emphasis on its importance also played a key role.

This study also has implications for future studies. On the one hand, participants in this study, while taking the Educational Measurement course, were also taking other courses offered by the university. There is the possibility that other courses may have also contributed to their demonstrating increased critical thinking abilities. On the other hand, the Ennis-Weir involved a case of overnight parking. Participants in the current study were mainly from small towns or countryside, and many of them did not view overnight parking in the street as a serious issue. Thus, there exist gaps between the participants' perceptions of the impact of overnight parking and the test designers' assumptions. These differences might have influenced the extent to which the participants critically examined the issue. Therefore, future studies need to take into consideration these factors in designing educational interventions and evaluating their effects in promoting critical thinking ability.

Conclusion

The current study shows, for the first time, that it is possible to promote preservice teachers' critical thinking abilities through existing teacher education courses with no extra costs of time, money and other resources. However, educational researchers share the view that teaching critical thinking is difficult (Willingham, 2007). The current study suggests that the extent to which a teacher education course can be effective depends on combined factors such as the content of the course and the instructor's teaching strategies. To us, increasing instructors' awareness of the potentials of their teaching activities for promoting preservice teachers' critical thinking abilities seems to be the first step of using existing teacher education courses for this purpose.

References

Adler, M.J. (1986). *A guidebook to learning: For the lifelong pursuit of wisdom.* New York: MacMillan.

Ashton, P. (1988). *Teaching higher-order thinking and content: An essential ingredient in teacher preparation.* Gainesville, FL: University of Florida.

Beyer, B.K. (1985). Critical thinking: What is it? *Social Education, 49*, 270-276.

Blythe, T. (1998). *The Teaching for Understanding guide*. San Francisco, CA: Jossey-Bass.

Cassel, J.F., & Congleton, R.J. (1992). *Critical thinking: An annotated bibliography*. Lanham, MD: Rowman & Littlefield Publishers.

Coe, R. (2002, September). *It's the effect size, stupid: What effect size is and why it is important.* Paper presented at the Annual Conference of the British Educational Research Association, University of Exeter, England.

Davidson, B.W., & Dunham, R.L. (1996, July). *Assessing EFL student progress in critical thinking with the Ennis-Weir Critical Thinking Essay Test*. Paper presented at the 16th Annual International Conference on Critical Thinking and Educational Reform, Rohnert Park, CA.

Ennis, R.H. (1962). A concept of critical thinking. *Harvard Educational Review, 32* (1), 81-111.

Ennis, R.H. (1987). A taxonomy of critical thinking dispositions and abilities. In J. B. Baron and R. J. Sternberg (Eds.), *Teaching Thinking Skills: Theory and Practice* (pp.9-26). New York: Freeman.

Ennis, R.H., Millman, J., & Tomko, T. (1985). *Cornell critical thinking tests Level X & Level Z—manual*. Pacific Grove, CA: Critical Thinking Press and Software.

Ennis, R., & Weir, E. (1985). *The Ennis-Weir critical thinking essay test*. Pacific Grove, CA: Critical Thinking Press and Software.

Facione, P.A. (2009). *Critical thinking: What it is and why it counts*. Retrieved from http://www.insightassessment.com

Hudgins, B., & Edelman, S. (1986). Teaching critical thinking skills to fourth and fifth graders through teacher-led small group discussion. *Journal of Educational Research, 79*, 333-342.

Kurfiss, J.G. (1988). *Critical thinking: Theory, research, practice and possibilities. ASHE-ERIC Higher Education Report No. 2, 1988*. Washington, DC: ERIC Clearinghouse on Higher Education.

Lippman, M. (1980). *Philosophy goes to school*. Philadelphia: Temple University Press. Nickerson, R.S. (1987). Why teach thinking? In J. B. Baron and R. J. Sternberg (Eds.), *Teaching thinking skills: Theory and practice*. New York: Freeman Press.

Norris, S.P. (1985). Synthesis of research on critical thinking. *Educational Leadership, 42*, 40-45.

Norris, S. P. & Ennis, R. H. (1989). *Evaluating critical thinking*. Pacific Grove, CA: Midwest Publications.

Paul, R. (1988). Critical thinking in the classroom. *TEACHING K-8, 18*, 49-51.

Patrick, J.J. (1986). Critical thinking in the social studies. *ERIC Digest, 30*. Retrieved from http://ericae.net/edo/ed272432.htm.

Perkins, D. N. (1987). Knowledge as design: Teach thinking through content. In J. B. Baron & R. J. Sternberg (Eds.), *Teaching thinking skills: Theory & practice*. New York: Freeman Press.

Perkins, D. (1992). *Smart schools: From training memories to educating minds*. New York: The Free Press.

Perkins, D. (1993). Teaching for understanding. *American Educator*, *17*(3), 28-35.

Salkind, N.J. (2006). *Tests and measurement for people who (think they) hate tests & measurement*. Thousand Oaks, CA: Sage Publications.

Swartz, R.J. (1987). Teaching for thinking: A developmental model for the infusion of thinking skills into mainstream instruction. In J. B. Baron and R. J. Sternberg (Eds.), *Teaching thinking skills: Theory and practice* (pp.106-126). New York: Freeman Press.

Swartz, R.J., & Parks, S. (1994). *Infusing the teaching of critical and creative thinking into elementary instruction*. Pacific Grove, CA: Critical Thinking Press and Software.

Walsh, D., & Paul, R. (1988). *The goal of critical thinking: From educational ideal to educational reality*. Washington, D.C.: American Federation of Teachers.

Wideen, M., Mayer-Smith, J., & Moon, B. (1998). A critical analysis of the research on learning to teach: Making a case for an ecological perspective on inquiry. *Review of Educational Research. 68*(2), 130-178.

Willingham, D.T. (2007). Critical thinking: Why is it so hard to teach? *American Educator, 32*(2), 8-19.

Wiske, M.S. (1998). What is teaching for understanding? In M. S. Wiske (Ed.), *Teaching for understanding: Linking research with practice* (pp.61-68). San Francisco, CA: Jossey-Bass.

Minghui Gao, Ed. D., is Assistant Professor of Education in the Department of Teacher Education at Arkansas State University, USA. Professor Gao earned his EdD from the Harvard Graduate School of Education. He conducts research on the teaching of thinking skills, informal reasoning, and human symbolic capacities and their development.
Correspondence: P.O. Box 2350, State University, AR 72467, USA.
Email: mgao@astate.edu Fax: 1-870-972-3344

Xu Zhao is an advanced doctoral student at the Harvard Graduate School of Education, where she earned a M.Ed. in Human Development. Her research interests focus on the development of social cognition during adolescence and early adulthood.
Correspondence: 1100 E. Harrison St. #101, Seattle, WA, 98102, USA.
Email: xuz930@mail.harvard.edu

Faculty and Students' Awareness and Challenges of E-learning in a College of Education

Khamsum Kinley

This study explored the use of e-learning by student teachers and faculty members at the Paro College of Education, Royal University of Bhutan. It provides an overview of the current status of e-learning at the College including the challenges faced by both faculty members and students teachers, and the influence of ICT resources on the use of e-learning by the lecturers and student teachers. The results indicated that there exist challenges in exercising e-learning at the College for teaching and learning. The data indicated that the Internet connection is slow and revealed that most of the lecturers have average computer competency. This study strongly recommends that the College develops a strategic plan for ICT infrastructure and resources that includes policy and guidelines for use. This study also suggests that lecturers and student teachers use freely available e-learning management software.

Background

What difference does Information Communication Technology (ICT) make to learning? This question has been asked in many forms for over 35 years, and there is no simple answer (Kennewell & Beauchamp, 2007). Not so long ago, a computer and Internet connection were considered luxuries, but now these facilities are becoming a necessity. ICT is a fast growing technology. In teaching and learning ICT has advanced the use of video conferencing, search engine databases such as *Google* for information retrieval, and other technologies in education contexts. The Internet, as one of the ICT technologies, offers a wealth of information on unlimited topics for any kind of user (Ackland, Spink, & Bailey, 2007). All the data retrieved from the Internet may be considered resources for teaching and learning. Additionally the Internet is being used for numerous social activities, information sharing, entertainment, business, management and government.

At the Paro College of Education (PCE), Royal University of Bhutan (RUB), the provision of computer laboratories and access to the Internet, has apparently led to better teaching and learning processes, to some extent. At the College there are currently three computer laboratories and a library available to 746 students and 48 teaching staff. In the September semester of 2008, 61 different modules were offered in the Bachelor of Education and Post Graduate Diploma in Education programs at PCE (Kinley, 2008) One of the factors contributing to the quality of education is the availability of resources (including ICT) and services such as e-learning for teaching and learning. An overview of the existing network infrastructure at the College is outlined in the Appendix.

Purpose of the Study

The purpose of this research was to explore and provide an overview of the status of e-learning at the PCE, Bhutan. The research also explored the challenges faced by the students and teacher educators of the College and generally provided significant information on the use of e-learning. The core objectives were to:

- Investigate the lecturers' and students' awareness of e-learning management software;
- Explore the availability of resources for e-learning services in the College; and
- Explore the challenges faced by the lecturers and students.

Research questions. T he following research questions were formulated.

1. What access do the students and lecturers have to computers?
2. What access do they have to e-learning?
3. What is the level of lecturers' computer competence and e-learning awareness?
4. What are some of the challenges faced by the students and the lecturers in using e-learning services?

Literature Review

In recent decades, new technologies, exemplified by the Internet, have become increasingly popular for their potential for Web services such as e-learning (Ran, 2003). Rosenberg (2000) defined e-learning as the use of Internet technologies to deliver a broad

array of solutions that enhance knowledge and performance. According to Rosenberg, e-learning is based on three fundamental criteria:

1. E-learning is networked, which makes it capable of instant updating, storage/retrieval, distribution and sharing of instruction or information.
2. It is delivered to the end-user via a computer using standard Internet technology.
3. It focuses on the broadest view of learning – learning solutions that go beyond traditional training paradigms (p. 28).

Rosenberg's (2000) definition of e-learning is adopted as the working definition of e-learning in this article.

E-learning is becoming more popular in university education worldwide (Chitanana, 2008). New Web services such as social networks, blogging and search engines are being used while learning management system (LMS) such as Blackboard[1] and Sakai[2]; and technology advanced hardware such as Smart Board[3], are also being used for learning and teaching. Online learning has been used intensively for teaching and learning in Hong Kong since 2003 when schools were closed during the SARS (Severe Acute Respiratory Syndrome) crisis (Fox, 2007). A study carried out in Malaysia (Baker & Mohamed, 2008) and India (Sajja, 2008) found that ICT services such as e-learning have proved to be a very important aspect of the teaching-learning process. However, it will take some time to gain popularity in developing countries such as Bhutan because of the lack of services and infrastructure.

In Bhutan, ICT is recognized as one of the most important tools to achieve development objectives. Perhaps in this technology age, it is also seen as one solution to the widely expressed concern of a perceived decline in the quality of education (Choden, 2008; Dorji, 2005; Wangchuk, 2007), although there is a dearth of empirical evidence to substantiate such criticisms. Bhutan's ICT Policy and Strategy includes e-learning as one of the strategies to enhance the quality and accessibility of education by 2010 (Bhutan Information and Communications Technology Policy and Strategies, 2004).

Some of the colleges in Bhutan such as Samtse College of Education have made systematic efforts to introduce ICT for learning support in the provision of distance teacher education programs. The in-service teachers involved in ICT-facilitated distance education at the College found that the ICT-based learning support was valuable. However, there were significant barriers to full integration including overloaded network systems, lack of availability of technical support, limited ICT infrastructure, resistance to change and the need for training (Jamtsho & Bullen, 2007, pp. 156-158).

Research Method

Before proceeding with the study, all the research ethics protocols of the college were observed.

Participants

Forty four lecturers and ten undergraduate students participated in the study. Among the lecturers, thirty four (77%) were male and ten (23%) were female. The lecturers were from different departments. Of the students, five were female and five male. The students were enrolled in the Bachelor of Education program.

Data Collection

A mixed research method was used in the study to include both quantitative and qualitative data. Cresswell (2009) and Shaw (2003) promote the use of quantitative and qualitative methods as supporting each other and giving greater weight to the findings of a study. The lecturer participants provided quantitative data through a questionnaire while the student participants provided qualitative data through the interview. Semi-structured interviews were used to assess their e-learning awareness, Internet and e-learning access, and challenges they faced with e-learning services. All the interviews were digitally recorded and transcribed using Audacity, an open source software program (SourceForge, 2008).

The questionnaire for the lecturers included demographic items, and four 5-point Likert scaled items to gather information on the e-

[1] www.blackboard.com
[2] www.sakaiproject.org
[3] www.smarttech.com

learning awareness and status at the college. The literature guided the development of the questionnaire. Forty four (44) of forty eight (48) lecturers returned a completed questionnaire, thus providing a broadly representative sample (91.6%) of the lecturer population in the college.

Data Analysis

The combination of qualitative and quantitative analysis, commonly known as mixed method analysis, can be combined to expand the scope of a study (Greene, Caracelli, & Graham, 1989). The qualitative and quantitative data were analyzed separately. The interview data were transcribed, coded and analyzed to investigate the participants' awareness, access and challenges faced with regard to e-learning. To ensure anonymity each participant was identified by a pseudonym, Student S1, Student S2, Student S3, and so on. The quantitative data collected through the questionnaire were entered into SPSS (statistical package for social science) and statistically analyzed. The results of the qualitative and quantitative analyses were then combined at the interpretive level of the study but each data set remained analytically separate from the other. The response rate was 100% for the interview and 91.6% (44 of 48) for the questionnaire.

Results

The research questions deal with access, awareness, competence or expertise and challenges. The findings are presented in this order.

Access to Computers and E-learning

The study revealed that most of the lecturers (86%) have a computer in their office; 96% of them use a computer for planning and developing teaching materials; 68% use computers for classroom teaching (see Table 1). On the other hand, students have access to computers approximately two to four hours per week because of limited availability (see Appendix). Most (65.9%) of the lecturers do not have access to any of the e-learning management software. The College has Online Teaching and Learning System (OLTS) for teaching and learning, developed by an academic staff. The professional development program for the lecturers was also conducted twice by the concerned academic staff. Only a few students and lecturers (12%) use the OLTS for teaching and learning purposes.

Awareness of E-learning Management Software

Most of the schools and colleges in Bhutan use a traditional 'face-to-face' method for teaching and learning (Kinley, 2009). At the PCE none of the students selected for the interviews had heard about any of the e-learning management softwares and some of them were not aware of e-learning. On the other hand, a few lecturers were aware of the existence of Moodle (29.5 %) and Blackboard (18.2 %).

Table 1
Lecturer's Access to Computers and E-learning

No	Question	Never (%)	Seldom (%)	Often (%)	Always (%)
1	Do you have access to a computer in your office?	6.8	6.8	11.3	75
2	If, yes do you use the computer for planning and developing your teaching materials?	0	2.3	20.5	75.5
3	Do you use the computers for teaching your students?	4.5	27.3	38.6	29.5
4	Do you have access to any of the e-learning management software?	65.9	22.7	6.8	4.5
5	If, yes do you use the software in your teaching?	52.3	22.7	6.8	0
6	The PCE has Online Teaching and Learning System (OLTS) for teaching and learning. Do you use this system for teaching your students?	59.1	29.5	6.8	4.5

Perceptions of Computer Expertise

The survey of lecturers revealed that 86.4% perceived their computer competency was at an average or above average level (see Table 2). In addition, 91.0% considered that they had an average or above average level of competency using the Internet (see Table 2). The findings from the questionnaire data (see Table 2) and the interviews (Student S9, 2008) have indicated that most of the lecturers and students perceived that they had an average or better level of computer expertise which implies awareness and competency. In general, most of the lecturers and students believed they knew how to use computers and the Internet. However, few had used computers for their teaching and learning purposes.

Table 2
Lecturers' Perception of Their Level of Computer Expertise

No	Question	Very Poor (%)	Poor (%)	Average (%)	Good (%)	Very Good (%)
1	What is your level of expertise in using computers?	0	13.6	43.2	34.1	9.1
2	What is your level of expertise in using the Internet?	2.3	6.8	43.2	36.4	11.4
3	What is your level of expertise in using computers for teaching?	4.5	15.9	40.9	31.8	6.8

Table 3
Challenges Faced by Lecturers

Do you face any challenges while using e-learning or in accessing e-learning?							
	Challenge	Strongly Agree (%)	Agree (%)	Neither Agree nor Disagree (%)	Disagree (%)	Strongly Disagree (%)	Missing (%)
1	Lack of computer access in lecturer's offices	20.5	11.4	13.6	38.6	15.9	
2	Lack of comfort using computers	6.8	25	15.9	31.8	20.5	
3	Lack of students interest	2.3	13.6	43.2	31.8	9.1	
4	Lack of lecturers' interest	2.3	9.1	25	45.5	11.4	6.8
5	Problems with Internet access such as slow connection	68.2	22.7	0	4.5	2.3	2.3
6	Lack of technical support/advice	18.2	22.7	31.8	27.3	0	
7	Lack of administrative support/initiative at faculty level	13.6	18.2	36.4	29.5	2.3	
8	Lack of awareness regarding ways to integrate the software into teaching	11.4	50	22.7	15.9	0	
9	Lack of access to computer lab with your classes	13.6	47.7	18.2	15.9	4.5	
10	Inadequate training and professional development program on using ICT for teaching.	18.2	45.5	22.7	13.6	0	
11	Inadequate ICT infrastructure and resources	15.9	29.5	31.8	20.5	0	2.3

Challenges Faced by the Lecturers and Students

The lecturers' responses were that they had problems in using e-learning. The data indicated that the Internet connection is too slow as 91% of the lecturers raised this issue. The students also had the same problem. Student S4 and Student S5 pointed out that the Internet connection was very slow:

"The main challenge faced in using e-learning is the slow Internet connection*"* (Student S4, 2008, p. 4). "The Internet connection in the labs is very slow" (Student S5, 2008, p. 4). There was a lack of awareness regarding the ways to integrate e-learning into teaching

(61.4%). The training and professional development program on using ICT for teaching was regarded as inadequate by 63% of the lecturers who also complained of inadequate ICT resources and infrastructure. On the other hand, most of the lecturers have access to computers in their office (see Table 1), so more than 54.5% of the lecturers perceived no problem of access to computers (see Table 3). The study found that the majority of the lecturers, who have computers in their office, were confident in using their machines (see Table 2).

Another problem was inadequate student computer access. The Appendix shows that the number of computers (98) is too few compared to the number of students (746) in the College. The computer student ratio was 1:76 and as a result, each student had only two hours of computer access per week.

Conclusion and Recommendations

The objectives of the study were realized. The findings lead to practical recommendations in four areas of ICT in Paro College for the benefit of teacher educators and their students: infrastructure, policy, resources- specifically e-learning software, and professional development for the lecturers (teacher educators).

ICT Infrastructure

A university, college or school cannot implement e-learning successfully without adequate resources and proper planning. Resources are essential for any developmental activities. In Bhutan, the current technological infrastructure renders the use of ICT impractical (Jamtsho & Bullen, 2007). The study indicated that 45% of the lecturers felt that there was a lack of ICT infrastructure and resources in the College (see Table 3). Slow Internet connection (only 1Mbps bandwidth) is one of the major problems faced by both the lecturers and the students. A student pointed out that the access to a computer and to the Internet from the college laboratory is a barrier to learning (Student S3, 2008), The computer-student ratio is too high (nearly 1:8) for effective use and e-learning. The data generally confirmed that there were inadequate ICT resources and infrastructure thereby causing a major barrier to quality teaching and learning. As the Internet is the main source of information for the students' assignments and projects, this study recommends the up-grading of the Internet bandwidth in order to access and retrieve information from the Web at a greater speed, and increasing the number of computers in the computer labs to provide computer access for all the students.

Policy on ICT/networking

Most colleges and universities have an e-learning policy and strategic planning for technology in place. An e-learning plan will serve as an enabling force to help a college achieve success in implementing its strategic initiatives (West Hills e-Learning Strategic Planning Committee, 2002*)*. An institutional strategic plan and learning design are considered most important aspects with regard to the development of e-learning (Al-Humiyyan, Al-Huwail, & Al-Sharhan, 2008; Chitanana, 2008). Research done by Jebeile (2003) in a secondary college in Sydney, Australia, recommended that various activities be supported by the Web and strategic plans be considered for the integration of e- learning into teaching. At the Paro College of Education, there is no policy or documentation on the ICT infrastructure, resources and future plans. This study strongly recommends that there be a policy and guidelines for the development and maintenance of ICT infrastructure and resources as a part of a strategic plan for the college.

Freely Available E-learning Software

Some of the learning management software (LMS) such as *Blackboard* is expensive for a small college like PCE. However, there are many other open source e-learning software programs which are freely available online for use. This study suggests using freely available LMS such as Sakai, Moodle or CourseLab.

Professional Development Program

Training and professional development programs are essential in order to equip the teaching staff with the latest technology competence and confidence. At the PCE, 63% (see Table 3) of the lecturers felt that there is a need to conduct training and professional development programs on integrating ICT for teaching. This study has found that two professional development programs were undertaken at PCE on 'Online Learning and Teaching System' (OLTS). OLTS has

necessary features such as assigning module coordinators, uploading/downloading lectures notes, and activating student feedback. However, the data collected indicated that only lecturers from the IT department and a few from other departments were using the OLTS.

This study strongly recommends OLTS to be used across the departments for better teaching and learning. The College could encourage lecturers to engage with the OLTS by providing incentives and other measures such as: freeing lecturers from some teaching and administrative duties; awarding a certificate upon completion of the program; reflecting technology professional development activities in their annual performance appraisal; receiving credit towards promotion, study leave, access to research opportunities and conference attendance. In Bhutan, although emphasis is given to the use of ICT in teaching and learning (The Wheel of Academic Law, 2005), online social networks and online learning are new to the culture and hence to the curriculum. There is a need also for further research to assess, investigate and explore how online social networks can be used for teaching and learning.

References

Ackland, R., Spink, A., & Bailey, P. (2007, June). *Characteristics of. au websites: An analysis of large-scale web crawl data from 2005*. Paper presented at the 13th Australian World Wide Web Conference, NSW, Australia.

Al-Humiyyan, A., Al-Huwail, N., & Al-Sharhan, S. (2008). Blended e-learning design: Discussion of cultural issues. *International Journal of Cyber Society and Education, 1*(1), 17-32.

Baker, A. B., & Mohamed, S. (2008). Teaching using information and communication technology: Do trainee teachers have the confidence? *International Journal of Education and Development using ICT, 4*(1).

Bhutan Information and Communications Technology Policy and Strategies. (2004). Thimphu: Ministry of Information and Communication.

Chitanana, L. (2008). The current state of e-learning at Universities in Zimbabwe: Opportunities and challenges. *International Journal of Education and Development using ICT, 4*(2).

Choden, P. (2008). Good intentions, bad execution. *Kuensel: Bhutan's Daily Newspaper* Retrieved from http://www.kuenselonline.com/modules.php?name=News&file=article&sid=9707

Creswell, J. (2009). *Research design: qualitative, auantitative, and mixed methods approaches* (3rd ed.). Newbury Park: Sage Publications.

Dorji, J. (2005). The Story of Growth and Change in the Bhutanese Education System. Q*uality of Education in Bhutan.*Thimphu Bhutan: KMT Publisher.

Fox, R. (2007). Information Technology Use During Severe Acute Respiratory Syndrome (SARS): Teachers' Experiences. *Journal of Technology and Teacher Education, 15*(2), 191.

Gable, G. G. (1994). Integrating case study and survey research methods: An example in information systems. *European Journal of Information Systems; Basingstoke, 3*, 112.

Greene, J., Caracelli, V., & Graham, W. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis, 11*(3), 255.

Jamtsho, S., & Bullen, M. (2007). Distance education in Bhutan: Improving access and quality through ICT use. *Distance Education, 28*(2), 149-161.

Jebeile, S. (2003). The diffusion of e-learning innovations in an Australian secondary college: Strategies and tactics for educational leaders. *The Innovation, 8*, 4.

Kennewell, S., & Beauchamp, G. (2007). The features of interactive whiteboards and their influence on learning. *Learning, Media and Technology, 32*(3), 15.

Kinley, K. (2008). *A time table production model and program for schools and colleges in Bhutan*. Paper presented at the 14th Academic Board Meeting, Royal University of Bhutan.

Kinley, K. (2009, June). *Internet and web service to improve student's written tasks: An action research.* Paper presented at the 2009 Australian Teacher Education Association, Charles Sturt University, Albury, NSW.

Ran, S. (2003). A model for web services discovery with QoS. *ACM SIGecom Exchanges, 4*(1), 1-10.

Rosenberg, M. (2000). *E-learning: Strategies for delivering knowledge in the digital age*: McGraw-Hill Companies.

Sajja, P. S. (2008). Enhancing quality in e-learning by knowledge-based IT support. *International Journal of Education and Development using ICT, 4*(1).
Shaw, I. (2003). Advancing methods: PhD research skills in Social Work. *ESRC Workshop*.
SourceForge (2008). *Audacity: Audio editor and recorder*. Retrieved from http://audacity.sourceforge.net/
The Wheel of Academic Law. (2005). Thimpbhu: Royal University of Bhutan.
Wangchuk, S. (2007). Teachers: A Much Maligned Lot. *Kuensel: Bhutan's Daily Newspaper* Retrieved from http://www.kuenselonline.com/modules.php?name=News&file=article&sid=8980
West Hills e-Learning Strategic Planning Committee. (2002). *West Hills Community College District e-learning strategic plan 2002-2005*: West Hills Community College.
Yin, R. (2008). *Case study research: Design and methods*. Newbury Park: Sage publications.

Khamsum Kinley is currently pursuing a doctorate degree at the Queensland University of Technology, Brisbane, Australia. He has a Master's degree in Information Technology from that institution. He was a lecturer in the Department of Information Technology at the Paro College of Education, Royal University of Bhutan for the last three years. His areas of research interest include information technology in education, information behaviour, information retrieval, web searching, learning style and cognitive styles.
Correspondence: School of Information Technology, Queensland University of Technology, 126 Margaret Street level 9, Room 914, GPO Box 2434, Brisbane, Australia 4001
Email: k.kinley@qut.edu.au

Acknowledgement
I here acknowledge the Leora Cordis Trust, International Society for Teacher Education for providing financial support through which I could present this paper at the 29th ISfTE Annual Seminar held at the Weber State University, June 3-9, 2009. I am grateful to Associate Professor Warren Halloway for the contribution rendered in the development of this article.

Appendix
Network Infrastructure

	Network services	
1	Number of Network Points	267
2	Number of Computer Laboratories	3
3	Number of computers in the labs	98
4	Total number of Computers	150
5	No. of Users	814
6	Size of Bandwidth	1Mbps
7	Cost of Bandwidth per Month	Nu.30, 000 (US$681)
8	Type of Internet Connection	Leased line

Source: Network information record file

Mathematics Anxiety and Teaching Self-Efficacy of Preservice Elementary Teachers

Kristin Hadley

This study investigated the relationships among preservice teachers' math anxiety, anxiety about teaching math, math teaching self-efficacy beliefs, and adherence to NCTM Standards-based instructional practices. Sixty preservice teachers were surveyed regarding their mathematics anxiety, anxiety about teaching mathematics, mathematics teaching self efficacy, and instructional practices. The results indicated that teachers with higher mathematics anxiety tended to be anxious about teaching mathematics and had lower mathematics teaching self efficacy. No relationship was found with instructional practices. When separated into high and low mathematics anxiety groups, the relationship with anxiety about teaching mathematics was similar for both groups, but the relationship with mathematics teaching self efficacy only existed with the low mathematics anxiety group. Teachers with higher mathematics anxiety showed no relationship with teaching self efficacy. There is an implication here for preparing mathematics teachers in order to improve mathematics teaching in schools.

Preservice elementary (kindergarten-grade 6) teachers in the United States (USA.) have the highest or among the highest mathematics anxiety of all college majors. Mathematics competence and anxiety can then impact the preservice teacher's mathematics teaching self-efficacy, the belief that one can effectively teach so that students learn. The National Council of Teachers of Mathematics Teaching Principle (NCTM, 2000) states,

> Students learn mathematics through the experiences that teachers provide. Thus, students' understanding of mathematics, their ability to use it to solve problems, and their confidence in, and disposition toward mathematics are all shaped by the teaching they encounter in school. (p. 16-17)

It is therefore vital that elementary teachers be confident in their ability to teach mathematics effectively. Lack of teacher confidence can be traced to several issues including inadequate content knowledge, math anxiety, anxiety about teaching math, and poor math teaching self-efficacy.

Teachers must have a deep understand of mathematics to teach the subject effectively (L.Ma, 1999). This deep understanding allows them to be flexible in their teaching to reach each student. Additionally, the National Research Council (2001) stated that teachers

> need to know the mathematics they teach as well as the horizons of that mathematics – where it can lead and where their students are headed with it. They need to be able to use their knowledge flexibly in practice to appraise and adapt instructional materials, to represent the content in honest and accessible ways, to plan and conduct instruction, and to assess what students are learning. (p. 369)

Unfortunately, lack of mathematical content knowledge can be a problem for some elementary teachers. This can be the result of math anxiety and can contribute to low math teaching self-efficacy. The purpose of this study was to investigate the relationships among preservice teacher math anxiety, anxiety about teaching math, math teaching self-efficacy beliefs, and understanding of effective mathematics instructional practices (NCTM, 2000).

Math Anxiety

Math anxiety can be defined as a negative emotional reaction when one thinks about mathematics or performs a particular mathematical task (Lee, 2009). This negative emotional reaction can cause difficulties in math courses and even in everyday mathematical situations. Mathematics anxiety is related to many characteristics. Studies have correlated higher math anxiety with gender (females), age (older), test anxiety, lower level of high school math, lower math ACT (American College Testing) score,

decreased mathematical achievement, lack of use of manipulatives in previous math classes, tactile-kinesthetic and global learning style, and college major (Bessant, 1995; Betz, 1978; Ertekin, Dilmac, & Yazici, 2009; Gresham, 2007a; McCoy, 1990).

Ma (1999) explored the relationship between anxiety toward math and achievement in math in elementary and secondary students in a meta-analysis and found that students with math anxiety had lower mathematics achievement. This relationship existed regardless of gender, grade level, ethnicity, measurement instruments, and year of publication of the included studies. Hembree (1990), in a meta-analysis, found that mathematics anxiety was negatively correlated with mathematics performance. Higher levels of anxiety consistently related to lower performance at all grade levels investigated in the studies examined. Additionally, the examined studies found that participants with higher mathematics anxiety had greater math avoidance indicated by taking fewer math courses in high school and college. Hembree found, in analyzing the relationship between math anxiety and college major, that elementary education majors had the highest levels of math anxiety. Kelly and Tom have (1985) also found that the most anxious college students were elementary education majors, when students in a mathematics anxiety reduction course were removed from consideration. These results indicate that those in training to teach math to our youngest students are often the most anxious about math themselves and may have avoided taking math courses.

People often attribute math anxiety to stressful experiences in math courses which makes it essential that elementary teachers are comfortable, confident and effective in their mathematics instruction. Trujillo and Hadfield (1999) surveyed 50 preservice elementary teachers in a math methods course. All participants completed a math anxiety scale and then the five with the highest level of mathematics anxiety were interviewed by the researchers. All interviewees indicated having had bad experiences in previous math classes and none indicated positive support for mathematics at home. All of these participants stated that they plan to employ the constructivist and developmental approach to teaching math in their own classes. The researchers initially suggested that math specialists could be used to alleviate passing on mathematics anxiety because

> Teachers who suffer from high levels of mathematics anxiety may not be very effective in their own mathematics instruction. To be more specific, it has been conjectured that they tend to teach mathematics in a very traditional format, which is not in accordance with the latest standards. These particular participants, however, indicated that they plan to be much more progressive in their future mathematics instruction. (p. 225)

The preservice teachers were aware of the important role of a teacher and the need to teach in a way to not instill math anxiety in their own students.

Battista (1986) found that preservice teachers' mathematical knowledge was significantly related to their learning of mathematical pedagogy as measured by exams but was not related to their teaching performance. Data from his study did not support the hypothesis that mathematics anxiety inhibits the learning of math pedagogy. Preservice teachers who were math anxious learned how to teach math as well as those who were not math anxious. Hadley (2005) found that math anxiety was related to elementary teachers' anxiety about teaching math in the classroom but was not related to student achievement. Additionally, Hadley found that teachers who were not anxious about teaching math where more likely to teach lower grades.

Teaching Self-Efficacy

Teaching self-efficacy is the belief that one can effectively teach so that students learn. When teachers are confident in their ability to teach mathematics effectively they tend to teach more conceptually-oriented lessons (Kahle, 2008) and this is linked to greater student understanding (Adams, Brower, Hill, & Marshall, 2000). Teacher efficacy is often considered to have two parts (Enochs, Smith, & Huinker, 2000). One part is personal teaching self-efficacy which is a teacher's belief that they have the skills and abilities to

be an effective teacher. The other part is outcome expectancy, or the belief that one can bring about positive student outcomes, that is, learning. Studies (Bursal & Paznokas, 2006; Swars, Daane, & Giesen, 2006), investigating the link between math anxiety and math teacher efficacy in elementary preservice teachers, found that the preservice teachers who exhibited lower levels of math anxiety had higher efficacy for teaching math while math anxious teachers did not believe they would be effective math teachers. While the constructs of math anxiety and math self-efficacy are closely related, they have been found to have unique factors that can be investigated (Lee, 2009).

An understanding of effective mathematics instructional practices (NCTM, 2000) could have an influence on teacher confidence and efficacy beliefs. Battista (1994) has said "All our efforts to make the mathematics curriculum consistent with the NCTM Standards will fail if teachers' beliefs about mathematics do not become aligned with those of the reform movement" (p. 470). These interrelated constructs: math anxiety, anxiety about teaching math, math teaching self-efficacy, and understanding of effective mathematics instructional practices need to be investigated further with preservice teachers to understand the relationships.

Method

To investigate the relationships among preservice teacher math anxiety, anxiety about teaching math, math teaching self-efficacy beliefs, and understanding of effective mathematics instructional practices a correlational survey design was used.

Participants

Participants included students in the undergraduate and graduate elementary education program at a western university in the United States. Of the 60 (4 males, 56 females) participants, 46 were students in their last semester before student teaching in a Teacher Education program. The remaining 14 participants were in the Master of Education Elementary Licensure program.

Data Collection

Participants completed the Elementary Teacher Mathematics Anxiety and Self-Efficacy questionnaire consisting of four parts. The first part was the Abbreviated Math Anxiety Scale - AMAS) by Hopko, Mahadevan, Bare, & Hunt, (2003). This 9-item Likert scaled survey investigated participants' feelings of anxiety toward math such as using tables in the back of a math book, thinking about and taking an upcoming math test, and being given a homework assignment of difficult problems. Results could range from 9 to 45, with 9 indicating no math anxiety and 45 indicating very high math anxiety.

The second part of the questionnaire, the Anxiety about Teaching Math (ATM) scale, was created by the researcher (Hadley, 2005) to mirror the AMAS but to investigate specific anxiety about teaching mathematics in the elementary classroom. Items included questions about teaching students how to interpret tables and charts, working out equations on the board in front of students, talking to students about different ways to solve problems, and writing math lesson plans. The results from this 9-item Likert scaled survey could range from 9 to 45, with 9 as no anxiety about teaching math and 45 indicating very high anxiety.

The third section of the questionnaire included five items which asked how many times per week they would have students use manipulatives, write about mathematics, participate in non-routine problem solving tasks, represent mathematical problems in many ways, and use small group learning activities, reflecting the teachers' desire to teach in a manner consistent with the NCTM Standards (2000). The results could range from 5 to 25, with 5indicating very traditional instructional practices and 25, indicating very progressive instructional practices.

The final section of the questionnaire was the Mathematics Teaching Efficacy Beliefs Inventory (MTEBI) by Enochs, et al., (2000). Items included questions about participant's confidence in teaching mathematics effectively such as, continually finding better ways to teach mathematics, belief that the participant can overcome student inadequacies through effective mathematics instruction, ability to answer student questions, and the ability to "turn students on" to mathematics. This 21item Likert scaled survey could range from

21 to 84, with 21indicating very negative beliefs about math teaching self-efficacy and 84 indicating very positive beliefs about math teaching self-efficacy. The complete questionnaire is available from the author.

Participants completed the questionnaire online during the first week of the semester during the class session of an elementary math methods course. It was done at the beginning of the semester as research (Gresham, 2007a; Rule & Harrell, 2006) has indicated that math methods courses frequently decrease students' math anxiety and improve attitudes about math. Students met in a computer lab adjoining the classroom and were asked to complete the questionnaire which was administered by the researcher who was the instructor of the class for the 14 Master's level participants but was not the instructor of the class for the undergraduate participants. Participants were shown how to access the questionnaire and informed about the voluntary nature of participation. The researcher then left the computer lab and allowed students to complete the questionnaire without interruption. Most students completed the questionnaire although a few chose to not participate.

Results

Preliminary descriptive analysis was completed for the four sections of the questionnaire. The mean on the math anxiety scale (AMAS) was 24.08, with scores ranging from 12 to 44. The mean for the anxiety about teaching math scale (ATM) was 22.05, with scores ranging from 9 to 38. For the math teaching self-efficacy scale (MTEBI), the mean was 61.27, with scores ranging from 48 to 75. When asked about the types of instructional practices they would like to employ, these preservice teachers indicated an overall desire to use effective instructional practices in accordance with NCTM (2000) Standards, with a mean of 20.67, with scores ranging from 9 to 25 (see Table 1).

Table 1
Preservice Teachers' Math Anxiety, Anxiety about Teaching Math, Teaching Self-efficacy, and Instructional Practices

	N	Min	Max	Mean	S.D.
Math Anxiety	60	12	44	24.08	7.85
Teaching Anxiety	60	9	38	22.05	7.49
Teaching Efficacy	60	48	75	61.27	5.33
Instructional Practices	60	9	25	20.67	3.66

To understand the relationship among math anxiety, anxiety about teaching math, teaching self-efficacy beliefs, and instructional practices, correlations were calculated (see Table 2). Math anxiety was related to anxiety about teaching math ($r=.508$, $p<.01$) and was negatively related to math teaching self-efficacy ($r=-.275$, $p<.05$). This indicates that the preservice teachers who were math anxious were also anxious about teaching math and had lower mathematics teaching self-efficacy beliefs. Anxiety about teaching math was also negatively related to math teaching self-efficacy ($r=-.489$, $p<.01$) indicating that the preservice teachers who were anxious about teaching math also had lower math teaching self-efficacy beliefs. There was no relationship between instructional practices and any of the other three variables.

Participants were split into two groups according to their math anxiety score. The low anxiety group was below the math anxiety mean while the high anxiety group was above the math anxiety mean. Both groups showed a relationship between math anxiety and anxiety about teaching math. However, while the subset below the mean for math anxiety (n=35) retained relationships between math anxiety, anxiety about teaching math, and teaching self-efficacy, the subset above the mean (n=25) no longer showed a relationship between math anxiety and teaching self-efficacy, or between anxiety about teaching math and teaching self-efficacy (see Table 3).

Table 2
Relationships among Math Anxiety, Anxiety about Teaching Math, Math Efficacy, Beliefs and Instructional Practices

	Math Anxiety	Anxiety about Teaching Math	Teaching Efficacy	Instructional Practices
Math Anxiety	---	.508**	-.275*	.021
Anxiety about Teaching Math	.508**	---	-.489**	.081
Teaching Efficacy	-.275*	-.489**	---	.087
Instructional Practices	.021	.081	.087	---

*p<.05
**p<.01

Table 3
Relationships among Math Anxiety, Anxiety about Teaching Math, Math Efficacy Beliefs, and Instructional Practices for Subsets Above and Below the Mean of Math Anxiety

	Math Anxiety		Anxiety about Teaching Math		Teaching Efficacy		Instructional Practices	
	Low anxiety	High anxiety	Low anxiety	High anxiety	Low anxiety	High anxiety	Low anxiety	High anxiety
Math Anxiety	---	---	.458**	.419*	-.456**	.074	.147	-.195
Anxiety about Teaching Math	.458**	.419*	---	---	-.712**	-.196	.156	.005
Teaching Efficacy	.456**	.074	-.712**	-.196	---	---	-.162	.324
Instructional Practices	.147	-.195	.156	.005	-.162	.324	---	---

*p<.05
**p<.01

Discussion

The results from Table 2 illustrate the interconnectedness of math anxiety, anxiety about teaching math, and math teaching self-efficacy beliefs. When preservice teachers are anxious about mathematics, they are more likely to be anxious about teaching mathematics and less likely to have high math teaching self-efficacy. This supports the findings of Hadley (2005) which also indicated a relationship between math anxiety and anxiety about teaching math with practicing elementary teachers. The results of this study also support Swars, Daane, and Giesen (2006) with preservice teachers with higher math anxiety having lower math teaching self-efficacy. Interestingly, anxiety about teaching math was more strongly related to math teaching self-efficacy than math anxiety, r=-.489 compared to r=-.275. This suggests that these two constructs, anxiety about teaching mathematics and math teaching self-efficacy, may have overlapping elements. Further investigation of factors underlying the scales is warranted. There was no relationship between understanding effective math instructional practices and any of the other variables. This is likely due to most of the participants indicating a desire to use effective practices so there was less variability in the results.

When teachers were split into high and low math anxiety subgroups and the relationships investigated, the low anxiety preservice teachers continued to have low anxiety about teaching mathematics and high math teaching self-efficacy. However, the high anxiety group continued to have high anxiety about teaching math but there was no relationship with math teaching self-efficacy. Also, even though this group remained anxious about teaching math, it did not predict their math teaching confidence. This interesting finding merits further investigation. It may be that these preservice teachers who have higher math anxiety have greater belief that they can be a successful elementary mathematics teacher and refuse to let their anxiety inhibit their teaching, thus supporting the contention of Trujillo and Hadfield's (1999) participants.

In today's educational climate with a strong emphasis on accountability and results, it is important to identify factors that influence student achievement. Undue focus on accountability tends to cause teachers to be more algorithmic in their instruction. As teacher math anxiety has shown a relationship with student mathematics achievement (Hadley, 2009), it is essential that time be spent helping teachers become comfortable and confident in teaching the mathematics curriculum by gaining a deep understanding of the concepts they teach along with understanding conceptually-based instruction (Hiebert & Wearne, 1992) and children's mathematical thinking (Carpenter, Fennema, Peterson, Chiang, & Loef, 1989). Mathematics teacher educators need to focus on working with preservice teachers to improve their abilities to uncover student mathematical thinking through formative assessments and questioning (Burns, 2010). Additionally, elementary teachers must teach mathematics to promote "profound understanding of fundamental mathematics" (L. Ma, 1999, p. 125) in all students to avoid the acquisition of math anxiety. With increased math teaching self-efficacy, classroom teachers will feel confident in encouraging student initiative and independence (Karp, 1991) thus promoting greater mathematics learning.

References

Adams, K., Brower, S., Hill, D., & Marshall, I. (2000). *The components of an effective mathematics and science middle school: standards, teaching practices, and professional development*. The South Texas Research and Development Center, Corpus Christi, TX. (ERIC Document Reproduction Service No. ED 499032).

Battista, M. (1986). The relationship of mathematics anxiety and mathematical knowledge to the learning of mathematical pedagogy by preservice elementary teachers. *School Science and Mathematics, 86*(1), 10-19.

Battista, M. (1994). Teachers' beliefs and the reform movement in mathematics education. *Phi Delta Kappan*, *75*(6), 462-470.

Bessant, K.C. (1995). Factors associated with types of mathematics anxiety in college students. *Journal for Research in Mathematics Education, 26*, 327-345.

Burns, M. (2010). Snapshots of student misunderstandings. *Educational Leadership, 67*(5), 18-22.

Bursal, M., & Paznokas, L. (2006). Mathematics anxiety and preservice elementary teachers' confidence to teach mathematics and science. *School Science and Mathematics*, *106*(4), 173-180.

Betz, N. (1978). Prevalence, distribution, and correlates of math anxiety in college students. *Journal of Counseling Psychology*, *25*, 441-448.

Carpenter, T.P., Fennema, E., Peterson, P.L., Chiang, C., & Loef, M. (1989). Using knowledge in classroom teaching: An experimental study. *American Educational Research Journal, 26*(4), 499-531.

Enochs, L. G., Smith, P. L., & Huinker, D. (2000). Establishing factorial validity of the Mathematics Teaching Efficacy Beliefs Instrument. *School Science and Mathematics, 100* (4), 194-202.

Ertekin, E., Dilmac, B., & Yazici, E. (2009). The relationship between mathematics anxiety and learning styles of preservice mathematics teachers. *Social Behavior & Personality: An International Journal, 37*(9), 1187-1195.

Gresham, G. (2007a). An invitation into the investigation of the relationship between mathematics anxiety and learning styles in elementary preservice teachers. *Journal of Invitational Theory and Practices, 13,* 24-33.

Gresham, G. (2007b). A study of mathematics anxiety in preservice teachers. *Early Childhood Education Journal*, *35*(2), 181-188.

Hadley, K. M. (2005). *Mathematics anxiety of elementary teachers and its effect on student mathematics achievement (*Unpublished doctoral dissertation). Utah State University, Logan, UT.

Hadley, K. M. (2009). *Investigating the relationship between elementary teacher mathematics anxiety, mathematics instructional practices, and student mathematics achievement.* Manuscript submitted for publication.

Hembree, R. (1990). The nature, effects, and relief of mathematics anxiety. *Journal for Research in Mathematics Education, 21,* 33-46.

Hiebert, J., & Wearne, D. (1992). Links between teaching and learning place value with understanding in first grade. *Journal for Research in Mathematics Education, 23*(2), 98-122.

Hopko, D. R., Mahadevan, R., Bare, R. L., & Hunt, M. K. (2003). The Abbreviated Math Anxiety Scale (AMAS): Construction, validity, and reliability. *Assessment, 10* (2), 178-182.

Kahle, D. (2008). How elementary school teachers' mathematical self-efficacy and mathematics teaching self-efficacy relate to conceptually and procedurally oriented teaching practices. *Dissertation Abstracts International Section A: Humanities and Social Sciences*, 69, 5-A.

Karp, K.S. (1991). Elementary school teachers' attitudes toward mathematics: The impact on students' autonomous learning skills. *School Science and Mathematics, 91*, 265-270.

Kelly, W.P., & Tomhave, W. (1985). A study of math anxiety and math avoidance in preservice elementary teachers. *Arithmetic Teacher, 32* (1), 51-53.

Lee, J. (2009). Universals and specifics of math self-concept, math self-efficacy, and math anxiety across 41 PISA 2003 participating countries. *Learning and Individual Differences, 19*, 355-365.

Ma, L. (1999). *Knowing and teaching elementary mathematics*. Mahwah, NJ: Lawrence Erlbaum Associates.

Ma, X. (1999). A meta-analysis of the relationship between anxiety toward mathematics and achievement in mathematics. *Journal for Research in Mathematics Education, 30*, 520-540.

McCoy, L.P. (1990). *Correlates of mathematics anxiety*. Paper presented at the Annual Meeting of the American Educational Research Association, Boston, MA. (ERIC Document Reproduction Service No. ED 325 393)

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: Author.

National Research Council. (2001). *Adding it up: Helping children learn mathematics*. Washington, DC: National Academy Press.

Rule, A., & Harrell, M. (2006). Symbolic drawings reveal changes in preservice teacher mathematics attitudes after a mathematics methods course. *School Science & Mathematics, 106*(6), 241-258.

Swars, S. L., Daane, C. J., & Giesen, J. (2006). Mathematics anxiety and mathematics teacher efficacy: What is the relationship in elementary preservice teachers? *School Science and Mathematics, 106*(7), 306-315.

Trujillo, K., & Hadfield, O. (1999). Tracing the roots of mathematics anxiety through in-depth interviews with preservice elementary teachers. *College Student Journal, 33*(2), 219-232.

Kristin Hadley, Ph. D. is an Assistant Professor at Weber State University in Ogden, Utah,USA. She has been a classroom teacher and administrator for 20 years prior to joining the university. She is passionate about teaching mathematics for understanding and decreasing mathematics anxiety.
Correspondence: Dr.Kristin Hadley, Weber State University, 1304 University Circle, Ogden, UT 84408-1304, USA.
Email: kristinhadley@weber.edu

A Study of Teachers' Attitudes Towards the Use of Cooperative Learning in Teaching Liberal Studies

Jacky Pow
and
Louisa Yan

As part of the recent education system transformation in Hong Kong, Liberal Studies has been added to the senior secondary education curriculum. In this cross-disciplinary subject students are required to adopt an issue-enquiry approach to learning and are encouraged to work in groups to investigate contemporary social issues. To prepare our student teachers for teaching this subject, we tried to explore attitudes which might affect their use of cooperative learning, a strategy appropriate for group work. In this study, in-service student teachers from a part-time Postgraduate Diploma in Education programme were invited to engage in cooperative learning activities. Data were generated through observations and interviews. The initial findings showed a mixed attitude with regard to the use of cooperative learning in teaching Liberal Studies.

Background to the Introduction of Liberal Studies

Hong Kong has recently undergone an education reform to change the academic structure from a 2+2+3 pattern (2-year senior secondary plus 2-year matriculation plus 3-year undergraduate education) to a 3+4 pattern (3-year senior secondary plus 4-year undergraduate education). This will, in theory, provide enough senior secondary places for all the students in junior secondary by abolishing the current examination barrier to their matriculation resulting in only one public examination for admission to university. Part of this change is the introduction of a new core subject to their secondary studies, Liberal Studies (LS), which counts towards university admission.

Liberal Studies is a cross-disciplinary subject that requires students to use multiple perspectives to study a broad range of contemporary issues so as to broaden their knowledge, develop their thinking skills and make them aware of social issues. Especially in this subject, students are required to adopt an issue-enquiry approach to learning. In most LS classroom teaching, students are encouraged to work collaboratively to investigate contemporary social issues. As stated in the Liberal Studies Curriculum and Assessment Guide (2007), "Teachers often employ strategies to help students to work together and learn from one another, so that they combine their efforts to achieve outcomes they could not achieve on their own" (p. 97). Although small group cooperative learning has a number of advantages (Zhang, 2005), its use in Hong Kong schools is not very popular, not only because of the lack of collegial, administrative, and parental support but due to limitations in available resources and the classroom's physical environment (Tam, 2001). This study set out to explore teachers' attitudes towards cooperative learning and see how such attitudes affect teachers' use of cooperative learning in LS teaching.

The Hong Kong Context

Hong Kong has had an elite education system ever since the colonial period under the British. Llewellyn et al. (1982) stated that in the 1980s only 3 % of the secondary school population was able to secure a place in local universities. By 2007/08 this figure had risen to 18.5%. Although many more tertiary institution places have been made available in recent years, it is still far from the situation of accessibility to postsecondary education in Western countries. It has been highly competitive for students in Hong Kong to matriculate and gain a place in a university. This keen competition has resulted in an examination oriented education culture with parents and teachers having very high expectations of students' academic performance. It follows that the school curriculum is driven by the examination system. The curriculum is made up of subjects, each with a broad prescribed syllabus. According to Salili (1996) the content is at an unreasonably high standard. The transmission of a huge volume of facts and information induces teachers towards quick transference of

knowledge through chalk and talk. Although this didactic approach in teaching has been widely criticized by educators, it has continued as the main teaching and learning practice in Hong Kong. There is great pressure on children from parents and teachers to do drill work and homework, often at the expense of their interest and social life (Cheung & Lau, 1985). Without the necessary support from the government, school senior management, parents, peers and students, the introduction and use of instructional methods other than direct instruction in such an examination oriented culture is not at all easy.

Cooperative Learning

Over the years there has been a great deal of development work on cooperative learning, and much progress has been made in using strategies that help students work well together (Joyce & Weil, 2000; Krol, Veenman, & Voeten, 2002). The effectiveness of cooperative learning as a teaching strategy that promotes socialization and learning is verified by the general results of a series of research efforts conducted across educational settings and subject areas (Gillies, 2007). Its appropriateness for higher order conceptual learning has been confirmed by numerous studies. For instance, cooperative learning has been used successfully to increase reading and writing achievement levels (Stevens, 2003), understanding of science (Foley & O'Donnell, 2002), and problem solving in mathematics (Sahlberg & Berry, 2002). The social benefits associated with cooperative learning have also been documented. It has been shown to promote social relationships in groups (McMaster & Fuchs, 2002; Slavin & Cooper, 1999), foster interpersonal skills (Cowie & Berdondini, 2001), and develop competence in conflict management (Pfaff & Huddleston, 2003). Johnson, Johnson & Stanne (2000) have argued that cooperative learning should enter the mainstream of educational practice.

Parallel to this advancement in the development of and research on cooperative learning, teachers are increasingly encouraged to incorporate cooperative learning activities into their class requirements (Sapon-Shevin, 2004). In Hong Kong the potential contribution of social interaction to academic learning is highlighted in the curriculum and assessment document (Curriculum Development Council, 2001) which laid out the blueprint of the education reform in a local context:

> Students of different abilities can learn well together (e.g. through co-operative learning) if the learning processes allow them to contribute different ideas at different levels. Learning from peers and collaboration helps to remove the feeling of failure and provides the emotional basis to boost motivation and learning. (p.79)

However, the act of putting students into groups or teams will not in itself bring about the desirable outcomes of cooperative learning. Woolfolk (2008) highlights the differences between group work and cooperative learning. The former is simply several students working together. The physical proximity may not necessarily be associated with group interaction and cooperation for learning. Cooperative learning requires much more than putting students in groups. Cooper & Mueck (1992) define cooperative learning as "a structured, systematic instructional strategy in which small groups work together toward a common goal" (p.68). The method stresses face-to-face interaction by all students, positive interdependence among the group members, individual accountability to ensure individual performance, and an emphasis on practicing as well as monitoring collaborative skills. Each of these features constitutes a main component of the method (Johnson & Johnson, 1999). To bring about these conditions, a well-designed task structure is crucial. Cooper & Mueck (1992) emphasize that a clearly structured team learning assignment is a pre-requisite of effectively functioning cooperative learning groups. It should be able to create interdependence of both goal and means among the students and involve all of them actively in organizing themselves for exchanging information, participating in discussion, using their critical appraisal skills and making decisions. Research lends strong support to the role that task design plays in the success of cooperative learning. Having reviewed the literature on small group collaboration, Mercer (1996) highlighted the importance of establishing the task which requires communication and collaboration among the children to solve a problem.

Group work motivates students to engage in cognitive restructuring and elaboration processes through collective problem solving activities (Pell et al., 2007). When students are asked to explain and elaborate what they know to others, they must first try to organise their thoughts and put them in order before they can present them out. In this way, students are more likely to be able to remember and reproduce new information. Moreover, in presenting their beliefs and ideas and testing those of others, students are much more likely to abandon misconceptions and adopt the viewpoints constructed through interactions with peers with whom they can easily relate (Damon, 1984). Hence, offering students opportunities for giving explanations is far more conducive to their learning than receiving explanations (Webb & Palincsar, 1996).

Although research findings on the effects of cooperation on performance are generally positive (Johnson, Johnson, & Stanne, 2000), it is however evident from the literature that teachers have a critical role to play in facilitating students' successful transition to cooperative learning. The literature shows that when teachers failed to provide structure and guidance, student discussion consistently degenerated into confusion and frustration (Kagan, 1999; Yan, Liddle & Csete, 2001). Students need structured guidance on both the cooperative learning tasks and the processes (Kagan, 1999), and failure to guide them can result in student confusion and frustration (Kinchin, 2004). To reap the benefits associated with cooperative learning, teachers must make sure that the groups are well structured to promote cooperation for mutual development and that the group task is relevant and enquiry based which calls for students to dialogue together (Gillies, 2007). Students need to have positive team experiences before they can begin to work effectively in teams (Pfaff & Huddleston, 2003; Thorley & Gregory, 1994). We believe that is the same for student teachers. If a student teacher has an affirming experience of and a positive attitude towards cooperative learning, the chances that they will employ cooperative learning strategies in their teaching is increased. This investigation is an attempt to study whether teachers' attitude is a major factor in determining the use of cooperative learning in an in-service teacher education setting.

Teachers' Attitude

Coon (2006) points out that there is a relationship among attitudes on an object or issue with one's affective component (emotion, feelings), cognitive component (beliefs, ideas) and behavioural component (predispositions to act). One example illustrates: In cooperative learning each participant would have a belief (cognitive) about whether the use of cooperative learning is beneficial to their students. They might respond emotionally (affective) to the use of cooperative learning in the classroom, finding it either easy to manage and effective or difficult to manage and ineffective. Then they would have a disposition to act (behavioural), either to use or not use cooperative learning strategies in their classes.

There is evidence that teachers' positive attitude to cooperative learning fosters progress and contributed to a positive classroom 'ethos' (Stoll, 1992). Hence we wanted to find out, if student teachers got to know more about the theories behind and the skills of cooperative learning, would there be any changes in their attitude towards it. In this case, we expected that student teachers would have a positive attitude towards cooperative learning after two intervention workshops provided. We began with the belief that if teachers have a positive attitude towards cooperative learning, the chances of their using it would be higher.

Method

This section describes the study participants and design of the study.

Participants

Twenty student teachers from a Liberal Studies teaching methodology course in a part-time Postgraduate Diploma in Education (PGDE) programme were invited to participate in the study. These student teachers were in-service teachers in the day and attended the study programme in the evenings. They had teaching experience in other subjects but not in Liberal Studies, as this new subject will first be offered in the academic year of 2009-2010. However, some of them might have teaching experience in similar subjects such as

Integrated Humanities. Participation in the study was voluntary. To encourage participation in the whole study, we offered them a copy of the Cooperative Learning Handbook.

Design

This project aimed to study student teachers' attitude toward cooperative learning methods. The major data generation methods were observations and individual interviews.

Workshops and observation. We designed two intervention workshops, each three hours long. Participants formed groups of four and engaged in two cooperative learning workshops. In the first 3-hour workshop, they were asked to participate in cooperative learning activities related to "problem solving skills". The workshop consisted of a number of cooperative learning activities with the aim to solve a social problem. Students were required to work together to brainstorm, draw concept maps, share their readings, negotiate, and finally reach an agreed solution. The purposes of this workshop were to demonstrate how working in a group can solve a problem more effectively and how to implement cooperative learning in a classroom situation. Two weeks later, the student teachers joined a second workshop, on the use of cooperative learning in teaching. This second 3-hour workshop introduced a number of cooperative learning strategies and the student teachers had to engage in the learning activities. The workshop aimed to let the student teachers know the rationale behind those cooperative learning methods and how they could implement them in their classroom. Two well experienced teachers in cooperative learning, having used the method in primary and secondary schools, were invited to facilitate these two workshops. Each facilitator was responsible for facilitating one workshop. Each of the workshops was observed and all the cooperative learning activities were video-recorded and transcribed for analysis in terms of the group dynamics and students' attitude towards cooperative learning.

Individual interview. All of the participants were invited to an individual interview with the investigators. The interviews aimed to collect richer data about participants' attitude towards cooperative learning after the two intervention workshops. Semi-structured interviews were used and the basic interview questions were:

1. What do you think is cooperative learning?
2. What have you learned from the two cooperative learning workshops?
3. How do you feel about the cooperative learning processes in the two workshops?

Participants' perceptions of outcomes. The observation and interviews collected information on the views of the participants towards their experience of the intervention workshops. What were their perceptions of the effectiveness of the workshops in enhancing their knowledge, skills and attitude regarding cooperative learning?

Results

The results are presented according to the central concepts of the research questions: understanding of meaning (knowledge), learning acquired (skills), and feelings about the workshop.

Understanding of Cooperative Learning

When asked about the meaning of cooperative learning, many participants responded directly, in clear terms and without hesitation. The study identified three elements which made up most of the responses.

Element 1: Definition - A group of people interact with one another to fulfill learning goals.

Element 2: Process - Group members participate in sharing, discussing, integrating answers and compiling report for sharing with other groups.

Element 3: Outcomes - The group process enables members to learn about others' opinions, understand others' perspectives, complement each other and learn from each other.

Skills and Strategies Acquired from the Workshops

Participants had no difficulty reciting skills and strategies learned from the workshops. All of them provided a detailed account of their learning outcomes. The interviews identified four categories of outcomes.

Category 1: Cooperative learning strategies. Five strategies were named by the participants: think-pair-share (8); roundtable (4); three step interview (3); read and explain pairs (3); jigsaw (2). The number in brackets after each strategy indicates how frequently it was mentioned in the interviews.

Category 2: Group formation and building strategie*s*. In addition to the cooperative learning strategies, the participants also provided a detailed account of strategies associated with the successful implementation of cooperative learning. A typical example: group formation and building strategies which include methods to form groups, assign roles, foster team spirit and reward cooperative effort.

Category 3: Management strategies. Another strategy-type frequently referred to by the participants in the interviews fell into the category of management strategies. Specifically the participants referred to the use of start-stop signal and timer together with clear instructions.

Category 4: Teaching for understanding strategies. Besides learning about cooperative learning, many participants said they had also formulated a much better picture of how to facilitate students' comprehension of reading materials and acquisition of a deeper understanding in the related issues.

Feelings about the Intervention Workshops

The interview data revealed that most participants found their workshop experiences enjoyable and rewarding. Adjectives most frequently used by the participants to describe their feeling about the workshops were: *happy, interesting, enjoyable, engaging* and *comfortable*. All of these words indicated the participants' positive attitude towards the workshops. Some participants further highlighted, in the interviews, that they found cooperative learning effective in promoting students' learning and would like to have the instructional approach incorporated in their schools so as to transform boring lessons into lively ones as well as provide interesting experiences for the students. According to these participants, the current paradigm shift in instruction towards cooperative learning offered the right future direction.

While most of the participants expressed a favourable attitude towards the workshops, a few participants had reservations. One of them said the pace of the workshops was rather quick and personally would prefer a mode of learning which was less dynamic. Others worried about the problems arising in the implementation process; in particular, difficulties of accommodating individual differences, handling discipline problems and motivating students who are not interested in the group activities. We cross referenced these findings with the video recordings and observation notes. The video recordings showed scenes that were similar to what the participants had described in the interviews.

Discussion

The study set out to explore factors which may affect teachers' use of cooperative learning in teaching Liberal Studies. Two intervention workshops designed around the principles which we believed conducive to teachers' use of cooperative learning were implemented and evaluated. The findings from the interviews and the observations indicated that the workshops were highly successful in the following domains:

- Knowledge: The participants were able to identify the features which characterize cooperative learning.
- Skills: The participants were able to report the skills and strategies learned for the implementation of cooperative learning.
- Feelings: The participants were happy about the workshops and their feedback was highly positive.

Judged by the above findings, the workshops should have had a positive impact on the participants' feelings (attitudes) towards cooperative learning. However, when asked whether they had a change in their attitudes towards the use of cooperative learning in their own class, most of them had reservation in incorporating any of the strategies into their daily teaching. In other words, the participants felt positively about the two interventions, but did not have corresponding positive attitude towards cooperative learning in general. This suggested that their favourable experience in

the workshops as described in the interviews had little impact on their attitude towards cooperative learning. There just was not the transition or change. This went against our expectation that the workshops would have a positive impact on participants' attitudes towards cooperative learning.

This finding is disappointing at a first glance. However, a closer look does help us clarify some gaps in our conception of teacher development. It offers us a good chance to reflect and subsequently develop insights into approaches towards teacher development. The workshops were not by themselves sufficient to change teachers' personal attitudes towards cooperative learning (Pow & Yeung, 2007). Most participants maintained their previous perceptions of the cooperative learning method and the learning outcomes offered by the cooperative learning process. Data collected from the later part of the interviews also indicated that participants had reservations about the use of cooperative learning in their teaching.

Our findings support the view held by Coon (2006) that one's attitudes on an object or issue are related to three components namely, affective, cognitive and behavioural. Teachers' disposition to act (i.e. the behavioural component) is closely related to their belief (i.e. the cognitive component) about the values of cooperative learning and emotional responses (i.e. the affective component) to the use of cooperative learning. The workshops, though perceived adequate as sources of knowledge and skills as well as a pleasurable experience, were just the beginning of a journey. The workshops promoted the participants' interest in cooperative learning methods and served as a means to encourage some to try out the strategies in their class. A few participants reported that they experimented with the workshop methods in their classrooms with modest success. It was the first step in the process through which the participants internalized the values of cooperative learning. To continue with the journey and consolidate their learning, the participants have offered the following suggestions for us to consider.

- Promote the use of cooperative learning in their schools during teacher development day.
- Provide more exemplars in the methods course for observation and analysis.
- Share experiences of using cooperative learning during class and solicit feedback from instructor and peers.

To improve the study, there should be a practice period between the two intervention workshops for the student teachers to have supervised practice in using cooperative learning strategies in their classes. By doing so, the student teachers would have more experience and confidence to try out cooperative learning strategies, on their own, in their teaching. It is believed that the findings from the interview would then be more legitimate and convincing as the student teachers would base their comments on their experience of practice rather than on merely perception.

Conclusion

We believe that teachers need to have adequate knowledge and skills for implementing cooperative learning in daily teaching. We also understand that a positive attitude towards cooperative learning is important if we want to make it a widespread learning method in Liberal Studies. However in this study, despite the fact that the student teachers said that they saw the benefits of and had a positive view towards cooperative learning, they also indicated they had reservation in using cooperative learning as a teaching method; so it would seem that attitude is not a determinant factor. This message was clearly received when we finished all the interviews.

Teacher education institutes in Hong Kong have tried their best to introduce innovative teaching and learning methods and the student teachers did learn a number of them. The problem is, as shown in this study, that teachers may not have that many choices in pedagogy in an examination-driven education system. They would rather not take a risk and therefore use familiar direct instruction methods instead. Given the demands of the situation, i.e. an examination driven curriculum in a highly competitive system, it

would seem that, attitude towards and/or personal interest in some innovative teaching methods simply do not have an important role to play in altering the situation. It would appear that Slavin's (2004) condition for effective use of cooperative learning, that is, coordination of efforts in the learning tasks, which competition or individualization (Michaels, 1977) does not require, is not likely to come about soon in Hong Kong's very examination driven education system, so the didactic approach to teaching is here to stay. For change to occur in the teaching approach in any such education system it is necessary that there be a real change in assessment approaches, schools' mission and culture, and parents' expectations.

References

Cheung, P. C. & Lau, S. (1985). Self-esteem: its relationship to the family and school social environments among Chinese adolescents. *Youth and Society, 16*(4), 438-456.

Coon, D. (2006). *Psychology: A modular approach to mind and behaviours* (10th ed.). Belmont, CA: Wadsworth/Thomson Learning.

Cooper, J. & Mueck, R. (1992). Student involvement in learning: Cooperative learning and college instruction. In A. Goodsell, M. Maher, & V. Tinto (Eds.), *Collaborative learning: a sourcebook for higher education*. National Center on Postsecondary Teaching, Learning, and Assessment.

Cowie, H. & Berdondini, L. (2001). Children's reactions to cooperative group work: A strategy for enhancing peer relationships among bullies, victims, and bystanders. *Learning and Instruction, 11*, 517-530.

Curriculum Development Council. (2001). *Learning to learn*. Hong Kong: Author.

Curriculum Development Council and Hong Kong Examinations and Assessment Authority (2007). *Liberal studies: Curriculum and assessment guide (secondary 4-6)*. Hong Kong Special Administrative Region: Author.

Damon, W. (1984). Peer education: The untapped potential. *Journal of Applied Developmental Psychology, 5*(4), 331-343.

Foley, K. & O'Donnell, A. (2002). Cooperative learning and visual organizers: Effects on solving mole problems in high school chemistry. *Asia Pacific Journal of Education, 22*, 38-50.

Gillies, R. M. (2007). *Cooperative learning: Integrating theory and practice.* Thousand Oaks, CA: Sage.

Johnson, D. & Johnson, R. (1999). Making cooperative learning work. *Theory into Practice, 38*, 67-73.

Johnson, D., Johnson, R., & Stanne, M. (2000). *Cooperative learning methods: A meta- analysis*. Retrieved from http://www.co-operation.org/pages/cl-methods.html

Joyce, B., & Weil, M. (2000). *Models of teaching* (6th ed.). Boston, MA: Allyn & Bacon.

Kagan, S. (1999). *Cooperative learning resources for teachers*. San Juan Capistrano, CA: Resources for Teachers.

Kinchin, I. A. (2004). Investigating students' beliefs about preferred role as learners. *Educational Research, 46*, 301-312.

Krol, K., Veenman, S., & Voeten, M. (2002). Toward a more cooperative classroom: Observations of teachers' instructional behaviours. *Journal of Classroom Interaction, 37*, 37-46.

Llewellyn, J., Hancock, G., Kirst, M. & Roeloffs, K. (1982). *A perspective on education in Hong Kong: report by visiting panel.* Hong Kong: Hong Kong Government Printer.

McMaster, K & Fuchs, D. (2002). Effects of cooperative learning on the academic achievement of students with learning disabilities: An update on Tateyama-Sniezek's review. *Learning Disabilities Research and Practice, 17*, 107-117.

Mercer, N. (1996). The quality of talk in children's collaborative activity in the classroom. *Learning and Instruction, 6*, 359-377.

Michaels, J.W. (1977). Classroom reward structures and academic performance. *Reviews of Educational Research, 47*(1), 87-98.

Pell, T., Galton, M., Steward, S., Page, C. and Hargreaves, L. (2007). Promoting group work at key stage 3: Solving an attitudinal crisis among young adolescents? *Research Papers in Education, 22*(3), 309-332.

Pfaff, E. & Huddleston, P. (2003). Does it matter if I hate teamwork? What impacts student attitudes toward teamwork. *Journal of Marketing Education, 25,* 37-45.

Pow, J. & Yeung, S.W. (2007). A reflective-participative approach to professional development in teaching of liberal studies in schools. *Hong Kong Teachers' Centre Journal, 6,* 16-29.

Salili, F. (1996) Accepting personal responsibility for learning. In Watkins, D. A. & Biggs, J. B. (eds.), *The Chinese Learner: Cultural, Psychological and Contextual Influences*. Hong Kong: CERC & ACER.

Sahlberg, P. & Berry, J. (2002). One and one is sometimes three in small group mathematics learning. *Asia Pacific Journal of Education, 22,* 82-94.

Sapon-Shevin, M. (2004). Introduction. In E.G. Cohen, C. M. Brody & M. Sapon-Shevin (eds.). *Teaching cooperative learning: The challenge for teacher education*. Albany: State University of New York Press.

Slavin, R. (2004). When and why does cooperative learning increase performance? In H. Daniels & A. Edwards (eds.), *The Routledge Falmer reader in psychology in education*. London: RoutledgeFalmer.

Slavin, R. & Cooper, R. (1999). Improving intergroup relations: Lessons learned from cooperative programs. *Journal of Special Issues, 55,* 647-663.

Stevens, R. (2003). Student team reading and writing: A cooperative learning approach to middle school literacy instruction. *Educational Research and Evaluation, 9,* 137-160.

Stoll, L. (1992) Teacher growth in the effective school. In M. Fullan and A. Hargreaves (eds.), *Teacher Development and Educational Change*. New York: Routledge.

Tam, S.H.Y. (2001). The implementation of group work in Hong Kong: A case study. *Asia-Pacific Forum on Science Learning and Teaching, 2*(2), Article 5. Retrieved from http://www.ied.edu.hk/apfslt/v2_issue2/tamhy/index.htm

Thorley, L. & Gregory, R. (1994). Using group-based learning in higher education. *In* R. Gregory (ed.), *Teaching and learning in higher education series*. Herndon, VA: Stylus Publishing.

Webb, N. & Palincsar, A. (1996). Group processes in the classroom. In D. Berliner & R. Calfee (3rd ed.), *Handbook of educational psychology* (pp. 841-873). New York: Macmillan.

Woolfolk, A. (2008). *Educational psychology (*10th ed.*), Active learning edition*. Upper Saddle River, NJ: Pearson Ed.

Yan, L., Liddle, M. and Csete, J.M. (2000). Influence on the group work process of Chinese students: Lessons learnt from a skilled-based course in Hong Kong. *Journal of Psychology in Chinese Society, 1*(2), 65-91.

Zhang, Y.F. (2009). Task type and teacher's role: Two important factors in effective group learning. *Thinking Classroom, 6*(3), 36-41.

Jacky Pow received his Ph.D. from the University of Nottingham, UK. He has a research and professional interest in innovative pedagogies and enhancement of learning and teaching with technologies.
Correspondence: Department of Education Studies, Faculty of Social Sciences, Hong Kong Baptist University, Kowloon Tong, Hong Kong SAR, China.
Email: jackypow@hkbu.edu.hk

Louisa Yan received her Ph.D. from the Hong Kong Polytechnic University. Her research focuses on the contextual influences on students' approaches to learning and the implications for the design of curriculum, teaching and assessment.
Correspondence: Department of Education Studies, Faculty of Social Sciences, Hong Kong Baptist University, Kowloon Tong, Hong Kong SAR, China.
Email: louisa@hkbu.edu.hk

Metacognitive Development in Undergraduate and Graduate Students in Teacher Education and Business Administration

Louise Richards Moulding
Penée Wood Stewart
Susan Sunny Cooper

Metacognition is knowledge and regulation of one's thinking processes, an essential element of experts in a domain. Although there has been abundant research into the development of children's' metacognition, relatively little research has focused on the development of adult metacognition. Previous research found that metacognition improves significantly with age and with years of teaching experience in a sample of preservice and in-service educators. The current study examines differences in metacognitive knowledge and regulation of educators compared to other professions. Undergraduate and graduate students in two programs, business administration and teacher education, were surveyed using the Metacognitive Awareness Inventory to determine metacognition by age across disciplines. No significant correlation was found between age and metacognitive knowledge and regulation. A significant difference was found between graduate business and graduate education student mean scores in metacognitive regulation. No significant differences were found for metacognitive knowledge between any of the groups.

It has been over thirty years since Flavell (1976) defined metacognition as "knowledge concerning one's own cognitive processes and products or anything related to them" (p. 232). This focus by researchers on "thinking about thinking" has coincided with the overall shift in psychology from a behavioural to a cognitive examination of the learning process. Observable behaviour is easier to measure and define, thus the work on metacognition, which is not observable, has a certain "fuzzy" quality even after extensive research (McCormick, 2003).

Metacognition has a far-reaching impact on the lives of individuals. Metacognition is essential for many academic tasks such as reading comprehension and writing (Lesley, Watson & Elliot, 2007). It is also a critical component of successful communication, social cognition, attention, self-control, problem-solving, and personality development (Flavell, 1979). Metacognition is particularly important for educators who use these skills daily to reflect on their practice, adjust communication strategies to meet individual student needs and model metacognitive strategies for their students. Those who lack metacognitive awareness frequently struggle deciding a course of action or determining the most effective or efficient step to reach their goals (Martinez, 2010).

There is still much debate on exactly what are the key components of metacognition and which instruments best provide valid and reliable measurements (Alexander, 2008; McCormick, 2003). Eventually, most theorists separated metacognition into two subcategories, *knowledge* about cognition and *control* or *regulation* over cognition (Paris & Winograd, 1990). These subcategories are usually labelled metacognitive knowledge and metacognitive regulation (Brown, 1987; Neitfeld, Cao, & Osborne, 2005; Schraw & Dennison, 1994).

Metacognitive knowledge corresponds to what individuals know about their own thinking processes, knowledge about strategies and when and why to use them. One reason it is so critical for teachers to have metacognitive knowledge is so they are aware of the thinking processes and strategies for their content area. If they are fully aware of how they learn their content, they are better able to teach their students how to learn that same content. Individuals with high metacognitive knowledge avoid the expert blind spot when teaching others. Wiggins and McTighe (2005) articulate the importance of metacognition in their explanation of expert blind spot; "What is obvious to us [educators] is rarely obvious to a novice—and was once not obvious to us either, but we have forgotten our former views and struggles" (p. 138).

Metacognitive regulation corresponds to the skills individuals use to plan, implement strategies, self-monitor and evaluate their own learning (Schraw & Dennison, 1994). Metacognitive regulation is the foundation to reflective teaching practice. Teacher reflection on lessons combined with student assessment information helps teachers make constant recursive instructional improvements. Without metacognitive regulation teachers continue teaching in the same manner, without adjusting instruction based on self-evaluation or student outcomes.

Metacognitive thinking is characteristic of Piaget's formal operational thought. Most theorists believe that the development of metacognitive knowledge begins in early childhood and continues throughout adolescence (Schraw & Moshman, 1995). A tacit assumption in much of the research has been that metacognitive skills are fully developed by adulthood. For instance, Veenman and Spaans (2005) claim that the metacognitive skills of university students "have been developed and balanced out for several years" (p.162). It appears that there may be a particular need for research on metacognitive development of adults.

Much of the existing research on adult metacognition has focused on the specific metacognitive processes used by adults, not on the development of metacognition in adulthood due to age or specific experiences (Flavell, 1979; Kluwe, 1982; Narens, Graf & Nelson, 1996; Sternberg, 1990). However, more recently, two studies have looked at age and experience as they correlate to metacognitive knowledge and regulation. Stewart, Cooper & Moulding (2007) found that metacognitive regulation improves significantly with age and teaching experience when comparing undergraduate preservice teachers to graduate in-service teachers. Young and Fry (2008) found a significant difference between education graduates and undergraduates with regard to metacognitive regulation, but not metacognitive knowledge. These new studies suggest that experiences may make a contribution to further development of metacognition, even in adults.

Recently, *Educational Psychology Review* devoted a special issue to metacognition, self-regulation and self-regulated learning summarizing what is currently known about the topic and highlighting many areas that still need investigation (Alexander, 2008). These articles document the re-emerging interest in metacognition and the progress made in understanding it, but also illuminate the need for further clarifying research. Schunk (2008) recommends more developmental research be conducted. He states, "It is time that researchers engage in more detailed study of how changes in metacognition, self-regulation, and self-regulated learning affect educational outcomes" (p. 466). Our study asks the reverse question: How does educational experience affect changes in metacognition? This study examines whether there is a relationship between age, level of education (undergraduate and graduate) and program of study (business and education).

Methodology

The purpose of this study was to investigate whether adults' metacognitive knowledge and regulation vary across level of program and major. This research builds on previous work that suggests a relationship between metacognition and experience.

Participants

Undergraduate and graduate students from two programs (business administration and teacher education) at a northern Utah university participated in the study. Undergraduate students were either juniors or seniors (3rd or 4th year of university work), majoring in business administration or teacher education. Although data about undergraduate degrees of the graduate level students was not collected during the project, it is likely that graduate students hold undergraduate degrees in a variety of areas because the programs do not require that the bachelor's degree be in business or education for admission into the program. Participants were volunteers, completing the survey during a class session in each program. Table 1 displays the characteristics of the participants by program and program level. Of note are the gender differences in the two programs. The preponderance of males in the business administration program and females in teacher education made it unreasonable to conduct analysis by gender without the influence of program. Furthermore, previous studies

(Cooper, 2004; Justice & Dornan, 2001) found that metacognition was not related to gender.

Table 1
Participant Characteristics

	Gender		Age	
	Male	Female	Mean	Standard Deviation
Business				
Undergraduate	34	16	27.43	7.51
Graduate	62	11	31.03	6.41
Education				
Undergraduate	4	46	27.62	9.05
Graduate	15	38	34.28	8.22

Instrumentation

The survey used in this study was the Metacognitive Awareness Inventory (MAI) designed by Schraw and Dennison (1994). While most metacognitive instruments have been designed for use with children and adolescents, the MAI was designed for use with adults. This self-report instrument continues to be used in studies of adult metacognition (Sperling, Howard, Staley & DuBois, 2004; Young & Fry, 2008). The MAI instrument consists of 52 statements to which participants respond by marking a Likert scale. Average completion time is approximately ten minutes (Schraw & Dennison, 1994). The MAI statements represent two components of metacognition: metacognitive knowledge and metacognitive regulation. Within the knowledge component are statements of declarative knowledge (knowledge about self and strategies), procedural knowledge (knowledge about strategy use), and conditional knowledge (when and why to use strategies). The sum of responses yields the knowledge score. The regulation component covers planning (goal setting), information management (organizing), monitoring (assessment of learning and strategy), debugging (strategies to correct errors), and evaluation (analysis of performance and strategy effectiveness). The sum of these statements results in the regulation score. The total score is the sum of all items.

Procedures

The survey was administered by the researchers during class sessions in the two programs at both the undergraduate and graduate levels. Cooperation from the course instructors facilitated the administration and encouraged participation. All students were informed that the survey was voluntary and some chose not to participate.

For each respondent, three scores were generated. Scores for metacognitive knowledge, metacognitive regulation, and total MAI score were used in the data analysis. Data from the questionnaire were analyzed using group membership as the independent variable and the three MAI scores (knowledge, regulation, and total score) as dependent variables in a one-way analysis of variance (ANOVA). Alpha was set at 0.05 for all statistical tests.

Results

Descriptive Statistics for the Sample Groups

Table 2 presents the descriptive statistics for the undergraduate and graduate participants in the research study. Three scales are reported: MAI knowledge consisting of 17 items and MAI regulation with 35 items. In general, education students, both undergraduate and graduate, scored higher on metacognitive knowledge than the business students. Metacognitive regulation had scores that were more similar across groups, with the exception of graduate education students who scored much higher. This was similar to the results for the total score.

Table 2
Descriptive Statistics for MAI Scores (Knowledge, Regulation and Total) by Group

		Knowledge		Regulation		Total	
	n	Mean	SD	Mean	SD	Mean	SD
Business							
Undergraduate	50	65.48	6.60	127.48	14.87	192.96	20.01
Graduate	73	65.92	7.79	125.08	16.44	191.00	22.79
Education							
Undergraduate	50	66.48	7.66	125.50	20.04	191.98	25.84
Graduate	53	68.32	7.10	134.11	17.61	202.43	22.38

Metacognitive Awareness: Group Differences

The primary purpose of this research was to determine if a difference in metacognitive awareness existed between undergraduate and graduate students in two programs. The scores for metacognitive knowledge, metacognitive regulation, and total MAI score were compared to detect differences between the four groups. A one-way analysis of variance was performed with group membership as the independent variable and scores as dependent variables. Results indicated that there was no significant difference in scores for metacognitive knowledge. However, there was a significant difference in metacognitive regulation and total score (See Table 3). To isolate the differences, a Tamhane (T2) post hoc test was performed. This revealed that the significant difference in regulation and total score was between the graduate students in the two programs; education graduate student mean scores were significantly higher than business graduate student mean scores. No significant difference was found between undergraduate and graduate within programs, nor between undergraduates across programs.

Table 3
One-way Analysis of Variance for MAI Scores (Knowledge, Regulation, and Total)

	df	Sum of Squares	Mean Square	F
Knowledge				
Between Groups	3	252.47	84.16	1.56
Within Groups	222	12010.01	54.10	
Regulation				
Between Groups	3	2921.11	973.70	3.27*
Within Groups	222	66113.80	297.81	
Total Score				
Between Groups	3	4660.19	1553.40	2.98*
Within Groups	222	115805.92	521.65	

*$p<0.05$

Correlation of Age with MAI Scores

In previous studies (Cooper, 2004; Justice & Dornan, 2001) the issue of age as a correlate to metacognition has been raised. Given the wide age range of the participants in this study (19-61 years old), the correlation of age to metacognitive knowledge, regulation, and total score was completed using Pearson product-moment. In addition, age was correlated to the scores by subgroup. Table 4 displays that age was not significantly correlated with metacognitive knowledge, regulation, or the total score for any subgroup. A total sample correlation showed a statistically significant correlation; however, the coefficients were extremely small. This significant outcome was likely due to the much larger n-size of the total sample. To verify this, a random subsample of 53 was used and, indeed, no significant correlation was found.

Table 4
Correlation of Age with MAI Scores for Groups and Total Sample

	n	Mean	SD	Knowledge	Regulation	Total Score
Business						
Undergraduate	50	27.43	7.51	0.132	0.278	0.251
Graduate	73	31.03	6.41	0.062	0.213	0.174
Education						
Undergraduate	50	27.62	9.05	-0.068	0.091	0.050
Graduate	53	34.28	8.23	-0.052	0.203	0.143
Total Sample	226	30.25	8.14	0.048	0.219*	0.181*
Random Sub sample	53	30.43	9.22	0.076	0.202	0.174

* $p<0.05$

Discussion

The results of this study indicate that metacognitive knowledge is stable across ages, educational level, and program of study. This is consistent with previous studies that found no significant differences in metacognitive knowledge in different populations of adults (Schraw, 1994; Sperling et al. 2004; Young & Fry, 2008). This may suggest that metacognitive knowledge is fully developed by the end of adolescence.

Previous studies found differences in metacognitive regulation in undergraduate and graduate education students (Stewart et al., 2007;Young & Fry, 2008). However the results of this study did not find differences between undergraduate and graduate education students; nor were there differences between undergraduate and graduate business students. A statistically significant difference did occur between graduate students in education and business. There are several possible explanations for this result. The first is that graduate education students engage in reflection and have greater awareness of their metacognitive regulation. According to Sternberg (2001), experts are more skilled than novices at time allocation, strategy selection, prediction of task difficulty, and monitoring. All of these are sub-skills of metacognitive regulation. Ertmer and Newby (1996) argue that thoughtful reflection is a key element that separates the novice from the expert. The relatively low metacognitive regulation scores of the graduate business students may indicate that, while they are expert in content knowledge, they may not regularly practice thoughtful reflection in a manner that develops metacognitive regulation. Further research is needed to see if encouraging careful reflection will promote growth of metacognitive regulation.

A second possible explanation for the high scores of the graduate education students may be that they responded in a way they felt was "correct" or socially acceptable for educators. "When metacognition, self-regulation, and self-regulated learning are assessed with self-report measures—as they often are (Winters et al., 2008) people may be unrealistic in their self assessments of what they actually do" (Schunk, 2008, p. 466).

Age seems a plausible explanation for the results in which graduate students outscore undergraduate students. However the correlational analysis in this study did not support age as an explanation. These results suggest life experience alone is inadequate in developing metacognitive regulation. Other variables such as course work and program of study, in other words, type of academic engagement, may have a greater influence on regulation development.

Previous research has found that there was a difference in MAI scores of first year college students and sophomore/ junior education students (Sperling, et al., 2004).The pattern of scores among the sophomore/junior education students in Sperling et al.'s research for knowledge, regulation, and total score were very similar to those found in this study, with mean score differences <10%. These researchers suggested that future research needs to look at the development of metacognition in college students, in particular by examining the MAI scores of specific population samples, as was done in this study. However, the research results reported here examined students MAI scores in two

programs at two levels with results that were not conclusive concerning development of metacognition in adults. Future research will expand the sample to include more programs, both undergraduate and graduate. In addition to measuring metacognition, primary cognitive processes required in such programs will be documented.

Implications for Teacher Education

This research has implications for teacher education. Teacher educators should model effective use of metacognition with preservice teachers. Activities and strategies that make this process explicit should be regularly included in the curriculum. For example, a common task in teacher preparation programs is the development of lesson objectives from broad content standards. When a teacher reads content standards, he or she envisions that content from an expert perspective. One with highly developed metacognitive knowledge successfully uses task analysis to break down the standard into sequential, manageable learning objectives for daily instruction. Teacher educators should make this same process transparent in their own courses. 'Think aloud' by the teacher educator is a means to this transparency and demonstrates metacognition in action. Developing metacognitive skills during preservice teacher preparation may promote the use of metacognitive regulation earlier in teachers' careers.

There were limitations to this research that will guide future research endeavours. It is not known if the graduate students in each program are "novices" or "experts", an important distinction according to Ertmer and Newby (1996). To address this, future research should gather at least two additional points of data for each participant. First, information from graduate students about work experience in the field (i.e., business and education) and, second, the domain of the undergraduate degree of the graduate students could shed light on the extent of experience within the domain.

References

Alexander, P.A. (Eds.). (2008). Metacognition, self-regulation, and self-regulated learning: Historical roots and contemporary manifestations (Special issue). *Educational Psychology Review, 20* (4).

Brown, A. (1987). Metacognition, executive control, self-regulation, and other more mysterious mechanisms. In F. Weinert & R. Kluwe (Eds.), *Metacognition, motivation, and understanding* (pp. 65-116). Hillsdale, NJ: Erlbaum.

Cooper, S. S. (2004). *Metacognition in the adult learner.* Unpublished master's thesis, Weber State University, Ogden, Utah, USA.

Etmer, P.A. & Newby, T.J. (1996). The expert learner: Strategic, self-regulated, and reflective. *Instructional Science, 24,* 1-24.

Flavell, J.H. (1976). Metacognitive aspects of problem solving. In L. B. Resnick (Ed.), *The nature of intelligence* (pp.231-235). Hillsdale, NJ: Erlbaum.

Flavell, J.H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist, 34,* 906-911.

Justice, E. M. & Dornan, T.M. (2001). Metacognitive differences between traditional-age and nontraditional-age college students. *Adult Education Quarterly, 51,* 236-249.

Kluwe, R.H. (1982). Cognitive knowledge and executive control: Metacognition. In D.R. Griffin (Ed.), *Animal mind, human mind* (pp. 201-224). New York: Springer-Verlag.

Lesley, M., Watson, P. & Elliot S. (2007). "School" reading and multiple texts: Examining the metacognitive development of secondary-level preservice teachers. *Journal of Adolescent & Adult Literacy 51*(2), 150-162.

Martinez, M.A. (2010). *Learning and cognition: The design of the mind.* Upper Saddle River, NJ: Pearson Education.

McCormick, C.B. (2003). Metacognition and learning. In W.M. Reynolds & G.E. Miller (Eds.), *Handbook of Psychology, 7, Eductional Psychology* (pp. 79-102). Hoboken, NJ: John Wiley & Sons, Inc.

Narens, L., Graf, A. & and Nelson, T.O. (1996). Metacognitive aspects of implicit/explicit memory. In L.M. Reder (Ed.), *Implicit memory and metacognition* (pp. 137-170). Mahwah, NJ: Erlbaum.

Nietfeld, J.L., Cao, L., & Osborne, J. W. (2005). Metacognitive monitoring accuracy and student performance in the postsecondary classroom. *Journal of Experimental Education: Learning and Instruction, 74,* 7-28.

Paris, S.G., & Winograd, P. (1990). How metacognition can promote academic learning and instruction. In B. Jones & L. Idol (Eds.), *Dimensions of thinking and cognitive instruction* (pp. 15-51). Hillsdale, NJ: Erlbaum.

Schraw, G. (1994). The effect of knowledge on local and global monitoring. *Contemporary Educational Psychology, 19,* 143-154.

Schraw, G. & Dennison, R.S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology, 19*, 460-475.

Schraw, G. & Moshman, D. (1995). Metacognitive theories. *Educational Psychology Review, 7*(4), 351-371.

Schunk, D.H. (2008). Metacogniton, self-regulation, and self-regulated learning: Research recommendations. *Educational Psychology Review, 20* (4), 463-467.

Sperling, R.A., Howard, B.C., Staley, R. & DuBois, N. (2004). Metacognition and self-regulated learning constructs. *Educational Research and Evaluation, 10*(2), 117-139.

Sternberg, R.J. (1990). *Metaphors of mind: Conceptions of the nature of intelligence.* Cambridge: Cambridge University Press.

Sternberg, R. J. (2001). Metacogntion, abilities, and developing expertise: What makes an expert student? In H. Hartman (Ed.), *Metacogntion in learning and instruction: Theory, research and practice* (pp. 247-260). Norwell, MA: Kluwer.

Stewart, P.W., Cooper, S.S. & Moulding L. R.(2007). Metacognitive development in professional educators. *The Researcher, 21*(1), 32-40.

Veenman, M.V.J. & Spaans, M.A. (2005). Relation between intellectual and metacognitive skills: Age and task differences. *Learning and Individual Differences 15,* 159-176.

Wiggins, G. & McTighe, J. (2005). *Understanding by design* (2nd ed.). Upper Saddle River, N.J.: Pearson Education.

Winters, F.I., Greene, J.A. & Costich, C.M. (2008). Self-regualtion of learning within computer based learning environments: A critical analysis, *Educational Psychology Review, 20* (4), 429-444.

Young, A. & Fry, J.D. (2008). Metacognitive awareness and acadmic achievement in college students. *Journal of the Scholarship of Teaching and Learning, 8*(2), 1-10.

Louise Richards Moulding is assistant professor in teacher education at Weber State University. She teaches curriculum development, assessment, and research methodology. Her areas of interest include classroom assessment, educational measurement, and school accountability.
Correspondence: Weber State University, 1304 University Circle, Ogden, Utah,
USA 84408-1304
Email: lmoulding@weber.edu Fax: 801-626-7427

Penée Wood Stewart is associate professor in teacher education at Weber State University. She teaches educational psychology, curriculum and assessment and reading methods courses. Her areas of interest include brain research, visual imagery and struggling readers.
Correspondence: Penée W. Stewart, Weber State University, 1304 University Circle
Ogden, Utah, USA 84408-1304
Email: pstewart@weber.edu Fax: 801-626-7427

Susan Sunny Cooper is Director of Education at CenterPoint Massage & Shiatsu School in Minneapolis. She teaches pathology, Chinese medicine, and professional development courses. Her areas of interest include metacognition and issues of adult learners.
Correspondence: CenterPoint Massage & Shiatsu School, 1313 5th Street SE, Suite 336
Minneapolis, MN 55414
Email: education@centerpointmn.com

Travelling Together: Narrative Biographies from Israeli Professional Doctorate Students Informing our Teaching

Julia Ibbotson
Sandra Morgan
David Davies

Narrative biographical enquiry was used as a research tool for reflecting on and exploring a group of students' perceptions of the strengths and weaknesses of the learning and teaching strategies used in their professional doctoral programme, and their views of the impact the programme has had on their personal and professional lives, workplaces and communities. Data was gathered from participants in an international EdD programme, specifically the Israeli cohort who began their studies in January 2007. Findings of the study identified themes, major issues and emerging concerns which may be used to shape the programme, inform graduate teacher education curriculum, and identify concerns that resonate internationally with similar programs, and especially with the professional practice doctoral programme.

Research Context and Purpose of the Study

In this article, we explore issues of research using narrative biographies from students as a research tool, and we look at the ways in which the voices from narratives can inform and shape our teaching and programme. The focus and purpose of the research lie in considering the students' perceptions of the strengths and weaknesses of the learning and teaching strategies used in the doctor of education (EdD) professional programme of the researchers' university in England, and of the impact the programme has had on personal and professional lives, workplaces and communities. This study forms part of an ongoing research project which will later include a comparable UK cohort and recent graduates of the programme in both the UK and Israel.

The data for this study was gathered from students on the international EdD programme, specifically the Israeli cohort, who began their studies in January 2007. The research is located in the interpretative paradigm and uses qualitative methods of content analysis, using coding and categorisation, in order to gain insight into the students' perceptions of need and impact. Interviews, biographical "stories", focus groups and workplace observations were used to: (a) support the researchers' understanding of the participants' cultures, whether those cultures are Jewish, Muslim, Christian, Arab or Israeli within Israel, and (b) to encourage the reflective reconstruction of experience.

Narratives in Research. While we acknowledge the critical issues involved in narrative research and analysis (Hendry, 2007; Polkinghorn, 2007), we are convinced that there is rich data to be drawn from such an approach when our focus is to "hear" the voices within their cultural contexts. This reflects the growing interest in narrative biographical enquiry and the use of "voice" in UK research and elsewhere, for example, USA., Australia, Europe, Scandinavia. Narrative biographical research provides the theoretical underpinning of this study. The use of the narrative biography as a research tool is explored briefly in this section, as we reflect upon the issues of the philosophy and rationale of the approach.

As Cortazzi (1993) points out, there are different perspectives on narratives. Our perspective is that of educationalists needing to understand more about the learning culture of our doctoral students and about pivotal incidents that have shaped their experience and knowledge (Webster & Mertova, 2007). It is about exploring with them their transition points or "epiphanies" (Roberts, 2002) which have created major life themes for them and may have had transformational effects on their learning and on their career trajectories. The approach we have adopted attempts to encourage our students to make sense of their world and to construct meanings for themselves and others (Webster and Mertova, 2007). We believe that narrative research tools provide us with powerful insights into the experiences and reflective thinking of others, and enable understandings which are not

usually developed from other modes of enquiry (Ellis & Bochner, 2000; Trehar, 2009).

If we follow Bruner's (1990) claim that narrative deals with the vicissitudes or changing nature of intentions, and Maykur and Moorhouse's (1994) notion that intentions are central to understanding a participant in qualitative research, then we need to recognise that our students are learners on a journey with turning points and critical incidents which have formed those intentions. It is the narrative of itself, not only the facts within it, that helps us to understand the voice. We need to know "how (the participants) themselves see their situation, what their experience is like, what they believe and how they think" (Cortazzi, 1993, p. 5).

Methodology

We wanted to provide in-depth sources of rich data in order to collate thick narratives (Roberts, 2002; Wallace, 1993; Webster & Mertova, 2007; Trehar 2009). During the first phase of the study, all participants were invited to attend one of four focus groups which concentrated on the four main areas of interest initially identified by the research team:

- reasons for choosing to undertake the professional doctorate (EdD) award with the specific university;
- views on the value of the EdD award;
- strengths/weaknesses of areas in the programme;
- possible benefits of participation in the EdD and achieving the doctorate.

Fourteen participants chose to attend the focus groups, which were audio recorded and transcribed. The sample was checked for range to provide a broad cross-section of the diversities of the actual class: gender, ethnicity, religion, occupation and location. Where there were "gaps" we identified students to invite who might fulfil any missing criteria.

Following the focus groups, interested participants were asked to write a three to four page biography under six main headings, which included their history, their community, their reasons for undertaking the EdD, the nature of and rationale for their research topic, and the impact of the programme on professional and personal and community lives. Ten biographies were received, and were checked that they reflected the spread of the group within the criteria set. They were analysed manually using a coding and categorisation method of content analysis to identify recurrent themes; discourse analysis allowed us to explore the meanings reflected in the texts.

The research base was then moved from the UK to Israel. There in-depth, face-to-face semi-structured interviews were held with the participants in varied locations of their choosing in Israel; these included homes, workplaces and churches. We needed to take steps to understand our research participants and the journeys on which they are engaged. The interviews therefore embraced the data previously collected in the focus groups and biographies. The interviews were conducted by two researchers, already known to the participants, and audio recorded. They were transcribed in full and analysed manually in the same way as with the written biographies. They were all checked for accuracy with the participants. Data from focus groups, biographies and interviews was cross-referenced in order to maintain internal validity and to sustain the narrative.

Findings

Here, we report on the analysis of the findings from all the tools which comprise the narrative biographical research and we focus on our investigation of the four interconnected areas outlined above. We identified six emerging themes; these will inform our teaching:

Relevancy Motivating Choices of Programme

All the participants combine further study with working. The research analysis indicates that they have several purposes for undertaking further study:

Motivation to reach 'the top professionally'. An analysis of our findings indicates that these participants are driven by the desire to achieve a doctoral award as a means to be recognised professionally, although not necessarily in terms of specific promoted roles. Most had considered both the

PhD and EdD routes and choices of university*:* "I wanted to advance professionally and develop important academic skills" (Male, Arab Muslim: biography). One participant (a headteacher) was explicit about his goals and ambitions professionally:

> My school was the focus of my study. We can ask everybody here in the area, who was the leader of the school before I became the principal? My school is now going up up up up, and the parents know that. I have students not just from here but from everywhere; I have students from Cuba, I have students from towns… I have students from everywhere. Ok, I know what I've done is important, but more important for me is that I develop my skills. (Male, Arab Christian: interview)

The factors that led these participants to choose to study an EdD with the specific university include: joining an established university, studying in English in order to disseminate work more easily on an international basis, the chance to build up knowledge in the field, and flexibility.

Desire to gain recognition and status from their own communities. A number of the participants indicate that studying for a doctorate has already brought them increased status and opened up further opportunities for them. This was a common desire, but especially so among Arab Christians and Arab Muslims in the group, possibly because of the feelings of tension (alienation) for them as members of the Israeli state.

> It was to me about a challenge, because all my life I wanted to be a winner, to have something, to maybe to win a prize or something, you know, as a champion, and then winning you know as a performer, as a singer, as a dancer, only win with something….I'm hungry for something. (Female, Arab Christian: interview)

Desire to combine a degree with practical research into their own work by investigating a particular topic. Participants want to make a contribution to their chosen professional field both practically and academically. They stress their desire to research a particular topic of interest to them, which might be difficult elsewhere in academic contexts where the doctoral student is constrained by professorial interests. The teaching in the programme, at the heart of this study, is predicated on the notion of ownership of the advancement of professional knowledge and development which originates from individuals' concerns and priorities and which can bring about change in practice: "I wanted autonomy...to choose a field and topic…not have to fit in with a professor's own agenda, as you have to with a PhD here in Israel" (Male, Israeli Jew: interview).

Desire to bring about change. Many participants express a desire to improve and change the way they work. "I have some problems in my school and the work-based project is a wonderful chance to investigate these. I want to change things" (Male, Arab Muslim: focus group).

> Of course I believe in this state, in Israel, we must grow up together, we must work together, and we must live together. I chose this programme especially for the children, because the children will be our future, the future of this area, the future of this state, we must teach them for loving, for respect, and to work together. To build the bridge for the peace between the Arab and the Jewish; and the Christians, and the Muslims, and the Jews. (Male, Arab Christian, interview)

> The effect of the research has been to a change in my perception …today I am more aware of gender differences. My research influenced the choice of two female teachers. (Male, Arab Muslim: biography)

The last two identified areas above are those in which we, as tutors, can focus in our curriculum design and in the nature of the

support we provide for participants. This is about meeting the needs of the participants professionally as well as academically so that the work on the research and thesis on the EdD has a pragmatic outcome as well as an academic one (Major, 2002; Wellington & Sykes, 2006; Park, 2007).

The Search for Identity

This is an important, complex, recurring theme across all sources of data. Participants express issues of identity both as individuals and as a group.

On an individual basis, for example, one female participant expresses a paradox because her Northern European Jewish (Ashkenazy) identity is at one and the same time a powerful statement of her belonging to the Jewish people and also an affirmation of her distinctiveness and separateness within it. "Similarity and difference reflect each other across a shared boundary. At the boundary, we discover what we are and what we are not" (Jenkins, 2004, p. 79).

Other participants highlight the complexity of multiple identities. Many participants, living as they are in the socially and politically complex society of Israel (Rosental, 2005), are acutely aware of the disjunctions between the multiple identities involved in being, for example, a Christian Palestinian Arab, or an Arab Muslim living and working in the Jewish state of Israel. They have two 'mother' tongues, though Arabic is more central to their cultural sense of self than Hebrew. An example is that of one female participant who has had her cultural sensibilities partially shaped by her educational experiences in England. She speaks of identity confusion in affirming the cultural value of her upbringing, community and family. "I always felt different in Nazareth…as an Arab Christian I feel alienated" (as a Christian because the city is now majority Muslim, and as an Arab in Israel). She declared that her learning on the doctoral programme had been *"*a challenge*"* and had "changed (her) career path*"*.

The material and cultural 'holy land' is held to be sacred space by most of the participants - Jews, Arabs, Muslims, Christians - and as such is literally contested in war. This complexity seems to be particularly true of Christian Palestinian Arabs at the borders of Israel.

> It's complex actually as now we are considered Israeli Arabs so I am an Israeli Arab. My parents were born as Palestinians, now they are also Israelis also. We have lived in Nazareth for 400 or 500 years. My identity has changed and my perception of identity has changed through the years and now today I can talk about it and I am more aware of it. (Male, Arab Christian: interview)

A number of the groups' work-based projects are related to identity in a Jewish, Arab or Christian context in Israel, for example:

- Identity perception: the narrative and future orientation among Arab Muslim high school students.
- Why can't they read? - looking at links between mother tongue Arabic, Hebrew and English and identity.

"My concerns are the issues of reinforcing Muslim identity in our schools under Israeli Jewish systems" *(*Female, Arab Muslim: interview).These concerns have resonances across all three of the main religious, ethnic and social groupings. We, as tutors, need to focus these concerns in students' research projects.

Many participants appear to see a cohesive influence at work within the EdD programme, one that enhances their experience of study. Some participants describe an experience akin to Mezirow's (1991, 2000) "disorienting dilemmas" as catalysts for transformative learning for the self and their role within an Israeli identity. They seem to be developing an awareness, perhaps of what Giddens (1979, 1991) calls "reflexive self-identification". They are showing awareness that the categories of life in Israel are contentious and problematic (Rosental, 2005). Being Jewish in the context of the study group is one factor, but there are other external factors such as the need to work together as a multi-ethnic group. Jenkins (2004)) argues that identity is produced through discourse and that it is often the case that there are practical consequences of this, especially in the way people work

collectively (p.176). One participant explained that when he attended the first seminar he met people he would not normally meet, such as Muslims and Arabs. He recounts that he now feels differently about Arab people.

> I have been through an airport many times and seen Arab people taken out separately for questioning. But when this happened to members of 'my group' I felt completely differently about it. I thought these are my friends, why are they doing that with them? (Male, Israeli Jew: interview)

As individuals begin to interact on the programme and to associate with those with degrees of differences, they begin to see each other in new ways other than the stereotypical images to which they have been accustomed (Rosental, 2005). To some extent, the stereotypes begin to break down and this too is part of the educational transformation which the professional doctorate is enabling (Senge, 2006). We, as tutors, need to incorporate the means to these "transformational" events in the programme design and operation.

The Mode of Learning

Participants describe three ways in which their learning has been helped to move forward: support from the whole student group, the formation of 'learning communities' and tutor support for learning.

Support from the whole student group. Most of the participants say that they enjoy the team-work developed during the three seminars. This encouraged them and supported their learning. They found things in common, and having the groups changed around at intervals gave everyone a chance to meet different people. They enjoyed "*group learning with their peers"*.

> The group were all interested in studying, so it didn't matter about their backgrounds. There might be some resistance because he's a Jew or an Arab but when you create a group, you pass this barrier... for example, working (as a group) on the posters. (Male, Israeli Jew: interview)

The formation of "learning communities". Many of the participants have formed themselves into small 'learning communities', in many ways resonant of "communities of practice" (Lave & Wenger 1991; Wenger, 1998; Wenger, McDermott & Snyder, 2002). In most cases this constitutes two to five self-selecting people, often from diverse backgrounds, communicating regularly by telephone, e-mail or face-to-face, sharing ideas and materials. It is dedicated to study but has a social function as well. The groups help to:

- Keep members on track – they help each other to make sure assignments are delivered on time.
- Expose members to different perspectives and views. The group enables members to see other views as "the group are very different people from all over the country". Other perspectives also show what has been overlooked or seen only from one point of view. Members believe their own work has improved and is of better quality and more focused as a result of the group. "At the beginning it was more of a friendly, social occasion and then we found ourselves becoming a work group and sharing ideas; for example, we started to check out what research methods mean and what is appropriate" (Male, Israeli Jew: interview).
- Support members – The group also provides emotional support when "the going gets tough".

> This programme is a very British programme and there is a feeling that you are far, physically and mentally from the place. So this group creates closeness, speaking Hebrew, dealing with our local problems concerning a British programme. There is a restored community and a sense of being stronger than by ourselves. (Male, Israeli Jew: interview)

The key benefits, identified by participants in the research, of belonging to a learning community are: help each other; learn from each other as they have different backgrounds; share ideas; hear different opinions; give emotional support; help put people in touch with others who could help them; promote the circulation and exchange of information,

papers and articles; keep people on time; share expectations; motivate to keep going if you think you might drop out; and support in the contract-writing stage. "I think the papers I give in are academically better because of the group. The group becomes a mediator. You have to present something and, therefore, the group becomes a motivator" (Male, Israeli Jew: interview).

Tutor support for learning. All the participants expressed their appreciation of the tutors' approachability and interest in their topic and context, and their encouragement in terms of its efficacy as a model of change. "I very much appreciated tutor support for my difficult field in Israel: developing an appropriate curriculum for Arab Muslim schools" (Female, Arab Muslim: interview).

Participants also highlighted where changes could be made in the programme. These focused on improving the links between the seminars, cohesion of the processes, consistency of tutor engagement through the three seminars of the first year, and provision of supervisory tutors at the initial stage, so that they would feel supported from the early stages of their research, as in the PhD programme. These issues have been taken forward to the programme leader. The support ethos inherent in the programme design and delivery was clearly a significant issue for participants. This also has implications for the future development of the programme through re-validation and beyond.

The Value of Critical Thinking

All the participants reflect upon the impact that the EdD programme has had on their levels of thinking. They believe they have moved from a consideration of factual knowledge and descriptive accounts of their work, to a deeper level of thinking; for example, to a critical analysis of theory and its use to explain phenomena in professional practices. Analytical reflection is leading to a greater level of understanding of the complex relationship between theory and practice. Many participants feel they are "building and going forward with their thinking".

> I have changed my way of thinking a lot…. Doing my work-based project taught me that when I see a new book or new article I look at the criteria and this makes me concentrate on what I am reading with greater understanding… Now I think why this did happen, why did I succeed in this way of learning…? I compare my work to books and other peoples' research. I have changed a lot. (Female, Israeli Jew: interview)

Discussion with participants indicate that critical thinking marks a new way of thinking for many of our international students who come from cultures where education may be more concerned with building bodies of factual knowledge than independence of thought and originality. It is an area they have found transformational and valuable. As tutors we need to focus on the learning and teaching strategies we can develop in order to empower our students to think critically, creatively and independently.

The Internal Impact on Personal and Professional Development

All participants believe that there has been a personal impact on them and that they have changed in some way. They identify a number of experiences from their first year of the EdD programme. One participant describes how it has changed her whole way of life and her professional practice. She says "(I am) calm, relaxed and happy as I am working through the process of reading and writing my studies. I think there is a sense of achievement. I'm developing ideas and looking forward" (Female, Arab Christian: interview).

Initial analysis identified the three main benefits of EdD participation as:

(a) Exposure to new ways of thinking through: the diverse learning environment; hearing others talk about their research interests; meeting different opinions, for example, on methodologies; the development of critical thinking skills; self-learning; and exposure to new ideas and opinions. "I now have the ability to learn and to think differently and see things from different viewpoints and not accept everything as self-evident" (Female, Israeli Jew: biography).

(b) Strengthening professional expertise through: the personal challenge of the work-based project; exposure to others who come

from different fields but who broaden knowledge and provide tools; reading theory to enable them to be more critical of their professional work and so improve practice; and being a learner which makes them behave differently with children as learners. "I think the doctorate gives me authority and credence with my research in the community and I am taken seriously because of it. It also gives access for the research as the doctorate is seen as official" (Female, Arab Christian: interview).

(c) Enriching personal self-esteem through: pursuing a high-level qualification; combining both personal and professional development; improving confidence; and greater personal recognition by being a doctoral candidate. "In my personal life I have more courage" (Female, Arab Muslim: interview). "I have initiative: I am now publishing writing developed in the light of the research findings" (Male, Arab Muslim: biography).

These three major issues – exposure to new ways of thinking, strengthening professional expertise, and enriching self esteem - clearly illustrate, forms of Mezirow's (2000) "transformational learning", Roberts' (2002) "epiphanies", and Webster and Mertova's (2007) "pivotal incidents". They certainly have implications for the way we approach the enablement and empowerment of our students, and indicate the need for a focus on approaches to encourage reflexivity.

The External Impact on Workplaces and Communities

Many participants describe how their learning is impacting on the work environment. This includes both improvements to their own work through increased reflection on practice and also to the work of colleagues by involving them in their discussions:

> My principal encouraged me. I feel that what I am doing is real and I am now making a film. The teachers and principal are supporting me. The school now has a new stage for dancing which vibrates with the music for those young people who cannot hear. (Female, Israeli Jew: interview)

Most of the group's work-based projects are concerned directly with professional development, for example: designing effective health promotion programmes for professional and patient groups; how critical thinking can be developed in reactive and pro-active executive coaching. One participant encapsulates the thoughts expressed by many others: "I listen to my students and encourage them to adopt appropriate habits in their work: teamwork, critical thinking is important now; that's changed from before" (Male, Arab Muslim: biography).

Several work-based projects across the whole group are concerned with educational and student improvement, for example: holistic, whole-school improvement from the principal's perspective; strategic teaching-examining the effectiveness of a new pedagogic model; the contribution of after school clubs to the development of children at risk. As one student claims: "There are already big benefits for me and for the children. I see things differently now" (Female, Israeli Jew: interview).

Many participants highlight that they want to have an impact on their communities. This is particularly powerful in the accounts by Arab participants. One participant's work-based project is focused on improving community relationships: School friendships between Arabs and Jews. Other participants highlight the importance of community involvement and acceptance.

> I promise you that my research will be focused on the town of S----- and my community because the contribution of my results will be for the people of S---. (Male, Arab Muslim: focus group)

> I think an important part of the doctorate is supporting my community and making things better for them. I feel there is little support for them and without them I couldn't have got the same rewards for myself - personally and professionally. (Female, Arab Christian: interview)

Implications for Teacher Education

As teacher educators, we can see that there are implications here for our own learning about students' cultures and contexts, the constraints and the needs of communities and community development, in order that we may more effectively support and guide them in their quest to impact their workplace and community through their doctoral study and research. We can also see that there are implications for teacher education and programme development: Firstly, postgraduate study for educational practitioners needs to accommodate for students' differing workplace needs and contexts and to focus clearly on the individual needs of the institution and local context. Secondly, it is vital for an EdD programme to make it possible for learning communities to be established, either informally or formally, so that learners can support each other in what is often an isolating experience.

The Value of Narrative Research

Our findings indicate the value of listening to the voices of participants in the EdD programme. Narrative research enables participants to raise complex issues and questions that are important to them and their communities, for example, issues of identity, and to begin to explore their attitudes and perceptions of difficult areas in their lives. Participants described how they found it helpful to be guided to reflect on their experiences, to construct a version of their social world, and to indicate where their EdD experiences had caused them to question this construction. This narrative biographical methodology encourages a reflective approach which is valued by participants. It gives them time to think and to question their views and experiences, and to articulate these in a meaningful way for themselves. There are resonances here from Vygotsky's (1987) notion of language, not only *articulating* but *developing* thought. Participants' narratives gave the research a unique picture of the EdD and its students that can be used to illuminate the teaching and learning processes.

How Can These Voices Inform Our Teaching?

Firstly, our research indicates strongly the importance for teacher educators of understanding the complexities of students' contexts, for example, the socio-political context in which they are working as practitioners, and the effect that this can have on an individual's thinking about education. For many international students, and indeed some from the UK, the concept of higher level study is based on the frequent practice of assisting a professor in his/her research. There is little in such a model about the notion of autonomy of doctoral student learning, critical thinking, or pursuing their own concerns within their own practice. The basic supposition of much of the doctoral work in the UK, most especially of the professional doctorate with its assumptions of choice, independence of learning, critical thinking and relevancy to professional practice in the workplace, may be divergent from our respondents' academic and professional experience thus far. We need to acknowledge the needs of the students, and their individualities and identities in shaping the curriculum design.

Secondly, the implications of deep critical thinking as a focus for new thinking in teacher education, either academically or with professional application, is an exciting and indeed liberating experience for many of our students. In many cases, as reflected in the examples given above, it has enabled and empowered them to improve professional practice and to gain personal confidence to strengthen their practice and to innovate, especially in a culture where this is not historically embedded. Respondents demonstrated the power of transformative adult learning (Mezirow, 1991) to change their thinking on their own learning and professional practice. Our understanding of the importance of transformative critical and reflexive thinking and practice for our students has implications for the foregrounding we determine in the design of the teacher education curriculum and our support for students; for example, the activities we require them to engage in, such as critical annotated bibliography, discussion and debate, rationale for research questions and outcomes, and in individual critical reflection on practice and professional development.

Thirdly, the establishment and maintenance of learning communities is clearly an issue of importance to support our students within the

learning organisation (Senge, 2006). Not only is it a principle of an effective learning environment, but it also enables the sharing of ideas and critical justifications. Currently this is not a formal structure within our EdD programme but needs to be reviewed and considered in the light of the students' voice. However, a major issue in any consideration of a formalisation of such learning communities, in the form of required support groups within curriculum development, would be the question of whether such formalisation itself might militate against its effectiveness.

Finally and crucially, we need to explore in greater depth the way in which transformational learning takes place so that we can examine the implications for the structure of the EdD programme (and other teacher education programmes) and its impact on students' lives - intellectual, personal and professional.

References

Bruner, J. (1990). *Acts of Meaning.* Cambridge, Ma: Harvard Press.

Cortazzi, M. (1993). *Narrative Analysis.* London: Falmer.

Ellis, E. & Bochner, A.P. (2000). Autoethnography, personal narrative, reflexivity: researcher as subject. In N.K.Denzin & Y.S.Lincoln (Eds.), *Handbook of Qualitative Research*. London: SAGE.

Giddens, A. (1979). *Central problems in social theory: Action, structure and contradiction in social analysis.* London: Macmillan.

Giddens, A. (1991). *Modernity and self-identity: Self and society in the late modern age.* Cambridge UK: Polity Press.

Hendry, P.M. (2007) .The future of narrative. *Qualitative Enquiry, 13*(4), 487-498.

Jenkins, R. (2004). *Social Identity.* London: Routledge.

Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: CUP.

Major, D. (2002). A more holistic form of higher education: the real potential of work-based learning, *Journal of Widening Participation and Lifelong Learning, 4*(3). Staffordshire: Staffordshire University.

Maykur, P. & Morehouse, R. (1994). *Beginning qualitative research: a philosophical and practical guide*. London: Falmer.

Mezirow, J. (1991). *Transformative dimensions of adult learning.* Ca: Jossey-Bass.

Mezirow, J. (2000). *Learning as transformation: critical perspectives on a theory in progress*. Ca: Jossey-Bass.

Mills, C.W. (1970). *Sociological imagination.* London: Penguin.

Park, C. (2007). *Redefining the Doctorate.* York: HE Academy.

Polkinghorn, D.E. (2007). Validity issues in narrative research. *Qualitative Enquiry*, 13(4), 471-486.

Roberts, B. (2002). *Biographical research*. Milton Keynes: Open University Press.

Rosenthal, D. (2005). *The Israelis.* New York: Free Press.

Senge, P.M. (2006). *The fifth discipline: the art and practice of the learning organisation*. London: Random House.

Trehar, S. (Ed.). (2009). *Narrative research on learning: comparative and international perspectives*. Oxford: Symposium Books.

Vygotsky, L.S. (1987). *Thought and language* (2nd ed.). Cambridge, Mass: MIT Press.

Wallace, G. (1993). *Research issues: narratives and ethnography* .Derby: University of Derby.

Webster, L. & Mertova, P. (2007). *Using narrative enquiry as a research method*. London: Routledge.

Wellington, J. & Sikes, P. (2006). A doctorate in a tight compartment: why do students choose a professional doctorate and what impact does it have on their personal and professional lives? *Studies in Higher Education, 31* (6), 723-734.

Wenger, E. (1998). *Communities of practice*. Cambridge: CUP.

Wenger, E, McDermott, R and Snyder, W. (2002). *Cultivating communities of practice*. Boston: Harvard Business School Press.

Julia Ibbotson is a senior lecturer and Academic Development Manager in the School of Education at the University of Derby, Director of Studies for postgraduate students on MA and doctoral programmes, and an Associate of the International Centre for Guidance Studies. She is an active researcher, leading the EdD research team and two other current research projects on the impact of postgraduate professional development for serving teachers at the Masters level, and on gender management issues. She has published a number of articles and papers. She is a Fellow of the Higher Education Academy.
Correspondence: Dr. Julia Ibbotson, School of Education, University of Derby, Kedleston Road, Derby, DE22 1GB, England
Email: j.ibbotson@derby.ac.uk or juliaibbotson@btinternet.com

Sandra Morgan is a freelance research consultant and a visiting senior associate of the International Centre for Guidance Studies at the University of Derby. Her experience is varied and includes teaching, working in the careers service as practitioner and manager, and on a national basis, for government as a careers service inspector and contract manager. Her field of expertise is information, advice and guidance (IAG) policy and practice for young people and adults.
Correspondence: Dr Sandra Morgan, School of Education, University of Derby, Kedleston Road, Derby, DE22 1GB, England
Email: Asm66@greenbee.net

David Davies is an emeritus professor and former Dean of the School of Education at the University of Derby. He has also held posts as Dean of Faculty, and Deputy Principal at the University of Birmingham, Westhill College. He has taught at the Open University and the universities of Surrey and Cambridge. His interests include teacher education, work-related learning, access and widening participation, ethnographic research methods. His latest project is concerned with the educational development potential of the Loweswater Catchment in the Lake District, UK, in association with Lancaster University.
Correspondence: Professor David Davies**,** School of Education, University of Derby, Kedleston Road, Derby, DE22 1GB, England
Email: daviesclarke@btinternet.com

Teacher Complicity in Students' Academic Success: The Need for Critical Studies

Sally M. Hunter

An exploration of the concept of "whiteness" and how its hegemonic quality that pervades the USA and American schools and more particularly, Minnesota's schools also infects the teachers who are mostly white. The result is a disconnection between these 'white' teachers and the increasingly large number of non-white students in their classrooms. The suggestion is that white teachers need to become critically conscious of their whiteness and the associated privileges so they can be effective teachers to an increasingly diverse school population. There is a focus on Native American students.

All students do not fit the white dominant culture of the United States anymore. Today, the population growth of students of color, native indigenous students, Mexican immigrants, plus Hmong and Somali refugees in states like Minnesota is becoming the majority in the classrooms of the country. Students are categorized in racial/ethnic groups such as White, Black, Hispanic, Pacific Islanders, Asians and American Indians (Native or Indigenous). While the percentages of immigrant and refugee children plus Black and Native students in the schools are approximately 42.1% (National Center for Educational Statistics, 2004) and rising, the majority of teachers are white The latest U.S. government survey reports that 83.7% of all teachers in both public and private schools in the USA are white (National Center for Educational Statistics, 2003-04). This situation presents an incongruity and a challenge to the teaching profession.

Many white teachers entering the teacher education program in Minneapolis, MN find themselves unaware of their "whiteness" and what that means to their students of color (Tatum, 1999). The claim advanced in this article is that teachers who continue a "whiteness" philosophy and all that it means prevent students of color from learning. But through a critical study of society and schooling, teachers can and should learn ways to teach inclusively and help all their diverse students achieve academic success. Working together with their students, aware, critically conscious white teachers can overcome such obstacles to teaching and learning as racism, whiteness, and the hegemony nested in society. They can acknowledge and move beyond the results of a worldwide overarching history of colonialism that brought racism and whiteness into communities of color (Bonilla-Silva, 2006), thereby affecting many brown skinned people's learning, including Minnesota's native indigenous population. In this article the central concept of whiteness is discussed, followed by associated concepts of colonialism and hegemony and their impact on Native education. Then suggestions are offered and two examples provided that can point the way to helping white teachers overcome the obstacle of their whiteness when teaching diverse student populations. Finally some questions are raised and scholarly resources suggested for teacher educators who want their students to examine issues of whiteness so as to change the dominant curriculum and instructional approaches in schools.

Teacher Education Context

At a Midwest university in the United States a teacher educator saw the necessity of challenging white teacher candidates in her class to take a closer look at their whiteness connected to a hegemonic society and the school system. The preservice teachers took a course in human relations and multicultural education. The course includes the study of white privilege discussed by McIntosh (1989) and racial understanding of a term called "whiteness" (Warring, 2007). Studying both of these resources helped students to see how important it is to recognize their whiteness and see that students of color and Native students see them as members of the white group. The teacher educator presented contextual information with respect to issues of cultural history, racial history, inequities in the society and in schooling, and with particular reference to the experience of Native American students, past and present.

Throughout the educational and cultural history of our state and nation, teachers have

played a key role in the assimilating process of taking Native students away from their families and cultures to residential schools for education. The assimilation of Native students is part of the colonizing machinery that has had devastating effects on cultural ways of knowing and learning around the world. To better educate our preservice teachers, teacher educators need to help them think critically about what is necessary to prepare them to work with students of color in order to increase their academic achievement. When the preservice teachers learned how the hegemony nested in our society and schools is a form of brainwashing that keeps people behaving according to dominant (white) ways of what is acceptable and what is not, a teacher will take action. When teachers see how our society manipulates us and we all lose many freedoms which allow for diversity and new ways of learning and understanding, they will not be pleased and instead be motivated to change in order to reach all their students.

A first step is to develop trust; but if white teachers do not understand that their diverse students see them as members of the white (privileged) group, they would not see the need to have their students learn to trust them. Teachers must first identify and name their whiteness so they can make the sensitive changes to their relationships and the curriculum that invite Native students and students of color to learn along with others in the classroom.

Whiteness

Warring (2007) says, "The form of racism that has been institutionalized globally through European imperial colonization is called 'whiteness'. It is a system of advantage that privileges those who become identified as white while dis-privileging those who are non-white" (p. 194). If teachers hold a belief in whiteness, they prevent their students of color from learning. Students recognize teachers who think poorly of them and students are not willing to work for someone who dislikes them because that causes them to lose self-esteem (Tatum, 1999). McLaren (1997) wrote:

> Many white students reportedly still believe the United States is an egalitarian, color-blind society and thus refuse to define themselves as oppressors or recipients of white privileges . . . Not only do white students deny US racial history but they believe that their skin color provides them with no benefits. (p. 262)

Many white preservice teachers assume that their students will accept them as non-racial individuals and be color blind to their whiteness. This is not so. Whiteness is a powerful attitude/disposition claiming whites have superiority over people of color. It is pervasive everywhere, including in academia (Gallagher, 1994). Tatum (1999) and McIntosh (1989) both address white privilege and recognize the blindness of many whites from the dominant culture in viewing their whiteness. This lack of awareness is common and considered one aspect of racial white privilege, which is the privilege to not see themselves as white. If white teachers are to build strong relationships with their students of color, they must first recognize that they, as white teachers, are suspects to Native families and people of color. Both groups – color and Native - see teachers as members of the white group and may believe they possess all the negative characteristics of whiteness. McLaren (1997) says:

> Historically, the practice of whiteness has brought about such a devastating denial, disassembly, and destruction of other races, one would think that such a choice against whiteness would be morally self-evident. However, precisely because whiteness is so pervasive, it remains difficult to identify, to challenge and to separate from our daily lives. My message is that we must create a new public sphere where the practice of whiteness is not only identified and analyzed but also contested and destroyed…for choosing against whiteness is the hope and promise of the future. (p. 238)

Colonialism

Whiteness is embedded in colonialism and vice versa, and these are all mixed up with racism in a racialized society. In our country, Black people have long ago been feeling similar oppression as Native people from their relentless experience of racism. The long and sometimes bitter struggle of the Civil Rights

movement continues in obvious and subtle ways in the USA (Brown, 2002; Guinier & Torres, 2002) and in other parts of the world. New immigrants and refugees of color will begin to feel a similar oppression as they gradually learn the story of institutional racism in the United States (Lee, 2005). The colonial oppression of people of color around the world left a residue on whites and this residue continues into the present era (Nyamnjoh, 2006). That residue means white skin has ties to whiteness in the eyes of many minority and indigenous people. Without Natives' strong beliefs and worldview, the whiteness in public schools can be devastating for Native children. It is nearly impossible to understand who you are if you are brown but do not know your culture (Tatum, 1999). Assimilation began in earnest with the missionaries during colonial times and white attitudes about people of color that bred a lowered esteem in the colonized people around the world led to the reduction of cultural education.

Grande (2004) discusses the need of Native peoples to look upon their own people, their own communities to recognize their value of knowledge and ways of knowing that have been around before the current mainstream concept of education developed. In a few modern Native-run schools today, Native ways of thinking dominate the curriculum denying the colonialist teaching. However, most Native students continue to be subjected to the ideological hegemony of colonialism and whiteness in our capitalistic society and schools.

Hegemony and Dominant Society

Ideological hegemony operates throughout most of our institutional systems. Apple (1996) defines hegemony when he says,

> Hegemony describes a condition whereby dominance is accomplished as a matter of consent and shared social institutions and practices among the oppressed, rather than exclusively through the exercise of forcible coercion. . . . The concept of hegemony refers to a process in which dominant groups in society come together to form a bloc and sustain leadership over subordinate groups. One of the most important elements that such an idea implies is that a power bloc does not have to rely on coercion (Although at times it does). (p. 14-15)

This dominance affects education because education's main function is to maintain support for the dominant socio-economic system in the United States. The students, who are independent of this dominance in society, need strong relationships with all of their teachers, including the majority white teachers, who can help them wade through the bureaucracy of a hegemonic education system. But given the unbalanced statistical relationship of non-white students and white teachers, a dependency on the white teacher for guidance through the system is unavoidable.

Apple (Ibid) decries the power of hegemony in society's educational systems:

> The 'panic' over falling test scores, dropouts, and illiteracy; the fear of violence in the schools; . . . dominant groups within politics and the economy who have been able to shift the debate on education (and all things social) onto their own terrain—the terrain of traditionalism, standardization, productivity, marketization, and industrial needs. (p. 6)

Tatum (1999) explains the difficulties for youth of color in American schools with white culture and white teachers. As adolescents they begin to search for their own cultural identity and turn away from what they associate as white in the schools and consequently their academic performance declines. This occurs with so many of the children of color in American schools.

To counter educational hegemony, Lomawaima and McCarty (2006) suggest diverse schools be available for all students, such as a school based on Native thinking, Native language and Native art. They believe that Native people's experience could provide lessons from which all citizens can learn. There is urgency to making our schools more equitable and our education less hegemonic. Generations of children depend upon their

teachers for success, but too many are failing; teachers know that students of color and Native students are not learning at the same rate as white students. Graves & Ebbott (2006) recount data on Indian students' test performance that show that, "Indian students score lower than non-Indian students in all tests at all grade levels, according to numerous research reports" (p.175). Educators have heard and seen the statistics of the disparities and inequities of test scores, graduation rates and other signs of inequity. Although teachers are working very hard, the American school system has not changed and it consequently continues to support such inequities. A disconnection happens when students do not have the same perceptions of their teachers that their teachers believe they do, and this affects their learning. White teachers may see themselves as neutral individuals while students see white teachers as a part of the white dominant group. Perhaps it is time to take another look at teachers' perceptions of themselves.

Impact on Native Peoples' Education

The federal government policy for Native peoples in the USA. fluctuates between assimilation of Native peoples into the dominant culture and self-determination to allow Indian people the opportunities to make some decisions over their education. As domestic sovereign nations within the U.S. borders, established by treaty law in the U.S. Constitution, Native peoples continue to struggle for survival. Colonization by Europeans plus the mistreatment by the U.S. government resulted in Native people seeing whites as the oppressor. White teachers are viewed with suspicion when meeting with Native students and their parents. They are suspect of being another educational oppressor because Native peoples have experienced both coercive and non-coercive ideological hegemony through their forced boarding school experiences (Adams, 1995) and their public school experiences where white teachers teach them the dominant curriculum.

They were forced into boarding schools that denied them their language, religion, and culture and later in the twentieth century relegated them to public education without Native managed schools or Native educators available. Because of government policies such as removal and relocation, Native students are increasingly found in urban settings and in public schools. In Minnesota, there are more Native peoples living in the twin cities (Minneapolis and St. Paul) than on all the eleven reservations in the state. They are mostly in the public schools being taught by white teachers. Fuchs & Havighurst (1973) said,

> With only minor exceptions the history of Indian education has been primarily the transmission of white American education, little altered, to the Indian child as a one-way process. The institution of the school is one that was imposed and controlled by non-Indian society…its goals primarily aimed at removing the child from his aboriginal culture and assimilating him into the dominant white culture. (p. 371)

Jaimes (1992) reports how generations of Native peoples were educated to the colonial status quo and information was pounded into Native children until they were seriously confused about who they were, who their friends were, and how the world really works. When this happens, the students, confused about their identity, are in serious danger of failure in the dominant culture schools. The colonial experience left Native Peoples in poverty (Payne, 2005) and struggling to remain true to their language and culture. The government imposed boarding school experience for Native children remains in the collective memories of the grandparents and the parents in various degrees. The people who have been oppressed in their cultures and in their education carry the knowledge of a past they have lived or in which they did not live. That knowledge which comes down through the generations has profound individual and social consequences for how the people live, how they learn, and how they view the world. In the schools, a general mistrust of the prevailing white culture continues because of past and present injustice. Because white teachers in public schools teach Native students but do not know Native cultures, there has been a continual disintegration of their cultures from colonial times into modern times.

There are major differences between the dominant society's culture and Native culture. The two groups have different worldviews. Grande (2004) says there are five deep structures to colonialist thinking which appear to be in total opposition to Native ways of thinking. They are:

1. Belief in progress as change and change as progress;
2. Belief in the effective separateness of faith and reason;
3. Belief in the essential quality of the universe and of reality as impersonal, secular, material, mechanistic and relativistic;
4. Subscription to ontological individualism- where the self is the basic social unit; and
5. Belief in human beings as separate from and superior to the rest of nature. (p. 69)

These beliefs and concomitant values are taught in America's schools; they undergird and permeate the explicit and implicit curriculum.

For each of these five dominant culture beliefs there are corresponding Native beliefs, values and perspectives (Nerburn & Mengelkoc, 1991) that differ; but they are not taught in the schools.

1. While the dominant culture upholds change and progress, Native people believe they were created to take care of Mother Earth. It is a spiritual obligation to use the benefits of the earth and then give back so that life can continue as it was.
2. The separation of faith and reason, which is so valued in the United States, is not valued in Native culture. Native culture always includes the Creator and gives continual thanks for the blessings of nature and all life. Each tribe has its own name for the Creator and the belief systems permeate the culture.
3. The dominant culture believes that reality can be impersonal, secular, material, mechanized and relativistic which means knowledge is dependent on the capacity of the mind. Native belief says all of creation is spiritual including the plants and animals and looks to dreams and visions as a way to communicate with spirituality.
4. The dominant society believes in individualism and the self as the basic unit of society while Native people are much more community centered. The self is unimportant. What you can do for others is your duty in life. The family, the clan, the band, or the tribe has preference over the individual. The skills of the individual are valued and the rights to private ownership are honoured, but the emphasis is on working for the good of all. To be proud of yourself without giving the community and your spirituality credit for your success is not acceptable.
5. The dominant culture believes human beings are separate and superior to the rest of nature. Natives say the Creator made humans last and we are dependent on our relatives found in nature. We cannot survive without the earth, wind, water, and fire. We cannot survive without the plants and animals. Natives see all of nature as our relatives to whom we owe gratitude for our life.

The two belief systems or worldviews are the opposite of each other. It follows that today, Native people continue to experience a disconnection in thinking from their teachers and the curriculum in the public schools where the dominant culture's belief system prevails. Yet, through critical studies, white teachers can learn and value Native concepts and ways of thinking, and they can learn to teach the mandated curriculum within the frame of the Native belief system presented above.

Two Examples of Learning Situations with Positive Outcomes

In this section, two different situations are described that show positive results from white teachers looking critically at themselves and coming to understand their whiteness. One situation provides comments by neophytes - white preservice teachers - who have just been introduced to their whiteness. Another situation provides answers to questions related to whiteness from a career teacher, a successful white male teacher working in Native schools.

Case 1: White Preservice Teachers

The preservice teachers, who are suburban graduate students, first discovered their whiteness in a semester course, Human Relations and Multicultural Education. They were encouraged to think of themselves as

white and members of the white group because students of color see them in those terms. In order to reach the diverse populations in the schools, they need to know what this means to people of color so they can teach critically and invite students to trust them and form relationships of trust. Following this introduction and some selected reading and faculty facilitated discussion, some students began the process of seeing themselves as white.

> When Tatum talks about non-learners, I'm stuck. When we are not respecting our students and everything they are and have to offer; they are not learning from us. (Student-S1)

> I really hate to think that my accomplishments in life are because I am benefiting from being white. The thought of being privileged because of my skin color has not been something I have thought out much. I did think that if you work hard enough, you could succeed. Then I look at single mothers who work two jobs just to put food on the table so I see that meritocracy is not so accurate. (S2)

> Boy, did Peggy McIntosh prove my thoughts wrong. I am inspired by this woman, who asserts that, "The point of my work is not to make other (white) people feel blamed or guilty for benefiting from inherited systemic over-advantage" but rather to help people with power recognize that they have power and examine how they can use their "unearned power" to weaken systems of unearned privilege. After reading this article, I will look at many aspects of my life that I have taken for granted in a new light. I will listen and learn from people that I have before now always overlooked. (S3)

From these excerpts it is noted that this group of preservice teachers were just beginning to grapple with the fact that they are white and what that means to them by way of privileges and advantages that they have in our American racialized society. They also began to learn in critical ways about the continuation of racism in the United States.

Case 2: A Successful White Male Working in Native Schools

An extensive interview was conducted with a white male teacher who has successfully taught in Native schools in Minneapolis throughout his teaching career. Parts of the interview are reproduced here to show that he thoroughly recognizes his whiteness.

How were you accepted in the Indian school where you worked?

> The director of the school, a member of the American Indian Movement, gave a speech that was anti-white but challenged all the non-Indians about our historical role as whites and the racist attitudes that continue for generations. It was a teachable moment for the non-Indians and it challenged our views.

What have you done to insure that acceptance?

> I realized I had something to offer them (science education) and I was also interested in learning from the students. The reciprocity in the relationship was very good for me.

Is it difficult to be white when working with (Natives)?

> I definitely see the barriers of being white. In the Native community, I do not want to be perceived as a "wanna be" which is a white person trying to be a Native person. This is very much looked down upon in the community.

Are you judged by the color of your skin?

> I stay on the outside. I do not force myself to be included. I do ask to go to the sweat lodge but don't go uninvited. If I am included, I'll participate when there is an expectation for my participation. But, I know I can help others and I am able to create good relationships. I do not adhere to their beliefs but I can accept other worldviews…I participate in cultural activities but abstain from ceremonial practices.

Have you faced any difficulties in your community over working in an Indian program?

> The white population does not understand the Native community or even know about it. Our U.S. educational system doesn't inform us. For example, I helped the Native students make a documentary film about the relocation of Natives to the cities. The government policy, called Relocation, tore the people away from the land and caused a great loss of culture. The youth are learning about this history and understanding how it affects them. Now they can address these issues in themselves.

Do you feel you stand out and do not fit in?

> I never experience a negative with these students. It took ten years for some Native leaders to know who I was. As a white educated male, it was a humbling experience. It was a part of my refinement in being accepted.

What suggestions do you have for others like you looking to work in (Native) schools?

> Understand that kids do not want to be coddled. By coddling, I mean the "save the poor Indian" mentality. It's the attitude of some white people who want to storm into the agency or school and "save these poor Natives". Recognize that what you see might not be uncooperative behaviour but a sign of basic needs not being met. For many young urban Natives, the opportunity to be in your classroom is the safest place to be. Learn about the students and where they are coming from. Become involved with the family. There is a happiness you derive from doing good work and doing quality work. Working with Native people allows me to be both human and kind.

The teacher interviewed for this report has worked in Native schools and Native programs for at least 20 years and is very respected by the Native community.

Some Conclusions

There is hope that more and more white teachers will come to understand their whiteness with all of its privileges and that a critical study of this phenomenon in the society will help them to become successful teachers of diverse students. Much more is needed to help white preservice teachers become culturally responsive teachers (Banks, 2006; Boyer, 1995; Jenkins, 2004). There is more to know than learning the cultures and the perspectives of the students that comprise the classroom. Students who have little trust in their abilities to succeed in white dominated schools need dedicated, critical thinking teachers. They need a teacher who is trained to see into and through the nested hegemony of society and its institutions including schools.

The students need teachers who can change curriculum, form relationships, and find success in reaching Native students, students of color, and all students. When preservice teachers, who are motivated to help all students learn, study how the hegemony nested in our society and schools is a form of brainwashing that keeps people behaving according to dominant (white) ways of culture, (the status quo) their teaching will change. When teachers see how our society is manipulating us and we all lose freedoms which allow diverse ways of thinking, learning and understanding, they will be motivated to change how they select the curriculum and deliver it to respect and honor the diversity in their classrooms. All students will benefit from such critical-thinking, creative teachers.

When a disconnection exists between the perceptions of Native students or students of color and white teachers, teachers can turn that around, if and when they accept their relationship to the hegemony of the society and become determined to teach critically. They will give new meaning to the curriculum for students; they will help them understand the real world outside of the classroom. Only in this way can a trusting relationship develop between white teachers and all their students, which will allow for differing "teaching moments" and success in learning.

But for the teachers to become critically conscious and creatively active teachers, teacher educators must continually engage with some key questions and then teach the

preservice teacher to do likewise.

- Does the Black student, an immigrant student of color or a Native student see me as neutral or belonging to a white group?
- How do I see and understand my "whiteness"?
- What are the best ways critical thinking teachers can help their students to become critical thinkers?
- How can a white person with privileges use that bestowed power to unravel oppression and injustice? Many teacher education programs have a course, perhaps for a semester, in Human Relations and Multicultural Education or Diversity or something similar, intended to prepare teachers for their diverse classrooms. The discussions in those classes should move beyond the level of knowledge for awareness to a critique of the system and freeing themselves and their students from the binding ropes of the system.
- Does the teacher educator present this course traditionally as a description of what is or within the framework of critical cultural analysis that is promoted by such thinkers and researchers as Boyer (1995), Locke & Lindley (2007), McIntosh (1989), Payne (2005), Sleeter and McLaren (1995), Transken (2005)?
- Do teacher educators, who are teaching in courses other than diversity courses, introduce their students to materials written from worldviews that differ from the dominant white, racial, colonial paradigm?

References

Adams, D. W. (1995). *Education for extinction: American Indians and the boarding school experience*. Lawrence, KS: University Press of Kansas.

Banks, J. A. (2006). *Cultural diversity and education: Foundations, curriculum and teaching*. Boston: Pearson.

Boyer, J. B. (1995). *Culturally responsive instruction*. Paper presented at Washington Library World Pullman, WA.

Bonilla-Silva, E. (2006). *Racism without racists: Color-blind racism and the persistence of racial inequality in the United States*. Lanham, MD: Rowman & Littlefield.

Brown, C. S. (2002). *Refusing racism: White allies and the struggle for civil rights*. New York: Teachers College.

Fuchs, E., & Havighurst, R. J. (1973). *To live on this Earth: American Indian education.* Garden City, NY: Anchor Books.

Gallagher, C. A. (1994). White construction and the university. *Socialist Review, 1*/2, 165-187.

Grande, S. (2004). *Red pedagogy: Native American social and political thought*. Lanham, ML: Rowman & Littlefield.

Grant, C. A., (2009). *Teach! Change! Empower!: Solutions for closing achievement gaps.*Thousand Oaks, CA: Corwin.

Grant, C.A. & Sleeter, C.E. (2007). *Doing multicultural education for achievement and equity.* New York, N.Y: Taylor & Francis Group, LLC.

Graves, K. D., & Ebbott, E. (2006). *Indians in Minnesota.* Minneapolis, MN: University of Minnesota.

Guinier, L., & Torres, G. (2002). T*he miner's canary: Enlisting race, resisting power, transforming democracy*. Cambridge, MA: Harvard University.

Jaimes, M. A. (1992). *The State of Native America.* Boston, Mass.: South End Press

Jenkins, O. B. (2004). *Culture and experience*. Retrieved from http:// orvillejenkins.com/worldview/worldexperience.html

Lee, S. J. (2005). *Up against whiteness: Race, school and immigrant youth.* New York: Teachers College.

Locke, S. & Lindley, L. (2007). Rethinking Social Studies for a Critical Democraacy in American Indian/Alaska Natiave Education. *Journal of American Indian Education, 46* (1), 1-19.

Lomawaima, K. T., & McCarty, T. L. (2006). *To remain an Indian: Lessons in democracy from a century of Native American education*. New York: Teachers College.

McLaren, P. (1997). *Revolutionary multiculturalism: Pedagogies of dissent for the new millennium*. Boulder, CO: Westview.

McIntosh, P. (1989, July/August). White privilege: Unpacking the invisible knapsack. *Peace and Freedom*, 10-12.

National Center for Educational Statistics. (n.d.). 2003-04 Schools and Staff Survey. Retrieved from http://nces.ed.gov/surveys/sass/tables/sass_2004_18.asp.

National Center for Educational Statistics. (n.d.). 2004 Status and Trends in the education of racial and ethnic minorities. Retrieved from http://nces.ed.gov/pubs2007/ minoritytrends/tables/table_7_3.asp.

Nerburn, K., & Mengelkoch, L. (Eds.). (1991). *Native American wisdom*. San Rafael, CA: New York State University.

Ovando, C. J., & McLaren, P. (2000). *The politics of multiculturalism and bilingual education: Students and teachers caught in the cross fire*. Boston: McGraw-Hill.

Payne, R. K. (2005). *A framework for understanding poverty*. Highlands, TX: aha! Process, Inc.

Sleeter, C. E., & McLaren, P. L. (Eds.). (1995). *Multicultural education, critical pedagogy, and the politics of difference.* Albany: State University of New York.

Tatum, B. (1999). *Why are all the black kids sitting together in the cafeteria?* New York: Basic Books.

Transken, S. (2005). Meaning making & methodological explorations: Bringing knowledge from British Columbia's First Nations women poets into social work courses. *Critical Studies Critical Methodologies*, *5*, 3-29.

Warring, D.F. (2007). *Understanding and applying human relations and multicultural education: Teaching-learning in a global society*. Scottsdale, AR: Leadership, Inc.

Sally Hunter is an Anishinabe (Ojibwe) from Minnesota's White Earth reservation. She is an associate professor at University of St. Thomas teaching human relations and multicultural education.
Correspondence: Dr. S. M. Hunter, Teacher Education, University of St. Thomas, MOH 217, 1000 LaSalle Avenue, Minneapolis, MN 55403
Email: smhunter@stthomas.edu

Partners in Teacher Professional Development: Science Associations, Industry, School Districts and Universities Working Together for National Impact

Ann Benbow
and
Colin Mably

There is a pressing need for humans to understand how the Earth works and what their role is as part of the Earth system. The recent earthquakes in Chile and Haiti, the December 2004 tsunami in the Indian Ocean and many other such events have brought this home dramatically and tragically. Knowledge about the Earth is also essential for everyday personal and voting decisions. People all over the world need to make scientifically informed choices about energy and water use, places to live, waste disposal, forms of transportation, and much more. By 2025, eight billion people will depend upon the Earth's resources and systems. However, with our current use of the Earth's resources, quality of life expectations are unsustainable. Without an effective understanding of how the Earth works, people cannot make the scientifically informed personal and voting decisions that affect Earth's systems.

In the USA however, many elementary and some middle school teachers have insufficient preparation to teach Earth science, as they are often only required to have one three-credit non-laboratory science class in their preservice programs. Preservice education for many of these teachers emphasizes reading, language arts and mathematics over science, as these subjects make up the bulk of standardized test items for their students. To address this lack of preparation in the Earth sciences, in 2007, the American Geological Institute (AGI), a scientific and educational society representing over 120,000 geoscientists, developed a model for a national teacher professional development program that was a partnership between themselves, industry scientists, school districts and universities.

Providing grades K-12 teacher professional development in the Earth sciences is part of AGI's mission. The organization has a small staff of science educators who frequently conduct teacher workshops, but the demand for their time has outstripped their capacity to deliver all the workshops required. To solve this problem, AGI designed a model that would centralize their workshop efforts, and provide professional development for lead teachers from around the country. Funded by corporate grants, AGI offers two week-long summer Geoscience Teacher Academies: one for elementary and one for middle school teachers in Houston, Texas (home of the corporate sponsors). The workshops are conducted by teams of AGI teacher educators and university science teacher education faculty. Approximately 40 teachers, representing 11-12 states each year, attend each of the summer sessions. Teacher participants must be recommended by their school principals and school district supervisors as having skill in working with their peers, as well as some background knowledge in Earth science. Participants are required to hold workshops with their peers during the academic year following the summer workshops.

The workshops are held in corporate training facilities and in local Houston hotels. Geoscientists who work in the sponsoring industries visit the workshops and interact with the teachers. Teachers also visit the scientists in their facilities to see how they apply geoscience principles to solving real world energy problems. Grants from the corporate sponsors cover all costs for the teachers, including travel, lodging and meals. Workshops focus on geoscience content and investigations, as well as how to design and implement workshops for peer teachers back in their home school districts. Workshop topics also include: managing science investigations in the classroom; assessing student achievement in Earth science; using online resources to the best effect; improving student literacy; and strategies to excite students about geoscience careers.

To date, the impact of this project on the preparedness of grades K-8 teachers to teach Earth science has been significant. Each Lead Teacher has conducted approximately four to five three-hour workshops per year, with an average of 20 teachers attending each workshop. Each of these second-tier teachers, in turn, teaches approximately 25 students (K-5) to 150 students (grades 6-8) per year.

While each new cadre will consist of approximately 35-40 teachers each year, former cadres will continue to provide training for their school districts, bringing new teachers into the fold annually. Current impact has been assessed at two million students nationwide, and continues to grow. An international option is also beginning to take shape. If all goes well, there will be similar workshops in the UK, beginning in the summer of 2010.

Ann Benbow, a long-time teacher educator, is currently the Director of Education, Educational Outreach and Development at the American Geological Institute (AGI), Alexandria, Virginia, USA.

Colin Mably provides teacher professional development, research and evaluation services in the governmental, educational, and corporate sectors via his company: Educational Visions, of Maryland, USA.
Email: cmably@aol.com

Publication Guidelines

The journal (JISTE) publishes articles by members of the International Society for Teacher Education (ISfTE). Exceptions are made for a non-member who is a co-author with a member, or who is invited to write for a special issue of the journal, or for other specific reasons.

Articles submitted to JISTE must be written in English, following manuscript guidelines (see below) and will be anonymously reviewed by referees. Each article must pass the review process to be accepted for publication. The editors will notify the senior author of the manuscript if it does not meet submission requirements.

Articles are judged for (a) significance to the field of teacher education from a global perspective, (b) comprehensiveness of the literature review, (c) clarity of presentation, and (d) adequacy of evidence for conclusions. Research manuscripts are also evaluated for adequacy of the rationale and appropriateness of the design and analysis. Scholarly relevance is crucial. Be sure to evaluate your information.

Articles should move beyond description to present inquiry and critical analysis and provoke discussion.

Articles pertaining to a particular country or world area should be authored by a teacher educator from that country or world area.

If English is the author's second or third language, manuscripts accepted for publication will be edited to improve clarity, to conform to style, to correct grammar, and to fit available space. Submission of the article is considered permission to edit the article.

Published manuscripts become the property of the *Society*. Permission to reproduce articles must be requested from the editors. The submission and subsequent acceptance of a manuscript for publication serves as the copyright waiver from the author(s).

Manuscript Guidelines

- Manuscript length, including all references, tables, charts or figures should be 3,000 to 5,000 words. **Maximum length is 5, 000 words.** Shorter pieces of 1500-3000 words, such as policy review or critique papers are welcomed.

- All text should be double-spaced, with margins 1 inch all around (2.5 cm), left justified only.

- Paragraphs should be indented five spaces and separated by a space.

- Tables, Figures, and Charts should be kept to a minimum (no more than 4 per article) and each sized to fit on a page 8.5 x 5.5 inches (20 x 14 cm).

- Abstract should be limited to 100 - 150 words.

- The cover page shall include the following information: Title of the manuscript; name of author or authors, institution, complete mailing address, business and home phone numbers, FAX number, and e-mail address: Brief biographical sketch, background and areas of specialisation not to exceed 30 words per author.

- Writing and editorial style shall follow directions in the *Publication Manual of the American Psychological Association* (6th ed., 2009). References MUST follow the APA style Manual. Information on the use of APA style may be obtained at www.apa.org

Future Submissions

2010 (Volume 14, Number 2)
Theme – *Social Justice, Equity and Teacher Education*
This is a special issue featuring articles and book reviews that explore issues of social justice and equity in teaching and learning and teacher education. ISfTE members and non members are invited to submit critical essays and research studies that explore how social justice issues – race, poverty, immigrant status, gender, disabilities- impact teachers and their work and therefore the challenges to and responses of teacher education.
Deadline for Submission: December 1, 2009

2011 (Volume 15, Number 1)
Theme *– Educating Teachers for a Better World*
This is the theme of the seminar in Brazil hosted by the Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS). Participants (including those from the Distance Paper Group) are invited to revise their seminar papers, attending carefully to the manuscript and publication guidelines, and submit them to the journal for consideration. Book reviews on the theme are invited.
Deadline for Submission: August 1, 2010.

2011 (Volume 15, Number 2)
Open submission – Members of ISfTE are invited to contribute manuscripts related to any important topic in teacher education. Members are encouraged to co-author articles with their students or colleagues who may not be members of ISfTE. Articles that explore teacher education issues such as the practicum, mentoring in other disciplines (e.g. nursing, adult education, social work education) are particularly invited. Such articles should explore the discourse in relationship to teaching at the elementary, secondary or tertiary level.
Deadline for Submission: December 1, 2010

Book and Other Media Review Submissions

Reviews of books or other media created by ISfTE members are welcome. Either the review or the item reviewed must be by a member. Reviews may be no longer than 1000 words. .

Recent Publications Submissions

ISfTE members may submit an annotated reference to any book which they have had published during the past three years. Annotations should be no longer than 150 words.

Submission Requirements
It is preferred that articles be submitted by email directly to the editor (swilson@brocku.ca). To submit an article by email, send it as an attachment; use Windows Word, if at all possible.
You may also send articles by fax to 905-641-5229.
To submit an article by mail, send the manuscript and a computer disk. Due to the high cost of postage, manuscripts and computer disks will not be returned.

Manuscripts and editorial correspondence should be directed to:
Sybil Wilson, Editor JISTE
Faculty of Education
Brock University
St. Catharines, Ontario, Canada
L2S 3A1

Telephone: 905-227-2652
Fax: 905-641-5229
E-mail address: swilson@brocku.ca or send to jiste@isfte.org

Address changes, membership information and request for journal copies should be directed to:

Johan Borup, Treasurer, Printing and Distribution of JISTE
University College, Sjaelland
Damhusdalen 15 C
Rodoure, Copenhagen, 2610 DENMARK

Telephone: +453670-8799
E-mail: jrb@ucsj.dk