

International Education Journal

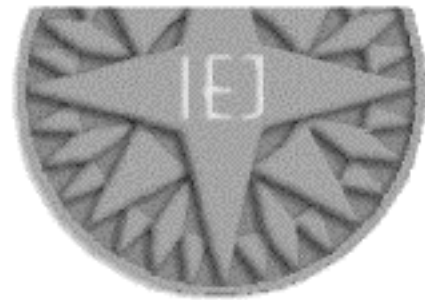


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International
Education
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Volume 7, Number 7, December 2006



Welcome to the International Education Journal. This is a broadly based journal encompassing research and review articles. Education is interpreted in a wide manner and includes human development, learning, school, formal and informal, tertiary and vocational education, industry training and lifelong learning.

Online - While there will be a hard copy version of the journal it is intended that it will be accessed in almost all instances via the web, free of charge.

Peer Review - All articles appearing in this journal have been subjected to a blind peer-review process by two experts in the field.

Copyright - Copyright of material in this journal rests with individual contributors. Apart from fair use such as brief quotation for scholarly purposes, permission to use material in this journal should be obtained from the authors concerned.

Publication Frequency - It is intended that the journal be published three times per year. However given the electronic characteristics of online publishing it is not necessary to wait until a full journal is assembled prior to publishing. Articles once accepted in appropriate form may be published without delay.

The views and styles expressed in the articles in this publication are those of the individual authors and are not necessarily shared by the reviewers, the editors or the editorial advisory board.

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Designed by Katherine Dix

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CONTENTS

Editorial: Back to the Future Keeves, J.P. and Dix, K.L.	873
Teachers and their international relocation: The effect of self-esteem and pay satisfaction on adjustment and outcome variables Richardson, W., von Kirchenheim, C. and Richardson, C.	883
White collar work: Career ambitions of Fiji final year school students Nilan, P., Cavu, P., Tagicakiverata, I. and Hazelman, E.	895
Using students' assessment of classroom environment to develop a typology of secondary school classrooms Dorman, J.P., Aldridge, J.M. and Fraser, B.J.	906
Use of webcasting technology in teaching higher education Yunus, A., Kasa, Z., Asmuni, A., Samah, B., Napis, S., Yusoff, M., Khanafie, M. and Wahab, H.	916
Mentoring primary school student teachers in Turkey: Seeing it from the perspectives of student teachers and mentors Ekiz, D.	924
Differentiated instruction: A research basis Subban, P.	935
Using multimedia case studies to advance pre-service teacher knowing Pflister, C.C., White, D.L. and Masingila, J.O.	948
Unexpected learning competencies of Grades 5 and 6 pupils in public elementary schools: A Philippine report Felipe, A.I.	957
The kindergarteners' learning and reflection on a thematic unit of Chinese traditional festivals: The application of culturally responsive pedagogy Hui-Chin Yang	967
Recent continuing education policies in Hong Kong: A focus on short-term performance through inducements Cheung, K.S.	992
Development and validation of a multiple format test of science process skills Temiz, B.K., Taşar, M.F. and Tan, M.	1007

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FUIIE

The publishers have arranged for the Flinders University Institute of International Education to produce and host an electronic mirror site containing all material in the Journal, accessed free of charge. There are no restrictions on downloading or printing single copies. The electronic version also provides readers with a search tool. FUIIE web site: fuiie.cjb.net

Aims of IEJ

The aim of the International Education Journal is to publish articles that possess one or more of the following characteristics or qualities.

1. The presentation of substantive findings which are of importance for policy and practice beyond the country in which the research was conducted.
2. The integration of education with academic disciplines such as anthropology, demography, economics, history, law, linguistics, philosophy, political science, psychology and sociology, or examines educational issues from the perspective of the disciplines or investigates issues at the interface between education and one or more of these disciplines.
3. The examination of educational issues from a cross-cultural or indigenous people's perspective.
4. The evaluation of educational policy or programs or the use of information technology of cross-national interest and significance.
5. The employment of advanced research methods and measurement procedures that are clearly explained.
6. The presentation of empirically or analytically based investigations of theory, models or conceptual frame works in the field of education.
7. The syntheses of research findings from comparative and cross-national studies in education.

Invitation

Contributors - Authors are invited to submit material to this journal. As a general guide articles should be not more than 5000 words. The journal may publish longer works such as theses or dissertations as occasional monographs. In every instance material must be received in publisher ready format. Full details of publication style and other requirements are set out under the heading Author Information.

Publishers - If you wish to have books or educational software reviewed and published in the International Education Journal please contact the editors.

Reviewers - If you are interested in contributing to the journal by writing a review article (500-1000 words) please contact the authors indicating your areas of interest. We look forward to hearing from you.

Author Information

IEJ welcomes practical and research manuscripts that focus on educational issues, provide a clear purpose and depth of discussion, and are presented in a straight-forward style accessible to an international audience.

The editors reserve the right to return poorly edited or improperly formatted manuscripts. Hard-copy only submissions cannot be accepted or returned.

Submissions should be forwarded electronically, either by:

email to: onlineeditor@iej.cjb.net

Manuscript Details

The manuscript should:

- show the article's title, authors' names, affiliation, and email addresses (these will be included on the online page), and postal address and telephone numbers (these will be removed from the final online page)
- abstract should not exceed 150 words
- paper should not exceed 5,000 words (20,000 for occasional papers)
- include 5 key words describing the article including those in the title
- be in final form ready for reviewing conform to the APA Reference System

General Principles for layout:

- Papers should be prepared using the downloadable template *iejbase.doc* with Microsoft WORD on Mac or PC.
- Use the heading and formatting styles contained in the template, under the Styles Menu, to format article.
- Images and tables should be correctly positioned with caption and are referred to before their appearance.
- Include images that are imported or inserted into the text from an external source as separate graphic files
- Figures constructed in WORD from the Draw Menu must be 'grouped'.
- Use footnotes, with one set of numbers running through the whole article.
- Use italics (not underline) for emphasis.
- Do not create additional headers and footers in the template *iejbase.doc*, just modify appropriately.
- Do not use page numbers in text. Other questions please contact email: onlineeditor@iej.cjb.net

Editorial: Back to the Future

John P. Keeves

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Managing Director Shannon Research Press

School of Education, Flinders University

This editorial presents a retrospective statement on the International Education Journal and its relationship with the Flinders University Institute of International Education and Shannon Research Press. By doing so, a strategic model of research and publication practice within an academic community is presented that seeks to find sustainability in an increasingly challenging climate.

THE INTERNATIONAL EDUCATION JOURNAL

The preparation and production of the *International Education Journal (IEJ)* is part of the Publications Program of the Flinders University Institute of International Education (FUIIE). Two years after the Institute was established, Dr Raeburn Reynolds had the vision to propose the setting up of a journal to help focus the work of the course that he was building in the School of Education at Flinders University that would lead to the award of the degree of Doctor of Education. He envisaged that the journal would be oriented towards international education and it was clear from the outset that the journal would be prepared and produced by FUIIE as part of its program of activities. Moreover, he arranged for the journal to be published by a privately owned publishing house – Shannon Research Press (SRP). The costs of preparation and production were initially carried by Dr Reynolds and were gradually shared as the journal expanded with the Flinders University Institute of International Education that was also publishing a newsletter, occasional papers, and subsequently a series of Research Monographs. When Dr Reynolds retired from the University in early 2002, office bearers of FUIIE continued with the work of preparation and production and SRP was sold. More recently the School of Education has made payments to SRP to assist with the work of publication. Furthermore, as the journal has expanded, the reviewing of articles has been undertaken voluntarily by members of the Editorial Advisory Board, Members of FUIIE both inside and outside Flinders University and has involved a heavy commitment by staff and senior post-graduate students of the Schools of Education at Flinders University and the University of Adelaide. The work of reviewing of articles has during the past two years become a heavy burden, and the contributions of all who have undertaken this work is acknowledged with gratitude, particularly the members of the Editorial Board.

The Aims of the *IEJ*

The aims of the International Education Journal are to publish articles that possess one or more of the following characteristics or qualities:

- a) the presentation of substantive findings that are of importance for policy and practice beyond the country in which the research was conducted;
- b) the integration of education with academic disciplines such as anthropology, demography, economics, history, law, linguistics, philosophy, political science, psychology and

- sociology, or examines educational issues from the perspective of the disciplines, or investigates issues at the interface between education and one or more of these disciplines;
- c) the examination of educational issues from a cross-cultural or indigenous people's perspective;
 - d) the evaluation of educational policy or programs or the use of information technology of cross-national interest and significance;
 - e) the employment of advanced research methods and measurement procedures that are clearly explained;
 - f) the presentation of empirically or analytically based investigations of theory, models or conceptual frameworks in the field of education; and
 - g) the synthesis of research findings from comparative and cross-national studies in education.

While these aims are both broadly based and oriented towards future developments in education from a cross-national and comparative educational perspective, together with a strong international and global orientation, they do not exclude issues that arise in a particular country, provided the issues raised are not limited to the country of origin of the submitted article. This focus of the journal occasionally leads to the rejection of articles that have originated in Australia or North America, which would be more appropriately published within the country of origin for an audience within that country to read. However, the location of Australia, and in particular, Flinders University within the Asia-Pacific Region leads to an emphasis on work within that region. In addition, a concern for work in education and for research into educational issues in developing countries, particularly, but not exclusively, in the Asia-Pacific Region has led to the establishment of a firmly held policy not to charge for the publication of articles, or for the submission of articles, or for access to the journal on-line, and not to market hard-copy annual or issue based copies of the journal, even to libraries. The primary purpose of the journal is to provide for the dissemination and discussion of research-based ideas and findings about education from an international and global perspective as widely as possible and at minimal cost.

Research and Publishing Program

From the initial links of the journal to the training of research workers through the degree of Doctor of Education course, a particular emphasis is given to assisting postgraduate students and early career researchers to publish the findings of their initial research studies. One consequence of this emphasis on training in research is the publication of the proceedings each year of reviewed papers initially presented at the annual Educational Research Conferences conducted by FUIIE in cooperation with the Schools of Education at Flinders University, University of Adelaide, University of South Australia, and the South Australian Institute of Educational Research. The publication of the papers given at other research conferences has also been undertaken with a similar purpose of introducing post-graduate students and early career researchers to the scholarly demands of publication. Furthermore, the proceedings of a research training workshop that addresses issues arising in the secondary analysis of readily available international data sets has also been published recently, with the view of raising certain issues that are confronting those post-graduate students and research workers who are engaged in the secondary analysis of data. In addition, certain controversial questions are raised in a recently published special issue of the *IEJ* that are concerned with a failure to maintain an international perspective at a time efforts are being made both within Australia and within OECD (Organisation for Economic Cooperation and Development) countries to raise the quality of higher education. These questions have important consequences for the final years of secondary schooling.

It should be noted that subventions have been received from the School of Education at Flinders University to assist with the publication of recent issues of the *IEJ* that contain papers presented at the Education Research Conference and the Research Training Workshop conducted by FUIIE. The *IEJ* has clearly developed into a highly important component of the work at the Flinders University Institute of International Education that strengthens the cross-national and international orientation of the activities it engages in within Flinders University and beyond.

THE CHALLENGE OF FUIIE AS AN INSTITUTE OF INTERNATIONAL EDUCATION WITHIN A UNIVERSITY

It is now ten years since FUIIE was initially informally and subsequently more formally founded in 1998 as an Institute within Flinders University. An institute within a university is faced with the challenge to contribute to the life and work of that university as well as to the attainment of the particular goals and purposes it seeks to address in ways that focus on teaching and research towards the betterment of the wider world in which it operates. The paths to be followed are those that scholars and leaders from the great universities around the world signpost and mark well.

The first challenge is to form a concentration of the best scholars it can attract to work within the institute in whatever capacity is most appropriate as students, staff and persons of adjunct or affiliated status. Of particular importance are the students, whether they are honours students, masters degree students, or doctoral students, and whether they come from within Australia, Europe, Asia or Africa. Of great importance is the richness and variety of their interests and concerns as scholars and research workers. They not only benefit from individual mentoring by more senior staff, but also by their informal interaction with each other. Consequently, arrangements must be made to promote and support such interaction, by providing working and living space, less formal work-in-progress seminars, or more formal conference presentations in which they can talk and debate ideas among themselves and among others who wish to enter into informed debate and discussion. However, informal discussion is not enough, it must lead to the scholarly writing of papers for presentation, articles for publication, and the sustained argument of a thesis for examination. Ideas and thought processes are clarified by both speaking and writing. All the tasks involved in writing for publication demand that ideas and relationships are clearly and logically argued in ways that others can read, examine and challenge. Students, for whom the language in which writing occurs is not their native language, invariably face considerable problems in learning to write clearly and logically in a language that for them is a foreign language. However, while English is a complex language to use, it has such a richness of lexis and structure that great clarity of meaning can be readily achieved if care is taken in the writing and editing of text.

Underlying the development of ideas and relationships, of models, propositions and hypotheses, as well as theoretical frameworks and perspectives in the fields of Education, is the need for training beyond that obtained in a bachelors degree course. While some of such training can be accomplished by reading widely and well, the range of material now readily accessible is so great that some introduction to such material through lectures and seminars is today essential. Furthermore, the procedures now available for both logical and statistical analysis of not only information, but also the count data and measurements made on identified variables are so extensive and so readily accessible with the advent of laptop computers, that courses that focus on the learning of such procedures are essential, particularly in honours, masters and doctoral degree courses. However, course work programs are not enough. An institute within a university must also provide such training for its members who are not only students but also research workers who need to keep abreast of such developments. Moreover, for the learning of new skills of analysis, sustained effort is required.

The developments that are occurring in the social and behavioural sciences as well as the physical and biological sciences are related to the rapid expansion of knowledge, the advancement of technology, and the impact of global communication. The barriers between disciplines are breaking down and the growing points in learning and research are occurring at the interfaces between disciplines, so that a multi-disciplinary approach is essential. No institute within a university can hope to be successful if it adopts too narrow a focus. Learning about these developments can not occur in large and impersonal classrooms. Only by improving out-of-classroom connections between students and staff, improving writing skills to achieve greater clarity of thought, as well as curriculum reform to keep abreast of new ideas and the new findings and perspectives of research, can both students and staff continue to work and study in the scholarly world of the future. This is particularly true for the fields of Education.

A strong focus on internationalisation is essential for an institute of international education. Attendance at international conferences is useful but costly when compared with maintaining contact with colleagues working in similar fields, even at the post-graduate student level through the internet. Great gains are to be made through global engagement. Working in teams not only at the local level, but also at the cross-institutional and cross-national levels, provides effective ways of keeping abreast of developments and sharing knowledge. However, for each individual there is the need to write, to clarify ideas, to read and to publish. An institute that promotes and supports such interaction is central to the work of a university. Its success is not only to be judged by the size of the research grants that it attracts, but also by the research scholars that it trains and who graduate at a high level, by the publications that it issues, by the seminars that it conducts, and the conferences at which papers are read and debated.

Financial support is necessary to maintain computer equipment, printing equipment to support publication, to provide access to libraries around the world through the internet and the flexibility of access to small sums of money to purchase materials and services quickly when needed. However, working space is essential for staff and students to work together in close proximity, to share ideas and experience and to engage in informal discussion and debate, and to hold more formal meetings, lectures and seminars.

The Goals and Purposes of FUIIE

It was with these ideas in mind that the Flinders University Institute of International Education was set up to pursue the following goals and purposes.

Goals: The Institute and its members aim to contribute constructively to debate and research towards the resolution of the substantial issues and challenges facing both initial and recurrent education worldwide.

Purposes: The Institute and its members seek to:

- a) invigorate and reform debate on the role of education in world peace and justice, the protection of the world's natural and cultural heritage, and the promotion internationally of human development with a full appreciation of the differences between cultures;
- b) use creatively technology for the advancement of learning across cultures;
- c) create a self-sustaining and innovative Institute that contributes to research, scholarship and community service for the advancement of learning throughout life.

The Institute seeks to achieve these goals and purposes in three key ways.

1. A strong research and training program is sustained.
2. Collegiality and good fellowship within the Institute are fostered.
3. An active publications and dissemination program is maintained.

The Institute has relied very heavily on voluntary help to support much of its program of activity during 2006. Its life and work have been greatly enriched by its capacity to attract the best students from the PhD, Ed.D, M.Ed and B.Ed (Hons) programs to share in its activities, and to enable them to interact with staff and colleagues who give their time and energies voluntarily to research and training activities. At the same time through an Outreach program, it has drawn attention to the issues and problems created by terrorism and by ignoring the international aspects of education.

The challenges faced by an institute of education within a university have thus been met by working with scholars of high quality among students, staff and adjunct persons, by conducting seminars and conferences, by maintaining a strong publications program, by providing opportunities for informal debate and discussion, by focusing efforts on research training programs, but supporting the enhancement of the quality of written work, and by maintaining a strong international orientation in all possible activities.

John P. Keeves

SHANNON RESEARCH PRESS

Publish or Perish

Publishing is potentially a high profit and high margin business when only the marketability and bottom line of a product are considered. As a result, less marketable products that only attract a select readership, are generally turned down by the larger publishing houses on the basis of the so-called 'bottom line', even though the work often is of high quality. Books resulting from research, such as PhD theses, fall into this category and typically get declined for publication. Editors of the larger publishing houses know that this work, despite its scholarship, has limited appeal. The question is raised, is it any less worthy of publication because it is not as profitable?

In addition, the challenge of getting research published in the form of journal articles is also becoming increasingly difficult and costly. Many journals not only require an exorbitant subscription fee to access articles but also charge authors a review fee, regardless of whether the article is published or not. This challenge is further compounded by the growing competition between authors to have their work published in a finite resource, in which there are only a small number of appropriate reputable journals with only a limited number of spaces.

Driving this publishing frenzy in the academic community, certainly in Australia, but similarly in other parts of the world, is the bottom line. In Australia, university departments are increasingly dependent upon the publication output of their staff to maintain government funding support. The more a university publishes, the greater the allocation of government research funding that it receives. So the old adage 'publish or perish', which used to be a phrase referring to the future career of an academic, now refers to the future of a whole department, faculty, or even university.

The Conundrum

Clearly, in an increasingly financially hostile environment, where every research dollar counts, there is enormous pressure from above for researchers to have their work published. Yet the researcher is also faced with resistance from below in trying to get their work published. Often they receive knock-back after knock-back, either from publishing houses that reject the work on poor marketability, or from journals, because there just are not enough spaces and the standards are raised so high that unless you have 'Professor' in front of your name, you don't stand a chance. From this conundrum, a gap in the market place and a clear need to fill it, is apparent. The model upon which Shannon Research Press (SRP) is based and from which the production of

works such as the *International Education Journal (IEJ)* and the *FUIIE Research Monographs* have evolved, is the result.

Modus Operandi

SRP operates as a non-profit business dedicated to providing the best in affordable, small volume, quality publishing, with a mission to promoting a wide variety of research issues at minimal or no cost to either the reader or the author. Although this mission would seem to run contrary to most business practices, the success of SRP over the last five years suggests that this mode of operation is both viable and sustainable, and possibly even essential to the longer-term success of an academic community.

At the core of SRP's success is its relationship with its academic community. This is probably its greatest strength and the main feature that sets it apart from other publishing houses, where the relationship is usually between author and publisher. In essence, SRP works independently but alongside an academic community, such as FUIIE, to provide an organisational framework that supports and promotes the publication of research. Underpinning this approach and addressing the needs of researchers, is that it is the academic community and not the market place nor the bottom line that determines what gets published.

In order to understand the interconnectedness between all entities concerned, Figure 1 provides a summarising diagram of the *modus operandi*. It should be noted that non-specific terms, such as 'academic community' and 'journal' are adopted here because such a model of practice is potentially reproducible in any university school or department to form a cooperative relationship with a publishing house such as SRP.

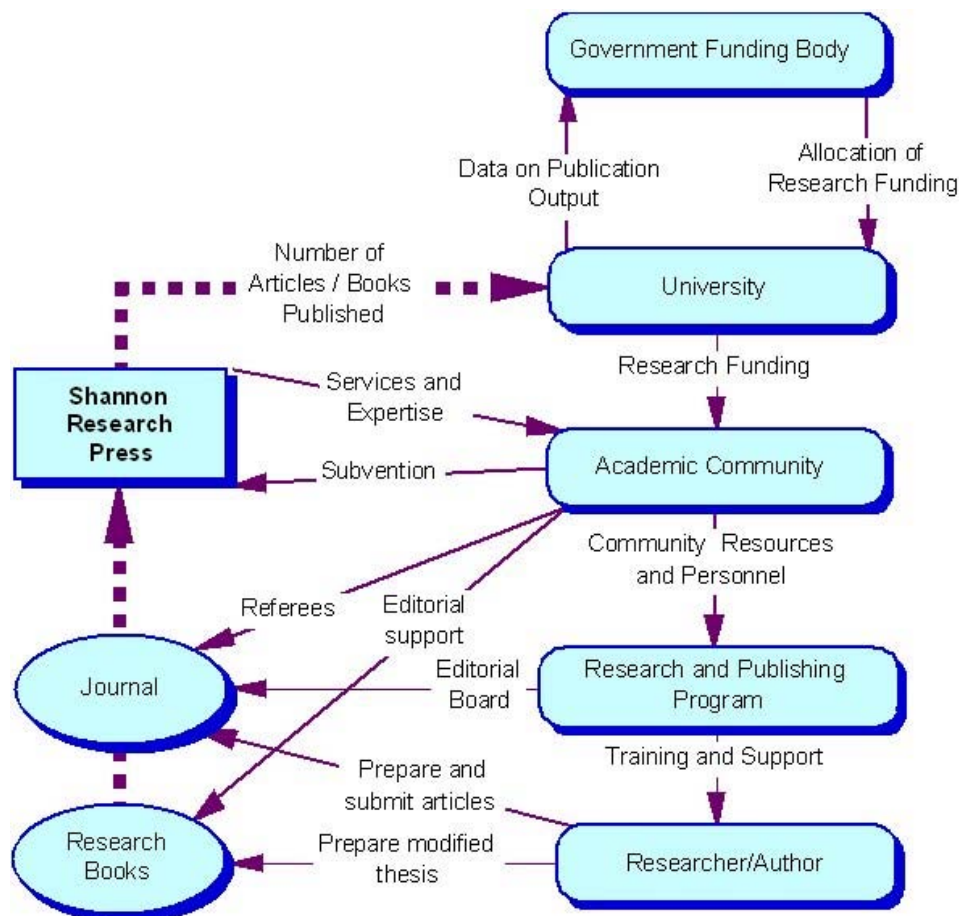


Figure 1. Model under which SRP operates alongside an academic community

So what does this cooperative relationship entail? Within the university system in Australia, researchers belong to a research program, developed by an academic community such as a school or department, which belongs to a faculty that receives and distributes government funding. In order to stimulate scholarly work, an academic community, designs a research and publishing program that results in the need for a journal, such as the *IEJ*. Through the program, researchers receive training, support, and resources to prepare articles suitable for any appropriate journal. In conjunction with SRP an editorial board is formed by a body, such as FUIIE. The duties of the board become an integrated part of the normal workload and functioning of the community supporting the journal. Blind review of papers submitted by colleagues or external authors are undertaken by members of the editorial board and the community involved, as well as other local and international experts in the field. In order to keep costs to a minimum, while reaching a maximum audience, the journal is published electronically on the internet, with at least 12 hardbound copies made available to libraries for indexing and archival purposes.

Similarly, a research and publishing program may also seek to publish PhD theses (see Figure 1). Again, in conjunction with SRP and supported by senior academics or their supervisors, who are members of the supporting community, authors are encouraged to re-write their theses in order to make them more accessible to a broader audience. Authors also undertake the substantial task of re-formatting and copy-editing of their work prior to a final evaluation from SRP.

So what aspects of this model of practice sets SRP apart? The combination of features that appear to be unique to SRP in comparison to other publishing houses include the following policies and practices.

- SRP is a commercial organisation that puts the quality of scholarship ahead of marketability.
- Journals are open-access, peer-reviewed, and full text, underpinned by a sufficiently broad range of interests to embrace, in the first instance, the scholarly work of the local community, but also to target a clearly defined research niche in the global community. The *IEJ* is a good example of this.
- SRP produces and markets books, like the *FUIIE Research Monographs*, through direct marketing online. The direct marketing of SRP books is implemented through its web site. The production of hardcopy books is supported by FUIIE and marketed through established academic distribution channels. These books are sold at twice their production cost in order to break-even on those copies that are sent as a requirement to national and state libraries for archival purposes, and to other libraries for the purposes of indexing.
- Journals and books published by SRP satisfy DEST (Australian Department of Education, Science and Training) refereeing requirements for HERDC (Higher Education Research Data Collection). Currently, articles and books published by authors from Australian Universities are counted towards the allocation of research funding.
- Overheads are kept to a minimum by SRP substantially operating out of the supporting academic community. Any fee incurred by the community to SRP is for expertise and services, not shop-fronts and overheads. In addition, by allowing authors greater involvement in all stages of the publishing process, costs are further minimised.
- The flexibility of these arrangements and the availability of high-speed online communication means that similar models are viable in any field of academic research and open to the majority of schools and departments in Australian universities.

The Benefits

There is a well-known adage that ‘you have to spend money to make money’. Although much of the effort that goes into running a journal or producing research monographs is absorbed into the normal day-to-day functions of a school or department, in the form of voluntary community service, there are still some costs that require funds. The costs of outsourced services, expertise, and hard-copy production of journals and books are born by the supporting academic community. However, if FUIIE’s success is any indication, these costs are minor in comparison to the government research funding that is generated by the increased output of publications by university staff and post-graduate students due to the new focus on publishing activities within the academic community.

Of greater benefit, however, are the intrinsic gains to research, scholarship, and community that are non-financial in nature. The value that a journal brings to the academic community worldwide as a vehicle to publish leading edge research, free of charge and to a global audience, goes without saying. However, the value to be gained closer to home, within the immediate academic community, may not be as apparent. What follows is by no means an exhaustive list of benefits but serves to highlight the unique and important contribution a journal brings to a school or department.

- development of a research community;
- provides opportunities and experiences for early career researchers;
- increased publication output;
- opportunity to gain referee experience;
- raises awareness of latest research and issues;
- prestige and status in the research community;
- supports staff and students to publish without the delays of other mainstream journals;
- opportunity to learn new skills by getting involved in the publishing process;
- government funding (DEST points) gained resulting in increased research funding;
- opportunity to gain editorial experience; and
- strengthens relationships with other institutions (publication of special themed issues).

MEASURES OF SUCCESS

In order to understand the effectiveness of a strategic alliance between SRP and an academic community, a summary of FUIIE’s publishing milestones over the last eight years of operation serves as a case in point. The milestones examine the achievements of the *IEJ* and the *FUIIE Research Monographs and Series*, and go to form an indication of a measure of success.

The *IEJ*

The success of a journal can be measured on many fronts and in the commercial world it is usually the profit margin. Being an online free-access, non-profit, university sponsored journal, the *IEJ* turns to other measures of success. These indicators include the level of *IEJ*’s web presence, the number of visitors, frequency of article intake, and the number of articles published.

Whether it is a shop front, the phone book or on the web, location has always been an important ingredient in success. When it comes to searching the web using Google.com, the most popular search engine available, *IEJ* has prominence. Type in ‘*IEJ*’ and the journal lands at the top of the list of about 130,000 sites, or use the words ‘international education journal’ in any order and out of over 12 million (yes, million) results, the journal still comes first.

More importantly, through the promotional efforts of SRP, *IEJ* is prominent in notable indexing services and directories of open-access journals that make refereed work freely available on a

global scale. These include, the *Australian Education Index* (AEI), Australian Public Intellectual Network (API), National Library of Australia (Australian Journals On Line, AJOL), Australian Council of Education Research (ACER), *VOCED* (produced by NCVER for UNESCO), Yahoo Education Directory, New Zealand's LeadSpace, ELDIS, American Educational Research Association (AERA-SIG), *NewJourn*, and the *Directory of Open Access Journals* (DOAJ), in addition to numerous university libraries and government institutions. *IEJ* has even been reviewed in *TOJDE* the *Turkish Online Journal of Distance Education* and receives many submissions from Turkish authors.

This level of exposure obviously takes time and the growth is reflected in two ways: first, by the number of visitors to *IEJ* each year, and second, by the annual intake of articles submitted. Figure 2 presents the two measures of growth. The logic of presenting these measures together follows that as the number of visitors increases each year, the number of articles submitted also increases. In 2006, *IEJ* received its 100,000 visitor and processed its 600th article. Figure 2 also presents trend lines, which suggest that in 2007 the intake of articles may top 300 submissions and the website will have been viewed by well over 150,000 people.

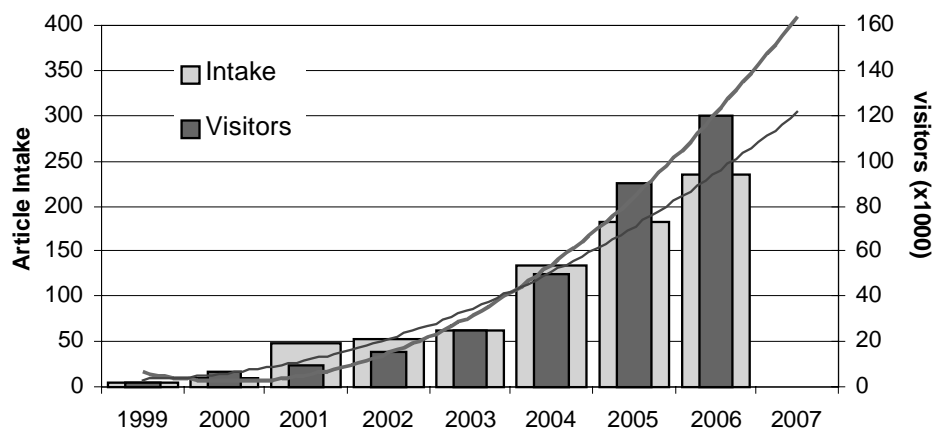


Figure 2. Number of visitors to *IEJ* each year and the annual intake of articles submitted

Another indication of success, and presented in Figure 3, is the growth in the number of papers *IEJ* publishes each year. Although the editors have had to put a cap on the number of published papers, due to the sheer workload involved, 2006 is one of the busiest years yet, with the publication of over 80 papers from around the world in seven issues. The increasing public profile of the *IEJ* has led to the increased intake of articles resulting in an average acceptance rate of 35 per cent during 2006. However, if special editions of *IEJ* are excluded, then the actual acceptance rate of articles published in the four regular journal issues is closer to 20 per cent.

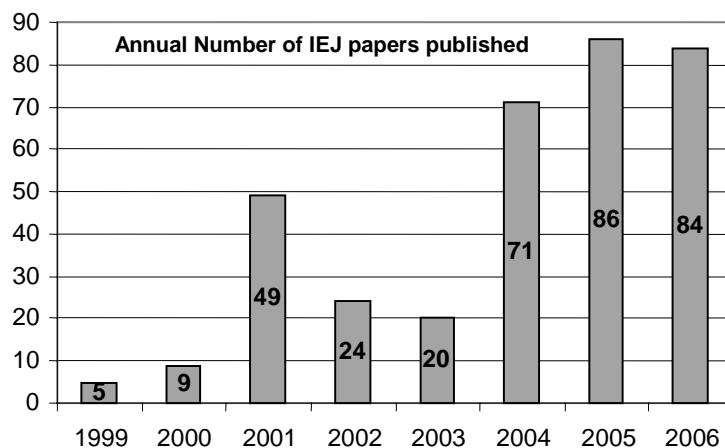


Figure 3. Number of *IEJ* papers published each year

FUIIE Research Monographs and Series

The *FUIIE Research Monographs*, resulting from reworked PhD theses, is another mainstay in FUIIE's publishing success. To date, 16 monographs have been published and another 11 books are in final production stage. Sales have been so strong that many of the books have been sold-out and reprints are in demand with back-orders to fill.

In even greater demand is the first of the books in the *FUIIE Research Training Series*. These small, highly practical booklets are proving to be very popular, selling into the hundreds.

LOOKING BACK AND TOWARDS THE FUTURE

The intention of this editorial is to present a model of practice that appears to be unique in the global research community. The success and effectiveness of a close-knit academic community, such as FUIIE, in partnership with an entity like SRP has shown to be, over the last eight years, a potent combination. The service and intrinsic value that such an undertaking provides not only to the immediate academic community and university, but also to the broader research community, are numerous. On these measures, this model of practice is a resounding success.

However, although the motivations to undertake a research and publishing program on this scale are not born out of financial interests, for sustainability, it must at least break even. And on this measure too, with modest financial outlay yielding research funding many times in return, the venture has also been a resounding success. The revenue generated is then fed back into the system from the university to provide funds and resources for further research and scholarship, ensuring a viable and productive academic community. All it requires is foresight and willing participation.

Katherine L. Dix

Teachers and their international relocation: The effect of self-esteem and pay satisfaction on adjustment and outcome variables

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This is the second of two papers investigating the adjustment process in a designated group of expatriates, (teachers), who have severed ties with their home country and employer. In the first paper we examined the effect of self-efficacy and flexibility within this adjustment process, revealing the significance of self-efficacy but failing to show a pronounced relationship between flexibility and adjustment (von Kirchenheim and Richardson, 2005). In this particular study, again based on existing literature, the value of self-esteem and pay satisfaction on the adjustment process was explored. Again, it was hypothesised that adjustment would result in reduced turnover intention, increased life satisfaction, and higher job satisfaction. Based on our findings, there would now appear to be some clear implications for individuals and organisations involved in the expatriation process. More specifically, from a personal point of view, there is evidence to suggest a direct relationship between specific personal characteristics, pay satisfaction, job satisfaction, and turnover intention. In essence, those who score high on scales which measure self-efficacy and pay satisfaction would appear to be the ones most likely to find success within the international relocation process. Thus, from an organisational perspective, the accurate measurement of some of these identified intrinsic and extrinsic factors may provide valuable information to the employer regarding those applicants that have the greatest probability of adjustment. Given that both studies looked exclusively at educators in its sampling, the implications for faculties of education, who are seeing increasing numbers of their graduates accept postings in foreign jurisdictions, are profound.

Expatriate, adjustment, relocation, self esteem, pay satisfaction

BACKGROUND

There has been increasing interest in the issue of expatriate **adjustment** over the recent past (Luthans and Farner, 2002; Selmer, 2001; Wang, 2002). This is due primarily to the incremental importance of international trading, cross-national manufacturing and the emergence of a global economy (Adler, 1991; Johnston, 2004; New York Times, 2002), all resulting in a dramatic increase in the expatriation of employees (Dodd, 2003; Harvey et al., 1999; Harzing, 1995; Windham International and the National Foreign Trade Council Survey, 1997). This is especially profound within education where ever increasing numbers of foreign countries are regularly

seeking out the services of university trained teachers, (particularly those trained in English speaking countries), in an effort to give their young citizens the necessary skills required to compete effectively in this newly emerging borderless economy (Brown, 2004; Richardson and Richardson, 2002-2006). As one popular teacher recruitment and training site specifically reports, “teachers work in virtually every country in the world. They probably have more choice about where to work than any other profession” (Norwood English, 2006). With respect to this view, although there can be little doubt that employment opportunities now know no national boundaries, conversely, current research in the field reports a relatively high failure rate within these expatriate assignments (Black, 1988; Black and Gregersen, 1999; Down, 1978; Tung, 1981), education seems no exception. There has, however, been very little published research devoted exclusively to the study of educators serving in foreign destinations.

Nonetheless, for the employee in general, across all disciplines, it is evident that adjustment following foreign relocation is fraught with tremendous amounts of anxiety, stress, and pitfalls (Harvey, 1983). Restated, many expatriates, when first introduced to a completely foreign environment or culture, initially experience an intense period where they have to, at minimum, psychologically recalibrate (Furnham and Bochner, 1986). Although the term ‘adjustment’ is used frequently in the literature (Adler, 1991; Black, Gregersen, and Mendenhall, 1992), there does not appear to be a consistent or universal definition of it. However, with this point being conceded, when it comes to measuring cross-cultural adjustment, the criterion of whether or not an individual returns prematurely from his or her overseas assignment is the one most frequently applied (Baker and Ivancevich, 1971; Desatnick and Bennett, 1978; Lanier, 1979; Misa and Fabricatore, 1979; Tung, 1988). By utilising this particular perspective, studies overwhelmingly indicate that between 30 per cent and 50 per cent of all expatriate employees ultimately terminate their employment before their contract officially expires, with rates ranging from 25 per cent to 40 per cent when associated with a developed country, to as high as 70 per cent when associated with a developing country (Buckley and Brooke, 1992; Shay and Tracey, 1997). However, premature termination of contract may not be the only reliable indicator of overall adjustment. For example, several other studies have tried to measure the true ‘effectiveness’ of expatriate employees in their overseas assignments, and have discovered that a statistically significant number, although not returning to their countries of origin prematurely, are nevertheless viewed as being completely ineffective in their postings, with their overall assignments being considered ultimately as failures (Black and Gregersen, 1991; Copeland and Louis, 1985; Naumann, 1993).

The authors of *Global Assignments, Successfully Expatriating and Repatriating International Managers* (Black et al., 1992), devote an entire chapter to the issue of cross-cultural adjustment. Their discussion centers on the issue of ‘culture shock’. This theme was also taken up by Oberg (1960), where he describes a process whereby a new culture is rejected in favour of a very positive review of, and desire for the familiar. Similarly, Hofstede (1983; 1980) reviews some of the significant differences in work-related values between cultures and their effect on global assignments. In this work, ‘adjustment’ remains broken into a number of different factors and subsequent measures. As might be expected, much of this early research in the field focuses on aspects of living, such as food, transportation systems, and daily customs. However, more recently, adjustment is filtered through a more complex paradigm, being defined and described by some as consisting of three very distinct but related factors (Black et al., 1992); adjustment to the job, adjustment to interacting with host-country nationals, and finally, adjustment to the general nonwork environment.

Other research, concerning adjustment, has further divided it into two main temporal sections (Black, Mendenhall, and Oddou, 1991). The first is called ‘anticipatory adjustment’ and refers to the expectations that the individual forms about the new culture and assignment. These expectations can be based on factual information such as knowledge acquired through reading and

training, or through personal beliefs and wishes. It is generally conceived that the more accurate the expectational set, the smoother the adjustment will be. The second temporal section proposed by Black et al. (1991) is the 'post-arrival' or 'in-country factor' adjustment. Of importance here is the process that takes place when the expatriate actually arrives in the new country, again, particularly as it relates to the individual and his or her expectations. In essence, it is believed that the degree to which expectations are confirmed or disconfirmed, greatly impacts on adjustment. Louis (1980) addressed this issue for 'newcomers' in general, and described it as the difference between expectations and reality. Her theory suggested that negative surprises detracted from successful socialisation or adjustment. Both of these temporal sections are further subdivided into individual factors, job factors, organisational factors, and non-work factors.

What is evident in the literature is that there are numerous definitions and subsequent measures for the construct of 'adjustment.' It is important, therefore, to define the term in a way that incorporates many of the definitions previously used and studied, while at the same time lending itself favourably to the specific purposes of this particular study. The following then is the specific definition of adjustment utilised for this study: **Adjustment is the person's ability to function effectively, personally and vocationally, in the new environment.**

With very little exception, the majority of published research within this general domain has focused on individuals moving overseas for work with a parent company or on those who have been formally recruited by a home country organisation for an overseas assignment (for example, the Peace Corps or CIDA here in North America). The greatest percentage of this research would seem to involve primarily North Americans moving abroad to represent a multi-national parent company. The literature, then, does not adequately address the issue of how a specific sub-group, (namely teachers who resign from their current employment to accept overseas jobs), adjust to their new environments. Thus, this research is an attempt to address this quite apparent void.

INTRODUCTION TO PRESENT STUDY AND HYPOTHESES

Hypothetical Antecedents

The present study has been designed to measure adjustment in individuals who have willingly left employment in their home country to seek out opportunities within the educational sector in a foreign jurisdiction. Relying on the proposed definition of adjustment cited directly above, it is necessary to measure personal attributes and examine their relationship to certain outcomes associated with subjects who have adjusted effectively to their new environment. Some literature (for example, Sayegh and Lasry, 1993) suggests that it is proper adjustment that enables the individual to function optimally in the new environment. Reciprocally, successful adjustment is likely to result in a general sense of well-being in both the world of work and in the private life of the individual. The causal relationships are not clear.

Although self-esteem has long been known to play a significant role in education in general (Davies and Brember, 1999; Erikson, 1968; Hansford and Hattie, 1982; Katz and Chard, 1989; King et al., 2002; National Association of Elementary School Principals, 1990), and in the chemistry of the truly exceptional educator in particular (Allinder, 1994; Dietzel, 2006; Dewar, 2002; King and Peart, 1992; King, Warren, and Peart, 1988; Lamborn et al., 1991; Miller, 1997; Roy, 1987), its influence within the expatriate adjustment dynamic has also not gone unnoticed. For example, in a very broad way, specific traits of character have consistently been found to be relevant to adjustment in expatriate communities (Caligiuri, 2000; Costa, McCrae, and Dye, 1991; Costa and McCrae, 1992; Mendenhall and Oddou, 1985). Trying new foods and engaging in different hobbies or sporting activities is often an expatriate necessity because the familiar is inaccessible. Hence, an attitude of open-mindedness would appear to play a significant role in moderating the stress sometimes associated with culture shock. Likewise, some authors (Black et

al., 1992), quoting research by Mendenhall and Oddou (1985) and Hawes and Kealey (1981), imply that expatriates (individuals, spouses, and families) who are generally 'willing' to make accommodations with respect to dealing with unfamiliar or different experiences are also the ones most likely to make the smoothest of transitions. Similarly, Caligiuri and Jacobs (1993) and Tung (1981) found that individuals who are open to new cultures, able to get along with people of different backgrounds, and capable of being effective in a variety of situations, ultimately, have the capacity to adjust much better. As Konopaske and Werner more succinctly put it, "in a global assignment context, researchers have identified several personality characteristics and have proposed that such factors can influence expatriate success" (2002, p. 409); with openness to experience, extraversion, agreeableness, emotional stability, and conscientiousness appearing very high on the list.

With direct reference to the concept of self-esteem playing a role within the expatriate experience, Dowling and Schuler (1990) propose that it should be, at minimum, seriously explored. They suggest that individuals possessing high self-esteem are more likely to become involved in behaviours that strengthen overall 'mental hygiene', allowing them, for example, to replace pleasurable home culture activities with parallel substitutes in the host culture. According to Dowling and Schuler (1990), individuals with high self-esteem and high self-efficacy are seen to persist in attempting to learn new behaviours. More specifically, it would appear that expatriates who are high in self-esteem and self-efficacy are also the ones who are persistent in learning and imitating the appropriate behaviours of the host country, which then sets in motion a process which leads directly to adjustment. Consequently, these individuals are less likely to become discouraged when compared to those with low self-esteem and low self-efficacy (Black et al., 1991; Dowling and Schuler, 1990). Black et al., (1992) and Black and Mendenhall (1990) addressed the issue of expatriate adjustment through the application of social learning theory (Bandura, 1977). This theory states that learning takes place through the use of four central elements: attention, retention, reproduction, and incentives. One of the main arguments of this theory is that gradual modelling of behaviour is more effective than modelling of only the final or target behaviour. Individuals with high self-esteem and high self-efficacy are seen to persist in attempting to learn new behaviours when compared to those with low self-esteem and low self-efficacy. It is surmised that these same individuals will be more willing to change mental and behavioural patterns and consequently, adjust successfully to their new environment. As Baumeister et al. suggest (2003), at minimum, high self esteem may provide a great benefit to individuals merely because of its incredible capacity to move people to work harder and persist longer in the face of adversity.

Further, as might be expected, one cannot look at international relocation and overall adjustment without, at some point, examining the issue of remuneration or pay satisfaction within this whole dynamic because it is consistently cited as having some considerable influence on both job satisfaction and turnover intention (Hills, Bergman and Scarpello, 1994; Milkovich And Bloom, 1998; Milkovich and Newman, 1999; Townsend, Scott and Markham, 1990). In short, pay as it relates directly to employment, does seem to matter in the attracting, motivating, and retaining global assignees.

In summary, in consulting the literature, self-esteem and pay satisfaction would appear to substantially assist, expatriates in the overall adjustment process. Improved adjustment, in turn, should result in higher life satisfaction, greater job satisfaction, and decreased turnover intention. The following then, are the six hypotheses investigated within the confines this particular study.

- Hypothesis 1 suggests that **individuals with high self-esteem will be better adjusted.**

- Hypothesis 2 states that **individuals with higher levels of pay satisfaction will be better adjusted.**
- Studies have clearly demonstrated that adjusted individuals grow to not only enjoy their foreign assignments, thereby completing their overseas contracts, but are also more productive in the process. Hypothesis 3 then, suggests that **adjustment predicts job satisfaction.** Quite naturally, following on from this, Hypothesis 4 states that **adjustment predicts turnover intention.**
- Hypothesis 5 is predicated on the perceived permeability between life and work stress (Frone, Russell, and Cooper, 1992). In the context of the present study, this may play an even more significant role due to the fact that employees have, in most instances, left a job in their home country to join a new employer in their new country. This suggests that work and non-work adjustment may result in differing levels of well-being and life satisfaction. Thus, Hypothesis 5 states that **adjustment predicts overall life satisfaction.**
- Hypothesis 6 is based on the idea that individual differences predict adjustment and that adjustment, in turn, predicts certain outcomes. Adjustment is believed to act as a mediator between the two predictor variables and the three outcome variables. Hence, Hypothesis 6 states that **adjustment mediates the relationship between the antecedent and outcome variables.**

METHOD

Procedure

Permission was sought and granted by the Ministry of Education and the Education Department of a small island Caribbean state, to survey all teachers employed by the host government in the public school system. In order to collect all information before expatriate employees would formalise their requests to renew or terminate their contracts in the following year, all data were collected over a two week period in late fall. The questionnaires were distributed and collected by the authors directly. In total, 196 questionnaires were distributed. Of these, an effective sample of 184 usable and complete surveys were obtained for a return rate of 94 per cent.

Participants

The **sample** consisted of 56 expatriates from North America and the United Kingdom, and 128 teachers from other Caribbean countries. The mean age for the expatriates was the 40-49 year age group. There were 56 males and 126 females with two missing responses. In order to ensure homogeneity of working conditions, the total sample consisted of only those individuals who spent more than 50 per cent of their working time in a teaching capacity which excluded most school administrators and support staff.

Measures

Self-esteem was measured with a series of eight items adapted from the Jackson Personality Inventory (1976). The adaptation allowed for a response format that was appropriate for a Likert-type scale format.

Pay satisfaction was measured with a shortened version of the Pay Satisfaction Questionnaire (PSQ; Heneman and Schwab, 1985). This scale consisted of the eight highest loading items from the factor analysis performed by Judge (1993).

Adjustment was measured with a scale developed for this project. It initially consisted of 20 items. These items were generated following interviews for a realistic job preview exercise (von Kirchenheim, 1992). A sample item is "Although I do not necessarily agree with the politics, I accept the way things are done here."

Job satisfaction was measured with a five-item scale similar to that used by Ostroff and Kozlowski (1992). A sample item is "I am very dissatisfied with this job," (reverse scored).

Turnover intention was based on a four-item scale. Three of the items were based on the scale used in the Ostroff and Kozlowski (1992) study. The other item addressed whether expatriate employees intended to renew their contract or terminate their employment with the government. A sample item from the scale is, "In general, I intend to stay in this job for as long as possible."

Life satisfaction was measured with the five item Satisfaction with Life Scale developed by Diener, Emmons, Larsen, and Griffin (1985). This scale was designed to measure global life satisfaction (Pavot and Diener, 1993). An item from this scale is "I am satisfied with my life."

Psychometric Properties

The items for the adjustment scale were compiled through an item writing exercise. The initial alpha on the twenty item scale was 0.49, so it lacked the necessary level of reliability. Consequently, the scale was factor analysed using an exploratory principal component factor analysis procedure with a varimax rotation of factors. Extracting 10 items from a two factor solution, with a minimum factor loading of 4, resulted in a revised and shortened scale with an internal consistency of 0.74. Four items addressed work related adjustment while the other six items measured non-work adjustment, thus meeting the criteria for the definition of adjustment.

Table 1 presents means, standard deviations and intercorrelations between the measures. Reliabilities of the measures are also presented in this table. As can be seen, the measures meet an accepted standard of alphas at 0.70 or higher.

Table 1. Descriptive statistics and correlation matrix

Variable	Mean	Std Dev	1	2	3	4	5	6
Self Esteem	28.29	5.87	(0.77)					
Pay Satisfaction	22.27	6.93	-0.06	(0.89)				
Adjustment	39.08	5.91	0.12	0.15*	(0.74)			
Life Satisfaction	16.33	4.06	0.21*	0.13	0.36*	(0.73)		
Job Satisfaction	18.24	4.36	0.14	0.27*	0.53*	0.57*	(0.84)	
Turnover intention	9.02	4.08	-0.04	-0.21*	-0.53*	-0.36*	-0.70*	(0.82)

Note: * denotes correlation is significant at $p < 0.05$. Correlations with values $\Rightarrow 0.25$ are significant at $p > 0.001$. Coefficient alphas are reported in the diagonals, in parentheses.

RESULTS

The first hypothesis stated that high self-esteem would correlate with better adjustment. This was not supported by the data ($r=0.12$, $p=0.09$). There is however, a significant correlation between self-esteem and life satisfaction ($r= 0.21$, $p<0.05$).

The second hypothesis stated that pay satisfaction would be associated with increased adjustment. This hypothesis received support ($r=0.15$, $p<0.05$). As would be expected, pay satisfaction was also correlated with job satisfaction and negatively correlated with turnover intention. There was, however, no relationship between pay satisfaction and life satisfaction.

In order to ensure that there were no suppressors, an overall regression was performed. Both hypothetical antecedents were regressed onto adjustment. No evidence of suppression was found in this analysis.

The next set of hypotheses dealt with the outcomes of positive adjustment. Specifically, the third hypothesis stated that adjustment would be associated with increased job satisfaction. This hypothesis was supported ($r=0.53$, $p<0.01$). The fourth hypothesis, stating that adjustment would negatively correlate with turnover intentions, was also supported ($r= -0.53$, $p<0.01$). Similarly, the fifth hypothesis was supported, stating that overall life satisfaction would be associated with adjustment ($r=0.36$, $p<0.01$).

The next step was to use hierarchical multiple regression analysis (Cohen and Cohen, 1983) to test the overall model (Hypothesis 6), that adjustment would act as a mediator. Table 2 shows the results of hierarchical regression with adjustment operating as a mediator for pay satisfaction, for the outcomes of job satisfaction, life satisfaction and turnover intention, respectively. As some significant relationship between the predictors and adjustment must exist, it was decided that only the variables that fit the overall model by meeting the precondition of correlating at a significant level, would be retained at this step. This effectively eliminated self-esteem from the equation.

Table 2. Results of the first hierarchical regression

Variables	Beta	R2	F Change	B
Job Satisfaction				
Pay Satisfaction	0.18		0.28	
Adjustment	0.46	0.193	52.56	0.34
Life Satisfaction				
Pay Satisfaction	0.08		0.14	
Adjustment	0.32	0.091	19.29	0.22
Turnover Intention				
Pay Satisfaction	-0.13		-0.22	
Adjustment	-0.29	0.074	16.07	-0.20

A test of mediation is indicated in this model as the hypothesis suggests that adjustment adds to our understanding of the relationship between the predictor and outcome variables in the expected direction. Preliminary support and evidence of at least partial mediation for the model is indicated if there is significant change at each step of the equation. In order to test for full mediation a second step is required. The factors are entered into the equation in reverse order. Evidence of full mediation is provided if the predictive factors at step two do not significantly add to the variance explained by adjustment. As can be seen in Table 2, there was significant change at each step of the equation. Table 3 presents the regression results when the factors have been entered in reverse order, with Adjustment entered at the first step and Pay Satisfaction entered at the second step. These results indicate that for both Job Satisfaction and Turnover Intention there is only partial support for the mediation model.

Table 3. Results of the second hierarchical regression, performed in reverse order

Variables	Beta	R2	F Change	B
Job Satisfaction				
Adjustment	0.53	0.284	72.13	0.39
Pay Satisfaction	0.13		0.20	
Life Satisfaction				
Adjustment	0.36	0.131	27.37	0.25
Pay Satisfaction	0.05		0.09	
Turnover Intention				
Adjustment	-0.35	0.125	26.10	-0.24
Pay Satisfaction	-0.10		-0.18	

DISCUSSION

The purpose of this study is to investigate the adjustment process in a designated group of expatriates who have severed ties with their home country and employer. Based on existing literature, the strength of self-esteem and pay satisfaction in the adjustment process was

investigated. It was hypothesised that adjustment would result in reduced turnover intention, increased life satisfaction, and higher job satisfaction.

The results provide partial support for the proposed model, but also provide additional findings that are of interest. As expected, there is evidence of a relationship between pay satisfaction and other job-related factors, namely job satisfaction and turnover intention. All of the outcome factors correlate positively with adjustment. It should be noted that the pay satisfaction measure used is multi-dimensional. Clearly, then, there is a relationship between perceptions of pay and benefits, overall adjustment, and other work related factors.

As was documented in our previous study on the international relocation of teachers and their adjustment, a surprise finding to us at the time was that flexibility was without profound influence within the overall process (von Kirchenheim and Richardson, 2005), unlike several other studies which found flexibility to be quite predictive of future adjustment (Gentile et al., 1993; Tung, 1991). We highlighted a proposed explanation for this discrepancy as potentially being found in the fact that the measures used in designing our specific research model were not appropriate for determining the type of flexibility required in the particular international setting under study. In review, the Caribbean country studied, especially its Education Department, is world renowned for adhering to a very rigid set of standards that are overwhelmingly Christian based. Hence, deviation from the standard is very much discouraged. In fact, as we noted, within this international setting, inflexibility may be of value and actually assist in the adjustment process.

The same sense of surprise, as noted directly above where flexibility is specifically explored, also holds true with respect to our present study, where self-esteem, (at least where a large group of educators is concerned), does not appear to have any measurable degree of sway. Although a relationship between self-esteem and life satisfaction is found, this correlation is tenuous at best and does not fit the overall model. Although we believe that self-esteem may indeed help individuals feel good about themselves, it does not appear to, at least in any substantial way, contribute to their overall ability in being able to adapt successfully. Restated, although high self-esteem may assist individuals in coping effectively with the negative stress of international relocation (Baumeister et al., 2003), it does not appear to assist them in their actual adjustment. To utilise the 'stress inoculation' model advanced by Meichenbaum (1975), self-esteem may protect individuals from experiencing the dysfunctional aspects of stress associated with relocation, but not actually aid in adjustment. However, it just may be that the results, at least where self-esteem is concerned, may be vastly understated, again, for reasons that are solidly anchored in the uniqueness of both the international setting, and the particular sampling being profiled. For example, to extend a similar logic, such as that applied above where previous (flexibility) results were briefly discussed, the culture, which is Christian based, may actually prevent or limit responses that advance a view of 'self' that might in any way be perceived as being superior to those of the next person, thereby perhaps skewing the final analysis.

Limitations of Present Research

Clearly this study was conducted on a very homogeneous population. The subjects had relatively the same education, identical job descriptions, worked under very similar conditions, and lived in the same non-work environment. Consequently, it is difficult to make generalisations to other groups. It would be valuable to conduct similar studies not only with other organisational groups, but also in different geographical settings. Similarly, a design that does not rely solely on self-report may add considerably to the validity of the findings. This study also does not specifically measure whether or not expatriates are successful in their jobs as educators. It may also have been helpful to have controlled for job tenure. Finally, although we noted, empirically, some subtle differences in the responses from foreign nationals from North America, the United Kingdom, and other countries in the Caribbean, we were prevented from formally or officially collating these

data in this particular way due to constraints placed on the survey design and analysis by the host country. As mentioned in our previous study, this may have significant influence, particularly in getting more accurate measurements in the flexibility and self-esteem domains, as many educators of Caribbean extraction come from countries that share a similar heritage and tradition. As a result, future research needs to match clearly country of origin with specific response, which we believe can more powerfully highlight the role played by self-efficacy, flexibility, self-esteem, and pay satisfaction in the adjustment experiences of expatriate teachers.

Practical Implications

Despite the limitations of this study, and the one which preceded it (von Kirchenheim and Richardson, 2005), there are some clear implications for individuals and organisations involved in the expatriation process. Of paramount importance, appear to be the issue of self-efficacy and pay satisfaction. From a personal point of view, those who score high on scales which measure self-efficacy, and those who perceive their international endeavours as being rewarded in a beneficial fashion, appear to be the ones most likely to find success within the international relocation process. From an organisational perspective, the accurate measurement of some of these studied factors may provide valuable information to the employer regarding those applicants that have the greatest probability of adjustment; because with little exception, as has been previously demonstrated, maladjustment prevents even the most technically or professionally qualified employees from working to their full potential.

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White collar work: Career ambitions of Fiji final year school students

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The career ambitions of 1012 pupils in the final years of secondary schooling in Fiji were surveyed. The range of careers they nominated was very narrow, with teaching, nursing and other white collar work in the majority of responses. This stands in somewhat stark contrast to projected labour force needs, and the current serious shortage of skilled workers in key growth industries. Data on factors influencing pupil career choice indicated that over 80 per cent knew someone about the kind of job they were aiming for, and that many of these people were adults in their local environment. This finding emphasises the role schools must play if the skilled human resource potential of Fiji is to be realised. Schools in which a well-supported technical and vocational training program (TVET) was established tended to show much wider career ambitions, not only for TVET students but also for students in the academic strands.

School-leavers, career ambitions, local influences, technical vocational education training, TVET, Mathematics

INTRODUCTION

This paper reports on preliminary analysis of research undertaken in 2005 in nine very different secondary schools in Fiji. Responses were completed to a survey by 1012 students, with the majority from Form 7 (Year 12), some from Form 6, and some from the technical and vocational education and training sector (TVET). The purpose was to investigate school to work transitions. Pupils came from a variety of socio-economic backgrounds in the north, west, Nadi and Suva. The original idea to conduct this study came from Veramu's (1992) research. He interviewed 1008 young people aged 15-29 years of both races in rural and urban areas and found "high but unrealistic expectations for future employment" (ECREA, 2002, p.9). It was hypothesised that if this were also true for senior high school graduates, it would impact on future Fiji human resource capacity. Veramu (1992) concludes that "too many of them were unemployed and the reality is that the current education system does not provide the necessary skills required by the job market" (ECREA, 2002, p.9). The 2000 national education report reached similar conclusions (Tavola, 2000; Sharma, 2000).

The last three years have seen a much greater emphasis on TVET in secondary schools. Yet it has always been difficult to persuade parents and pupils of the value of vocational study. While secondary schools can develop subjects and courses that are more responsive to market needs, there remains the problem of student choice. Senior-level pupils and their parents still cling to traditional white collar job stereotypes.

BACKGROUND

Fiji and its Economy

A relatively prosperous state, Fiji forms an important centre of industry and education in the South Pacific (EU, 2002a, p.29). GDP was predicted to grow at 4.1 per cent in 2005 (Fijilive, 2005). Life expectancy is around 70 (World Bank, 2003). Literacy is around 91.6 per cent (EU, 2002b, p.7). Formerly reliant on sugar production, Fiji has developed garment manufacturing industries (Storey, 2004), and become an international tourist destination. The tourist industry is growing very rapidly (Waqausa, 2004; Narayan, 2003), creating not only a new labour market (direct and subsidiary sectors), but new education and training imperatives (Yarrow, Strachan and Krishnamurty, 2000). However, the sugar and garment industries are under threat as the world moves towards full economic integration. The future will see some radical, potentially destabilising shifts in the economic base of Fiji, in the composition of the labour force, and in education and training alignments (Chand, 2001). Fiji has already undergone some “deagrarianisation” (Potter and Cooke, 2004, p.306). Over half the population are urban residents (Connell, 2003).

Fiji has a population skewed towards youth, so the entry of large numbers of workers with inappropriate qualifications into the urban labour market in a climate of low growth of traditional employment opportunities, and diminishing wage rigidity, will lead to a growing pool of under- and un-employed people (Chand, 2003, p.22) and social unrest. So careful development of human capital potential is therefore central not only to a future stable economy, but to the maintenance of political stability. However, it would appear from our research that an important locus of future career decision-making still lies in outdated family and community discourses about traditionally appropriate jobs for Fijians, Indians, males and females. This suggests an increasing role for schools in actively shaping the career ambitions of pupils.

Secondary Education and Training

Tables 1 and 2 show that total enrolments increased in Forms 6 and 7, but perhaps decreased in TVET. Increased enrolments in Forms 6 and 7 (qualifying year for tertiary entry) indicate the present upward credentialling of the local labour market. Formal education has been important for Fijians since first colonisation (Tavola, 1991, p.9), while schools for Indian children were established in 1898 (p.11). Tavola emphasised that “perceptions of education were inextricably linked with white-collar occupations in the modern sector of the economy and social demand throughout the colonial period was for a western-type literary education” (1991, p.15-16). Teasdale explains that,

A system of examinations and reporting regulated progression through the school, and provided incentives for students to acquire knowledge and the formal credentials for having done so. These credentials in turn were linked to subsequent employment. The higher the credentials the more prestigious and well-paid the job at the end. This was the system of education that was exported to Oceania during the colonial era. (Teasdale, 2005, p.2)

Senior schooling in colonial times explicitly produced indigenous civil servants. Tevita Koroi, a Suva school principal, believes that this ideology still prevails so that the entire logic of the Fiji schooling system remains implicitly driven by a colonialist mindset.

Table 1. Form 6 and 7 enrolments by race 2003-2004

Sector	Form 6		Form 7	
	2003	2004	2003	2004
Fijians	6368	6965	1447	1755
Indians	5627	5565	2726	2793
Europeans	118	61	22	28
Chinese	82	58	32	19
Others	454	536	141	142
Total	12649	13185	4368	4737

Source: Fiji Ministry of Education

Table 2. TVET Enrolments by number of schools and gender 2003-2004, along with the total FIT franchise TVET enrolments

Category	2003 (n=63)	2004 (n=62)	2005
Males	1536	1374	
Females	783	600	
Total ^a	2319	1974	
Total FIT Franchise TVET enrolments	644	809	830

Source: Fiji Ministry of Education. n=number of schools. ^a It is not clear whether these figures include those pupils taking Fiji Institute of Technology (FIT) franchised TVET programs in secondary schools.

By the 1950s “post-war prosperity had spread to Fiji and economic growth was starting to be linked with manpower planning” (Tavola, 1991, p.23), although indigenous Fijians were largely left out of this. The Spate (1959, p.24) report recommended that, with the exception of Chiefs, “Fijians should become independent farmers on traditionally owned land, while retaining villages as communal centres”. The 1960s saw the opening of the Derrick Technical Institute (now Fiji Institute of Technology) and the University of the South Pacific in Suva. Independence in 1970 heralded the restructuring of schooling, curriculum reform and Fijian affirmative action. An examination of enrolments at Form 7 show that Fijian enrolments increased from 1447 in 2003 to 1755 in 2004, demonstrating the flow-on effects of affirmative action initiatives.

In the mid-1970s, vocational education started to respond to manpower needs. This continued in the 1980s, but the problem of too many academic school-leavers for the number of white-collar jobs remained, partly because it was hard to convince parents of the merits of vocational education (Tavola, 1991, pp.34-41). This remains a serious problem. In 2002 there was “an average of only 2,000 new jobs for the usual annual figure of 17,000 school-leavers” (Mausio, 2003, p.445). Teacher and nurse training institutions turn away thousands each year, and graduates from some university degrees can take up to ten years to find steady work. Many complete a technical qualification to make themselves more employable. Indo-Fijian teachers and nurses often migrate to other countries leaving a shortfall of practitioners. Yet there are sectors of the local labour market showing such a severe skills shortage that workers are brought in from overseas, for example, skilled garment cutters, pattern-makers and embroiderers, building construction managers, qualified dive instructors, beauticians, chefs and air-conditioning technicians. There seems to be little present alignment of the education system with manpower needs.

We found that the historically-established strong career orientation towards standard white-collar work on the part of pupils and their parents remains strong even though new job opportunities in the public sector have markedly declined. For young males, the fast-growth labour force sectors (FIBS, 2003) are as follows:

- Community, Social and Personal Services
- Manufacturing
- Wholesale/Retail Trade
- Restaurants and Hotels
- Transport, Storage and Communication
- For young females:
- Manufacturing
- Community, Social and Personal Services
- Wholesale/Retail Trade
- Restaurants and Hotels

In the professional fields, Fiji has a shortage of trained psychologists, veterinarians and architects. Yet very few of the occupations just mentioned appeared in the survey.

METHODS OF RESEARCH

This research project involved cooperation between the University of Newcastle and the Fiji Institute of Technology. Survey and interview data were collected from the following schools:

- All Saints Secondary (Labasa)
- Labasa College
- Labasa Sangam (SKM) College
- Ratu Navula Secondary (Nadi)
- Nadi College
- Jasper Williams High (Lautoka)
- Natabua High (Lautoka)
- Ba Methodist High (Ba)
- Nasinu Secondary (Suva)

None of these are so-called 'flagship' schools like Queen Victoria, Adi Cakobau or Yat Sen. They were chosen to approximate general range choices for ordinary pupils and parents who must pay tuition fees for senior years. Nasinu Secondary has an almost exclusively Fijian enrolment while all others have mixed race enrolment. Labasa Sangam, Labasa College and Natabua Secondary enjoy a reputation for excellent examination results. Jasper Williams (all female) and Ba Methodist occupy a starkly contrasting lower socio-economic and academic position. All Saints, Labasa College, Natabua, Ratu Navula and Nasinu all have TVET programs (either Ministry of Education, franchised FIT modules or both). Nadi College takes Form 7 students who have not achieved entry anywhere else. 576 Fijians, 390 Indo-Fijians and 46 coded as 'others' completed the survey. Of Fijians and Indo-Fijians, 538 were female and 428 male. The group of 'others' were not considered by gender. Interviews were conducted with the Principal or Assistant Principal and with Ministry careers officers.

Form 7 education is not readily available everywhere in Fiji. Many of the students in this study came from small islands or the mountainous interior. They lived in local hostels or with relatives. All schools have well-established reputations and some dedicated former pupils who tend to send the next generation there. This is particularly so for Fijian students. As we shall see below, this sense of 'following in the footsteps' of older family members in schooling may extend to following career aims.

Descriptive statistical analysis of some key survey questions indicated that most career ambitions followed stereotypes, namely, white collar work of various kinds. A substantial influence on career decision-making by families and community members was also found.

FINDINGS

In this section, data on parents' occupation, presented in Table 3 is compared with student job choices, shown in Table 4. Best-liked and least-liked school subjects are reviewed with the aim of illuminating how some subjects open or close career options.

Parent Occupations and Student Career Aspirations

Parent's occupations, (see Table 3) were coded using a scale based on Erickson and Goldthorpe's (1992) classification of occupational groupings. Examples are provided.

1. **Professional, executive and senior managerial:** doctor, engineer, lawyer, architect, university lecturer, stockbroker, bank manager, politician, significant business owner, CEO or executive officer, resort manager.
2. **Para-professional, lower-managerial, small business owner:** teacher, school principal, nurse, paramedical and health workers, accountant, field officer, journalist, owns a retail or service business, real estate agent, police, army, ship's captain, foreman, shop steward, farmer (large land-holding), reverend, pastor, clergyman.
3. **Clerical, service and financial:** civil servant, clerk in a small company or business, shop assistant, waitress, bank teller or worker, public relations, receptionist, booking clerk.
4. **Trades and technical fields:** automotive mechanic, mechanical or other engineering (no degree), IT (no degree), carpenter/joiner, tiler, plumber, electrician, telecommunications worker, FEA worker, cook, pastrychef, beautician, builder, musician, classical dancer.
5. **Manual work:** factory worker, cane-cutter, labourer, miner, fisherman, market seller/trader or worker, farmer (small land holding), taxi driver, transport driver, dock worker
6. **Unemployed, no job, domestic labour or housewife:**(no income, small inconsistent income from various sources, or traditional land leased out providing some small income).
7. **Other:** international rugby player.

It is assumed that members of these occupational groupings share relatively similar, Levels of income, levels of economic security, chances of career advancement, scope of authority and control, and levels of work autonomy. (Pakulski, 2004, p.98)

Table 3. Parents' occupations expressed as a percentage (%)

School	Code 1	Code 2	Code3	Code 4	Code 5	Code 6	Code 7	Total
All Saints	0	21.98	2.19	4.39	42.85	25.27	3.29	100
Labasa College	0	22.39	7.60	15.21	43.75	21.85	1.04	100
Labasa Sangam	7	33.10	4.84	5.65	30.65	12.90	5.65	100
Natabua	4	33.98	7.76	5.56	27.18	10.67	1.94	100
Nadi College	7	17.10	9.21	9.21	23.70	27.60	6.57	100
Jasper Williams	0	22.44	2.04	22.44	36.73	16.32	0	100
Ratu Navula	1	12.74	0.98	10.78	46.07	24.50	3.92	100
Ba Methodist	9	10.50	7.90	2.63	27.60	39.50	2.63	100
Nasinu	0	21.10	3.51	13.50	28.14	30.15	3.51	100

Except at Labasa Sangam and Natabua Secondary where there were more occupations in Code 2, over 50 per cent of parent's occupations were manual work or unemployed, no job, domestic

labour or housewife. There is no classic racial explanation of the kind often used to explain such a pattern. Labasa Sangam was certainly 72 per cent Indo-Fijian, and Natabua was almost 60 per cent, but Labasa College – with almost 65 per cent of parent occupations in Codes 5 and 6, was over 65 per cent Indo-Fijian.

Table 4. Student career ambitions expressed as a percentage (%)

School	Code 1	Code 2	Code 3	Code 4	Code 5	Code 6	Code 7	Total
All Saints	22	60.43	5.49	2.19	2.19	3.29	4.39	100
Labasa Coll	18	59.89	5.72	15.62	1.56	0	0	100
Lab Sangam	30	50.80	9.68	8.06	0.80	0	0.80	100
Natabua	35	35.92	5.82	15.56	3.88	0	5	100
Nadi Coll	18	69.70	5.26	2.63	1.32	0	2.63	100
Jasper Will	10	79.59	4.08	0.00	0.00	0	6	100
Ratu Navula	4	41.17	4.90	19.60	29.41	0	0.98	100
Ba Meth	22	68.40	5.26	1.32	0.00	0	3.00	100
Nasinu	13	63.80	6.03	10.00	0.50	0	7.03	100

At seven of the nine schools, where over 50 per cent of parent's occupations were in Codes 5 and 6, over 60 per cent of respondents wanted a job in occupational Category 2. Some just wrote down 'white collar'. At All Saints for example, nearly 60 per cent wanted to be an accountant, a teacher or a doctor. At Labasa College, almost a quarter wanted to become accountants. At Labasa Sangam 20 per cent were hoping for various white collar jobs. At Jasper Williams, 40 per cent aimed to be an accountant or a teacher. At Nadi College, Ba Methodist and Nasinu, 161 of 351 students wrote 'teacher'. In total, the most popular jobs (in descending order) were teacher, accountant, civil servant, engineer, nurse, doctor and lawyer. The career ambitions of most pupils were inflated in relation to actual chance of success, either because the labour sector is already over-supplied, or because the examination results needed for relevant tertiary education are rarely attained by students at that school. Senior educationalists acknowledged the problem of 'mismatch', for example,

This is what happens when you take people through a system that is targeting a white collar job – that job market. It takes young people through that tunnel kind of preparation. So if the job's available they will be able to get those jobs. But if the jobs are not available, those young people just stay (...) in towns. (...) It's partly the system - partly the opportunities that are available and the advice that they get. That's the kind of perception most people have – you go to school and you get a job – you get a government job. And when you look at government jobs it's mostly teaching and nursing and I know a few departments and ministries that used to take people into the public service (...). So it's that which has been there for quite some time. (Tevita Koroi, Principal – Nasinu Secondary, October 2005)

Ratu Navula and Natabua schools stand out in Table 4, although for different reasons, since 52 per cent of students at Natabua were contemplating non-traditional professional or para-professional careers, higher than any other school. Moreover, almost 50 per cent of students at Ratu Navula indicated a job in Codes 4 and 5, reflecting their career orientation towards sectors of the local tourism industry. Innovative approaches to careers education are taken in those two schools and both have well-supported and extensive TVET programs.

SUBJECT PREFERENCES AND STUDENT CAREER AMBITIONS

The accepted wisdom of career counselling is that young people should form career ambitions around the subjects they like, and avoid fields they dislike. Table 5 presents the modal response within each school of students' favourite and least favourite subjects.

Table 5. Most common favourite and least favourite subjects by school (n=1012)

School	Favourite Subject (mode)	Least Favourite Subject (mode)
All Saints Secondary School	Economics and Accounting	Mathematics
Labasa College	Mathematics	Mathematics
Labasa Sangam (SKM) College	Mathematics	Mathematics
Natabua High School	Mathematics	Mathematics
Nadi College	English	Mathematics
Jasper Williams High School	English	Mathematics
Ratu Navula	English	Mathematics
Ba Methodist	English	Mathematics
Nasinu	English	Mathematics

As survey respondents self-nominated, it was possible for some to name Mathematics as their favourite, while others named it least favourite. However, approximately 45 per cent of 1012 students disliked Mathematics, while only around 25 per cent at the three highest achieving schools liked it. Mathematics constitutes a significant career barrier for many students. All Principals expressed concern about this.

INFLUENCES ON CAREER AMBITIONS

A preference scale indicated the importance or otherwise of a list of factors influencing career choices. A response of ‘1’ indicated extremely important and ‘5’ signalled unimportant. Table 6 ranks the factors that influence personal career choice.

Table 6. Ranking of factors influencing personal career choice (n =1012)

Factor	Rank
Success in a school subject	1.1
Future income	1.3
Future job security	1.3
To support my future family	1.3
Interest in a school subject	1.3
My own interests	1.4
Teachers at school	1.8
Family members and relatives	1.9
Reading about jobs	1.9
Ideas from media	2.3
So I can move overseas	2.6
People that I met	3.1
Input from friends	3.3

These ranked factors do not however represent the actuality of student choice processes. On another question it was obvious that family members and relatives, the church and the local community play a much more significant role than is implied in responses here. We note though, that the apparent wide agreement that success in a school subject is important, bears upon the issue of general antipathy to Mathematics.

The question that followed the request to say what job they would like, was whether they had ever met anyone with that kind of job. The next question asked: ‘If yes, how did you meet (or know) that person?’ and participants could indicate that it was either a family member, neighbour or community contact. Table 7 presents the results to both questions and shows that in all schools, more than three quarters answered ‘yes’.

The lowest affirmative responses from Natabua and Jasper Williams schools, are probably low for slightly different reasons. In both schools students were aiming for Code 1 occupations, so possibly they had never personally met an architect or lawyer, for example.

Table 7. Responses to ‘Have you ever met anyone with that job?’ (n=1012), along with male and female responses as to how they knew the person (n=827)

School	Yes=1 %	Male %	Female %
All Saints	86	47.61	69.81
Labasa Col	83	45.65	61.35
Lab Sangam	81	52.94	64.40
Natabua	78	62.50	46.87
Nadi Coll	83	27.27	57.50
Jasper Will	76	0	71.87
Ratu Navula	85	35.50	29.26
Ba Meth	84	36.36	43.75
Nasinu	80	48.31	64.83

This data contradicts the earlier data on factors influencing career decisions. For example it appears ‘family’ often does play a very important role. Broadly speaking, females were more likely to be following a family or local community member in their career choices. No ‘race’ pattern in responses was found. Instead, the difference seems to derive from the commitment to careers education of the school itself. The most notable exception to the trend, Ratu Navula school, offers the most substantial TVET programs oriented to the relatively new local tourism industry, so it may be that a generational reproduction effect is more effectively minimised there.

DISCUSSION

In summary the following relationships were found.

- A limited range of career choices were based seemingly on who one met in the first 17 years of life and lack of labour market knowledge.
- A limited range of career choices were based on the career aspirations of the previous generation and the dominance of the colonialist white collar work discourse.
- A range of career choices with highly competitive entry points to tertiary training involving severely limited quotas for nursing, teaching, and USP degree study, further complicated by failure and fear of Mathematics.
- The range of career choices was limited by fixed ideas about gender and race.
- There was danger of choosing a career with high levels of graduate unemployment.
- There was danger of choosing jobs and careers linked to shrinking industries and institutions (like the civil service), rather than expanding ones.

More than two-thirds of the desired jobs nominated by students at the nine schools were in the Code 2 occupations of accounting, teaching, civil service and nursing, or Code 1 occupations of medicine, engineering and law. Given the original Veramu (1992) finding, it does seem that career aspirations of students at most schools are inflated, or at least distorted, in relation to actual chances of success. For instance, according to the Lautoka Teachers College 2003 prospectus, each year approximately 6,000 applications are made for less than 300 actual places. Similar numbers apply to the Fiji College of Nursing for a strictly limited quota of places (around 210). Fiji College of Advanced Education, USP and FIT also have very large numbers of Form 7 graduates applying. In all cases it will be examination results that determine entry, and access to scholarships. A teacher at Ba Methodist School claimed that when some graduating Form 7 Fijian students failed to obtain entry to commerce programs, teacher or nurse-training, and were unable to find a white collar job, they simply returned to the village, especially the girls. While this is certainly understandable, it does represent a net loss of human resource potential for the nation, and a lack of return on the considerable investment of parents in schooling. Moreover, it would be

so much better if the young person in question were to return to the local community with much-needed high level technical skills in areas like agriculture, marketing, mechanics or textiles, rather than just the abstract academic knowledge obtained in senior school. In fact, the three most desired occupations of Fijian students, accounting, teaching, and various other kinds of white collar work, are virtually guaranteed to ensure the young person who does get this kind of job never returns to his or her own small, local community, whereas some other occupations such as plumber, electrician or seamstress, do offer that possibility.

In relation to school subjects, we conclude that in both direct and indirect ways, Mathematics as it is currently taught to Form Four and Five acts as a gate-keeping device, implicitly favouring the academic orientations of only some students. Excluding 'others', 52 per cent of females indicated Mathematics was least favoured, compared to only 35 per cent of males (Chandra and Lewai, 2005; Evening, 2004). Even more starkly, 72 per cent of Fijian students indicated they disliked Mathematics (Puamau, 2002), compared to only 31 per cent of Indo-Fijian students. It is a case of the system failing the pupils rather than the pupils failing the system. All nine Principals confirmed the existence of the Mathematics 'problem' and expressed concern about the effect it had on student confidence. It may also have an indirect influence on career ambitions. If so many students dislike Mathematics, then this must affect their choice of disciplinary study streams in senior years. Many implicitly rule themselves out of careers by avoiding Mathematics. Certainly some knowledge of Mathematics is required for many of the highest growth labour sector jobs. However, calculus, advanced trigonometry or algebra need not be included. More training in simple arithmetic, geometry, statistics, and less reliance on calculators is needed, and should form the basis for a second level of senior Mathematics study.

Responses to the preference scale for influences on career choice must be read sceptically, since implicit denial of family influence is contradicted responses to particular questions. For Fijians, for example, culturally children usually play an almost insignificant role in family decision-making, although this may be changing for urban-dwellers. In the survey, almost all females who wanted to be nurses identified a relative as role model, and the same pattern was true for males who wanted to be agricultural field officers. In other words, the formation of career ambitions seems grounded in the particular local environment for over half of these young people, possibly experienced as a much more authoritative source of ideas about jobs than the abstract world of career choice pamphlets that schools might provide. It became clear from interviews with Principals that the two schools at which this pattern was least evident were those with successful TVET programs and well-organised careers counselling, as well as careers information days.

The generational reproduction pattern is identified as a problem. With the best intentions, parents and families may well be advising students, and recommending role models for occupational choices, which made more sense 20 years ago than they do now.

This is part and parcel of the colonial legacy. Because for a long time, since colonisation, Fijian parents, as well as Indian parents, have been led to believe, or could I say, have been misled to believe, that the best work anybody could ever get is in the white collar jobs. (...) Fijian citizens have been led to believe that, you know, get your kids educated so they become teachers, doctors, nurses and all, because that is where the money lies. (Mr Nemani, Careers Officer, Ministry of Education, September 2005)

However, not only is that no longer 'where the money lies', but obtaining any kind of 'white collar' job can no longer be expected. There are a great many more rewarding careers now than becoming a white collar worker, which promise less intensely competitive tertiary entry, better graduate employment prospects, and higher pay rates. But senior students seem mostly unaware of this.

CONCLUSION

In Fiji the rhetoric of many educationalists and economists is about building human resource capacity to support a new set of industries and endeavours. However, our research indicates that this may stand for nothing if young people and their families continue to believe in only a narrow and outdated set of career paths.

At present it seems some schools rely for careers education mainly on information given out by tertiary education providers during school visits. Since tertiary institutions are primarily interested in promoting their own courses, this does not represent anything like adequate careers education. We recommend in this article systematic expansion of careers module teaching and counselling in schools, right down to primary schools, with careers information made directly available to all parents, even those in villages, perhaps through the local primary school. Parents, who care deeply about the future of their children, and spend a great deal of their income on schooling, should have much better careers awareness. This could be achieved through some informal training sessions using existing forums such as church groups, village meetings, school functions and so on.

Our research findings strongly suggest that a broader range of imagined career options, and less stereotyped career ambitions, were observable at the schools where solidly-supported TVET programs were offered. We suggest that the positive focus of principals, teachers and community leaders on these programs may alter the entrenched school culture of traditional white collar work as the only logical outcome of completing Form 6 or Form 7. Accordingly we recommend the considerable expansion of well-supported, high profile TVET programs in secondary schools, not only because they are sorely needed, but because there is some evidence that the very presence of these programs in schools expands future career awareness for all pupils. It is possible to imagine a much more flexible senior curriculum in Fiji, with integration of practical and academic subjects leading to more targeted pre-career study. A further recommendation emerging from the research is for the introduction of another kind of Mathematics syllabus from Form 3, so the subject does not act as an implicit gate-keeping device, keeping some groups of students away from particular career categories.

In closing, we stress that our data implies the continuing pattern of large numbers of well-educated young people entering the urban labour market only to be disappointed. If the trend goes unchecked, this will only add to the existing high numbers of over-educated, unemployed young people, a recipe for social unrest. It seems a great waste of local Fijian human potential when overseas workers must be brought in to fill so many gaps in the labour force. We maintain that relevant secondary educational reform is central not only to ensuring Fiji has a sustainable economy in the future, but through that, to the future maintenance of political stability, in which traditional cultures can be maintained without conflict.

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Using students' assessment of classroom environment to develop a typology of secondary school classrooms

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Research employing the Technology-Rich Outcomes-Focused Learning Environment Inventory (TROFLEI) was conducted in Australian secondary schools. A sample of 4,146 students from 286 classes responded to the TROFLEI which assesses 10 classroom environment dimensions: student cohesiveness, teacher support, involvement, task orientation, investigation, cooperation, equity, differentiation, computer usage and young adult ethos. Validation data attested to the sound structural characteristics of the TROFLEI. Cluster analysis was used to develop a classroom typology of five relatively homogeneous groups of classes which were described as exemplary; safe and conservative; non-technological teacher-centred; contested technological and contested non-technological.

Classroom environment, classroom typology, cluster analysis, technology-rich learning, outcomes-focused learning

CLASSROOM ENVIRONMENT RESEARCH

During the past 35 years, the study of classroom environments has received increased attention by researchers, teachers, school administrators and administrators of school systems. The concept of environment, as applied to educational settings, refers to the atmosphere, ambience, tone, or climate that pervades the particular setting. Research on classroom environments has focussed historically on its psychosocial dimensions, those aspects of the environment concerned with human behaviour in origin or outcome (Boy and Pine, 1988). Reviews of classroom environment research by Fraser (1998b), Dorman (2002), Goh and Khine (2002) and Khine and Fisher (2003) have delineated at least 10 areas of classroom environment research including: associations between classroom environment and outcomes, evaluation of educational innovations, differences between students' and teachers' perceptions of classrooms, comparisons of actual and preferred environments, effect on classroom environment of antecedent variables (for example, gender, year level, school type, subject), transition from primary to secondary school, school psychology, teacher education, educational productivity research, and using environment instruments to facilitate changes in classroom life.

Because of the ethical dilemma of deliberately manipulating environments in a true experimental design, almost all environment-outcomes research has used ex post facto designs and correlational data techniques. Results of studies conducted over the past 30 years have provided

convincing evidence that the quality of the classroom environment in schools has a significant influence on student learning (Fraser, 1994, 1998a). That is, students learn better when they perceive the classroom environment more positively. Importantly, many of these studies have controlled for background variables with students' perceptions of the classroom environment accounting for appreciable amounts of variance in learning outcomes, often beyond that attributable to background student characteristics.

During the last decade, significant research on the use of computers in classrooms has been conducted. Much of this research has focussed on the effect of computer usage on student attitude, social outcomes, motivation and interest (see Bain, McNaught, Mills, and Lueckenhausen, 1998; Goh and Tobin, 1999; Lajoie, 1993; Schofield, Eurich-Fulcer, and Britt, 1994). However, few studies have investigated psychosocial dimensions of computer classroom environments. In one study that did involve classroom environment, Mucherah (2003) investigated the environment in social science classrooms using technology. This study raised important issues concerning the inadequacy of training and support of teachers who attempted to integrate the use of computers in the curriculum. Recently, Dellar, Cavanagh and Romanoski (2006) reported associations between information and communication technology learning and classroom learning culture and Lu, Wan and Ma (2006) investigated the use of wireless laptops in college classrooms that purportedly had a constructivist learning environment.

The use of cluster analysis to establish typologies of classrooms based on assessments of classroom environment is not common. Moos (1978) developed a five-cluster solution with the following classroom orientations: control, innovation, affiliation, task completion and competition. McRobbie and Fraser (1993) used the Science Laboratory Environment Inventory in typological research in Queensland science classrooms. Brekelmans, Levy and Rodriguez (1993) employed the Questionnaire on Teacher Interaction in The Netherlands to develop a typology of teacher communication style that had eight profiles: directive, authoritative, tolerant and authoritative, tolerant, uncertain and tolerant, uncertain and aggressive, repressive, and drudging. In recent research, Rickards, den Brok and Fisher (2005) built upon this Dutch research to develop similar profiles for teacher communication styles in Australian schools.

The purpose of the present article is to report the use of a relatively new classroom environment instrument, the Technology-Rich Outcomes-Focused Learning Environment Inventory (TROFLEI) which has ten scales: student cohesiveness, teacher support, involvement, task orientation, investigation, cooperation, equity, differentiation, computer usage and young adult ethos. Details of the development and validation of actual and preferred forms of the TROFLEI using multitrait-multimethod (MTMM) modelling within a confirmatory factor analysis framework have been reported by Aldridge, Dorman, and Fraser (2004). The research reported in this article uses cluster analysis to develop a typology of classrooms based on TROFLEI data collected from a large sample of Australian secondary school students. The following section describes the study.

DESIGN OF PRESENT STUDY

Research Objectives

The present research had two objectives:

- a) to validate the TROFLEI using a large sample of Australian secondary school students, and
- b) to establish a typology of classrooms based on students' perceptions of classroom environment.

Sample

A sample of 4,146 students from 10 secondary schools in Western Australia and Tasmania responded to the Technology-Rich Outcomes-Focused Learning Environment Inventory (TROFLEI). Table 1 describes the sample. These students were from 286 classes. One of the Western Australian schools in the sample has embraced technology to a very high degree with computer usage integrated throughout the teaching and learning activities and general administration of the school.

Table 1. Description of sample

Gender	Sample Size					Total
	Year 8	Year 9	Year 10	Year 11	Year 12	
Male	78	57	71	1,138	591	1,935
Female	73	66	108	1,149	815	2,211
Total	151	123	179	2,287	1,406	4,146

Assessment of Classroom Environment

The TROFLEI consists of 80 items assigned to 10 underlying scales (8 items per scale). Table 2 shows scale descriptions and a sample item for each scale. Seven of the 10 TROFLEI scales are from the *What is Happening in this Class?* (WIHIC) instrument which is a well-established and widely-used questionnaire in classroom environment research (see Aldridge and Fraser, 2000; Dorman, 2003). The WIHIC scales are: student cohesiveness, teacher support, involvement, task orientation, investigation, cooperation, and equity.

Table 2. Descriptive information for 10 TROFLEI scales

Environment Scale	Scale Description	Sample Item
Student Cohesiveness	The extent to which students know, help and are supportive of one another.	I am friendly to members of this class.
Teacher Support	The extent to which the teacher helps, befriends, trusts and is interested in students.	The teacher considers my feelings.
Involvement	The extent to which students have attentive interest, participate in discussions, do additional work and enjoy the class.	I explain my ideas to other students.
Task Orientation	The extent to which it is important to complete activities planned and to stay on the subject matter.	I know how much work I have to do.
Investigation	The extent to which skills and processes of inquiry and their use in problem solving and investigation are emphasised.	I carry out investigations to test my ideas.
Cooperation	The extent to which students cooperate rather than compete with one another on learning tasks.	I share my books and resources with other students when doing assignments.
Equity	The extent to which students are treated equally by the teacher.	I get the same opportunity to answer questions as other students.
Differentiation	The extent to which teachers cater for students differently on the basis of ability, rates of learning and interests.	I do work that is different from other students' work.
Computer Usage	The extent to which students use their computers as a tool to communicate with others and to access information.	I use the computer to take part in on-line discussions with other students.
Young Adult Ethos	The extent to which teachers give students responsibility and treat them as young adults.	I am encouraged to take control of my own learning.

The robust nature of the WIHIC's reliability and validity has been widely reported in studies that have used the instrument in different subject areas, at different age levels and in nine different countries. Since the initial development of the WIHIC, the questionnaire has been used successfully in studies to assess the learning environment in Singapore (Fraser and Chionh, 2000), Australia and Taiwan (Aldridge and Fraser, 2000), Brunei (Khine and Fisher, 2001), Canada (Zandvliet and Fraser, in press), Australia (Dorman, 2001), Indonesia (Adolphe, Fraser and Aldridge, 2003), Korea (Kim, Fisher and Fraser, 2000), the United States (Allen and Fraser, 2002), and Canada, England and Australia (Dorman, 2003). Within these countries, the WIHIC has assessed the environment in a range of curriculum areas including high school science (Aldridge and Fraser, 2000), mathematics (Margianti, Fraser and Aldridge, 2001), mathematics and science (Raaflaub and Fraser, 2002) and mathematics and geography (Fraser and Chionh, 2000).

Three new scales of educational importance were developed for the purpose of this study. In order to capture the individualised nature of an outcomes-based program, a differentiation scale was adapted from the Individualised Classroom Environment Questionnaire (ICEQ; Fraser, 1990). This scale assessed the extent to which the teacher provides opportunities for students to choose the topics on which they would like to work and progress at their own pace. Because technology-rich learning environments required students to use computers in a range of ways, the computer usage scale was developed to provide information about the extent to which students used computers in various ways (for example, email, accessing the internet, discussion forums). Finally, a young adult ethos scale was developed to assess the extent to which teachers gave their students responsibility for their own learning.

Historically, negatively-worded items have been used in classroom environment instruments to guard against passive responses. However, Barnette (2000) questions the utility of such items, as they could not be considered direct opposites of their positively-worded counterparts. In addition, studies have revealed that positively-worded items improved response accuracy and internal consistency (Chamberlain and Cummings, 1984; Schreisheim, Eisenbach and Hill, 1991; Schriesheim and Hill, 1981). It was considered appropriate, therefore, to use only items with a positive scoring direction in our study.

Students responded to items using a five-point Likert format, of 'Almost Never', 'Seldom', 'Sometimes', 'Often', 'Almost Always'. To provide contextual cues and to minimise confusion to students, it was considered appropriate to group together those items that belonged to the same scale instead of arranging them randomly or cyclically (Aldridge, Fraser, Taylor and Chen, 2000). Scale scores for each respondent were obtained by aggregating scores for the eight items for that scale.

Data Analysis

Scale scores were computed for each student. These scores were used to calculate scale means for each of the 286 classes. Hierarchical cluster analysis, a procedure which attempted to identify relatively homogeneous groups of cases based on selected characteristics, was performed on the data. Analyses used these scale means for each class to establish clusters of classes. To verify that the selected cluster solution separated the cluster groups, a multivariate analysis of variance (MANOVA) was performed on the data using the 10 TROFLEI scales as dependent variables and cluster membership as the grouping variable. Tukey's post hoc procedure was used to ascertain if pairwise comparisons of cluster group means revealed statistically significant differences.

RESULTS

Validation of TROFLEI

Factor Analysis

Detailed validation of the TROFLEI using confirmatory factor analysis has been reported elsewhere and is not reported here (see Aldridge, Dorman and Fraser, 2004). A principal components factor analysis with varimax rotation was performed on the data. It yielded 10 factors that accounted for 64.6 per cent of variance in TROFLEI scores. All items had loadings of at least 0.46 with the factor corresponding to their a priori scale and below 0.35 with other factors ($M = 0.70$, $SD = 0.08$).

Scale Statistics

Internal consistency reliability coefficients (Cronbach coefficient alpha) were computed for each scale with the individual student and class as units of analysis. Analyses conducted with the class as the unit of analysis used the class mean as the measuring statistic (see Table 3). These results show that all scales had good internal consistency. Indices ranged from 0.82 for differentiation to 0.95 for equity with the individual as the unit of analysis and from 0.86 to 0.98 with the class as the unit of analysis. They compare favourably with those reported in previous learning environment research (for example, Dorman, Adams, and Ferguson, 2002; Dorman and Ferguson, 2004).

Table 3. Scale statistics for 10 TROFLEI scales

Environment Scale	Cronbach α		Mean Correlation		ANOVA $F(285, 3860)$	Scale Statistics	
	Student	Class	Student	Class		M	SD
Student Cohesiveness	0.89	0.94	0.38	0.45	2.83	31.84	2.43
Teacher Support	0.93	0.97	0.41	0.48	5.51	28.97	3.69
Involvement	0.91	0.95	0.46	0.53	2.94	26.60	2.78
Task Orientation	0.89	0.93	0.39	0.47	2.36	31.68	2.22
Investigation	0.94	0.95	0.38	0.46	2.45	24.46	2.86
Cooperation	0.92	0.95	0.41	0.47	2.80	30.64	7.48
Equity	0.95	0.98	0.37	0.45	3.17	32.52	3.10
Differentiation	0.82	0.86	0.22	0.23	3.12	24.47	2.93
Computer Usage	0.88	0.93	0.20	0.21	6.50	24.33	4.72
Young Adult Ethos	0.94	0.97	0.37	0.45	3.04	33.18	2.76

Note. Scale means and standard deviations were computed using item class means.

Discriminant validity (using the mean correlation of a scale with the remaining nine scales as an index) ranged from 0.20 for the Computer Usage scale to 0.46 for the Involvement scale with the individual as the unit of analysis and from 0.21 to 0.53 with the class as the unit of analysis (see Table 3). These values suggest that the TROFLEI's scales are distinct but tend to overlap. Given that the TROFLEI has 10 scales assessing classroom environment, this result is not surprising.

In order to establish whether the TROFLEI differentiates between classes, a one-way ANOVA with the individual student as the unit of analysis and class membership as the main effect was performed for each scale. The results of these analyses are shown in Table 3 and indicate that all 10 scales differentiated significantly between classes ($p < 0.001$). The eta² statistic, which is a ratio of between to total sums of squares (Cohen and Cohen, 1975), indicated that the proportion of variance explained by class membership ranged from 14.39 per cent for the Task Orientation scale to 31.97 per cent for the Computer Usage scale. Table 3 also shows means and standard deviations for each scale.

CLUSTER ANALYSIS

A review of dendograms based on hierarchical cluster analysis indicated that a five cluster solution in which 279 of the 286 classes could be clustered was appropriate. These clusters accounted for 4,067 of the 4,146 students in the sample (98.1%). These five homogeneous groups (Clusters A, B, C, D and E) contained respectively 156 classes (2,122 students), 62 classes (1,077 students), 15 classes (181 students), 31 classes (546 students), and 15 classes (220 students). Figure 1 shows TROFLEI mean scores for these five clusters.

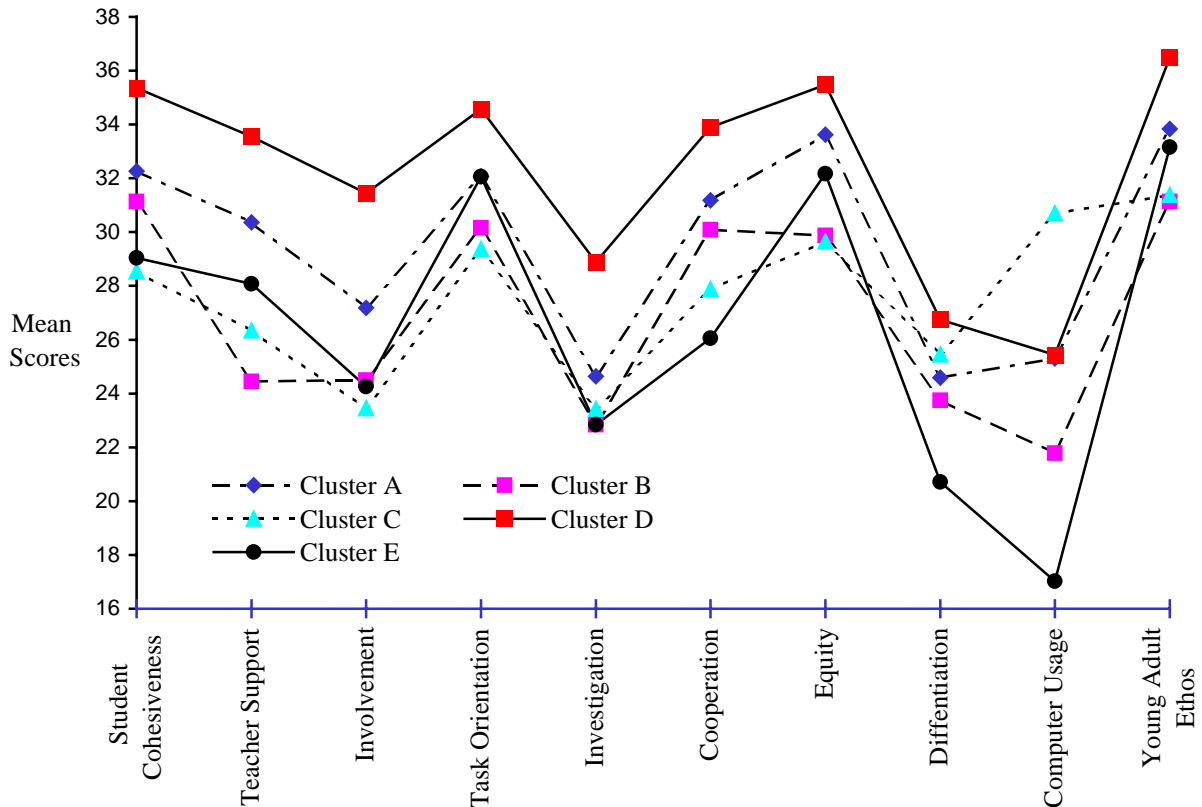


Figure 1. Mean scores for five clusters of students for 10 TROFLEI scales

In order to verify this five cluster solution, a multivariate analysis of variance (MANOVA) was performed on the data using the 10 TROFLEI scales as dependent variables and cluster membership as the grouping variable. The MANOVA analysis was significant with Wilks' lambda criterion of 0.003, $F(40,1006) = 22.8$ ($p < 0.001$). Univariate F tests for the effect of cluster grouping on each TROFLEI scale yielded the following results: Student Cohesiveness, $F(4,274) = 51.9$ ($p < 0.001$); Teacher Support, $F(4,274) = 123.5$ ($p < 0.001$); Involvement, $F(4,274) = 107.8$ ($p < 0.001$); Task Orientation, $F(4,274) = 44.0$ ($p < 0.001$); Investigation, $F(4,274) = 42.4$ ($p < 0.001$); Cooperation, $F(4,274) = 51.9$ ($p < 0.001$); Equity, $F(4,274) = 49.5$ ($p < 0.001$); Differentiation, $F(4,274) = 14.1$ ($p < 0.001$); Computer Usage, $F(4,274) = 34.5$ ($p < 0.001$) and Young Adult Ethos, $F(4,274) = 39.9$ ($p < 0.001$). Tukey's post hoc procedure revealed that 77 of 100 comparisons of cluster group means were significant ($p < 0.05$). These analyses confirm that this cluster solution separated the classes into five distinct groups.

Consideration of Figure 1 indicated the following findings: scale means for Cluster D were the highest on all scales apart from Computer Usage. Clusters C and E has low scale means on most scales. The exception to this pattern was Computer Usage for Cluster C which was the highest for the five groups. In fact, eight Cluster C scale means and nine Cluster E scale means were below the respective means for the full sample. However, Clusters C and E can be distinguished by the

means for one scale: Computer Usage for which Cluster E had the lowest mean and Cluster C the highest mean.

Although all 10 Cluster B means were below their respective full sample scale mean, there were only two scales for which the Cluster B mean was the lowest: Teacher Support and Involvement. Cluster A constituted 156 of the 279 clustered classes. While its scale means were all above the full sample mean, none of the Cluster A scale means was more than 0.36 standard deviations above the respective full sample scale mean. In general, Cluster D classrooms had the most positive environments. Clusters D and E has the poorest environments. Cluster A classrooms were above average but they were not the most positive environments in the sample. Cluster B classes were below average but they were not the poorest environments. It is noteworthy that only 31 of the 279 classes fell into Cluster D and that Clusters C and E had a total of only 30 classes.

DISCUSSION

This research has shown that the TROFLEI has very sound psychometric properties. Its scales have very good internal consistency reliability and it has very sound factorial validity. Its overall structure compares favourably with classroom environment instruments developed over the past two decades and reported in reviews of classroom environment research by Dorman (2002), Fraser (1998a, 1998b, 2002). Of significance is the fact that the TROFLEI assesses contemporary dimensions of classroom environments. This reflects the view that classroom environments are dynamic rather than static entities and that instrumentation needs to be continually reviewed. It is now customary to validate context-specific instruments rather than simply use an instrument 'off the shelf' when conducting classroom environment research.

The results of the cluster analysis raise three important issues. First, although it is possible to establish typologies of classes through cluster analysis, little research has been conducted in this area. Typically, classroom environment research of the past 35 years has used large student samples and employed quantitative data collection methods. Cluster analysis provides a very useful way of achieving parsimony when such data are analysed. Each of the clusters identified in this study can be assigned a descriptor that encapsulates the main characteristics of that cluster. For this study, the five acceptable descriptors are: Cluster A: safe, conservative; Cluster B: non-technological teacher-centred; Cluster C: contested technological; Cluster D: exemplary; Cluster E: contested non-technological.

Second, only 11 per cent of classes (31/279) were assigned to Cluster D – the exemplary environments cluster. This is a disappointing result and suggests that there is considerable room for improvement in the environments of many of the remaining 248 classes. It is also noteworthy that Computer Usage was the only scale for which Cluster D did not have the highest cluster score. Computer Usage had the lowest mean for the full sample but, as the profiles of Figure 1 indicate, it had the highest spread of results. There is considerable variation in Computer Usage scores and this suggests that there are divergent ways in which computers are being employed in schools. One of the schools in the sample was established with the aim of integrating technology into all aspects of the school including administration, teaching and learning. Of the 31 classes in Cluster D, only four classes were from the 115 classes surveyed in this school. It is noteworthy that 95 of the 115 classes from this school were in Clusters A and B, neither of which scored the highest on Computer Usage. It would appear that students' perceptions of Computer Usage are not consistent with the rhetoric of the school in terms of the integration of computers into everyday school events.

Finally, it is desirable that research builds upon and extends the findings of this cluster analysis. To unravel the complexities of classroom environments, the exemplary classrooms of Cluster D should be studied in more detail. Through observation and intensive, focussed qualitative research

it would be possible to ascertain the key behaviours of teacher and students in these classrooms. Such findings would be of particular benefit in pre-service teacher education courses and in-service professional development for practising teachers.

CONCLUSION

This study has reported the use of the TROFLEI to identify homogeneous clusters of classes from a large sample of secondary school classrooms. The TROFLEI is a relatively new classroom environment instrument developed within the traditions of high inference measurement which have been the dominant methodology of learning environment research for the past 35 years. Validation data attested to the TROFLEI's sound structure. It is desirable that further research on classroom environment typologies be conducted so that a body of literature can be firmly established.

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Use of webcasting technology in teaching higher education

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Schools and universities all over the world are continuously exploring ways to use the web technology in improving teaching effectiveness. The use of course web pages, discussion groups, bulletin boards, and e-mails have shown impact on teaching and learning in significant ways, across all disciplines. e-Learning has emerged as an alternative to traditional classroom-based education and training, especially for distance learning programs. Thus, this research study was conducted to investigate the effectiveness of the implementation of webcasting technology in teaching in higher education. In this research, three modes of webcasting lectures were experimented on three different groups of students, using the pre test-post test-control group experimental design. The modes are live streaming, pre-recorded streaming and video on demand (VOD). The group that attended the face-to-face lecture acts as the control group. The overall analysis showed that the students who went through the VOD group showed the most gain in the tests.

Webcasting technology, online learning, web-based learning, distance learning, higher education

INTRODUCTION

Computer-based systems have great potential for delivering teaching and learning material. According to Evans, et al. (2004), the growth of the internet has boosted the use of the web for teaching and learning. There are several advantages in using a web-based learning system in education. It can be used at any time and place, learning materials can easily be updated, interaction between the learner and the teacher can be fostered in several ways, multiple media such as text, audio, graphics, video and animation can be incorporated, it allows learners to form

learning communities, learners' progress can easily be checked, and a learner-centred approach can be implemented to take into account the many differences between learners (Jolliffe, Ritter and Stevens, 2001).

Web-based learning has also been promoted as a better teaching method and as a tool that can improve students' performance, although research findings have shown contradictory results. Research has not shown consistent teaching and learning advantages on the use of these technologies (Devitt and Palmer, 1999; Greenhalgh, 2001; Watson, 2001). Research in science education has also been slow to investigate the outcomes of the changes that ICT brings (Greenhalgh, 2001).

According to Armstrong (2000), many courses are now taught over the internet. Armstrong described the use of video conferencing and webcasting technology in traditional courses. He claimed that the technology is a sustaining product for higher education because it enables lecturers to perform many of their existing functions better. Armstrong proposed that classes could be taped, allowing the students to review the lecture at any time. This would create the opportunity for a student to study the material in a non-linear fashion. Students could learn the material in the order that is most comfortable for each individual. He also described how this technology allows for guest speakers to make appearances over the webcasting easily and allows students to repeat lessons that they do not understand or to learn lessons that they have missed.

Webcasting technology has made it possible for the delivery of digital information over the internet. Webcasting is defined as sending digital information over the internet for reception, viewing and listening by the public, possibly involving some interaction between the sender and recipients. In a technical sense, webcasting is the published and subscribed or broadcast and tune-in methodology for distributing information from one to many recipients (Miles, 1998). This study focuses on the effectiveness of using webcasting technology to deliver lectures to students at Universiti Putra Malaysia. The research focuses on three modes of webcasting delivery, live streaming, pre-recorded and video-on-demand.

Live Streaming

Data streaming, commonly seen in the form of audio and video streaming, is when a multimedia file can be played back without being completely downloaded first. Most files, like shareware and software updates that have been downloaded off the internet, are not streaming data. However, certain audio and video files such as Real Audio and QuickTime documents can be streaming files, meaning users can watch a video or listen to a sound file while it is being downloaded to their computer. With a fast internet connection, users can actually stream live audio or video to their computer. Among the advantages of live streaming are (a) transfer of data that allows for longer or live video images to be watched as they are downloaded to a computer, (b) streaming media that is broadcasted to many people at a set time, and (c) broadcasting (streaming) of lectures in a remote location but there is no element of interactivity.

Pre-recorded

One of the simplest and most direct applications of webcasting technology is the indexing of pre-recorded sessions to bring a level of interactivity to an otherwise linear media. In addition to the embedded on-screen menus necessary for time shift-delivered indexed video, cassette jackets can carry printed instructions and menus for easy access at any time by the user. It involves recording at an earlier time for transmission later and allows delayed broadcasting of lectures at specified pre-arranged slots.

Video-on-Demand (VOD)

In video-on-demand (VOD) delivery, videos of lectures are archived on the server for anytime anywhere access by students. It involves the ability to stream video and audio content over the network in real time to computer with full video control functionality. It is also known as a virtual video player for every user.

Unlike conventional systems, cost effective VOD system provides high quality, full screen digital video streaming over an ethernet network using internet protocols. Full on demand control for each individual user is available directly to any computer on the network.

This new technology is being developed all the time, because VOD has so many different applications to offer to the customers and its economical possibilities have been seen. Many companies, organisations and universities are developing products and standards. The University of Putra Malaysia (UPM) is one that is involved in research on the effectiveness of VOD technology for students.

OBJECTIVE OF THE STUDY

The key objective of the study is to determine whether there are differences in students' achievement through different modes of teaching: face-to-face and three types of webcasting technology (live streaming, pre-recorded, and video-on-demand).

In this study, effectiveness is measured using students' achievement in a pre-test and post-test developed by the course lecturer.

METHOD

The study adapted the pre-test post-test control group experimental design to investigate the effectiveness of the various modes of webcasting technology in teaching. Figure 1 illustrates the research design used.

R	O₁	X₁	O₂	R: random assignment to groups O ₁ : pre-test O ₂ : post-test X ₁ : pre-recorded technology X ₂ : live streaming technology X ₃ : video-on-demand (VOD) technology
R	O₁	X₂	O₂	
R	O₁	X₃	O₂	
R	O₁		O₂	

Figure 1. Research design

The teaching experiment involved a course on Bioinformatics, a core course offered for fifth semester students of the Bachelor of Science (Biotechnology) program. Apart from the students in the fifth semester, there are also students in the sixth and seventh semester. Besides the Bachelor of Science (Biotechnology) students, a large group taking this course are students from the Bachelor of Science (Biochemistry) program.

For the teaching experiment, teaching materials amounting to six hours of lectures were prepared for the different modes of teaching. The teaching was conducted in three two-hourly sessions. The experiment was conducted in the May semester over two years. The first experiment involved 104 respondents, while the second involved a total of 112 respondents. In the first experiment, 28 students (27%) were randomly assigned to the Face-to-Face group, 24 students (23%) to the Live Streaming group, 26 students (25%) to each of the Pre-Recorded and the VOD groups. In the second experiment, a total of 79 students participated: 21 students (27%) were randomly assigned

to the Face-to-Face group, 17 students (22%) to the Live Streaming group, 21 students (27%) to the Pre-Recorded group, and 20 students (25%) to the VOD group.

In the first experiment, while students of the face-to-face control group attended the lecture, the live streaming group accessed the lecture in a computer laboratory close to the lecture room. The students were each provided with a computer equipped with headphones. As in normal lectures, the students took notes during the lectures. The next day, the technical group edited the recorded lecture and uploaded the lecture in the Webcasting Group server. Apart from storing the lectures on the server, the lectures were also prepared in 10 compact discs (CD) as backup. The VOD group came in during their free time to view the pre-recorded lectures. They were given the URL to download the lecture from the server. The pre-recorded group viewed the lecture at a specified time arranged by the technical group in the laboratory. Attendance was recorded for all sessions.

However, it was observed that students in the VOD and the Pre-recorded groups could have shared information with students assigned to the live streaming and face-to-face groups, prior to the time that they were to view the lesson. Therefore, in the second experiment, it was decided that all four groups would attend the lecture at the same time. Therefore, the lectures were pre-recorded without any students attending. The recorded lectures were then edited and merged with the Power Point presentation. Considerations were made as to when segments of the lecturer and segments of Power Point presentation were to be focused on. The recorded lectures were then stored on the server and saved on CD as backup for the teaching sessions.

During the teaching sessions, the lecturer repeated the lecture with the students from the Face-to-Face group and keeping very strictly to the same materials and discussions made during the pre-recording of the lectures. At the same time, the live streaming group received the ongoing lecture streamed to them live in a computer laboratory. The pre-recorded and the VOD groups viewed the pre-recorded lectures from the server. In some cases, where students had problems accessing the server, the CD was then used.

Prior to the teaching experiment, respondents were given a pre-test. The test comprising 60 items covered the content to be taught in the six hours of lecture. Post-test was given after the teaching. In order to ensure equivalence between pre-test and post-test, the same questions were maintained but the sequence of questions was changed and in some of the questions, the questions were rephrased.

In the first experiment, the post-test was given after the six hours of lecture sessions. However, to control students' interaction with lecture materials and course mates or even maturation, the post-test in the second experiment was administered after every two-hourly lecture session. This ensured that the test measured only what the students had gathered during the two-hour long lecture through the different modes of teaching, the face-to-face and the three modes of webcasting technology.

Students were randomly assigned to the four groups in the first experiment. However, in the second experiment, extra measures were taken to ensure that the four groups were equivalent. Subjects were randomly assigned to groups based on their cumulative grade point average (CGPA). Equal distribution of subjects based on gender and race was also considered. Students were first grouped into three categories: (a) CGPA greater than or equal to 3.5, (b) CGPA greater than 3.0 but less than 3.5 and (c) CGPA greater than 2.5 but less than 3.0. None of the students had CGPA less than 2.5. From each category, students were divided into four subgroups taking into account gender and race as criteria in forming the subgroups. Each subgroup was randomly assigned to form the four groups required for the experiment. The four groups were then randomly assigned to the four groups, control (face-to-face) and the three webcasting groups.

RESULTS

Table 1 shows the pre-test and post-test scores of the Phase 1 experiment for all four modes of delivery. There is an increase in the post-test scores for all modes of instruction.

Table 1. Test scores for Experiment Phase 1

Modes of Delivery	Tests	Experiment Phase 1 (n=104)	
		Mean	SD
Face to Face	Pre-test	60.89	10.98
	Post-test	83.75	4.00
Live Streaming	Pre-test	62.71	13.19
	Post-test	83.13	4.38
Pre-recorded	Pre-test	60.77	13.24
	Post-test	81.15	4.08
VOD	Pre-test	57.50	14.02
	Post-test	80.38	8.59
Overall Score	Pre-test	60.43	12.81
	Post-test	82.12	5.69

Table 2 shows the pre-test and post-test scores of the Phase 2 experiment for all four modes of delivery. Similar to Phase 1 experiment, there is an increase in the post-test scores for all modes of instruction. As noted in the method section, the pre-test and post-test were administered before and after every lecture.

Table 2. Test scores for Experiment Phase 2

Modes of Delivery	Tests	Experiment Phase 2 (n=79)	
		Mean	SD
Face to Face	Pre-test 1	8.81	1.75
	Post-test 1	17.38	2.01
	Pre-test 2	9.67	2.08
	Post-test 2	18.24	1.41
	Pre-test 3	9.14	2.54
	Post-test 3	18.29	1.93
	Overall pre-test	9.21	2.14
	Overall post-test	17.97	1.82
Live Streaming	Pre-test 1	10.94	2.54
	Post-test 1	18.00	1.00
	Pre-test 2	11.71	1.74
	Post-test 2	18.12	1.45
	Pre-test 3	9.71	2.86
	Post-test 3	17.41	2.53
	Overall pre-test	10.78	2.51
	Overall post-test	17.84	1.77
Pre-recorded	Pre-test 1	10.81	2.62
	Post-test 1	17.48	1.60
	Pre-test 2	11.48	2.52
	Post-test 2	18.76	1.26
	Pre-test 3	11.00	2.30
	Post-test 3	16.81	1.50
	Overall pre-test	11.10	2.46
	Overall post-test	17.68	1.65
VOD	Pre-test 1	10.90	2.00
	Post-test 1	16.65	2.37
	Pre-test 2	11.15	1.84
	Post-test 2	18.20	1.40
	Pre-test 3	9.40	1.39
	Post-test 3	14.70	2.52
	Overall pre-test	10.48	1.90
	Overall post-test	16.52	2.56

Based on the results of the ANOVA analysis, it was found that there was no significant difference between the three pre-test scores and the three post-test scores for each of the four groups. It shows that the three pre-test or post-test scores for each group are about the same.

Since the overall pre-test scores are different between groups, therefore achievement cannot be measured based on the subjects' performance in the post-test. Therefore, comparison was made based on the difference in performance between the pre-test and post-test scores for each mode of instruction (see Table 3). For example, the increase in performance for Lecture 3, VOD group is equal to the difference between Pre-test 3 and Post-test 3 for the VOD group. ANOVA results presented in Table 3 show that there is a significant difference between different modes of instruction on the mean difference in pre-test scores and post-test scores on the set of tests given during the lectures.

Table 3. ANOVA results on differences in test performance based on modes of lectures

		Sum of Squares	df	Mean Square	F	Sig
Increase in performance in Lecture 1	Between Groups	85.449	3	28.483	3.718	0.015
	Within Groups	574.501	75	7.660		
	Total	659.949	78			
Increase in performance in Lecture 2	Between Groups	48.111	3	16.037	2.860	0.042
	Within Groups	420.496	75	5.607		
	Total	468.608	78			
Increase in performance in Lecture 3	Between Groups	192.410	3	64.137	7.739	0.000
	Within Groups	621.539	75	8.287		
	Total	813.949	78			

* significant at 0.05 level

Based on Lecture 1, post hoc test show that there is a significant difference between the mean difference of pre-test and post-test scores between the Face-to-Face group and the VOD group. Based on Lecture 3, it was found that there are significant differences between the mean difference of pre-test and post-test scores between the VOD group and the Face-to-Face group and between the VOD group and the Pre-recorded group. Differences between post test and pre-test is found to be greatest for the VOD group (mean = 9.14) as compared to that of the Pre-recorded group (mean = 5.81) and the Face-to-Face group (mean = 5.30). Based on these findings, shown in Table 4, it was found that the VOD group gained the most from the series of lectures.

CONCLUSIONS

The overall results show that the students who went through the VOD group had the greatest gain in the tests. Lecture through VOD technology gave positive impact towards students' learning as compared to the other two webcasting technologies used. It could be due to the interactive features of VOD technology. Students were able to control the lecture video sequences and suit the sequence to their needs. For example, they could decide when to play, pause or stop. As for the content, technicians were able to edit the lecture content without changing the originality of the lecture. Video lecture editing could increase the audio as well as the visual quality before the video was used for subsequent lecture sessions. Editing could rectify the videos before they were stored on the server for video lectures filing retrieval. With the data transmission speed of 300 kilobytes per second (progressive download), the video files played were stable in terms of audio and visual. Apart from that, the conduciveness of the room used by the VOD group might also be a contributing factor to students' better scores.

Among the benefits of VOD are as follows: (a) full video functionality for each user, (b) maximum access to content, (c) interactive information delivery, (d) improved security of resources, (e) low cost content distribution and (f) full online management interface.

Table 4. Sheffe's analysis of mean differences in pre-test and post-test scores of webcasting modes

Difference between Post-test and Pre-test	(I) Mode	(J) Mode	Mean Difference (I - J)	Sig	95% Confidence Interval	
					Lower Bound	Upper Bound
Lecture 1	Live Streaming	Pre Recorded	0.392	0.979	-2.19	2.97
		Video on Demand	-1.513	0.428	-4.10	1.07
		Face to Face	1.309	0.564	-1.30	3.92
	Pre Recorded	Live Streaming	-0.392	0.979	-2.97	2.19
		Video on Demand	-1.905	0.183	-4.35	0.54
		Face to Face	0.917	0.772	-1.56	3.39
	Video on Demand	Live Streaming	1.513	0.428	-1.07	4.10
		Pre Recorded	1.905	0.183	-0.54	4.35
		Face to Face	2.821*	0.018	0.35	5.29
	Face to Face	Live Streaming	-1.309	0.564	-3.92	1.30
		Pre Recorded	-0.917	0.772	-3.39	1.56
		Video on Demand	-2.821*	0.018	-5.29	-0.35
Lecture 2	Live Streaming	Pre Recorded	-0.874	0.734	-3.08	1.34
		Video on Demand	-2.160	0.058	-4.37	0.05
		Face to Face	-0.638	0.880	-2.87	1.60
	Pre Recorded	Live Streaming	0.874	0.734	-1.34	3.08
		Video on Demand	-1.286	0.383	-3.38	0.80
		Face to Face	0.236	0.992	-1.88	2.35
	Video on Demand	Live Streaming	2.160	0.058	-0.05	4.37
		Pre Recorded	1.286	0.383	-0.80	3.38
		Face to Face	1.521	0.247	-0.59	3.64
	Face to Face	Live Streaming	0.638	0.880	-1.60	2.87
		Pre Recorded	-0.236	0.992	-2.35	1.88
		Video on Demand	-1.521	0.247	-3.64	0.59
Lecture 3	Live Streaming	Pre Recorded	1.896	0.262	-0.79	4.58
		Video on Demand	-1.437	0.509	-4.12	1.25
		Face to Face	2.406	0.102	-0.31	5.12
	Pre Recorded	Live Streaming	-1.896	0.262	-4.58	0.79
		Video on Demand	-3.333*	0.005	-5.87	-0.79
		Face to Face	0.510	0.956	-2.06	3.08
	Video on Demand	Live Streaming	1.437	0.509	-1.25	4.12
		Pre Recorded	3.333*	0.005	0.79	5.87
		Face to Face	3.843*	0.001	1.27	6.42
	Face to Face	Live Streaming	-2.406	0.102	-5.12	0.31
		Pre Recorded	0.510	0.956	-3.08	2.06
		Video on Demand	-3.843*	0.001	-6.42	-1.27

* The mean difference is significant at 0.05 level

In VOD delivery, the photographer made the decision as to when the slides should be the focus and when the instructor is the focus. This helps navigate the learning for the students. In a face-to-face setting, students may be focusing on the lecturer where else the slides should be the focus at that particular time. In all the webcasting modes of lecture, students tend to be very focused. They put the headphones on and focus on the computer monitor. However, in face-to-face setting, many things could disrupt the students' attention, especially friends who are sitting close by.

The results of the analysis also showed that the effectiveness of Face To Face lecture is lowest as compared to the use of webcasting technologies. Apart from students' concentration being disrupted by friends and whatever other happenings during the lecture session, students' concentration may be also be distracted because the recording was done during their session. The recording done during the face to face lecture is streamed live to the Live Streaming group. Therefore, such existing logistics problems need to be resolved to reduce interferences, such as providing the accessibility of a centre lecture room where the camera can be remotely controlled

by a cameraman from a control room. The settings in the other webcasting modes are quite different from the VOD mode. Headphone usage cuts off the connection between students and the existing environment and thus further reduces the interference, allowing students to give full concentration to the lectures.

Performance of the pre-recorded group is also low as compared to the VOD and Live Streaming groups. The production of the pre-recorded materials is based on an existing video, which needs to be encoded. The encoding process can reduce the video quality. Video that has been encoded will be streamed at a compression rate of 150 kilobytes per second. Students who received video at a lower compression rate than 150 kilobytes per second will have a poorer video quality. Due to this problem, students' concentration towards the pre-recorded lectures could be lower.

Live streaming is being streamed via progressive download with a compression rate of 300 kilobytes per second. Since the broad band loading burden is high, this reduces the data transmission speed rate to about 150 to 200 kilobytes per second. It was also reduce the satisfaction of student learning due to the poorer quality of audio and visual.

In summary, VOD can be used as an alternative to face to face lecture. This study has showed the effectiveness of VOD mode of delivery as compared to pre-recorded and live streaming webcasting deliveries and face to face delivery. However, more studies need to be conducted especially to ascertain the effectiveness of Webcasting technology in delivery of lectures for content such as mathematics, and for courses that involves demonstration or laboratory work.

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Mentoring primary school student teachers in Turkey: Seeing it from the perspectives of student teachers and mentors

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As the mentoring program has currently constituted a central component in the partnership established between primary schools and teacher education institutions, this research aimed to investigate the practice of mentoring from the perspectives of student teachers and class mentors. The data were collected by means of open-ended questionnaires and semi-structured interviews from the participation of 55 primary school student teachers. Supplementary data were gathered through semi-structured interviews from five class mentors. The results demonstrate important issues such as the unshared understanding of student teachers' teaching experiences between class mentors and the teacher education institution, and that the mentoring program is inadequate in terms of time management. It is suggested that the class mentors should be helped to open up an important opportunity for how to evaluate their practices in order to evaluate those which the student teachers experience.

Mentoring, primary school student teachers, qualitative study

INTRODUCTION

Studies on school and teacher education institution partnership advocate the significance of initial teacher preparation in terms of linking it with schools and with those who practise in schools (Darling-Hammond, 1994; Imig and Switzer, 1996; Toprakçı, 2003; Yiğit and Alev, 2005). Behind the idea of the partnership program is the need to alleviate the problem of disconnection between theory and practice during the process of student teachers' teaching, giving an opportunity for them to work with experienced teachers in a real school context (Asan, 2002; Senemoğlu, 2003). Despite an ever-growing literature with a central emphasis on school-based initial teacher education over the years (for example, Edwards and Collison, 1996; Furlong *et al.*, 1996; Furlong *et al.*, 2000), there appears to be little research which is concerned specifically with mentoring in primary schools. Moyles *et al.*, (1999) observe that formal mentoring, particularly in primary schools, is relatively new practice; and it has been recently formalised partly in response to a requirement of the school-based initial teacher education, and also partly because initial teacher education is viewed as the start of the professional development career, not the end of professional experience.

In Turkey, mentoring has been at the forefront of recent efforts in the partnership established between schools and teacher education institutions in order to prepare student teachers for the teaching profession more effectively (Higher Education Council and World Bank, 1998). The term 'mentoring' has many definitions (Cooper and Batteson, 1998; Gold, 1996; Stephenson, 1997), one of which is defined as "the interactions between a novice (the student teacher) and an expert (the teacher) which contribute to the novice's learning" (Collison, 1998, p. 174). In the

learning of a novice, a mentor is expected to discuss lesson preparation before a lesson with the student teachers, observe their lessons, discuss the lessons after observation, help them with teaching strategies, and to help them with classroom management (Monk and Dillon, 1995). Watkins (1992) also identifies the aspects of a mentor's roles which include pastoral support to a new teacher, supervision, and sequential introduction to professional issues in education. These tasks show that the role of a mentor is complex, involving many dimensions, because the mentor is a "counselor, observer, giver of feedback, instructor and assessor" (Cooper and Batterson, 1998, p.167).

Until 1998, student teachers in Turkey learned to observe and teach in classrooms. These observations and teaching were not always organised in systematic ways in all of the teacher education institutions across the country. This was so, even though there was a course called 'teaching experience'. Student teachers had not received the greatest benefit from the teaching practice due to fact that there were no laws and regulations related to it (Higher Education Council and World Bank, 1998). Each teacher education institution had its own mentoring schedules, such as two subsequent weeks in the last term of the fourth year, and one day per week starting from the first term of the third year and ending at the second term of the fourth year (Ekiz, 2003a).

As part of the wholesale changes that took place in primary education in the late 1990s in Turkey, initial teacher education was re-structured, systematised and regulated by the Higher Education Council more rigorously than had previously been the case. Although teacher education institutions still had control over the detailed content of the courses (for example, elected subjects), they were subject to the higher education regulations. In 1998, the Higher Education Council set the details of the nature, structure of initial teacher education, and school-based initial teacher education. The idea was to set up a national standard (Higher Education Council and World Bank, 1998).

Teacher education institutions established links with schools under the guidance of partnership program. Through this, the schools took a systematic responsibility for preparing student teachers for the teaching practice on the one hand, and the teacher education institutions took a hidden role to introduce schools to the new ways of working in practice by means of the student teachers on the other hand.

During the last five years, mentoring in school-based teacher education has undergone a dramatic change through the introduction of new roles and responsibilities. The new diversity and complexity of the mentors and the experiences of student teachers had increased. The roles and responsibilities of mentors were described by the Higher Education Council (1998, p.10) under 11 headings, some of which are:

- Mentors help student teachers in the development of their profession; the mentors assure that the student teachers observe their lessons, teaching methods and techniques in the classrooms,
- Mentors observe the works of student teachers in schools and evaluate these,
- Mentors do not leave student teachers in classrooms for a long time; if they have to leave the classrooms, they should be in a place where they can be reached easily.

Student teachers, in the course called "School Experience II", were required to prepare school-based assignments under the supervision of mentors. These assignments were structured as:

- Guidance and explanations
- Practice of asking questions
- Lesson management and classroom control
- Assessment and evaluation of pupils' works

- The utilisation of lesson books
- Group works
- The preparation of working-sheets and their use
- Recording and evaluation
- The preparation of test, giving mark, and analysis
- The utilisation of simulation in teaching
- Planning lesson and organising activities.

(Higher Education Council and World Bank, 1998, p. 35)

The details of these assignments, to be prepared after each school experience, were also provided by clear explanations and directions by the Higher Education Council and World Bank (1998, pp. 75-107).

The underpinning philosophy and nature of mentoring were related to the models of initial teacher education. Some of these models were; the apprenticeship model and the mentor as skilled craftsperson, the competence-based model and the mentor as trainer, and the mentor as a reflective coach (Brooks and Sikes, 1997). The recent research in Turkey undertaken by Ekiz (2003b) on models in teacher education by the participants of 60 student teachers, demonstrated that the nature of initial teacher education was heavily based on the competence-based model, and thus the student teachers complained about the inadequacy of the model, providing theoretical and practical justifications. It might be well assumed that mentoring also relied upon the competence-based model and the mentors might be seen as trainers. What might well be said was that although the teacher education institutions placed a significant emphasis on the roles and responsibilities of teachers in supporting student teachers under the systematised partnership program, the fundamental model of teacher education had not been changed, for example, from competence to reflective-based models.

Constable and Norton (1994, p. 123) argued that “at a time of change towards school-based supervision and assessment of students, it is more than ever necessary to understand what happens to students in school”. The lack of research in the area of mentoring practice might suggest the need for an investigation so as to contribute to the available literature on initial teacher education.

METHOD

The research was undertaken with the participation of 55 primary school student teachers who were in the fourth year of their initial teacher education at the Faculty of Education, Karadeniz Technical University, Trabzon, Turkey. Why did 55 student teachers participate in the study? As a lecturer and professional mentor, the researcher was responsible for all of their school experiences. The study was essentially prompted by their concerns and sometimes their complaints about their class mentors and mentoring practices. The data on the student teachers' views of mentoring were gathered by means of a questionnaire consisting of only two open-ended questions towards the end of their school experiences. These questions were: (a) what do you think of your class mentors? (b) What do you feel about mentoring practice? These two questions were generic in nature, simply because they aimed to provide as many views as possible. After that, a qualitative research approach was adopted to take, understand and interpret the participants' views in details (Bryman, 1988; Lincoln and Guba, 1985; Maykut and Morehouse, 1994; Merriam, 1998; Miles and Huberman, 1994).

Having read through the responses, qualitative interviews were conducted (see Appendix A). Through recorded interviews with five voluntary student teachers, the researcher hoped to gain a deeper insight into their written responses and to clarify some of their views. Supplementary data by means of interviews were collected from five class mentors, hoping to gain a clearer picture of

mentoring from two dimensions (see Appendix B). The strength of the study lay in the two perspectives of the data. The participant mentors within the research were selected from the schools which were characterised by their effective teachers.

The data were processed by constant comparative analysis to reach generic categories across the cases (Glaser and Strauss, 1967). In the first place, the data were categorised by coding each view into as many categories as possible, basing on 'feels right' or 'looks right' judgements (Lincoln and Guba, 1985), leading to tentative categories. Then, each view was compared with other views to reach similar properties of the categories (Glaser and Strauss, 1967). To a greater extent, cross-case analysis (Miles and Huberman, 1994; Stake, 1995; Yin, 1994) was utilised to generate constant occurring categories.

FINDINGS AND DISCUSSIONS

The nature of the data resulted in a range of findings, but only those that had a direct connection to major issues and which were thought to be at the heart of mentoring are reported. These are:

- unshared understanding,
- support from mentors,
- support to mentors,
- challenges, and
- evaluation of the mentoring program.

Unshared understanding

The study showed that there was an atmosphere of having an unshared understanding between class mentors and the teacher education institution in the management of student teachers' school-based works or assignments within the partnership program. One of the outstanding roles of mentors in the student teachers' teaching practice was defined as observing student teachers, and thus providing productive feedback. Nevertheless, the feedbacks seemed to be supplied without having the student teachers observed in the classrooms:

The mentor helps us with how to do the assignments. But s/he leaves the class to us and goes away. S/he says: "whatever you want to do, just do it". S/he leaves enough room for us to do whatever we want to do. Once the lessons are over, s/he asks: How did it go? What did you do? S/he does her/his best to help us. (Student teacher questionnaire response)

The absence of the mentors while the student teachers were teaching was also accepted by the student teachers for the psychological reason of anxiety:

S/he does not come to the class whenever we are in the school. S/he leaves us alone in the class. This seems to be useful to both of us. When the mentor is there, we are anxious. (Student teacher interview response)

What was interesting was, however, when interviewed, the mentors provided exact descriptions of their roles and responsibilities:

- To be models to student teachers.
- To have a good interaction with them.
- To observe them in the class.
- To pass our experience to them.
- To provide an understanding with them of school activities and practices.

(Class mentor interview responses)

Though these literal descriptions corresponded with those prescribed by the Higher Education Council (YÖK), implementation of these seemed to be problematic. There was a 'gap' between the rhetoric and the reality in their understanding and management of student teachers' school-based activities, which appeared to lead to unshared goals and understanding. This unshared understanding was also created by the nature of some of the assignments that the student teachers were required to prepare while and after teaching:

Our mentor tries to help us. Whatever we ask for something, s/he provides it and gives ideas. But some of the assignments we have to do cannot be done because, s/he says that these assignments are not suitable for the levels of the children and s/he wants us to do something else. The works we do are not what we have to do. (Student teacher questionnaire response)

This was particularly so, because all school-based assignments were organised and regulated by the Higher Education Council for all of the education departments (for example, science teacher education, social science teacher education, mathematic teacher education for secondary schools), and thus asking all student teachers to follow the same work was not realistic. Although the Higher Education Council allocated adequate scope for all of the departments to accommodate or modify what work could be done in reference to their subject areas, this was not the case. As noted above, for instance, one assignment was the preparation of a test, giving a mark, and the evaluation of the pupils' work. A problem occurred when the student teachers needed to give a test to first class pupils who did not already know how to read and write.

There was also a difference between the teacher education institution and the mentors in the understanding of how to teach primary school pupils. The difference mainly lay in the organisation of group work for the pupils and teaching strategies which were assumed to be based on a shared understanding and a shared aim in the experience of the student teachers:

In the activity of group work, our mentor says that it is not effective to divide the class into different groups. S/he says that one group is only suitable for the levels of the children. (Student teacher questionnaire response)

The reason for the difference in understanding of teaching experience would be the teachers' attempts at mentoring appeared to be determined by their practical constructions of teaching which were tacit in nature formed from their experiences as the teachers of pupils. This seemed to have a powerful influence on the mentors' understanding of how to offer guidance on what and how to do things in classrooms.

The mentors were expected to act as trainers, but a majority of the student teachers claimed that the mentors were unwilling to provide either oral or written feedback on their practices:

I would like to see him/her in the class to give me feedback. (Student teacher interview response)

The mentors were expected to observe the student teachers with the aim of providing them with feedback on what happened during lessons. The idea for this was to refine future practice on the basis of feedback of what was observed. There seemed to be no point even to observation without feedback. But, the student teachers repeatedly noted that they did not have opportunities for the necessary feedback. The school experience without observation and thus evaluation of their practices were not supportive for their initial professional learning. The student teachers indicated that the mentors appeared to think of their mentoring tasks in terms of only providing the classes which were sort of laboratories for 'trial-and-error-learning', but not to realise the inadequacy of such an approach in ensuring they got the best supervision:

If the mentor teacher had observed me, I would have seen my mistakes better. The role of the practicing school itself was not teaching. The children were only my subjects to test my knowledge. All of the teachers were very good, but they lack instructional roles. (Student teacher interview response)

Support from mentors

The mentors' roles were perceived as passing their necessary practical knowledge and skills to the student teachers, particularly in the area of making lessons appropriate for the levels of the pupils. Some student teachers expressed the view that they were supervised while learning about teaching in a practical sense and trying out ways to make their mainly theoretical knowledge accessible to the pupils:

The mentor does his/her best to help us. For instance, s/he helps us prepare questions to the levels of the pupils. (Student teacher questionnaire response)

However, some commented that some of the mentors did not support them in preparing what they were asked to do in schools:

To me, our mentor, personally, is very good person; s/he is kind and sincere. S/he works hard and appears to like his/her job. But, the only thing s/he lacks is how to help us. For example, when we ask for his/her help to complete our work, s/he couldn't help much. (Student teacher questionnaire response)

What seemed obvious from their comments was that some of the practices under the name of 'school-based assignments' were out of the mentors' knowledge. Others also commented that they needed to be provided with the necessary knowledge and skills, and that they could be in a better learning position with these opportunities:

S/he closely examines what work we'll do in the class. But, s/he does not present his/her ideas such as 'you can do like this, like that'. This would be better for us. (Student teacher interview response)

Still others argued that they lacked a social relationship with their mentors. Nonetheless, one of the features of mentoring was its dependence on a one-to-one relationship as a means of ensuring one of the essential aspects of the school experience:

We couldn't have enough dialogue with the mentor teacher. S/he provides us with resources. S/he does not show efforts such as 'learn something from me; get the best benefit from my experience.' (Student teacher questionnaire response)

It also appeared to be that the mentors and the student teachers had little in common because of the mentors' attitudes towards them:

The mentors are not keen on helping us because they don't believe in the usefulness of teaching practice only one day in a week. (Student teacher interview response)

The student teachers were isolated from an opportunity of interrogating interactions between theoretical knowledge and conceptualised knowing or personal constructions which would enable them to perform from a good teaching base. One of the features of mentoring was to be its reliance on the one-to-one relationships as a means of ensuring one of the important satisfying aspects of the teaching experience. However, this appeared to be not practised by some mentors.

Support to mentors

As part of the partnership program between teacher education institutions and schools, there was also a hidden aim to introduce schools to the new ways of working in the classrooms by means of

student teachers. This was simply because the recent research revealed that teachers' professional development opportunities were very limited, and accordingly they were mainly not aware of new teaching and learning approaches to be utilised in primary classrooms (Ekiz, 2001). Almost all of the student teachers in the study realised that they contributed to the work of mentors particularly in the following areas:

Our mentor also learns something from us. For instance, s/he learns how to make the lessons active because, s/he runs the lessons in routine ways. (Student teacher questionnaire response)

Our mentor teaches us something. But we also teach him/her something. For instance, s/he has learned how to prepare 'working sheets' and to organise 'group work' from our activities. (Student teacher questionnaire response)

In primary schools, as the traditional teaching approach was very common, which was defined as a teacher-centred approach (Ekiz, 2001), the student teachers commented that through their activities in the classrooms the mentors gained an understanding of how to 'make lessons active', how to 'prepare working-sheets', and how to arrange 'group work' which were outside the common practice of the classrooms.

Challenges

The student teachers, on the whole, noted that they faced a major challenge which was connected with the absence of the mentors while they were engaged in active teaching. One major challenge was to take the class under control:

Since our mentor leaves the class to us, we have difficulty with in classroom discipline. S/he shows authoritarian attitudes towards children to control the class, but we don't do this. This creates a classroom discipline problem for us. (Student teacher questionnaire response)

To a considerable extent, effective teaching practice was perceived as knowing pupils whom they would be teaching well. Due to the fact that they were only in the practising schools one day in a week, they came across problems with classroom discipline, which was seen as a main concern:

We couldn't know pupils enough by going into the schools once a week. So, we have problems in classroom discipline. The pupils also couldn't be accustomed with us. (Student teacher interview response)

One purpose of school experience was primarily to develop the student teachers' knowledge and experience as practitioners by providing them with extensive access to pupils in classrooms. Due to the absence of this, they did not even know the pupils whom they were teaching. The limitation of time spent in classrooms created further concern in the sense that they felt themselves as having two roles which were 'being a student' and 'being a teacher' concurrently:

It could have been better if the teaching practice was two days in a week. I feel like a student four days at the faculty of education, and as a teacher for one day in the school. I don't believe we need theoretical knowledge anymore. It could have been more effective if we spent more time with pupils. (Student teacher interview response)

This view coincided with the mentors' view:

The teaching practice should be at least two subsequent weeks. In the first week, student teachers should observe mentor teachers in practice, and in the second week

they should practice teaching under the observation of mentors. (Class mentor interview response)

Evaluation of mentoring program

In order to explore the effectiveness of mentoring, the mentors' views were also consulted by the interviews. This was because it was believed that attention should be paid to the perspectives of teachers who had begun to experience enhanced roles and responsibilities as mentors in initial teacher education because they knew better the effectiveness of the mentoring program as they observed students' teaching experiences. All of the mentors in the study stressed that the duration of the school experience should be extended from 'only-one-day-per-week' to 'at-least-two-subsequent-weeks' in order to create an effective mentoring program:

The program seems to be okay. But it is possible to develop it by allocating more time for teaching practice in schools. Experience can be developed by the practice. (Class mentor interview response)

It could have been better for student teachers if they work with more than one mentor teachers, observing their classes and practising there. (Class mentor interview response)

Significantly, although mentors reported that they had the necessary time for mentoring, the student teachers were not able to receive professional development gains adequately due to time difficulties:

We have enough time to help them. But they don't have enough time because they tell us that they have to study courses and prepare for the exams at the Faculty of Education. (Class mentor interview response)

The mentors were asked to provide their suggestions in order to make the mentoring program effective. These suggestions were mainly the duration of the mentoring program and having experiences in different classrooms due to the fact that they would be teaching different age groups when they graduated. This seemed to be a must, because mentoring in school-based education relied on a competence-based teacher education model which required demonstrations and explanations of pre-determined skills by mentors in a variety of classes:

- The teaching practice should be at least a month,
- They should acquire knowledge about school management and its related laws,
- The teacher educators should follow teaching practices closely,
- The student teachers should observe and practice in different classes of different teachers. (Class mentor interview responses)

As far as this last suggestion was concerned, the mentors pointed to the conceptualising of the strategies for the particular classes they could have by their mentors' valuable experiences from various angles.

CONCLUSIONS

Mentoring is now in Turkey regarded as a central strategy in the education of student teachers. It has been a particular role to play in introducing the student teachers to the real world of teaching by first-hand-experience. Although the concept of 'mentoring' under the partnership program occupies a central position in the education of the student teachers, the study shows that it has not been adequately understood or implemented well by mentors in schools. What was surprising about mentoring practice was that although the roles and responsibilities of teachers in supporting student teachers were enhanced, the practice had not been changed significantly. This is conducive

to the view that “educational change involves *learning* how to do something new” (Fullan, 1991, p. 289). The student teachers were still being left alone in classrooms with apparently an idea of ‘learning by trial and error’. The reason for leaving student teachers alone in class could be the culture of teaching, in which isolation and privatism constituted its one particular form. As Hargreaves (1994) argued, “classroom isolation brings with it problems (which is that) it ... shouts out possible sources of praise and support. Isolated teachers get little adult feedback on their value, worth and competence” (p.167). In relation to this study, Fullan (1991, p. 308) observed that “the role of mentor is new and clashes with some of the individualistic traditions of teaching”.

The evidence suggests that while the mentors had a clear view of the extent of their roles and responsibilities, these were seldom found in practice. Their activities with the student teachers did not parallel with either those they described by themselves or those set up by the Higher Education Council. Besides, they could not engage in joint inquiry or challenge them, because of the lack of regular interactions. The mentors appeared to value traditional practice not so much because they would have good reasons as because they would have always done it that way. This would influence them to expect the student teachers to adopt what they did. This is so; it has been pointed out that teachers’ values and beliefs both professionally and personally, underpin what they do and the way they do it (Nias, 1989; Day, 1999).

It is therefore correct to suggest that the mentors should be encouraged to discover what it is they value and why they value it. Teachers involved in mentoring can become more effective if they are provided with a central awareness of the details of what they should do and how they should operate in their roles. Such awareness would create a shared understanding between class mentors and teacher education institutions in the education of student teachers as well as helping them work with their pupils in a productive way. For this, one strategy would be to ask mentors “to reflect on what they believe would constitute enhanced effectiveness in their particular circumstances, and then to identify strategies which might improve their effectiveness” (Brooks and Sikes, 1997, p. 145).

The student teachers were typically involved in a very limited range of classroom activities without, in most cases, being observed and thus had little reflection “in and on” (Schön, 1983; Day, 1999) their teaching practices. One mentor’s role was described as a co-inquirer (Collison and Edwards, 1994) who encouraged student teachers to find out their weaknesses and strengthens as well as developing their own learning. Thus, the mentors should be co-inquirers in order to provide an opportunity for exploring jointly the diversity of classroom experiences.

The mentors viewed the amount of time the student teachers spent in schools for experience as a limitation. This seemed to impact heavily on their unwillingness to supervise the student teachers. Time management should be re-organised, and the teacher education institutions and schools should re-evaluate time management issues to ensure that all the student teachers had an equal and beneficial experience. It should be considered that allocated time was a pre-requisite of effective mentoring of the program. Furthermore, instead of designing the same school-based assignments for all of the departments, a room for manoeuvring should be allocated for each department in order to design and arrange its own school-based assignments. This was because, as the study shows, the nature of some of the assignments was impossible for the student teachers to complete.

Interviews provided strong evidence that since there was a lack of regular interaction between the class mentors and the student teachers, doubts could be raised about the effectiveness of mentoring practices. There was a need to train mentors how to supervise the student teachers. This went far beyond a brief introductory session on how to help the student teachers. It required mentors both to be skilled in the evaluation of their own practice as well as others. In this case, it was necessary to say that ‘know yourself’ comes first, ‘help others’, follows.

There remains, however, at least a complementary investigation to be undertaken which should aim to reveal the criteria for the selection of mentoring teachers in their roles, and according to what criteria they were described by schools as effective teachers. This proposed investigation would provide evidence for at least one significant question: 'Can effective teachers also be effective class mentors?'

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APPENDIX A: INTERVIEW QUESTIONS WITH STUDENT TEACHERS

1. What do you think about this model (teaching experience one day in a week)
2. What expectations did you have from the class mentors in helping you?
3. Did the class mentors help you in relation to your expectations? If so, how?
4. Do you think that this model has limitations? If so, what are these?
5. Do you see that you lack knowledge and skills in practice? If so, what are these?

APPENDIX B: INTERVIEW QUESTIONS WITH CLASS MENTORS

1. What do you think about this model (teaching experience one day in a week)
2. What do you think about your roles and responsibilities for mentoring the student teachers?
3. Do you think that you have enough time to help the student teachers? How much you are busy?
4. Do you think that this model has limitations? If so, what are these?
5. Do you see that the student teachers lack knowledge and skills in practice? If so, what are these?
6. Do you think that you provide necessary supervision with the student teachers?
7. According to you, how can student teachers learn better in teaching practice?

Differentiated instruction: A research basis

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With contemporary classrooms becoming increasingly diverse, educational authorities, teachers and school administrators are looking to teaching and learning strategies that cater for a variety of learning profiles. A paradigm that is gaining ground in many educational circles is differentiated instruction. This model proposes a rethinking of the structure, management and content of the classroom, inviting participants within the learning context to become engaged in the process, to the benefit of all. While the model has been accepted and set to work, there remains room for theoretical support to give it momentum. A recent, comprehensive analysis of the literature in this area examines this model, within the context of increasing academic diversity. This paper therefore seeks to synthesise the research supporting a shift to a new exemplar for modern education, and in so doing shed light on the rationale supporting differentiated instruction.

Differentiated instruction, curriculum, differentiation

INTRODUCTION

Current educational trends across the globe reflect significant changes in student populations from two or three decades ago. The inclusion of students from non-English speaking backgrounds, students with disabilities, students from diverse cultural backgrounds and students on accelerated programs, compel educators to relook at their teaching and instructional practices. The homogeneity of yesteryear has been replaced by widespread diversity, however in many contexts, teachers do not appear to have adjusted their methods to keep abreast of these trends. This paper begins with the presentation of a grounded learning theory to support the move to differentiated instruction. Following on from this, attention is focused on the factors that intensify a shift in instructional practice. Finally, the differentiated instruction model is presented as a response to addressing learner variance.

SEARCH PROCEDURE

Databases including ERIC, Proquest, Australian Education Index, British Education Index, CBCA (formerly Canadian Education Index), EdResearch Online, Education Theses Database, Education Theses Database, Expanded Education Academic (ASAP), and PsychInfo were searched for articles, books and further publications on 'differentiated instruction'. In addition, reference lists from various books, previous literature reviews and reports were perused for further references. Furthermore, brochures, information flyers and bulletins released by the Association for Supervision and Curriculum Development (ASCD), a key player in advocating a shift to differentiation, were searched for additional references. For the purposes of this paper, only research studies dealing with differentiated instruction, over the last 25 years from 1980 to 2005, were included. Articles were included in this review if they made pertinent reference to the model of differentiated instruction. Articles, which dealt with other aspects of teaching and learning, were excluded. This strategy allowed for a more intensive perusal of research in this field.

Given that the model of differentiated instruction is relatively new, attempts were made to draw as many references into the discussion. Despite efforts to ensure a comprehensive and exhaustive review of the literature relating to differentiating instruction, this analysis cannot be complete. This is a dynamic field, which is amended regularly, and contributions from across the globe keep this model fluid. The differentiated instruction model draws most attention from the United States, with key players contributing to the field through textbooks and guides. However, the strategy is gaining in popularity in many countries, including Australia.

CONTEXT AND PURPOSE OF THE STUDY

While differentiation is acknowledged to be a compelling and effectual means of restructuring the traditional classroom to include students of diverse abilities, interests and learning profiles, the philosophy is lacking in empirical validation. Currently, a great deal has been forwarded with regard to theory, with a decided gap in the literature regarding the use and effectiveness of the differentiated model in practice. The model does however draw a great deal of support, proof of which can be found in the plethora of testimonials, anecdotes and classroom examples available through a multitude of websites and publications dealing with differentiation. All reports echo promising outcomes. Still to be decided however, is whether teachers have restructured their teaching, being cognisant of this wealth of information presented on differentiation.

This study attempts to synthesise the research and the rationale underpinning the differentiated instruction model. Previous studies and investigations in this field have investigated factors including student diversity, learning styles, brain research and the multiple intelligences as dynamics propelling the shift to differentiation. While this paper draws attention to these key features, it also presents for query, the areas that may require further investigation.

CONCEPTUAL FRAMEWORK

Vygotsky's Sociocultural Theory of Learning

Several educationalists, researchers and school administrators view the social constructivist learning theory engendered by Russian psychologist, Vygotsky (1896-1934), as central to instructional enhancement, classroom change and redevelopment (Blanton, 1998; Flem, Moen, and Gudmundsdottir, 2000; Goldfarb, 2000; Kearsley, 1996; Riddle and Dabbagh, 1999; Rueda, Goldenberg, and Gallimore, 1992; Shambaugh and Magliaro, 2001; Tharp and Gallimore, 1988). Sociocultural theory, drawing on the work of Vygotsky (1962), and later Wertsch (1991), has significant implications for teaching, schooling and education (Tharp and Gallimore, 1988). This theory is based on the premise that the individual learner must be studied within a particular social and cultural context (Blanton, 1998; Flem et al., 2000; MacGillivray and Rueda, 2001; Patsula, 1999; Tharp and Gallimore, 1988). Such situatedness is necessary for the development of higher order functions, and such functions can only be acquired and cultivated following social interaction (Blanton, 1998; Riddle and Dabbagh, 1999; Rueda et al., 1992; Shambaugh and Magliaro, 2001). Social interaction is therefore fundamental to the development of cognition (Kearsley, 1996, 2005; MacGillivray and Rueda, 2001; Patsula, 1999; Riddle and Dabbagh, 1999; Scherba de Valenzuela, 2002). Furthermore, as a departure from other theories regarding cognition, Vygotsky's theory views education as an ongoing process, not a product (Riddle and Dabbagh, 1999).

The Zone of Proximal Development

Vygotsky's notion of the zone of proximal development, a central proposition of this theory, refers to a level of development attained when learners engage in social behaviour (Blanton, 1998; Kearsley, 2005; Riddle and Dabbagh, 1999; Scherba de Valenzuela, 2002). Riddle and Dabbagh

(1999) cite Vygotsky (1978) as defining the zone of proximal development as the distance between the actual development level and the level of potential development. Hence, the zone of proximal development (ZPD) links that which is known to that which is unknown (Riddle and Dabbagh, 1999). In order to develop the ZPD, learners must actively interact socially with a knowledgeable adult or capable peers (Blanton, 1998; Kearsley, 1996; Riddle and Dabbagh, 1999). A student can only progress to the ZPD, and consequently independent learning if he or she is first guided by a teacher or expert (Blanton, 1998; Kearsley, 2005; Riddle and Dabbagh, 1999; Rueda et al., 1992). Accordingly, responsive instruction acknowledges what the learner already knows, before a new skill is taught or new knowledge introduced (MacGillivray and Rueda, 2001). The learner's skill can only be extended and enriched through meaningful adult direction (Blanton, 1998; Riddle and Dabbagh, 1999; Rueda et al., 1992). The teacher's role becomes one of purposeful instruction, a mediator of activities and substantial experiences allowing the learner to attain his or her zone of proximal development (Blanton, 1998; Rueda et al., 1992). Further to this, Vygotsky perceives language and speech as tools, used by humans to mediate their social environments (Blanton, 1998; Riddle and Dabbagh, 1999).

The Implications of Vygotsky's Theory

Vygotsky's general theory of cognitive development, was used as a framework for this investigation, as it has implications for teaching and learning in contemporary times (Flem et al., 2000; Kearsley, 2005; MacGillivray and Rueda, 2001; Patsula, 1999; Shambaugh and Magliaro, 2001). The areas of social interaction, engagement between teacher and student, physical space and arrangement, meaningful instruction, scaffolding, student ability and powerful content all become elements to consider within the context of contemporary education. With its emphasis on social interaction, Vygotsky's theory sees the student-teacher relationship as collaborative, with the learning experience becoming reciprocal (Flem et al., 2000; Riddle and Dabbagh, 1999; Shambaugh and Magliaro, 2001). The instructional environment, including the physical arrangement of furniture would be so structured to promote interaction (Riddle and Dabbagh, 1999). Furthermore, the teacher would so design the lesson that instruction will extend the student to just above the student's current developmental level, building on that which the student already knows, but encouraging the student to move ahead into areas that pose greater challenge (MacGillivray and Rueda, 2001; Riddle and Dabbagh, 1999). In this regard, scaffolding would be an appropriate strategy to access the zone of proximal behaviour (Riddle and Dabbagh, 1999). The teacher would again engage student interest and modify tasks to suit ability levels (Riddle and Dabbagh, 1999). Lesson content will also be meaningful, compelling learner interest and providing a basis for the use of mediating tools like language (MacGillivray and Rueda, 2001; Patsula, 1999). Within this framework, this study investigates the use of the differentiated instruction model as a pedagogical instrument to facilitate the learning process.

A RESEARCH RATIONALE SUPPORTING THE NEED FOR A NEW EDUCATIONAL MODEL

The rationale to consider a new model is directed by several issues, including current student diversity, brain research, theories concerning learning styles and the multiple intelligences. Theories about how students learn, the content they learn and the instructional strategy used by the teacher has been the centre of a great deal of discussion in educational circles (Burton, 2000; Guild, 2001; McIlrath and Huitt, 1995). Research has proved the argument that individuals do not learn in the same way (Fischer and Rose, 2001; Green, 1999; Guild, 2001; Mulroy and Eddinger, 2003). Consequently, contemporary education has been influenced by several renowned theorists who have investigated the different methods learners use to conceptualise ideas (Brooks, 2004; Davis, Sumara, and Luce-Kapler, 2000). While strengthening the knowledge base in this field, it has assisted educators to examine instructional practices, changing curriculum and assessment

techniques (Brooks, 2004; Cohen, McLaughlin, and Talbert, 1993; Davis et al., 2000; Fischer and Rose, 2001; Green, 1999; McIlrath and Huitt, 1995; Mulroy and Eddinger, 2003). While educators understand that not all learners are the same, and that their needs are diverse, few teachers accommodate these differences in their classrooms (Gable, Hendrickson, Tonelson, and Van Acker, 2000; Guild, 2001). Uniformity, rather than attending to diversity, dominates the culture of many contemporary classrooms (Gable et al., 2000; Guild, 2001; Sizer, 1999). In commencing discussion on this issue, it is prudent to point out that every learner benefits from an engaging learning experience, every learner deserves to be treated with respect and every learner should have an opportunity to reach his or her potential (Guild, 2001). The current education system does not adequately address these needs (Guild, 2001). Traditional methods used by teachers often focus on exposing and remedying deficits, setting up some students for a pattern of failure (Levine, 2003). The following discussion presents the rationale that renders it imperative to consider a new model.

Addressing Differences

Contemporary student populations are becoming increasingly academically diverse (Gable et al., 2000; Guild, 2001; Hall, 2002; Hess, 1999; McAdamis, 2001; McCoy and Ketterlin-Geller, 2004; Sizer, 1999; Tomlinson, 2004a; Tomlinson, Moon, and Callahan, 1998). The inclusion of students with disabilities, students with language backgrounds other than English, students with imposing emotional difficulties and a noteworthy number of gifted students, reflect this growing diversity (Mulroy and Eddinger, 2003; Tomlinson, 2001b, 2004a). Learning within the inclusive classroom is further influenced by a student's gender, culture, experiences, aptitudes, interests and particular teaching approaches (Guild, 2001; Stronge, 2004; Tomlinson, 2002, 2004b). Most children accept that in a classroom they are not all alike, that while some possess strengths in sport, others may be academically strong (Tomlinson, 2000a). While it is accepted that the common basis for them all is a need for acceptance, nurturing and respect (Tomlinson, 2004a), attending to differences, assists each student in experiencing a degree of triumph while encouraging them to be all that they can be as individuals (Fischer and Rose, 2001; Mulroy and Eddinger, 2003; Stronge, 2004; Tomlinson, 2000a). It is necessary to take into account the vast differences among students in a classroom, acknowledging each student's strengths while accommodating their limitations (Guild, 2001; Mulroy and Eddinger, 2003; Tomlinson, 2001c, 2002). Contemporary classrooms should accept and build on the basis that learners are all essentially different (Brighton, 2002; Fischer and Rose, 2001; Griggs, 1991; Guild, 2001; Tomlinson, 2002).

The Dangers of Teaching to the Middle

Teachers need to know how to respond to the burgeoning diversity of contemporary classrooms (Fischer and Rose, 2001; Flem et al., 2000; McCoy and Ketterlin-Geller, 2004; Mulroy and Eddinger, 2003; Sizer, 1999; Tomlinson, 2001b, 2004a). The use of the one-size-fits-all curriculum no longer meets the needs of the majority of learners (Forsten, Grant, and Hollas, 2002; McBride, 2004; McCoy and Ketterlin-Geller, 2004; Tomlinson, 2002; Tomlinson and Kalbfleisch, 1998). The use of single-paced lessons delivered through a singular instructional approach disregards the different learning styles and interests present in all classrooms (Fischer and Rose, 2001; Forsten et al., 2002; Guild, 2001; Tomlinson and Kalbfleisch, 1998).

In addition, addressing student differences and interest appears to enhance their motivation to learn while encouraging them to remain committed and stay positive (Stronge, 2004; Tomlinson, 2004b). Ignoring these fundamental differences may result in some students falling behind, losing motivation and failing to succeed (Tomlinson and Kalbfleisch, 1998). Students who may be advanced and motivated may become lost as the teacher strives to finish as much of the

curriculum as possible (Tomlinson and Kalbfleisch, 1998). It would further appear that students learn effectively when tasks are moderately challenging, neither too simple nor too complex (Tomlinson, 2004b).

Brain Research

Recent research into the workings of the human brain has significant implications for educators (Greenleaf, 2003; King-Friedrichs, 2001; Levine, 2003; Nunley, 2003; Scherer, 2001; Tuttle, 2000). Brain-based instruction is cognisant of the brain's natural learning system (Greenleaf, 2003). Good instruction within the classroom seeks to utilise the brain adeptly, to process, store and retrieve information (Greenleaf, 2003). Brain research suggests three broad, related concepts that necessitate a differentiated approach (Tomlinson and Kalbfleisch, 1998). First, the learning environment should be safe and non-threatening to encourage learning (Tomlinson and Kalbfleisch, 1998). Children who experience discomfort through rejection, failure, pressure and intimidation may not feel safe within the learning context (Tomlinson and Kalbfleisch, 1998). Second, students must be appropriately challenged, the learner should be comfortable enough to accept the challenge that new learning offers, the content being neither too difficult nor too easy (Tomlinson and Kalbfleisch, 1998). Third, the student must be able to make meaning of the ideas and skills through significant association (King-Friedrichs, 2001; Tomlinson and Kalbfleisch, 1998). However, this knowledge about the workings of the human brain has yet to impact on classroom practice and teacher preparation programs (Levine, 2003).

Learning Styles

New evidence emerges regularly to support the premise that not all children learn in the same way (Guild, 2001). It is apparent that an awareness of different learning styles is a significant tool to understand differences and assist with student development (Strong, Silver, and Perini, 2001). Models of education based on learning styles have equipped teachers with the ability to plan their lessons and their curriculum, bearing in mind how students learn best (Strong et al., 2001). Being able to identify a student's learning style and teach to accommodate these can assist students to achieve better results academically and improve their attitudes toward learning (Green, 1999). Identifying learning styles enables a teacher to capitalise on a student's strengths and to become familiar with concepts they may find challenging (Green, 1999). Fine (2003) reported a significant gain in the test scores of students on special education programs, after their preferred learning style was incorporated into the instruction. Students' performances were significantly better when they were instructed through learning style approaches rather than traditional teaching methods (Fine, 2003). Furthermore, the attitudes of these students toward learning improved significantly, as they felt that their individual strengths were being accommodated (Fine, 2003).

Multiple Intelligences

Gardner's theory of the multiple intelligences is a departure from the view that intelligence is a single, measurable unit (Gardner, 1999). Gardner's theory focuses on eight intelligences, while highlighting the need for problem-solving (Campbell, Campbell, and Dickinson, 1999). An instructional technique or program that is heavily reliant on one of the intelligences, minimises opportunities for students who may not possess a propensity to learn in this way (Gardner, 1999). These students, who may not achieve in the traditional way, may become lost to both the school and the community at large (Campbell et al., 1999; Gardner, 1999). The multiple intelligences are presented as tools for learning and problem solving (Campbell et al., 1999; Green, 1999). Creating opportunities for all students, by enriching the classroom through multiple techniques and assessment forms, develops students and brings out their strengths (Campbell et al., 1999; Gardner, 1999; Green, 1999).

DIFFERENTIATED INSTRUCTION: RESPONDING TO THE NEEDS OF DIFFERENT LEARNERS

Tomlinson (2005), a leading expert in this field, defines differentiated instruction as a philosophy of teaching that is based on the premise that students learn best when their teachers accommodate the differences in their readiness levels, interests and learning profiles. A chief objective of differentiated instruction is to take full advantage of every student's ability to learn (Tomlinson, 2001a, 2001c, 2004c, 2005). In addition, she points out that differentiating can be performed in a variety of ways, and if teachers are willing to use this philosophy in their classrooms, they opt for a more effective practice that responds to the needs of diverse learners (Tomlinson, 2000a, 2005). Tomlinson (2000) maintains that differentiation is not just an instructional strategy, nor is it a recipe for teaching, rather it is an innovative way of thinking about teaching and learning.

To differentiate instruction is to acknowledge various student backgrounds, readiness levels, languages, interests and learning profiles (Hall, 2002). Differentiated instruction sees the learning experience as social and collaborative, the responsibility of what happens in the classroom is first to the teacher, but also to the learner (Tomlinson, 2004c). Building on this definition, Mulroy and Eddinger (2003) add that differentiated instruction emerged within the context of increasingly diverse student populations. Within the learning environment permitted by the differentiated instruction model, teachers, support staff and professionals collaborate to create an optimal learning experience for students (Mulroy and Eddinger, 2003). Also in this environment, each student is valued for his or her unique strengths, while being offered opportunities to demonstrate skills through a variety of assessment techniques (Mulroy and Eddinger, 2003; Tomlinson, 2001a; Tomlinson and Kalbfleisch, 1998; Tuttle, 2000).

This working definition of differentiated instruction reflects Vygotsky's socio-cultural theory, the main tenet of which lies in the social, interactional relationship between teacher and student. Tomlinson (2004c) points out that the teacher is the professional in the classroom, an individual who has been suitably trained to mentor and lead his or her wards, using appropriate techniques, assisting each learner to reach his or her potential within the learning context. Teachers are legally and ethically bound to be the expert leading the child to full development (Lawrence-Brown, 2004; Tomlinson, 2004c). The learners, in responding to the teacher's prompting, seek to be independent and self-sufficient, striving for greater awareness of their skills, abilities and ideas, taking increasing responsibility for their lives and their learning (Lawrence-Brown, 2004; Tomlinson, 2004c). The relationship between student and teacher is clearly reciprocal, the responsibility for development becoming a shared endeavour (Tomlinson, 2004c). In addition, the difficulty of skills taught should be slightly in advance of the child's current level of mastery, linking with the Vygotsky's zone of proximal development.

Differentiated instruction presents an effective means to address learner variance (Tomlinson, 2000a, 2001a, 2003), avoids the pitfalls of the one-size-fits-all curriculum (McBride, 2004), incorporates current research into the workings of the human brain (Tomlinson, 2001c; Tomlinson and Kalbfleisch, 1998; Tuttle, 2000) while supporting the multiple intelligences and varying learning styles (Lawrence-Brown, 2004; Tuttle, 2000) within contemporary classrooms. It provides a crucial platform for all teachers of inclusive classrooms, to create opportunities for success for all students (Tomlinson, 2000a). The differentiated classroom balances learning needs common to all students, with more specific needs tagged to individual learners (Tomlinson, 2001a). Differentiation can liberate students from labels, offering students individual opportunities to perform at their best (Tomlinson, 2003).

Differentiation forces teachers to shift their thinking from completing the curriculum, and compels them to move closer to catering to individual student needs (Tomlinson, 1999, 2000a). It allows the teacher to focus on the same key principles for all students, however the instructional

process, the pace and rate toward understanding these concepts varies (McAdamis, 2001; Tuttle, 2000). There are provisions for every child to learn as quickly and as deeply as possible (Tuttle, 2000). Teachers opting for differentiation find that they can use time and resources flexibly and creatively, assisting to create an atmosphere of collaboration in the classroom (Tuttle, 2000). Hess (1999) reports that as an added bonus, differentiation can be an engaging experience for teachers as it involves a different kind of energy compared to direct instruction.

Engaging Students

A fundamental tenet of the differentiated model, is that teachers must engage students (Tomlinson, 2000a). Research supports the view that curricula should be designed to engage students, it should have the ability to connect to their lives and positively influence their levels of motivation (Coleman, 2001; Guild, 2001; Hall, 2002; Sizer, 1999; Strong et al., 2001). Teachers are required to know their students, their backgrounds and their cultural links (MacGillivray and Rueda, 2001). Knowing students well allows teachers to figure out their strengths, thereby helping them to move forward (MacGillivray and Rueda, 2001). Engaging students actively in the learning process and in the content allows them to see patterns developing, to see the overlap between disciplines, to see learning as a cumulative whole (Coleman, 2001).

Catering for Interest, Learning Profile, Readiness

Differentiated instruction supports the classroom as a community, accommodating differences and sameness (Bosch, 2001; Brimijoin, Marquissee, and Tomlinson, 2003; Lawrence-Brown, 2004; Tomlinson, 2003). It allows for the creation of an environment in which all students can succeed and derive benefit (Lawrence-Brown, 2004; Tomlinson, 2003). Students differ in three important ways – readiness, interests and learning profiles – in a differentiated classroom, the teacher is obliged to attend to these differences in order to maximise the learning potential of each student in that classroom (Tomlinson, 2000b, 2001a).

Student interests vary, these interest can become effective tools to support learning in the differentiated classroom (Tomlinson, 2001a). Tomlinson (2001a) sees student interests as a powerful motivator, which wise teachers could take advantage of within the differentiated classroom. Teachers should find ways to engage students, by tapping into what interests students, and by involving students in the daily running of the classroom (MacGillivray and Rueda, 2001). Activities and discussions that are built around students' concerns and their life experiences allows the curriculum to become more meaningful to students (Bosch, 2001; MacGillivray and Rueda, 2001; McBride, 2004; Tomlinson, 2000b, 2001a). Allowing for student interests within the learning community, ensures that even marginalised students find a place (Lawrence-Brown, 2004). Most students, even struggling learners, have aptitudes and passions, providing an opportunity within the classroom for them to explore and express these interests, mitigates against the sense of failure previously experienced by these students (Lawrence-Brown, 2004).

Differentiated instruction takes cognisance of student variance by allowing the teacher to plan their content and process, supporting diverse learning styles (Lawrence-Brown, 2004; Tomlinson, 2001a). Opportunities can be created to foster group learning and provide options for individual instruction or independent learning (Lawrence-Brown, 2004; Tomlinson, 2001a). Teachers who are perceptive to the learning needs of their students help learners to make productive choices about the ways in which they will learn best (Tomlinson, 2001a). It further empowers the teacher to prioritise tasks to enrich the learning experience of specific students, students on individualised education plans can be directed to tasks which involve mastering essential skills, while students on accelerated programs may be challenged through compacting tasks or independent research projects (Lawrence-Brown, 2004). Differentiated instruction makes it possible for the teacher to

include authentic instruction, using project-based learning, bringing relevant and meaningful knowledge into the classroom (Lawrence-Brown, 2004).

Readiness makes reference to the point of entry of each student (Tomlinson, 2000a), while some students are typically at their grade level, others may be performing at below the level of their peers, while still others are a year or so ahead (Tomlinson, 2001a). Readiness levels vary greatly in current contexts, by devising support and material to support all learners, differentiated instruction develops an atmosphere for success for all learners (Lawrence-Brown, 2004). Teachers should be able to discern the evolving readiness levels of students in their care and accommodate these by providing tasks that are neither too easy, nor too challenging (Tomlinson, 2001a, 2003).

RESEARCH STUDIES SUPPORTING THE USE OF DIFFERENTIATED INSTRUCTION

Several recent studies have shown positive outcomes from the use of differentiated instruction. Johnsen (2003) conducted a study using undergraduate teachers differentiating instruction to suit different ability levels. Student teachers in this context were encouraged to differentiate content and process, using learning centres, different reading materials and different strategies (Johnsen, 2003). The study revealed that the use of differentiated techniques proved to be engaging, stimulated student interest and providing a gratifying experience for the undergraduate teachers (Johnsen, 2003). While the undergraduate teachers appeared to benefit from a rewarding experience, Johnsen (2003) does point out that students with exceptional needs continued to receive individual specialist support through other services. This begs the question: will differentiation completely meet the complex needs of all heterogeneous learners in the regular classroom, if all other support services are withdrawn?

A case study of one middle school's experience with differentiated instruction by Tomlinson (1995) revealed initial teacher opposition toward modifying instruction to suit learner variance. Added to this, administrative barriers including teacher dissention about being instructed to implement differentiated strategies by district officials, impacted on the teacher's sense of self efficacy (Tomlinson, 1995). Other barriers included teachers perceiving differentiated instruction as a fad that would pass, concerns over time allocated to prepare for differentiated lesson, unease over student assessments and preparation for testing, disquiet regarding classroom management and perceived teacher insecurity over a change in their role (Tomlinson, 1995). Observations of those teachers who adopted the use of differentiated techniques demonstrated that age was not a factor determining acceptance of the new exemplar. However, the teacher's attitude towards change proved a more decisive factor, with teachers who embraced change showing a greater inclination to adopt differentiation (Tomlinson, 1995). Teachers who experienced early successes with differentiation were more likely to persist. (Tomlinson, 1995). Tomlinson (1995) concluded that there was a need to investigate teacher resistance to new models catering for academic diversity, as well as considering teachers' perception of classroom management in the light of these changes. Classroom management appears to arise as a disquieting factor when changes are implemented – this phenomenon requires greater research since proponents of the differentiated instruction model believe that classroom management issues will decrease if teachers implement the model efficiently, yet there remains disquiet about a loss of control among teachers.

In a study investigating the use of differentiated instruction on student scores on standardised tests, teachers' perceptions of their ability to meet the needs of diverse students and parents' expectation of student performance, Hodge (1997) found that students who were prepared for tests using differentiated techniques showed a gain in their mathematics scores, but there were no comparable gains in reading scores. Further, teachers' perceptions of being able to meet the needs of diverse learners in their classrooms do not appear to be influenced by the use of traditional or differentiated instructional techniques (Hodge, 1997). With literacy levels being of great concern

to education authorities, it may be worth investigating whether student gains following the use of differentiated instruction are limited to learning areas like mathematics, while areas such as literacy require more traditional methods.

Tomlinson, Moon and Callahan (1998) investigated the nature of instructional practice among middle school populations, considering the degree to which teachers respond appropriately to academic diversity, using differentiation. This study revealed that very few teachers take student interests, learning profile or cultural differences into account when they plan lessons (Tomlinson et al., 1998). It was apparent that modifications to the tasks set were unusual and limited, with few teachers opting for differentiation of any form (Tomlinson et al., 1998). Some of the teachers who used varied instructional strategies facilitated more flexible classrooms, which allowed them to accommodate student needs more appropriately (Tomlinson et al., 1998). Most teachers expressed frustration about attempting to deal with learner variance, with many choosing the one-size-fits-all approach to teaching (Tomlinson et al., 1998). The results yielded from this study bodes poorly for both struggling and advanced learners, and highlights the need to rethink the current model of schooling (Tomlinson et al., 1998). These findings suggest an urgent need for another model that deliberately focuses on assisting teachers in their attempts to cater for burgeoning student diversity.

Differentiated instruction may mirror tracking as some teachers attempt to provide for the academic diversity of contemporary classrooms. This was evident in a study by Blozowich (2001) who found that teachers used a variety of techniques but continued to prepare lessons as they would for a tracked classroom. This researcher concluded that teachers implementing differentiated instruction require continuous and consistent professional development, coupled with intensive dialogue and consultation about how these techniques are being implemented in the classroom (Blozowich, 2001). Robison (2004) calls for further research into the utilisation of differentiated instruction techniques, as teachers view the issue of increased planning time with unease. Teachers also require support structures and cooperative teamwork to assist them as they prepare lessons incorporating differentiated instruction (Robison, 2004). Both tracking and time constraints require further investigation as potential barriers to the implementation of differentiated instruction.

McAdamis (2001) reported significant improvement in the test scores of low-scoring students in the Rockwood School District (Missouri), following the use of differentiated instruction. Apart from this tangible impact of the differentiated model, teachers in this study indicated that their students were more motivated and enthusiastic about learning. This study further reflected the whole-school change which differentiated instruction necessitates – efforts included professional development, mentoring and intensive planning (McAdamis, 2001). Teachers were initially resistant to the change, however strategies like peer coaching, action research, study groups and workshops offered on-going support and feedback (McAdamis, 2001). Teachers were eventually convinced of the benefits of differentiation and were keen to try other differentiated lessons in the year following (McAdamis, 2001). It is worth pointing out that training sessions, mentoring and professional development in this study were implemented over a five year period, and required a concerted response from all stakeholders including school principals, teachers, district trainers and school authorities (McAdamis, 2001). This study confirms the need for whole-school and whole-district change – without these essential support structures and the cooperation of all participants, it is unlikely that any differentiated program will endure. Further to this, it is clear that the results of a differentiated program can only be seen over a few years, with the initial stages being utilised to overcome teacher resistance and encourage a sustained effort.

An investigation of differentiated instruction strategies utilised by teachers in a study conducted by Affholder (2003) concluded that teachers who used these strategies more intensively showed

improved individual perception and adopted greater responsibility for student growth. In addition, this study revealed that teachers employing higher levels of differentiated techniques experienced increased feelings of self-efficacy and demonstrated greater willingness to try new instructional approaches (Affholder, 2003). It would further appear that differentiated instruction was favoured by more experienced teachers who were familiar with the curriculum they taught and who had received extensive training prior to implementing these methods in the classroom (Affholder, 2003). In the light of these findings, it may be reasonable to investigate why differentiation proved more popular with experienced teachers rather than their younger counterparts.

THEORETICAL FRAMEWORK

Three intersecting principles gleaned from the literature review serve as the basis for this research and development. First, from Vygotsky's grounded learning theory, which holds that reciprocal social interaction and the collaborative relationship between teacher and student, accommodates learning in a developmental and historical sense. Second, that the learning context is a social context which encourages the development of cognitive functions and communication skills. Social interaction between the learner and a knowledgeable adult enhances the possibility of intellectual activity. The third principle, drawn from research into the workings of the human brain and recent revelations regarding the multiple intelligences and learning styles, acknowledges that the potential for learning is enlarged if learners are engaged, associate new learning with existing information and are allowed to consolidate this information in a manner suited to an individual learning style.

Progressing from this theoretical basis, this study further takes cognisance of the tenets supporting the move to differentiate instruction, including contemporary student diversity, the dangers of teaching to the middle, research into the workings of the human brain, investigations into individual learning styles and the theories of multiple intelligences. Previous studies into the use of differentiated techniques in the classroom have considered student engagement (Johnsen, 2003; McAdamis, 2001), the experiences and reactions of teachers to heterogeneous classrooms (Johnsen, 2003; Tomlinson, 1995), administrative prerequisites (Tomlinson, 1995), the impact of differentiated techniques on test scores (Hodge, 1997) and the degree to which tasks are augmented or modified for gifted and struggling learners (Tomlinson et al., 1998). Aspects that continue to require investigation include the impact of differentiated instruction on teacher efficacy, the teacher's response to adopting a new model, the differences between differentiation and tracking, the impact of teaching experience on the teacher's ability to differentiate instruction, how time and resources are utilised during differentiation and, the challenges and strengths that teachers' perceive during the implementation of differentiated techniques.

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Using multimedia case studies to advance pre-service teacher knowing

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This paper uses Baxter Magolda's (1992) framework on ways of knowing to examine the effects of using multimedia case studies with beginning pre-service teachers (PSTs). Baxter Magolda referred to these ways of thinking as absolute, transitional, independent, and contextual. The written responses to two sets of tasks were analysed for 36 PSTs enrolled in their first education course at a large private university. The first task had the PSTs watch parts of a multimedia case and then discuss what they saw with peers and a facilitator. The second task had the subjects interact and make sense of a different multimedia case individually. Using Baxter Magolda's framework, each PST's responses to the events were coded. Results indicate that working together PSTs operated within contextual ways of knowing more often than they did when working alone. Implications for teacher educators are discussed.

Pre-service teachers, multimedia case studies, ways of knowing

After making a visit to a local classroom to conduct her first observation, Michelle (all names are pseudonyms), a beginning pre-service teacher (PST), approached one of the authors and said, "I went to my school and watched Mrs. K's class. I wrote down everything that happened." Michelle proceeded to display her notebook and asked, "Is this right?" Standing nearby was another beginning PST, Mike, who had conducted his observation on the same lesson. "I didn't do it that way. I wrote down only what the teacher did." Mike displayed his own notes and asked, "Is this right?" Even though both had observed the same lesson, they focused on different classroom events. In this way neither was wrong and both were right; they had constructed different notions of how to conduct the task of observing a lesson. As teacher educators, this prompted us to (a) begin to think about how PSTs actually approach their observations, (b) think about what Michelle and Mike meant when they asked "Is this right?" and (c) as instructors, discover ways to help our PSTs see a more complete picture of what is involved in teaching.

RATIONALE

Teacher education programs are comprised of different stages of preparation and the initial stages generally have PSTs conduct observations in classroom settings (White, 2005). Although Smith (1992) noted numerous shortcomings with field experiences, the logic behind observation remains simple – more time spent in an actual classroom better equips these PSTs with experiences that they can draw on in the future (Dewey, 1938).

The first two authors work with beginning (that is, first year) PSTs in courses designed to introduce them to teaching through college classroom experiences and observations in local P-12 classrooms. As Darling-Hammond (1997) noted, this balance of real classroom experiences with students, coupled with on-campus instruction is essential in preparing quality teachers who can better recognise and handle the complexities they may find in their future classrooms. Accordingly, the field experience classroom is intended to be an extension of their university class studies. The design of the course allows us to situate PSTs' learning in campus-based and field experiences. This is crucial to broadening student understandings because this learning is difficult to achieve in either setting alone (Darling-Hammond, 1997; Putnam and Borko, 2000).

PSTs generally come back from the field replete with anecdotes of their individual experiences. In our course, we create opportunities for PSTs to share the details of their experiences and prompt them to begin to interpret these experiences through larger educational philosophies. These opportunities assist PSTs to form shared understandings (Vygotsky, 1962) helping them gain a deeper appreciation for the events that have unfolded during their individual classroom observations.

Becoming a teacher involves the process of becoming a member of that community of practice. This means learning the language, theories, and daily practices of teachers. It is this process of becoming a teacher that is often complex for PSTs to understand because they initially lack the experience-based framework for making sense of what is happening in the classroom and for understanding what their host teachers are doing (Darling-Hammond and Rustique-Forrester, 1997). While PSTs generally want to express what they have experienced in their own observational settings, they are often unable to do so because they lack shared understandings of the complexities teachers face when facilitating classroom instruction. As Putnam and Borko (2000) noted about PSTs, "An important part of learning to teach is becoming enculturated into the teaching community – learning to think, talk, and act as a teacher" (p. 29). Therefore it is essential that PSTs begin to discuss what they are observing as important aspects of the classroom. This is problematic due to the distinct nature of their individual settings. Although the visits help connect class content to real-life applications, our PSTs lack a common experience on which to base their discussions (Masingila and Doerr, 2002). The problematic nature of this is inherent because PSTs are in distinct classrooms and have their own highly-individualised perspectives.

We believe that it is essential for PSTs, in discussions with their classmates who hold differing viewpoints, to acknowledge together the fact that teaching and learning exist in dynamic and fluid contexts. Gaining a sensitivity to the larger classroom context requires PSTs to be able to know and understand their experiences in different ways.

We chose to use multimedia case studies as a vehicle to allow our PSTs to construct common experiences to form a knowledge base for class discussions. In this paper we present (a) a theoretical discussion of the literature surrounding college students' ways of knowing and multimedia case studies, (b) a description of the multimedia technology we used, (c) the qualitative responses generated from student focus groups and content analysis of student work, and (d) implications for incorporating multimedia case studies as a tool for PSTs' learning.

THEORETICAL FRAMEWORK

Ways of Knowing

Several studies have focused on college students' development and tried to explain students' views of knowledge and ways of thinking. As described below, Perry (1970) places college students' views of knowledge on a continuum. Other researchers such as Belenky, Clinchy,

Goldberger and Tarule (1986) and Baxter Magolda (1992), in critique of Perry, constructed their studies differently with the result being that they moved away from this notion of a continuum to see student views of knowledge as falling into different domains. In this section we present the general ideas of each researcher and then describe our use of Baxter Magolda's work as a framework for this study.

Perry (1970) conducted a longitudinal study on male college students, documenting the cognitive developmental stages men go through as they progress from college freshmen to college seniors. Students in the earliest category are at the level Perry called "dualism". This stage is characterised by an expectation that there is a right answer for every problem and professors will provide this answer. It is the job of the student to learn this so-called 'right' answer. As students mature, they move toward "relativism". Here knowledge is seen as much more contextual, less absolute, and events must be interpreted in context in order to make sense.

Belenky et al. (1986), recognising the fact that Perry's (1970) study was limited due to its focus only on male college students, studied a group of women that included both college students and non-students. Their results suggest that women's understanding of knowledge cannot be placed on a continuum. Rather, women use five perspectives to "understand and make meaning of their worlds" (p. 15). These five perspectives are: silence, received knowledge, subjective knowledge, procedural knowledge, and constructed knowledge.

Baxter Magolda (1992), building upon Perry (1970) and Belenky et al. (1986) decided to interview both male and female students to discover their epistemological views of knowledge. She concluded that students structured their beliefs representing movement into and out of four domains of knowledge. This is not presented as a continuum as Perry suggested, but rather Baxter Magolda's model privileges each domain of knowing equally. She found that people use different ways of thinking at different times; thus the same individual may think in different domains even during the same conversation.

Baxter Magolda referred to these ways of thinking as absolute, transitional, independent, and contextual. When thinking in the **absolute knowing** category, students display certain characteristics. For example, students such as our PSTs (e.g., the two students in the introduction) may view learning as an event where the teacher is the source for all knowledge and the teacher's role is to emphasise the content of lessons. Knowledge is seen as complete and fixed. When thinking in this way, PSTs see things as right or wrong. While observing in their host schools, PSTs' thinking in this way may quickly cast classroom events in light of their personal views and deem events as categorically good or bad.

The next type of knowing is **transitional knowing**. When thinking in this way, PSTs recognise that it is not sufficient simply to receive knowledge; the PST must also understand the knowledge. In their college classroom, PSTs thinking in this way may classify behaviours as good or bad. This is different from absolute thinking because they can explicitly offer an opinion about what they observe. However, they do not provide justification for their views. When knowing in the **independent** way, PSTs are able to express that a teacher's actions are one possible way of doing things, but there may be other ways of doing things that the teacher has not chosen. Here, PSTs consider a teacher's actions in light of how the PSTs themselves would proceed. In **contextual** knowing, PSTs exchange ideas with others including their instructor, their host teacher, and their peers. Here, the PST situates his or her thoughts within the larger context of the classroom. He or she is open to the ideas of others as long as others can support their thoughts with clear evidence.

Although Baxter Magolda (1992) framed this movement as a journey, she is careful not to present students' perspectives in a linear, progressive fashion. Baxter Magolda allows us to frame student growth without privileging any domain. We believe that due to the complexities involved in teaching and learning it is important to help PSTs recognise all ways of knowing, most especially

we believe that it is essential that PSTs be able to operate within Baxter Magolda's realm of contextual knowing. It is in this realm that PSTs will encounter the complex world of real classrooms.

Multimedia Case Studies

Case studies have been used in the education of physicians, lawyers, and business professionals for more than one hundred years (Carter, 1999). In these contexts, cases are used because they allow young practitioners, together with classmates, to expand their knowledge within the safe environment of the classroom. As Putnam and Borko (2000) argue, case studies may also be important for teacher education: "Rather than putting teachers in particular classroom settings, cases provide vicarious encounters with those settings. This experience of the setting may afford reflection and critical analysis that is not possible when acting in the setting" (p. 8). Thus, by using case studies, teacher educators can set up opportunities for PSTs to examine, with peers, classroom events and issues that are similar to those they may see in their own future practice (Doerr and Thompson, 2004; Masingila and Doerr, 2002). In examining what is currently known from research on the use of case studies in teacher education, it seems clear that cases are used in a variety of ways. In particular, case studies are used to help new teachers develop their critical reasoning skills as well as increasing their understanding of the connection between theoretical and practical knowledge (Lundeberg, 1999). Practising teachers frequently consider problems and issues by talking, both formally and informally with other teachers (Pressley, 1999).

Typically, a multimedia case study consists of various data sources from a set of classroom lessons contained on a CD-ROM (Bowers and Doerr, 2003). The data sources on the multimedia case studies we used include (a) video clips of the lesson, the planning session, and the post-lesson teacher reflection, (b) transcripts synchronised to allow the viewer to read what is said as the video plays, and (c) an issues matrix that emphasises important pedagogical moments. It is the combination of these materials that allows PSTs working together to move from the limited scope of their personal observations toward gaining a shared understanding that captures the complexities of the classroom more fully. In this study we examine the use of multimedia cases with PSTs. In particular, our research examined the question: What role can multimedia case studies play in facilitating PSTs' ways of making sense of classroom observations?

METHODS

In order to address our research question of how multimedia case studies can be used to facilitate PSTs' ways of making sense of classroom observations, we designed two tasks: Event 1 and Event 2. Acknowledging that individuals learn and come to know the world differently in community, Event 1 allowed PSTs to work together in pairs, while Event 2 allowed for PST's to work individually. It is possible to view the different ways of knowing as forming two realms. In this way, knowing in the A-T realm (absolute – transitional ways of knowing) would be more individualistic, while knowing in the I-C realm (independent – contextual ways of knowing) would be more contextual. Knowing in an individualistic way is characterised as being limited to only one perspective. Knowing in the more contextual realms is characterised by using multiple perspectives. When knowing in more contextual ways, PSTs are able to make judgments based on multiple perspectives.

For Event 1, we selected one multimedia case study and showed the entire class of PSTs portions of video of the classroom instruction and the teachers' reflection. While watching the video, PSTs were asked to list observations that they considered noteworthy. After watching the video clips, PSTs were asked to compare their observations with a partner. Together they noted similarities and differences in the observations that they had written down. Partner discussions were then shared with the whole class. Finally, PSTs were asked to respond to these questions on the class

website: (1) What did you see in the video clips when watching alone? (2) What did you find in the video clips when talking with a partner? (3) How do you see this exercise impacting what you observe the next time you are at your assigned school?

With the same group of PSTs we then used Event 2 at the next class meeting. Here PSTs were given a different case study to use outside of class. Given that the literature clearly indicates that beginning teachers often struggled with classroom management, we asked PSTs to use the features of the multimedia case study to locate what they deemed incidents of classroom management. We suggested that they consider accessing the issues matrix to assist them in this endeavor. In order to complete the assignment, PSTs were required to respond to questions on the class website. These questions were: (a) what did you see in the video clips? and (b) how do you see this exercise impacting what you observe the next time you are at your assigned school?

Participants

Out of a class of 53 beginning PSTs, 43 volunteered to allow written assignments from the introductory course, taught by one of the authors, to be analysed for this research. Of these PSTs, 36 responded to both assignments. The PSTs were enrolled in their first education course and the majority were second-semester, first-year students. All PSTs enrolled in the course were required to complete certain assignments. Assignments completed by volunteers were later analysed for this research. The instructor was not informed regarding which PSTs had chosen to participate and allow their work to be used for this research until after their final grades had been turned in.

Analysis

Guided by Baxter Magolda's (1992) framework, we coded the participants' written responses first to Event 1 and then Event 2 for emerging themes using qualitative methods (Bogdan and Biklen, 2002). We did this with the goal of categorising the PSTs' responses in order to locate their thinking within Baxter Magolda's framework after being exposed to each approach.

Again, Baxter Magolda's (1992) categories are not intended to be viewed as linear or hierarchical. The framework consists of four categories. As shown in Table 1, these categories are 'absolute knowing', 'transitional knowing', 'independent knowing', and 'contextual knowing'. As we have applied them, they represent how students made sense of Event 1 and Event 2.

Those comments we categorised as 'absolute knowing' were those that offered what seemed to be an uncritical report of teachers' actions in which all actions were taken as being correct without further analysis. Those comments that were categorised as 'transitional knowing' were those that uncritically deemed teacher actions as categorically good or bad without providing any justification. Comments categorised as 'independent knowing' were those that examined teacher decisions as one way of acting in light of how the PST thought he or she would proceed in a similar situation. Comments we categorised as contextual were those in which PSTs examined teacher decisions in light of context as they saw it. These comments were similar to those categorised as 'independent knowing', but additionally indicated a willingness to be open to the ideas of others if those views could be supported with evidence. A summary of how we interpreted Baxter Magolda's (1992) framework and sample quotes from our data is found in Table 1.

PSTs' written comments were placed twice in this framework; once after we coded their response to Event 1 and again after we coded their Event 2 response. We used the letters to indicate each category according to the following scheme A (Absolute knowers), T (Transitional knowers), I (Independent knowers), C (Contextual knowers). In the next section we illustrate what each of these ways of knowing looked like.

Table 1. Coding scheme for PST responses to Event 1 and Event 2¹

Way of Knowing	Our Interpretation of Baxter Magolda as Applied to This Study	Example Quote from Data
Absolute Knowing	PSTs report host teacher action as being “correct” and always “right”	I am sure [my] host teacher knows the most effective way to control an urban classroom... (Molly)
Transitional Knowing	PSTs categorically deem host teachers’ actions as good or bad without justification.	All of the other kids were talking while he [another child] was presenting, and you could tell they didn’t care too much for what he had to say, and I know they [the children] are young, but the teacher didn’t do anything about it which I thought was a little off track. (Jill)
Independent Knowing	PSTs examine teacher actions as one possible way of proceeding and cast teachers’ decisions in light of how they would proceed	The teacher ignored them [the students]. This tells the students that this is appropriate behavior because they are not getting in trouble for it. She [the teacher] should exercise her control over these student-to-student interactions to maintain authority and the respect of students. (Jeanne)
Contextual Knowing	PST situates his/her thoughts in context as he/she sees it, but is open to ideas of others if they can be supported with evidence	It was interesting to note the differences in what we [my classmate] and I recorded of our observations... Watching a video of an elementary classroom made me more attuned to student reactions to the teacher (teacher behavior). I have found that young children are much more open and explicit with their emotional responses and therefore are easier to read than a junior or senior [in high school] who has spent 10 years learning to mask emotions. (Jerry)

Categorisation of Knowers

Responses coded as absolute knowers (represented as A) were individuals who offered comments that suggested they cast classroom events simply by labelling anything the teacher did as ‘positive’ and within the realm of what the PST understands to be ‘normal’ for teaching. One comment classified as ‘absolute knowing’ was, “After observing the advice that was given to the student teacher [on the multimedia case study] it helps me to re-evaluate what is the correct way about classroom management” (sic). Another PST, Kim, whose comments were coded as A, stated, “I learned from the video clips that it is really hard to lecture to young children and have them pay attention. I also learned that when asking questions it’s a good idea to ask questions with leading words to what you want” (sic).

Next were comments that were labelled as ‘transitional knowing’ (T). These comments spoke of teacher actions as being good or bad without providing any justification for the label. One PST whose comment was classified as T, in response to a prompt asking him to describe the parts of the lesson he had focused his attention on, said, “Overall the teacher was a very demanding lady who certainly got the students’ attention, but not in the best way.” This comment is illustrative of one that makes a judgment on the teaching, but does not offer a rationale for the critique. Another PST made the following comment, “She [the teacher] was very monotone which, at times made her sound very condescending, which was not her intention.” Here the PST offers an opinion that defines how she does not think she would speak to students given the same situation.

Comments classified as ‘independent knowing’ (I) were those that examined decisions made by that teacher’s way of acting. These comments reflect how the PST thought he or she would respond to a similar set of circumstances. One PST commented, “The teacher ignored them [the students]. This tells the students that this is appropriate behaviour because they are not getting in trouble for it. She [the teacher] should exercise her control over these student-to-student interactions to maintain authority and the respect of students.” In this comment, we infer the PST

¹ Adapted from Baxter Magolda's (1992) Framework

thinks that she would have acted differently in the same or similar situation. She indicates that the teacher should have acted immediately to maintain more control over the students and the PST grounds her position by supplying the rationale that teachers should be in control of their classrooms. This PST's comments reflect her position that in order to maintain classroom management one must act immediately on any classroom event.

Comments classified as 'contextual knowing' (C) were those that reflected an exchange of ideas with others. These comments indicate that the PST can situate his or her thoughts in the context as he or she sees it, and is also open to the ideas of others as long as these ideas are grounded in evidence from the classroom. One PST's comment, coded as C, was, "Personally I felt that she [the teacher] was a bit disassociated from her students, which she may have been, or perhaps this is a tactic that works well for her particular environment." Another PST claimed that she has "decided to take more into account" after comparing her observations with those of her classmates. Talking with a partner helped to further ingrain these small details because it is likely no two people saw exactly the same thing. Each of these comments reflects an attention to the context of the classroom and incorporates judgment based on philosophies that are balanced by what may be deemed as other sound possible actions and alternatives regarding similar situations.

RESULTS

We tallied the numbers of PSTs that we had categorised at each broad level: A, T, I, and C. Table 2 shows the resulting number of PSTs whose coded comments placed them in each way of knowing after Event 1 and Event 2.

Table 2. Coding of responses

Baxter Magolda: Domain of Knowing	Coded Response to Event 1				Coded Response to Event 2			
	A	T	I	C	A	T	I	C
# of PSTs	8	15	6	7	9	17	7	3

Our research question was designed to help us investigate how multimedia case studies could be used to facilitate PSTs' ways of making sense of classroom observations. Accordingly, we compared the coded responses from Event 1 and Event 2. These data are summarised in Table 2. According to Baxter Magolda (1992), ways of knowing should not be viewed as a hierarchy, but as domains that individuals move into and out of depending on the context. After completing Event 1, we found that more PSTs responded in ways that indicated that they were making sense (knowing) in independent and contextual ways than absolute and transitional ways. This contrasted with Event 2, that had a larger number of PSTs making sense (knowing) in absolute and transitional ways. Within this study, it is important to note that the PSTs' written comments represent only snapshots of the PSTs' way of knowing after each of the two events. The same PST might very well describe knowing in a different way when exposed to a different task.

DISCUSSION

In this section we discuss the results of this study and we offer discussion on possible reasons for the results that we found. Event 1 yielded responses representing PSTs' ways of knowing in Baxter Magolda's (1992) model. We anticipated that when working together, as in Event 1, more PSTs would fall into the contextual and independent realms, than when working alone, as in Event 2. We anticipated this would happen because the PSTs would have to share and justify their

comments to their classmates. Thus, in describing their rationales, they would, by virtue of the demands of the activity, be exhibiting the qualities outlined within the descriptions of contextual and independent domains.

That said, there are several implications for teacher educators. If PSTs are to make meaning from their experiences together, then they must have common experiences on which to build the shared and heightened understandings. It is by working together that PSTs are able to make meaning of their experiences and consider them in I-C ways. It is these more complex understandings that will help PSTs become enculturated into the community of practice that Putnam and Borko (2000) described. Multimedia case studies are a powerful tool for teacher educators to provide their students with these common experiences.

Because more PSTs' comments were categorised as being within the I-C realm after the group discussions in Event 1, it is plausible to infer that multimedia case studies should in conjunction with class time for PSTs to discuss their findings with each other and with their instructor. There is strong evidence that PSTs gain confidence in themselves and their teaching methods by talking through situations and exploring cases together with their peers (Barnett and Tyson, 1999).

Additionally, it is not enough just to provide opportunities for PSTs to talk with one another about the multimedia case study. It is logical to assume that PSTs will not be able to glean full understanding from simply interacting with a multimedia case study on their own and then discussing it with their peers. By having the course instructor act as the facilitator for discussion, much deeper understanding of the complex issues presented in the case is possible (Barnett and Tyson, 1999). This facilitator is most effective when he or she takes the role of pushing students to go further in their thinking and consider each other's viewpoints carefully (Levin, 1999). Therefore, through working with the facilitator and through discussion with classmates, these PSTs may be able to know in the independent and contextual ways; thus, placing themselves more in a position that acknowledges the complexities of classrooms. When on their own again they reverted to previous ways of thinking more toward the absolute and transitional realm. That said, teacher educators should design opportunities for PSTs to discuss classroom events with peers with the guidance of the teacher educator acting as a facilitator. It may appear that we are privileging more contextual ways of knowing over more absolute ways, but this is not the case. We are simply reporting that these interventions seem to allow PSTs to think in ways that more closely resemble the complexities in classrooms.

Future research might be focused in two areas. First, we recommend continuing to use multimedia case studies as a tool within Baxter Magolda's (1992) framework in order to locate PSTs' ways of knowing. Teacher educators should identify their PSTs' ways of knowing in order to design opportunities for them to construct new understandings of the context where they may be teaching.

Secondly, future research might be done to investigate whether multimedia case studies can help PSTs build more stable capacity to continue to know in the I-C realm. In the contextual way of knowing, this reliance on others "is replaced by an equalising of self and others" (p. 373). Therefore, "autonomy and connection are both required for complex forms of knowing" (p. 373). By discussing issues, PSTs gain confidence in their own ability to make decisions (Barnett and Tyson, 1999). Researchers should explore how opportunities such as incorporating the use of multimedia case studies in beginning PST education courses can open PSTs to the notion of privileging what they personally observe as they share their observations with classmates. Doing this might help teacher educators discover ways of helping PSTs to use multiple ways of knowing, particularly being able to know in the contextual realm when considering classroom events.

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Unexpected learning competencies of Grades 5 and 6 pupils in public elementary schools¹: A Philippine report

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The present study tested the assumption of a positive and linear relation between years of schooling and school learning in the Philippine setting. It replicated a 1976 study that had cast doubt on this assumption in the Philippine public educational system. It tested three competing hypotheses for that finding: common sense, the 1976 arrested development hypothesis, and the alternative accelerated development hypothesis.

To test these competing hypotheses, two factors were systematically varied: the grade levels of Ss and the levels of the tests used. The competing hypotheses have different predicted outcomes. A total n of 7097 from 96 schools participated in the study.

The results showed that on all tests Grade 5 showed more competencies than Grades 4 and 6, although Grade 6 continued to perform better than Grade 4. When sub-test level was held constant in multiple comparisons, Grade 5 was learning more Grade 6 competencies, whereas Grade 6 was losing not only Grade 6 but also Grade 5 competencies. It is noted that whereas Grade 6 enjoyed a slight superiority in achievement scores circa 1976, the present study shows that Grade 5 enjoys an impressive superiority over Grade 6 circa 2003. That in Grade 6 one knows more competencies than in Grade 5 seems to be a myth. The common sense hypothesis has been ruled out. The results are consistent with the accelerated development hypothesis.

Assessment, Philippines, basic education, comparative education, learning competencies

BACKGROUND

It is generally assumed that the more the years of elementary schooling, the more school competencies pupils learn. However, a search in the literature yielded no report systematically testing this assumption. This could mean that the assumption is being left untested, or that the outcomes of tests had not been reported because confirmation proves nothing interesting whereas deviations from expectations could be embarrassing. Yet, deviations are not implausible, and cases of deviations could even offer interesting data for comparative studies of educational systems of different countries.

To begin with, an appropriate test of the assumption is not easy to design. The minimum requirement is to have only one measure of schooling outcome (say, a test) appropriate to the

¹ Esperanza C. Buen, Jesus E. Sevilla, Venia E. Pepito, Lourdes M. Franco and Angeles A. Sampang of the Center for Educational Measurement contributed valuable inputs to the study. The Center funded the study.

different grade levels to be studied. By using only one measure, performance of different grade levels could then be meaningfully compared.

The prevailing practice, however, is to construct one level of test (as a measure of schooling outcome) for each level of schooling. Under this condition, the meaning of comparisons of different schooling levels would be lost. Differences in scores among grade levels would be ambiguous: they could be due to differences in the tests used or in what pupils from different grade levels actually learned.

Another relevant tradition is the approach in grade or age placement. In this tradition, only one test may be used and a subject's score on this one test is then expressed in terms of the performance of the age group or the grade level whose average score best resembles his score.

However, although this tradition satisfies the condition of using only one test for classifying scores according to age groups or grade levels, the method needed in developing the test precludes being able to disconfirm the assumption of a positive linear relation between years of schooling and competencies learned.

In the age or grade placement tradition, the test that is considered appropriate is that which satisfies empirically a positive and linear relation between age or grade level on one hand and test performance on the other. In developing the test, test scores are regressed on age or grade levels, or age or grade levels regressed on test scores. The test developer then imposes the criterion that the relation must be positive and linear in order for the test to be accepted. With such a criterion for developing a test, it will not be possible to disconfirm the assumption in question. An empirical study claiming no positive linear relation between years and outcomes of schooling would be simply dismissed as a case of a bad test.

In the Philippines, there have been claims that actual competencies in Mathematics and Reading of senior high school students are at the elementary school level only. Such claims could mean a non-linear relation (for example, quadratic) between competencies and years of schooling. Or, that the relationship could be linear but the slope is so low that it takes ten years of schooling to learn what could be done in six. Such claims call for empirical demonstration of whatever relation exists between these two variables. On this point, no published works have been found. Although the provenance of the claims is unclear, they nonetheless persist among critics of the educational system.

The Philippines was one country that officially tested if the positive linear relation of schooling outcomes and years of schooling held out in its public elementary school system. In 1976 the Department of Education of the Philippine government reported a comparative study of the performance on achievement tests of 4th, 5th and 6th Grade pupils, wherein it was reported that Grade 6 pupils did not perform much more than Grade 5 pupils on same tests while the latter performed distinctly better than Grade 4 (EDPITAF, 1976). In short, the study suggested that the assumed positive and linear relation might not obtain in the Philippines. The official reaction of the government was expressed in the Foreword by the then Secretary of Education who said that the finding was "disturbing and cause us no reason to rejoice".

Surprisingly, however, in spite of its social significance, the study was neither ever replicated nor its findings confirmed. After the 1976 study, the Philippine practice in tracking growth in school learning returned to the "one test for one grade level" approach (NETRC, 2004). In the meantime, new concepts and technologies have been put in place to better manage the schooling system. One such concept is that of "school learning competencies" which has led to specifying competencies and skills to be learned at each grade level. As the Department of Education curriculum guide puts it, "after undergoing (blank) years of the Program, the pupil is expected to have developed the following (listed) competencies" (Department of Education, 2004). The notion of a cumulative

school learning is clear. This system of specifying target competencies and skills for every grade level makes it easier to evaluate whether the system has been performing as intended. At the same time, the technology of diagnostic testing has been spreading. This technology permits more precise measurements of school learning than when “school achievements” were the object of measurement.

The present study is a follow up of the 1976 SOUTELE study with several differences. First, it used learning competencies or skills as the data to be studied instead of the older and rougher concept of “school achievement” in vogue in the 70’s. Second, it used diagnostic tests for measuring the learning competencies or skills instead of achievement tests. For actual test items, it used competency items prescribed by the Department of Education for each grade level. For design, it used the subject as his own control in establishing whether a difference in test scores between grade levels actually existed. In the present study, this was done with the use of multi-level tests.

PROBLEM AND HYPOTHESES

The main SOUTELE finding consisted of a report that on nine of ten achievement tests on elementary school subjects, Grade 6 pupils did not score much more than Grade 5 pupils. SOUTELE reported that the differences between the two grades were so small for them to be educationally significant. It was as if Grade 6 did not make any difference in student learning at all. The conclusion was that learning beyond Grade 5 had been arrested (the arrested development hypothesis), at least during that developmental stage. Several mechanisms (none critical for the present study) were proposed to explain the arrest.

The alternative view is that the arrested development conclusion was premature. To explain, refer to Figure 1. The heavy line going upwards from left to right in Figure 1 represents the common assumption of a positive and linear relation between school learning and years of schooling. That is the theory. The slope was exaggerated for expository purposes.

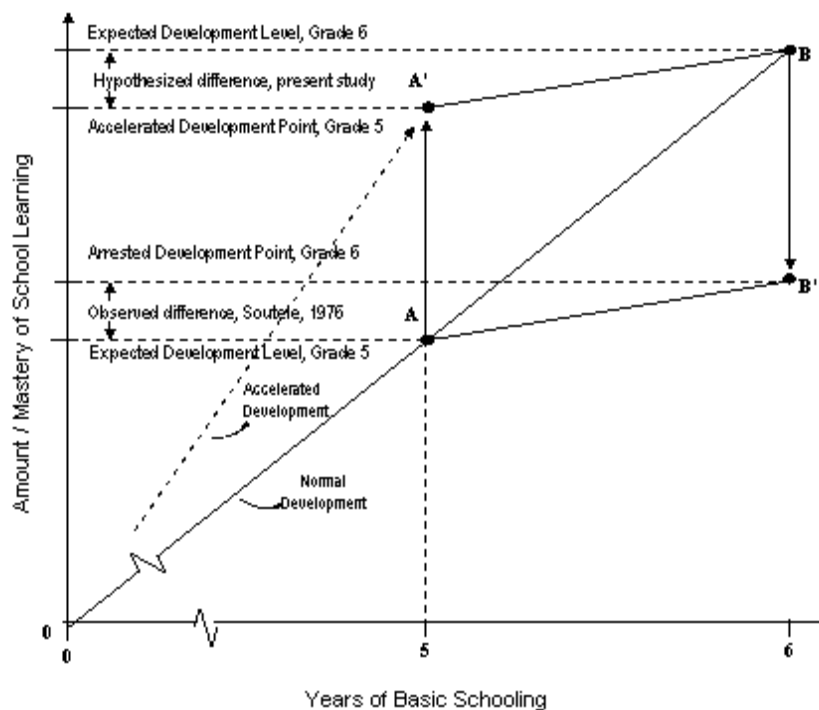


Figure 1. Relationship of schooling and learning

By Figure 1, learning among Grade 6 pupils as reported by SOUTELE did not proceed to Point B as predicted by the model but stopped at Point B' only, which was just a bit more than that expected for Grade 5. Hence the conclusion that their leaning had been arrested at the Grade 5 level.

The competing explanation however says that this reasoning is specious, since there was no independent evidence showing that Grade 6 pupils did not reach Point B. The alternative hypothesis is equally plausible: Grade 6 reached Point B as expected, but Grade 5 pupils learned more than they were expected, performed almost as well as the Grade 6 pupils and even reached Point A. Their learning, in other words, was accelerated (the accelerated development hypothesis) for which reason only a small difference was observed between Grades 5 and 6. From this viewpoint, the SOUTELE report should not be a cause to be disturbed but, instead, a cause to rejoice, using the language of the Secretary of Education.

In support of its position, the accelerated development hypothesis points out that the tests used were really Grade 6 tests, because they were pre-tested for the Grade 6 level and not for Grade 5. From this viewpoint, they were therefore the Grade 5 pupils who performed at the level of Grade 6, rather than the other way around.

Critical Tests of the Hypotheses

This reasoning suggests the value of using multi-level tests to determine whether it was the Grade 6 pupils who performed at the level of Grade 5, or the other way around. In a multi-level test, the items would be applicable to different grade levels instead of only one.

What was needed was a design that would enable one to say of Grade 6, as SOUTELE did, "They are **only** as good as Grade 5" (in order to support the arrested development hypothesis); or, alternatively, to say of Grade 5, as the accelerated development hypothesis would, "They are **even** as good as Grade 6".

To be able to make these conclusions, two types of items of learning competencies² were needed. One type consisted of Grade 5 competencies normed at the Grade 5 level (or simply, Level 5 test), and another type consisted of Grade 6 competencies normed at the Grade 6 level (or, Level 6 test, for short). The two types of items were mixed in one test form and all Grade 5 and Grade 6 pupils had to answer all items. Hence, the repeated measures design. To gain a better perspective on the issue, explore more aspects of elementary education, and provide better experimental control, items of Grade 4 were included in the mix.

Predictions

In this situation, the following are the respective predictions of the three hypotheses:

1. Common sense predicts that performance of Grade 6 will be as good as Grade 5 on Level 5 tests but will be better on Grade 6 level tests.

² Examples of competencies for the different subject areas prescribed by the Department of Education:

<i>English:</i>	Level 4:	"Uses the time expression/adverb of time to complete a sentence"
	Level 5:	"Selects the appropriate demonstrative pronoun to complete the given sentence"
	Level 6:	"Uses the positive form of adjective to make sentence complete"
<i>Mathematics:</i>	Level 4:	"Subtracts 5-digit numbers from 6-digit numbers"
	Level 5:	"Lists the prime factor of given numbers"
	Level 6:	"Adds decimals through ten thousandths"
<i>Science:</i>	Level 4:	"Explains how muscles cause body movement"
	Level 5:	"Cites the conditions that bring about changes in materials"
	Level 6:	"Identifies the nervous system and its major parts"

2. The arrested development hypothesis predicts Grade 6 will perform only as good as Grade 5 on both Level 5 and Level 6 tests.
3. The alternative accelerated development hypothesis predicts that even on Level 6 tests, Grade 5 performance will approach that of Grade 6.

METHOD

Design

The basic design was a 3 x 3 factorial, with repeated measures on one factor. The first factor was grade level (involving three levels – Grades 4, 5 and 6). The second factor was sub-test level (also three levels – Subtest Level 4, Level 5 and Level 6). Repeated measures were taken on the second factor. This basic design was replicated three times, once each for English, Mathematics and Science.

The Test Instruments

A battery of three multi-level tests, one each for English, Mathematics and Science, was used. Each test had 90 items of learning competencies prescribed by the Department of Education of the Philippine government for elementary curriculum. Each test had three subtests: one each for Levels 4, 5 and 6. Each subtest had 30 items. Thus, there were nine subtests altogether in the battery (see Table 1). For any given subject area, the items were jumbled by grade level and item difficulty. The tests were developed by a professional testing organisation.

Table 1. The Multi-level tests: Number of items

Subtest Level	Math Test	Science Test	English Test	Total
Level Subtest 4	30	30	30	90
Level Subtest 5	30	30	30	90
Level Subtest 6	30	30	30	90
Total	90	90	90	270

Subjects (Ss)

Ss were 7097 pupils from 96 schools of two administrative regions of the Department of Education (2320 Grade 4, 2350 Grade 5, and 2364 Grade 6). All 28 school divisions in the two regions participated.

Because the study called for competencies learned at the end of a certain grade level, testing was done at the beginning of the following school year. As a consequence, the Grade 6 pupils did not exactly come from the same schools as the Grades 4 and 5 pupils: “Grade 6” consisted of those enrolled as freshmen in the nearest public high schools (that is, nearest to the participating elementary schools) during the time of testing. Most of the high schools were regular public high schools, but five were science high schools contributing a total of 250 students to the sample.

RESULTS: COURSE OF GROWTH OF INDIVIDUAL COMPETENCIES FROM GRADE 4 TO GRADE 6

The most compelling findings on the comparative performance of Grade 5 and Grade 6 are graphically presented in Figure 2 (a, b and c) for the three English subtests, Figure 3 (a, b and c) for the three Mathematics subtests, and Figure 4 (a, b and c) for the three Science subtests. Each point in these figures represents the percentage of pupils in a grade level who answered correctly an item. Each line corresponds to one “competency” prescribed by the Department of Education for the elementary curriculum. Each line corresponds to one test item. A percentage, therefore, can be interpreted as the percentage of the pupils who “had” the competency.

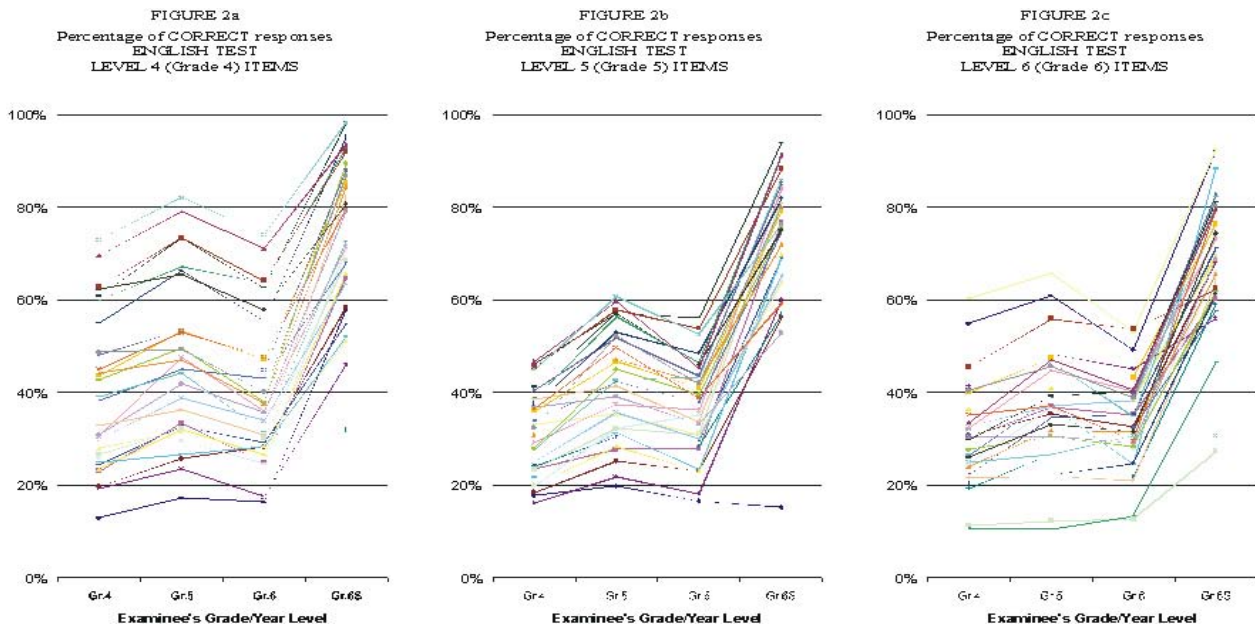


Figure 2. Percentage of correct responses for the three English subtests

Each subtest represents thirty competencies; therefore, each figure contains 30 lines. The grade levels of the pupils are shown in the horizontal axis. Grade 6 was divided into two, the “regular Grade 6” and the “science Grade 6”. A line that moves upward means that the percentage who answered the item correctly increased from one grade to the next. A line that moves downward means that the percentage decreased. For more impact, the reader is advised to look at each figure in its totality rather than scrutinise the details.

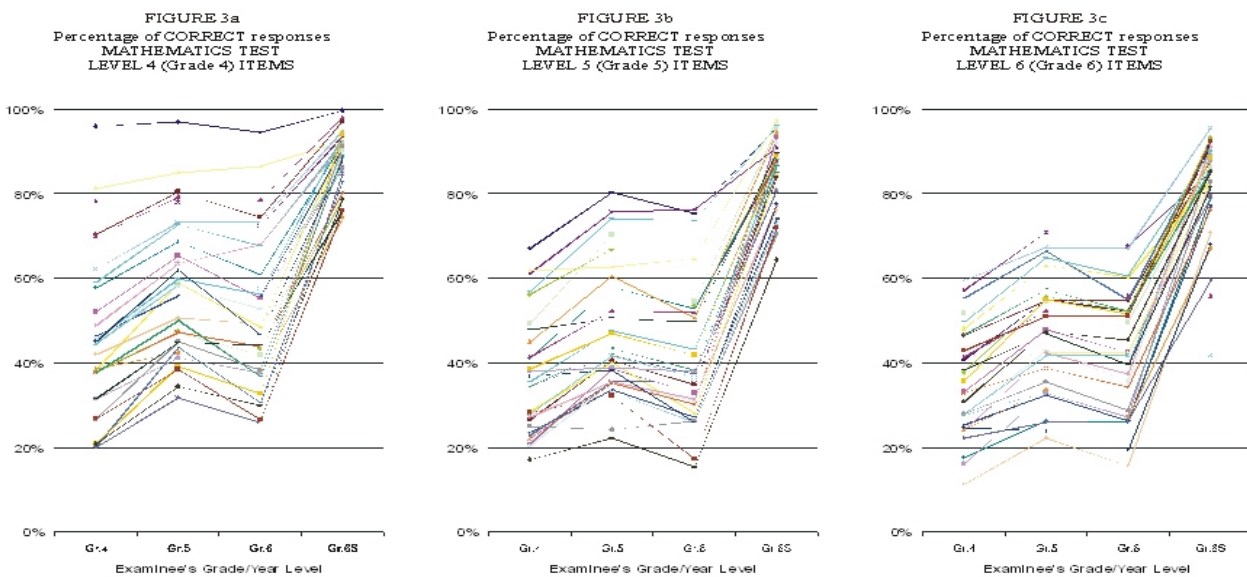


Figure 3. Percentage of correct responses for the three Mathematics subtests

In 261 out of the 270 competencies represented in the tests, Grade 5 scored more than Grade 4. This was expected. In the remaining nine competencies, the differences between the two grades were very minimal.

On the other hand, in 232 out of the 270 items, Grade 5 scored more than “regular” Grade 6. The number of competencies that registered decreases from Grade 5 to Grade 6 were 83 out of 90 cases in English, 75 of 90 cases in Mathematics and 74 of 90 cases in Science. Even with just the

Level 6 tests (see *Figures 2c, 3c and 4c* representing 90 items of Grade 6 competencies), Grade 5 scored more than Grade 6. Also, competencies gained in Grade 5 were subsequently lost in Grade 6. The growth of the competencies from Grade 4 through Grade 5 to Grade 6 followed an inverted “V” pattern. This was not expected.

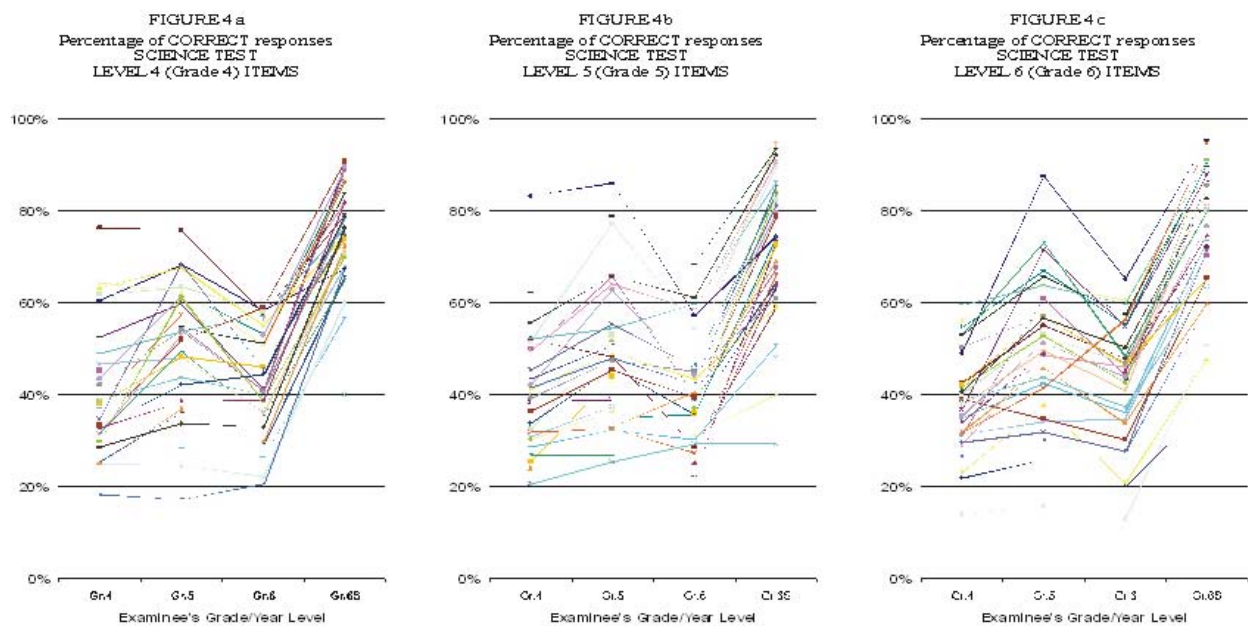


Figure 4. Percentage of correct responses for the three Science subtests

The science Grade 6 group was very distinct. They showed significantly more competencies compared to any of the groups studied, including the “regular” Grade 6.

F-tests showed a significant main effect attributed to Grade Level (for English, $F = 254.39$, $df = 2$, 6826, $p < 0.001$; for Mathematics, $F = 242.89$, $df = 2$, 6826, $p < 0.001$; and for Science, $F = 348.39$, $df = 2$, 6826, $p < 0.001$).

Similarly, there was also a significant main effect attributed to Sub-test level in all analyses (for English, $F = 5594.93$, $df = 2$, 13652, $p < 0.001$; for Mathematics, $F = 5052.37$, $df = 2$, 13652, $p < 0.001$; and for Science, $F = 501.84$, $df = 2$, 13652, $p < 0.001$). When subtest levels were held constant, multiple comparisons by grade levels using Duncan C revealed that Grade 5 had significantly higher scores than both Grade 4 and Grade 6 in all tests, including the crucial Level 6 tests. Unexpectedly, Grade 6 had significantly lower scores than Grade 5 even on Levels 4 and 5 tests. Although the scores of Grade 6 remained higher than those of Grade 4 in all comparisons, the results document an apparently ‘worsening’ Grade 6 *vis-a-vis* Grade 5 from 1976 when SOUTELE was published to the time of the present study.

These results were consistent with the accelerated development hypothesis and not consistent with both the arrested development hypothesis and common sense.

DISCUSSION

The Three Hypotheses and the Grade 5-6 Paradox

The common sense view that learning competencies increase with years of schooling was not supported by the results. This view might be correct in general, but it did not apply to Philippine public elementary education during 2003.

Circa 2003 in the Philippines, while Grade 5 had overwhelmingly more competencies than Grade 4 (expected), Grade 6 did not do as well compared to Grade 5. On the other hand, it was the

opposite. Not only did Grade 6 have less Level 5 competencies, but Grade 5 had more Level 6 competencies (not expected). That in Grade 6 one knew more than in Grade 5 seemed to be a myth. The reality of Philippine public elementary education reality was the opposite. That is why it is not inaccurate to call the finding a *paradox*.

The poor performance of Grade 6 did not seem to be a matter of Level 6 competencies being unable to develop beyond the Grade 5 level, as the arrested development hypothesis proposed. Compared to Grade 6, Grade 5 had more competencies of the Level 4, Level 5 and even Level 6 types. This means that competencies continued to be acquired (and not arrested) during Grade 5. Grade 5 pupils could answer Level 6 tests better than Grade 6 pupils themselves.

Present findings suggest (a) an above par Grade 5 education, and (b) a below par Grade 6 education. The performance of Grade 5 is unexpected; it deserves the official attention of the Department of Education.

A poorly performing Grade 6, the main point of the arrested development hypothesis, was first documented in 1976. After 29 years, there is no evidence that its performance *vis-a-vis* Grade 5 has improved. On the other hand, its present performance now seems to be even worse. Grade 6 is not what we supposed it to be. It had morphed.

Hypothesis for the Grades 5-6 Paradox

The more plausible explanation for the findings involved the operation of two mechanisms, one on the side of Grade 5 and the other on the side of Grade 6.

Hypothesis for the above-par Grade 5 performance

On the side of Grade 5, the mechanism involved an acceleration of the learning of Grade 6 competencies. A plausible factor for this is a change in the instructional process that takes place starting Grade 5. Beginning Grade 5 there is a shift from the "one classroom, one teacher" teaching assignment to the "departmentalisation" of teaching, wherein specialised teachers teach their respective subjects of specialisation. This could have led to a change in the way competencies are taught. As noted by SOUTELE itself, when the same teacher teaches the same subject area for both Grades 5 and 6, it may turn out that the teacher, even without intending it, would eagerly teach Level 6 competencies to Grade 5 pupils. This could account for the acceleration of learning in Grade 5.

Hypothesis for the below-par Grade 6 performance

On the side of Grade 6, the mechanism involved two components: depressing the learning of competencies "across the board" (that is, in several subject areas) and loss of competencies already learned.

The depression of learning "across the board" component is equivalent to the case of Grade 6 teachers not teaching enough of the Grade 6 curriculum to their pupils. This might be related to the practice of "teaching to the test", a practice wherein teachers spend a lot of time reviewing their students for various government-sponsored assessment tests throughout the school year, including the year-end National Achievement Test. Time for instruction is used instead for drills and practice for the examinations. This could lead to the acquisition of fewer Grade 6 competencies.

"Teaching to the test" could also lead to a loss of interest in and subsequent loss of competencies earlier learned because of the focus on "passing" the examinations. This then is what was registered as a loss of Grade 5 competencies among Grade 6 pupils. A longitudinal design could better study a hypothesis of loss.

However, even if the damage that “teaching to the test” might have inflicted is extensive and alarming, it is still repairable. Being rooted in a prescribed program, its adverse effects should disappear when the Department of Education would cancel the program in the future.

In 1976, Grade 6 still enjoyed a slight superiority in achievement over Grade 5; in 2003, it was the other way around except that the difference was no longer slight. This change signals that something undesirable was happening to the education of Filipino school children.

Need for Replication

Because of the serious social implications of the present study, it is suggested that it be repeated using a wider and more representative sample. The purpose of the replication should be to document the many other dimensions of the phenomenon, including its extent and magnitude and not to merely confirm it. It is expected that a more representative sample will magnify the Grade 6 depreciation that had been observed because the sample in the present study came from the more economically developed regions and better schools and was thus biased against finding a below par Grade 6 from the very start.

For an initial follow up of the implications of the present study, it might be better to look into all levels of the whole basic education ladder and for all the subject areas, and not only in Grades 4 to 6 English, Mathematics and Science. Education authorities should know if other grade or year levels are under-performing like the present Grade 6. They should know if the depreciation of Grade 6 is being recovered at all or not somewhere along one’s basic education. Studies should be done to determine if the depreciation means only a simple delay in formal learning. The authorities should evaluate if the system of schooling is seriously diminished by it. Those interested in compensatory education, should assess the place of special programs, such as the pre-baccalaureate or a Grade 7 program, catch-up approaches (such as lengthening instructional time), and even quick fixes (such as reviews) in recovering or compensating for the loss. Local governments should know the status of Grade 5-6 education in their jurisdictions, should they want to focus some local resources to the problem.

Curriculum

The present findings raise questions about some assumptions in current curriculum planning and design in the Philippine educational system. It appears that Grade 5 pupils could learn competencies intended for higher grade levels. It appears that the Department of Education has been setting curricular standards that are far too low. Filipino school children seem developmentally ready to learn competencies being assigned by curriculum makers for higher grades. Elementary pupils might even be already set to learn high school materials. The study raises issues about the curricula in teacher training institutions in order to make the basic education level more responsive.

The Below-Par Performance of Grade 6 and Philippine Development

The more serious implications are those that pertain to the larger issue of development. Education, including basic education, is viewed as a major tool for development. If the tool was defective, development must have been diminished. A defective system of basic education would not be able to perform the function for which it was designed. It would impair higher education and the correlated efforts to improve the lot of Filipinos. It will reduce the quality of human resources for local production and services, as well as for global competition. Grade 6 does not have the worth it is supposed to have in the market.

Of course, one could not yet tell the precise extent to which a below standard Grade 6 education has been affecting the larger development picture. However, because there is urgency in dealing

with it, one should not wait until his knowledge becomes full before acting. It is best to immediately look at the source of the problem and solve it there as soon as possible. Besides being expensive, quick fixes as well as catch-up compensatory programs might only mislead one to thinking that something is being done about the problem. Finally, just to ensure that the Grade 6 problem is kept engaged, the Philippines should monitor its system of schooling in terms of what children learn.

Improving education is standard concern for politicians and other national leaders. However, no current leader of note has ever shown awareness of SOUTELE's 29-year old report, that learning at the elementary school level was being held at the Grade 5 level. No one has ever inquired whether the situation has since changed. Politically, the issue has been completely neglected. Neglect might be why the situation seems to have become worse. The added concerns now are the vertical and long-term effects of a worsened situation. A Grade 6 level that performs below par might be related to the poor standing of the Philippines in the *Trends in International Mathematics and Science Study* (Gonzalez, *et al.*, 2004). It is also possible that the performance of other academic year levels has been dragged down.

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The culture and language learning of Chinese festivals in a kindergarten classroom¹

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Culture plays a vital role in second language learning. This paper presents an action research study that investigates the role of culture in a Chinese language program in a kindergarten classroom. Three topics have been explored: (a) culture as the core in the development of a thematic unit on Chinese festivals, (b) a culturally responsive pedagogy as a model of instruction, and (c) the assessment of student learning. Nine kindergarten children participated in this study. The thematic unit was undertaken for eight consecutive weeks. Five major Chinese festivals were integrated into this unit; the teaching and learning processes were examined to explore the application of a culturally responsive pedagogy. Diagnostic, formative, and summative assessments were administered to explore the children's learning. The assessments were based the participants' oral response to one-to-one interviews, their written responses on the Pictorial Attitudes Scale in a whole-group session, cultural artefacts, and drawing and writing products.

Thematic curriculum unit, Chinese culture and language, multicultural education, culturally responsive pedagogy

INTRODUCTION

Teaching culture as an integral part of language has gained importance in the Twenty-first century as a result of internationalisation and globalisation of communication (Lange and Paige, 2003). Although increased attention has been paid to the role of culture in second language learning and teaching, the major interest is still focused on the areas of reading and writing in learning a foreign language (Lafayette, 2003). Some teachers believe that culture takes the focus away from language learning and that cross-cultural experiences are too challenging and may cause discomfort to both the teacher and the learner (Lange and Paige, 2003).

On the other hand, a growing number of people in the language teaching profession are calling for a greater emphasis on culture. Kramsch (1993) believed that cultural context encourages diverse ways of thinking, viewing, speaking, writing, reading, and listening. Similarly, Crozet, and Liddicoat (2000) acknowledged that culture affected an individual's thoughts, actions, and words and they further assert that cultural understanding was fundamental in language learning and teaching. Papademetre (2000) has developed pathways for conceptualising the integration of culture and language and for multi-faceted discussions in cultural and linguistic practices.

A collaborative project has resulted in the development and publication of Standards for foreign language learning: Preparing for the 21st century (National Standards, 1999), which identifies the central role of culture in the language curriculum. The publication identifies the five C's in foreign language learning: communication, cultures, connections, comparisons, and communities.

¹ This article was extensively edited by Dr B. Matthews, Research Associate, Flinders University Institute of International Education.

It also explicitly addressed culture learning in two aspects of these factors: (a) cultures—to gain knowledge and understanding of other cultures, and (b) comparisons—to develop insights into the nature of language and culture. The importance of culture in second language learning, as described in this publication is as follows: (National Standards, 1999, p.3):

Through the studies of other languages, students gain knowledge and understanding of the culture that uses that language and, in fact, cannot truly master the language until they have also mastered the cultural context in which the language occurs.

United States as a Multicultural Society

The United States is a giant multicultural society given the fact that her population is composed of people from numerous and diverse ethnic and cultural backgrounds (Tiedt and Tiedt, 2005). According to the 2000 United States Census, it is anticipated that by the end of 2020 close to 40 per cent of United States students will be from culturally diverse backgrounds (Irvine and Armento, 2001). The United States Department of Commerce anticipates that students of colour (i.e., Latino students, African Americans, and Asian Americans) will constitute about 57 per cent of the nation's school-age children by 2050 (United States Department of Commerce, 1996).

The population of Chinese-speaking people residing in the United States is about 2.43 million, and Chinese language has become the third most commonly spoken language at home after English and Spanish (United States Bureau of the Census, 2000). The immigration policy, and the resultant executive order issued by President Bush has offered permanent resident status to 80,000 people from China, and has accelerated the growth of Chinese-speaking population in the United States (Lu, 2001). In addition, the adoption of Chinese children by Americans is becoming very common, and currently there are more than 20,000 adopted Chinese children residing in the United States (Manning, 2001). Johnson (2000) has reported that Asian Americans comprised about four per cent of the United States population in 1997, of which the Chinese-speaking population constituted the largest Asian ethnic group or 22 per cent. According to Johnson (2000), New York City and vicinity appeared to have the third largest Chinese-speaking population in the United States, after Los Angeles and San Francisco (Lai, 2001).

Multicultural Education

The movement toward a culture-based approach to language teaching prepares learners to participate in the multilingual and multicultural society in the United States. The publication of Standards for foreign language learning: Preparing for the 21st century (National Standards, 1999) calls attention to the importance of culture-based language learning in the United States as a multicultural society. The philosophical statement addresses this issue (National Standards, 1999, p.2):

The United States must educate students who are linguistically and culturally equipped to communicate successfully in a pluralistic American society. This imperative envisions a future in which all students will develop and maintain proficiency in English and at least one other language, modern or classical.

The increasing number of culturally diverse students amplifies the need to deliver multicultural programs for the heterogeneous populations while the rapidly growing Chinese-speaking population encourages us to value the teaching of Chinese culture and language courses in schools in the United States. Multicultural education promotes the rights of minority students (Wardle and Cruz-Janzen, 2004). In order to provide more professional knowledge and skills for teaching in today's multicultural context, teachers must be able to meet the needs of students from diverse linguistic and cultural backgrounds (Tiedt and Tiedt, 2005).

Culturally Responsive Pedagogy

A responsive pedagogy has been asserted by a number of researchers as an effective means of meeting the learning needs of culturally diverse students. The terms of culturally 'relevant' pedagogy and 'culturally responsive pedagogy' have been used interchangeably. Gay (2000, p.29) defined culturally relevant pedagogy as being "culturally validating and affirming". Gay (2000, p.29) further asserted that a culturally relevant pedagogy used "cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning more relevant and effective".

A culturally responsive pedagogy recognises the need to develop a sensitivity to both teachers' and students' culture. Students from diverse cultural groups bring to schools beliefs, values, and norms that are different from the mainstream culture of the school. Effective teaching should acknowledge and support the distinctive culture system of each student group. It is, therefore, important to examine the home-school culture continuity in order to gain insight into the individual student's literacy experience (Xu, 1999). Ruan's study (2003) on bilingual students' learning promotes the idea that in order to be culturally aware; a teacher needs to be sensitive to bilingual children's learning styles and needs, family literacy practices, and interactive patterns.

Critical reflection is considered as an important ingredient for culturally responsive pedagogy by a number of scholars. Dewey provided a philosophical framework for this subject. From his perspective, reflection was an active and deliberate cognitive process used to solve problems while reflective action referred to the active components of behavioural interventions (Dewey, 1933). Calderhead (1989) related the issues of equity, access, and social justice to critical reflection. Howard (2003, p.197) further defined the term critical reflection as "reflection within moral, political, and ethical contexts of teaching".

Culture is Fundamental in Second Language Learning and Teaching

Definition of culture

Culture as a concept is something that is shared among some members in a society. While the traditional models view culture as a static complex of classifiable facts, contemporary models consider the dynamic and interactive nature of culture. Both anthropologists and sociologists define culture as a complex that includes the elements of attitudes, beliefs, values, ideologies, knowledge, art, morals, laws, customs, ways of behaving and thinking, and other capacities and habits acquired by humans as members of a society (Darder, 1991; Lange and Paige, 2003).

The contemporary definition of culture is dynamic and interactive. Paige, Jorstad, Siaya, Klein, and Colby (2003) describe cultural learning as a dynamic, developmental, and ongoing process of acquiring knowledge, skills, and attitudes required for communication and interaction with individuals. Smith, Paige and Steglitz (2003) also propose a dynamic view of culture as the process of organising our diversity. This definition acknowledges the uniqueness of the individuals and also recognises their connection to the diversity. Similarly, Bennett, Bennett, and Allen (2003) depict an interactive view of culture as both objective and subjective. Objective culture is considered the cultural creation, including religious, educational, political institutions and artefacts of formal culture such as eating, costumes, and marriage. The definition of subjective culture by Bennett et al. (2003) is similar to the traditional view, in which culture is the verbal and nonverbal language, values, and cognitive style.

Culture in second language learning

Language and culture are inseparable. Culture is represented in part through language while language is manifested through culture (Brody, 2003). Cultural understandings are the underpinnings of communication and language learning, and therefore cultural learning is a

crucial element in the language classroom (Damen, 2003). To comprehend a message from a native speaker, it is essential to attend to the cultural meanings conveyed through body language and communication patterns (Damen, 2003). Smith, Paige, and Steglitz (2003) indicate that the deeper culture is manifested in how language is used in the cultural context. This notion is congruent with the Standards for Foreign Language Learning. The introductory section states, although communication is the heart of second language learning, students “cannot truly master the language unless they have also mastered the cultural contexts in which the language occurs” (National Standards, 1999, p.3). A lack of cultural knowledge puts a learner at risk of being culturally incompetent in communicating with native speakers (Crozet and Liddicoat, 2000). In a second language context where a native speaker community is not accessible, culture has to be taught explicitly by drawing the learners’ attention to cultural differences (Crozet and Liddicoat, 2000).

Context of culture and language learning

Over the past 40 years, there has been a search for settings (classroom versus naturalistic settings) that could facilitate culture and language learning (Paige, Jorstad, Siaya, Klein, and Colby, 2003). In the 1960s, attention was directed to the role of context and experience in the learning process, and a lot of support was given to experience-based learning, such as culture simulations in the classroom or study abroad program; in the 1970s, the attention shifted toward cognitively-based instruction; From the 1980s onward, the actual context that best promoted culture and language learning was favoured (Paige, Jorstad, Siaya, Klein, and Colby, 2003).

New culture can be grasped and understood by exposing the learner to a cultural context where culture is integrated into language learning. As Paige, Jorstad, Siaya, Klein, and Colby (2003) indicate, culture and language is learned from a dynamic interaction among the context, prior experience, and the individuals. Classroom-based learning is a common context. Some researchers point out that the rule-ordered characteristics in the formal classroom fail to engage appropriately students in the communication process and lead to superficial learning (Damen, 1987; Ellis, 1992; Pica, 1983). On the other hand, other researchers argue that the structured classroom, as a protective environment or an artificial community, benefits culture and language learning by allowing students to safely experiment with the language and culture (Kramsch, 1993; Mitchell, 1988).

Teacher and student variables in culture learning

Research suggests that a teacher needs to take the role of an educator, who deliberately helps students analyse the process of learning about culture (Paige, Jorstad, Siaya, Klein, and Colby, 2003). Effective learning relies on the teacher’s attitudes, goals, and priorities about culture in language education (Robinson, 1981). However, many United States studies reveal that culture learning ranks below language proficiency in the estimation of language teachers (Cooper, 1985; Wolf and Riordan, 1991). Many teachers are not able to develop cultural competence as they have little or no experience with different cultures (Bennett, Bennett, and Allen, 2003).

Therefore, an important reason to integrate culture into language teaching is to increase student motivation and positive attitudes toward language learning. Both motivation and attitudes are considered to be major factors influencing achievement. Motivation is the factor that impels students to learn while attitudes are students’ feelings toward learning (Paige, Jorstad, Siaya, Klein, and Colby, 2003). Gardner and Lambert (1972) propose two clusters of motivational indices: integrative and instrumental. The instrumental motivation is the desire to achieve language proficiency for other purposes, such as studying abroad, doing business, or communicating with people in the target culture. The integrative motivation looks for a sense of identifying with the group of people in the target culture.

Despite of the close connection between these motivations and attitudes, there are conceptual distinctions between them. For example, a person who is highly motivated to learn Chinese language does not necessarily develop positive attitudes toward Chinese culture. Gardner (1985) suggests a reciprocal relationship between high motivation and success in learning. Similarly, Robinson (1981) hypothesises that favourable attitudes toward a culture will not automatically lead to language acquisition, nor will exposure to a foreign language necessarily cause positive attitudes toward the culture. However, contacting people from the target culture can improve student attitudes toward language learning (Paige, Jorstad, Siaya, Klein, and Colby, 2003).

Integrating literature into the language classroom

A number of researchers claim that there is a crucial role played by children's literature in the language and multicultural classroom. Paige, Jorstad, Siaya, Klein, and Colby (2003) assert that literature can be an ideal carrier of culture. Wallace (2006) identifies the function of literature by stating that literature transports children to new cultural contexts, giving them an insight into the perspectives of the people, and providing them with vicarious experiences (Wallace, 2006). Johnson and Janisch (1998) assert that children's picture books provide an engaging focus for teaching and offer opportunities for modelling reading and thinking. Huck, Kiefer, Hepler, and Hickman (2004) support this notion by indicating that children enjoy reading literature, which provides enjoyment, a way of thinking, imagination, and vicarious learning. Both Norton and Irving connect literature to cultural appreciation. Norton (2005) indicates that literature plays a crucial role in promoting cross-cultural awareness and appreciation. Irving (1984) points out that the theme, characters, plot, and style from the story or folktale all provide clues to cultural values and attitudes that may enhance cultural understanding and appreciation. "Children prefer those stories that best represent their own way of looking at the world" (Huck, Kiefer, Hepler, and Hickman, 2004, p.36). Therefore, it is important to select literature that correctly depicts the beliefs, values, and cultural backgrounds of the diverse groups (Norton, 2005).

For the second language learners, reading the literature from other cultures is one way to improve their appreciation for both the target culture and people from that cultural background (Dieterich, 1972). As Huck (1990) notes, multicultural literature crawls inside the individual's skin. Block (2003, p.127) further illustrates that multicultural literature is "a powerful vehicle for maturing literacy abilities, increasing understanding across cultures, and seeing the world in a new way".

Cross-Cultural Awareness and Appreciation

Many studies reveal that a cross-cultural curriculum can enhance children's cultural awareness and appreciation. The process of cross-cultural experiences may lead to increased intercultural perception (Salyer, 1993). The concept of cross-cultural awareness and appreciation may be facilitated as depicted by Paige, Jorstad, Siaya, Klein, and Colby's conceptual model of culture learning (2003). This model distinguishes between culture-specific and culture-general domains of learning. Culture-specific learning refers to the acquisition of skills and knowledge of a given culture while culture-general learning refers to skills and knowledge transferable across culture. The teacher can promote an awareness of cultural diversity by directing student attention to cross-cultural differences and then to intra- and inter-cultural variations of linguistic differences (Paige, Jorstad, Siaya, Klein, and Colby, 2003).

Several researchers have developed models of intercultural sensitivity to provide educational support and challenge for the language learner. Bennett's Developmental Model of Intercultural Sensitivity (DMIS) describes two major stages, ethnocentric and ethno-relative that learners move through in their development of intercultural competence (Bennett, 1993). The six stages are denial, defence, minimisation, acceptance, adaptation, and integration. Similarly, Salzer (1993) proposes a six-stage model of cross-cultural appreciation, including ignorance, rejection, approximation, awareness, approval, and versatility. Christensen (1989) proposes a model of

cross-cultural awareness that includes five stages: unawareness, beginning awareness, conscious awareness, consolidated awareness, and transcendent awareness.

The value of these models for language and culture teachers is their development of cross-cultural awareness and appreciation. They assist the teacher to plan the curriculum, teach toward it, and assess student development within that framework (Lange, 2003). Kirk's (1996) and Doering's (1997) studies support the idea that cultural awareness can be improved by means of a well-designed curriculum. Kirk's kindergarten curriculum allows children to verbalise their prejudices and fears as well as to consider how they feel about each other, while Doering's geography curriculum uses integrated units, literature based instruction, and cooperative learning.

Research Purposes and Questions

Given the emphasis on culture in foreign language learning as well as the increasing growing population of Chinese-speaking students in the United States schools, it is important to examine the implementation of culture as the core in the Chinese language and culture program. The thematic unit of Chinese festivals was introduced to a kindergarten classroom in a public elementary school in the Mid-Hudson area in New York State. This study examined three major topics. First of all it explored how Chinese culture and language learning could be integrated in the thematic unit of Chinese festivals. Next it examined how the thematic unit was implemented, that is, was the thematic unit supportive of culturally responsive pedagogy? The final phase examined the assessment of children's learning in the Chinese Festival Unit and assessed how well children learnt from this thematic unit and whether the children made significant progress in achieving the learning goals.

METHOD

Participants

This is a small-scale action research study. Nine kindergarten children who attended a public elementary school in New York State during the 2004-2005 academic year were selected with approval from the local campus Institutional Review Board (IRB) as well as permission from the district superintendent, school principal, and their parents. The participants included four girls and five boys, ranging from age five to six years. There was one Taiwanese girl, one adopted Chinese girl, and seven Caucasian children. Only the Taiwanese girl spoke Chinese at home while all others spoke English. For all children except the Taiwanese girl, this thematic unit was their first experience of learning about Chinese culture and language.

Procedure

The study involved the development, implementation, and assessment of a unit on Chinese festivals. The unit, which was developed by the investigator, consisted of topics of five culturally-representative Chinese traditional festivals-(a) the Lunar New Year, (b) the Lantern Festival, (c) Chinese Memorial Day, (d) the Dragon Boat Festival, and (e) the Mid-Autumn Moon Festival. These five festivals were organised and mapped out using topics and guided questions, content knowledge, activities, New York State Learning Standards, Standards for Foreign Language Learning, goals, objectives, assessment, and resource materials. A sample curriculum map is presented in Appendix A. The thematic unit of Chinese Traditional Festivals was integrated with the academic subjects of English Language Arts, Arts, and Languages Other Than English. As Tiedt and Tiedt (2005) noted, the use of a thematic approach to organise learning activities was appropriate for studies that cross several academic subjects.

This thematic unit was put into practise once a week for eight consecutive weeks, and each session lasted for 50 minutes from 8:10 to 9:00am during the before school session. This thematic unit involved a variety of literacy activities. Children read, listened to, and reflected on the

festival-related picture books; they related the book to their life experiences either through oral discussion, drawing, or writing; they made the Chinese Zodiac; they sounded out and wrote the Chinese characters; they read lantern riddles; they counted using the numbers one to ten and spoke greetings in Chinese; they made paper lanterns, dragon puppets, lucky banners, shuttlecocks, and dragon boats, and shadow puppets; they played with the puppet theatre; sang the Chinese songs; and showed their favourite part of the Chinese festivals by drawing and writing.

The curriculum activities have been described in detail in the first section of the findings and discussion. The curriculum revision and development took into account the evaluation of children's learning, which was obtained from the cultural artefacts, drawing and writing products, oral responses to interview questions, and written responses to the Pictorial Attitudes Scale. Children's cultural artefacts such as paper lanterns, dragon boats, shuttlecocks were completed in class while the drawing and writing products were collected during the last class meeting. Three sample drawings and writings are included in Appendix E.

Both the oral interview and Pictorial Attitudes Scale were administered through diagnostic, formative, and summative assessments. The diagnostic and summative assessments were conducted during the first and last class meetings. The formative assessment took place at the end of each lesson. The Pictorial Attitudes Scale was conducted in a whole-group session. At the end of each lesson, each student was given a sheet from the Pictorial Attitudes Scale and was asked to colour in one specific face (☺ ☹ ☺) showing how he or she felt about the learning activities, whether listening to the story, making the artefact, writing the Chinese characters, counting using the numbers, or speaking the greetings.

At the end of each class, two to three children were randomly selected for an oral interview. The investigator approached an individual child who had done his or her individual work and then obtained his or her assent for a short personal interview. Numerous open-ended questions were asked to probe children's interests, questions, or reflections on the learning activities. Questions were asked to probe children's reflection on their learning. The follow-up questions varied depending on each subject's response. The interview lasted for two to three minutes for each child selected.

Sample oral questions were described as follows. Can you tell me anything about Chinese festivals? How do Chinese people celebrate the Lunar New Year? Can you speak Chinese greetings or write Chinese characters? Do you know how to make Chinese New Year crafts? Can you count using the numbers from one to ten in Chinese? Can you name the major parts of your body, for example, head, shoulder, knee, toe, eye, ear, mouth, and nose in Chinese? What did you hope to learn from this lesson? Did you like today's story, art, or craft activities? Why did you like it? Which was your favourite project or craft? Which was your favourite festival?

Both quantitative and qualitative data were analysed. The quantitative data was obtained from the Pictorial Attitudes Scale (Appendix B) and a comparison of student performance between diagnostic and summative assessment (Appendix C). The children's response to the Pictorial Attitudes Scale was tallied, and then the frequency distribution of the responses was presented (Appendix B). The number of students obtaining each learning goal in both the diagnostic and summative assessments was tallied and compared (Appendix C). The qualitative data were derived from the oral interview. Children's oral responses to one to one interview were transcribed, conceptualised, and grouped into categories. The transcribed data were broken down into discrete ideas and were then given a conceptual name or label. The name was taken either from the words of the participants or given by the investigator because of the meaning derived from the ideas verbalised. The conceptual names were then grouped into higher level categories. The presentation of the qualitative data was intertwined with the quantitative data.

FINDINGS AND DISCUSSION

The first section presents the curriculum content and the process of curriculum development of this thematic unit; the second section explores the application of culturally responsive pedagogy in this thematic unit; the final section presents the results of student learning in the thematic unit on Chinese festivals.

Culture as the Core of the Thematic Unit

Given the acknowledgment of culture as a vital part in second language learning, Chinese festivals became the core of this thematic unit. Nehru indicated that “Culture is the widening of the mind and of the spirit,” as cited in Hanson and Lynch (1990). Crozet and Liddicoat (2000) believed that culture determined not only what information was conveyed but also how information was delivered and perceived. The thematic unit was implemented in a kindergarten classroom, within which the investigator regarded herself as a cultural educator and ranked the learning of culture higher than language proficiency. In such a formal and structured context, the curriculum map was organised to guide the teaching and learning. By aligning this thematic unit with five traditional Chinese festivals, culture became the core of student learning.

Mapping out the thematic unit of five traditional festivals

The curriculum map illustrated what was really going on in this thematic unit as children moved through the different topics and learning activities. Guided questions on the five festivals were listed by week:

- Week 1: How did Lunar New Year begin? How did dragons, lions, lights, and firecrackers become part of the farmer’s celebration of the New Year?
- Week 2: Getting Ready for the New Year. What do people do to prepare for the Lunar New Year? What New Year greetings were and still are used?
- Week 3: The Chinese Zodiac. What is the order of the years in the Chinese calendar? What are the characteristics of each of the twelve animals?
- Week 4: The Lunar New Year Celebration—Lantern Festival 1. When and how do people celebrate the Lantern Festival? What types of lanterns do you like?
- Week 5: Lunar New Year Celebration—Lantern Festival 2. What does a dragon look like? What does a dragon symbolise in the Chinese society? Have you ever seen a dragon dance?
- Week 6: Chinese Memorial Day, also called the Clear Brightness Festival. When does the Chinese Memorial Day take place? What do people do during the Clear Brightness Festival?
- Week 7: The Dragon Boat Festival. Why and how do people celebrate the Dragon Boat Festival? What does a dragon boat look like? Why do people eat rice dumplings or dragon boat dumplings?
- Week 8: Mid-Autumn Moon Festival or Harvest Moon Festival. Why is it also called Harvest Moon Festival? What is a moon cake? How do people celebrate the Harvest Moon Festival?

The thematic curriculum was integrated with subjects of English Language Arts, Arts, and Languages other than English and was in compliance with the New York State Learning Standards (NYSED, 2004) and Standards for Foreign Language Learning (National Standards, 1999). Appendix D lists the learning goals with corresponding NYS Learning Standards (NYSED, 2004) and Standards for Foreign Language Learning (National Standards, 1999). According to the New York State Learning Standards, the learning of languages other than

English should enable children to develop cross-cultural skills and understanding as well as to use a language other than English for communication. The Standards for Foreign Language Learning has identified these two learning goals as Culture and Communication. Some basic conversation and those terms of children's interests such as number counting and the major parts of the human body as well as the festival-related cultural artefacts were integrated into this thematic unit.

Integration of cross-cultural literature into the thematic unit

Chinese cultural and ethnic heritage was introduced through children's literature in the topics of Chinese traditional festivals. The investigator used literature as interactive read-aloud resources in the introductory stage of each lesson. Reading several sections about a selected festival gave children a number of perspectives of each festival and helped the children scaffold and construct their understanding of festival related customs. The investigator also encouraged children to make connections between the literature and the activities such as crafts undertaken in the lesson.

The response to the Pictorial Attitudes Scale (Appendix B) indicated that most children in this study found these books appealing and were eager to read and talk about them. As Lynch-Brown and Tomlinson (2005) indicated, literature for children led to the enjoyment, imagination, inspiration, vicarious experience, and understanding as well as connecting it to cultural heritage. The festival-related picture books offered children opportunities to gain information about Chinese culture while the illustrations engaged the children's imagination.

The English version of children's picture books was selected for the children in this study and drew on the notion that children learn best when using their principal language (Tiedt and Tiedt, 2005). Literature selected for this study included folktales, fiction, and non-fiction. The folktales were stories handed down from generation to generation and connected the children to the past and the roots of Chinese culture and heritage; the fiction presented the stories of Chinese people's experiences in celebrating festivals; and the non-fiction provided facts about Chinese festivals, culture, and heritage. Both folktales and non-fiction needed instruction and interpretation along the way while the fiction had an immediate appeal for many of the children. By using numerous books throughout the course of the thematic unit, children were exposed to diverse views on each festival.

Folktales used in this study include a wild beast as an origin of New Year celebration in Chinese New Year: Holidays and Festivals (Flanagan and Zhurkina, 2003), twelve animals in the Chinese Zodiac in Celebrating Chinese New Year (Hoyt-Goldsmith and Migdale, 1998), message hid inside the moon cakes in China: The Culture (Kalman, 2001), and the tale of Qu Yuan in Moonbeams, Dumplings and Dragon Boats: A Treasury of Chinese Holiday Tales, Activities and Recipes (Simonds, Swartz, and So, 2002). Fiction included Lion Dancer: Ernie Wan's Chinese New Year (Waters and Slovenz-Low, 1990), Chinese New Year's Dragon (Sing and Liu, 1994), Celebrating Chinese New Year (Hoyt-Goldsmith and Migdale, 1998), Moon Festivals (Russell and Zhang, 1997), Festival Time! Lanterns and Firecrackers: A Chinese New Year story (Zucker and Cohen, 2004), Paper Lanterns (Czernecki, 2001), and Festival Time! Lanterns and Firecrackers: A Chinese New Year Story (Zucker and Cohen, 2004).

Non-fiction literature included Happy New Year: Kung-Hsi Fa-Tsai (Demi, 1997), Gung Hay Fat Choy: Happy New Year (Behrens, 1991), Dragon Boat Festival (Shui and Thompson, 1999), Awakening the Dragon: The Dragon Boat Festival (Chan and Zhang, 2004), Chinese New Year: Holidays and Festivals (Flanagan, and Zhurkina, 2003), Moonbeams, Dumplings and Dragon Boats: A Treasury of Chinese Holiday Tales, Activities and Recipes (Simonds, Swartz, and So, 2002), China: The Culture (Kalman, 2001), Chinese Food and Drink (Shui, and Thompson, 1999), Dragon Dance: A Chinese New Year Lift-the-Flap Book (Holub and Huang, 2003), and Red Eggs and Dragon Boats: Celebrating Chinese Festivals (Stepanchuk, 1994).

Five traditional festivals

The thematic unit of Chinese Festivals is aligned with five major traditional festivals, which are celebrated according to the Chinese lunar calendar. In the Chinese society, the lunar calendar used to count the passing years is based on the cycles of the moon (Kalman, 2001). There are 12 months in a year, and each month starts on the new moon (Stepanchuk, 1994). Each year is named after an animal, and each animal has certain characteristics (Hoyt-Goldsmith and Migdale, 1998). The order of the years in the lunar calendar is Rat, Ox, Tiger, Rabbit, Dragon, Snake, Horse, Goat, Monkey, Rooster, Dog, and Pig (Demi, 1997). These 12 animals constitute the Chinese Zodiac. The individual personality is considered to resemble the characteristic of the animal that the individual birth year is named after.

There are five important festivals celebrated in Chinese communities and society. They include Chinese New Year, the Lantern Festival, Clear Brightness Festival, the Dragon Boat Festival, and Mid-Autumn Moon Festival. Chinese New Year starts on the first day of the first lunar month, and Lantern Festival takes place on the fifteenth day after the first new moon. Clear Brightness Festival is held in April of the Western Calendar to honour family ancestors. The Dragon Boat Festival is held in remembrance of the politician and poet Qu Yuan and is celebrated on the fifth day of the fifth lunar month. The Chinese celebrate the harvest season with the Mid-Autumn Moon Festival to give thanks to the full moon in the eighth lunar month.

The Chinese New Year celebration begins with New Year's Eve feast and ends with the lantern Festival held two weeks later. Chinese New Year has been celebrated for more than 4,000 years (Hoyt-Goldsmith and Migdale, 1998). Farmers in old China started to celebrate the holiday to mark the end of winter and the beginning of spring (Flanagan and Zhurkina, 2003). A week before the New Year is the time when Chinese families prepare for the New Year celebration. They clean up the house, sweep out the old or bad luck, get a haircut, buy new clothes or shoes, pay all debts, put out peach or plum trees, decorate the doors and windows with lucky phrases written on red paper in black or gold ink, send the Kitchen God to heaven, and cook special food for the New Year's Eve feast (Demi, 1997; Flanagan and Zhurkina, 2003; Hoyt-Goldsmith and Migdale, 1998). There are dragon dances, lion dances, and lantern parades to scare away the evil spirits (Demi, 1997). Chinese people believe that all of these activities will bring forth a year of great fortune and prosperity.

On the fifteenth day of the Chinese Lunar New Year, the Lantern Festival is celebrated. The streets and parks are lit by hundreds of lanterns of all kinds and shapes, such as fish, pigs, dragons, horses, birds, and flowers. The traditional lanterns are made of paper, bamboo, coloured glass paper, and silk. The lanterns are illuminated by candles and carried on sticks. The Lantern Festival is also called Yuan Xiao Festival in Taiwan. Yuan Xiao is one type of sweet rice ball with fillings, such as sweet red beans, lotus seeds, coconut, peanuts, or sesame seeds (Shui and Thompson, 1999). The rice balls are served in sweet soup and represent happiness and family reunion (Simonds, Swartz, and So, 2002).

Both lion and dragon dances are important in the celebration of Chinese New Year and the Lantern Festival. Chinese people believe that both lion and dragon dances will scare away evil spirits and bring good luck. The lions' and dragons' bodies are made of brilliant coloured satiny cloth (Simonds, Swartz, and So, 2002). The lion sculptures are regarded as guards and are often placed outside the important buildings (Kalman, 2001). The dragon is considered as a well-meaning creature and a protector for the people (Chan and Zhang, 2004). It is a symbol of strength (Hoyt-Goldsmith and Migdale, 1998), spring, and new life (Kalman, 2001). The lion and dragon dancers leap and dance to the beat of drums along with a horn, firecrackers, and roaring crowds.

The Clear Brightness Festival or Qing Ming Festival is the Chinese Memorial Day. The term 'Qing-Ming' literally means 'clear brightness' (Simonds, Swartz, and So, 2002, p.34). The Clear

Brightness Festival takes place in April of the Western calendar. It is the time when flowers are ready to blossom, trees are sprouting tender buds, the air is clear and pure, and the sky is light and bright (Simonds, Swartz, and So, 2002). Chinese families tidy their ancestors' graves by clearing weeds, planting flowers, and sweeping the tombstone. Then food offerings of meat, vegetables, rice cakes, egg rolls, and fruit are set out for their family ancestors. After their ancestors have enjoyed the food offerings, the food is shared with families and relatives who take part in this event (Stepanchuk, 1994). This festival is all about remembering family ancestors. It originates from the tradition that caring for elderly was an obligation and responsibility in the Chinese agricultural society (Hoyt-Goldsmith and Migdale, 1998). Therefore, strong family bonds are established in traditional Chinese society where children grow up with feelings of belonging to a family and a community.

The Dragon Boat Festival takes place on the fifth day of the fifth lunar month. It is held to honour the patriotic poet, Qu Yuan, who lived 2,300 years ago in old China (Chan and Zhang, 2004; Stepanchuk, 1994). There were seven kingdoms in China, and the Chu and Qin were the two most powerful kingdoms at that time (Chan and Zhang, 2004). Qu Yuan served as a loyal minister to the king of the Chu kingdom, but others were jealous of Qu Yuan's close relationship to the king. These corrupt, jealous advisors accused Qu Yuan of treason and disloyalty when he advised his king against signing a suspected peace agreement with the enemy kingdom of Qin. Qu Yuan continued to express his love for the king and people in the Chu kingdom while he was in dishonourable exile. In 288 B.C., Qu Yuan decided to end his life by throwing himself into the Miluo River when the Chu kingdom was conquered by the enemy, the kingdom of Qin (Chan and Zhang, 2004). People launched their boats to search for Qu Yuan's body and threw handfuls of rice in bamboo leaves to distract the fish from his body.

Today people eat rice packages and hold dragon boats races in remembrance of Qu Yuan. During the festival, crowds gather along the banks of rivers to watch the dragon boat races. The dragon boat is about 40 to 100 feet long with 20 paddlers (Simonds, Swartz, and So, 2002). The prow is made of a beautifully carved dragonhead, the hull is colourfully painted, and the dragon tail is attached to the stern (Kalman, 2001).

The Mid-Autumn Moon Festival takes place on the fifteenth day of the eighth lunar month. It is also called Harvest Moon Festival (Kalman, 2001; Simonds, Swartz, and So, 2002). Chinese people celebrate the harvest season by giving thanks to the full moon. Moon cakes are prepared to share with friends and relatives during the festival. The moon cakes contain a variety of sweet or salty fillings, such as red bean, lotus, almond paste, eggs, or meat fillings. Moon cakes have special meaning in Chinese history. About 700 years ago, the Mongols, the invaders from the north, ruled China. Chinese people hid message inside the moon cakes and passed the cakes around to inform everyone of a secret plan to protect their homeland. The Chinese people gathered and succeeded in overthrowing the Mongols (Kalman, 2001). Therefore, the moon cakes are also associated with the victory over the Mongols.

In sum, the design of this thematic unit acknowledges that culture is a dominant factor embedded in both the teaching and learning processes. The thematic unit of Chinese festivals has been constructed and implemented based on students' prior knowledge, cultural experiences, and reflection on the current learning as well as the investigator's experiences and knowledge of the Chinese culture and heritage.

The Application of a Culturally Responsive Pedagogy

This study is supportive of what Irvine and Armento (2001) identified as a culturally responsive pedagogy, within which critical reflection was a vital part. The classroom-based learning invited children to reflect and relate the materials to a wider cultural knowledge base. Underlying this practice was the philosophy of learning and teaching that focused on both the teacher's and students' reflection. Howard (2003) noted that culturally relevant teaching depended on critical

reflection by both teachers' and students' on their culture. Children in this study were engaged in a discourse about culture when they were asked to reflect on cultural differences. Children were encouraged to share their experiences about United States festivals and Chinese festivals and further to reflect on cultural differences. Specifically, children were asked to compare Chinese and American foods, customs, and costumes. Sample questions included, 'American New Year is...while Chinese New Year is...' As a result, children in this study were able to note the similarities and differences between cultures as well as shared traits of both cultures. Children could then apply the knowledge to further their learning and interpret cultural acts in a real context. Children in this study also seemed to acquire cultural knowledge by communicating with the investigator, a native speaker of Chinese. As Damen (2003) indicated, a practical means to learn cultural skills was to exchange actively with cultural informants, such as the native speakers.

The thematic unit of Chinese Traditional Festivals is compatible with culturally responsive pedagogy. Irvine and Armento (2001) indicated that teacher knowledge and reflection were ingredients for culturally responsive lesson. They further note that a culturally responsive classroom was where all the students and the teacher had a sense of caring and trust, where students' needs and interests were met, where the teacher taught to and through strengths of students, where students' reflection and experiences were incorporated into teaching, and where diverse values and beliefs were respected.

The culturally responsive instruction acknowledges children's needs and interests, relies on close relationship between the teacher and students, and connects learning to cultural referents. Assessment of children's culture and language learning provides feedback to both children and the investigator about the nature of children's cultural and linguistic understanding.

In this study, children's knowledge and experiences were incorporated in the teaching of Chinese Traditional Festivals. For example, one of the children's familiar songs entitled Head, Toes, Knees, and Toes was translated into Chinese and was integrated into the teaching activities. Simple counting from one to ten was introduced to connect with their growing number sense. The investigator was also responsive to children's needs, interests, and learning preferences; both the diagnostic and formative assessments provided feedback to the curriculum design and revision. Both the oral interview and written survey of the Pictorial Attitudes Scale enabled the investigator to gain knowledge of the representative culture in the class.

The investigator also spent considerable classroom time developing and maintaining relationships with the children. By listening to children's personal experiences and comments, the investigator successfully built a rapport with those children in this study. For example, the investigator asked children to share their experiences about Chinese New Year, Chinese food, and Chinese cultural artefacts. Children were asked to express themselves openly about their attitudes to the learning activities, and they were usually willing to verbalise their thoughts and feelings about each festival. Children were also provided with the Pictorial Rating Scale to colour in one specific face (☺ ☹ ☺) to show how they felt about the stories, the cultural artefacts, the Chinese characters, and Chinese greetings. Finally, children were encouraged to build meaning and represent learning by drawing or writing about the Chinese festivals.

Festival-related crafts were used as cultural referents to help children acquire knowledge, skills, and positive attitudes. As Ladson-Billings (1992) noted, a culturally responsive pedagogy used cultural referents to empower children socially, emotionally, and intellectually. Festival-related crafts were also used to develop cross-cultural understanding. Children linked festival-related crafts to the Chinese festivals. For example, the red lucky banners and Chinese Zodiac are associated with the Lunar New Year; paper lanterns are linked to the Lantern Festival; dragon boats and rice packages in bamboo leaves are connected to the Dragon Boat Festival; the puppet theatre is linked to the Mid-Autumn Moon Festival.

A culturally responsive teacher should be willing to understand student's prior knowledge and cultural experiences, connect students' cultural experiences to new learning, allow students to participate in planning learning activities, use culturally familiar language, encourage students to construct meaning and represent learning in their own way, use manipulative materials, and align authentic assessment in the teaching and learning process, such as teacher observation, oral interviews, and student exhibitions (Irvine and Armento, 2001).

Assessment of Children's Learning

The assessment of the children's learning is based on oral interviews and the Pictorial Attitudes Scale as well as the cultural products and cultural artefacts, drawings, writing, and the puppet theatre play. The assessment of culture learning focuses on both the objective culture (cultural artefacts) as well as subjective culture (as in language use). The systematic inclusion of cultural components in this thematic unit does increase the children's motivation to study the Chinese language. The assessment reveals the children's knowledge of Chinese culture and heritage, the skills of craft making, attitudes toward learning activities, and experiences in cultural encounters.

The comparison between diagnostic and summative assessments

Data were based on the diagnostic and summative assessments as well as both the formative assessment, that is the ongoing learning experience, and the portfolio with the festival-related artefacts, drawings, and hands-on activities. The assessments used in this study cover three domains of learning: affective, behavioural, and cognitive. The affective domain of learning is shown in the results from the Pictorial Attitudes Scale while cognitive and behavioural learning is manifested from the festival-related crafts and oral interviews.

Assessing children's reactions and responses was a useful means of examining the effects of instruction. Children made significant progress in terms of the four learning goals, presented in Appendix C (for d.f. = 6, a t-value of 8.33, $p < 0.01$). Because the probability value meets the criterion for significance (that is, $p < 0.01$), there was significant difference of the number of children who achieved the learning goals between the diagnostic and summative assessments. The diagnostic assessment revealed that only two children were able to name one Chinese traditional festival (Chinese New Year), described the festival-related customs, and had experience in making festival-related artefacts. On the other hand, all of them were able to name all festivals except the Clear Brightness Festival, recall the festival-related customs, and make festival-related crafts in the summative assessment.

In this study, children's learning focused more on culture-specific rather than culture-general learning given the time constraint and the young age group selected for this study. In terms of culture-specific learning, the children demonstrated their knowledge of basic greetings, customs, and heritage relevant to a given Chinese festival; they displayed skills of craft making and speaking the Chinese greetings. As the summative assessment revealed, most of the children demonstrated the ability to speak basic greetings although many of them were not able to recall the Chinese characters, count the numbers, or name the major parts of the human body. Children were familiar with the basic greetings, such as Ni Hao (How are you?), Wo Ai Ni (I love you!), Zao An (Good morning!), Zai Jian (Bye-bye!), Ba Ba (Father), and Ma-ma (mother). On the other hand, only one girl demonstrated the ability to count using the Chinese numbers and name the major parts of the human body, and only the simple Chinese characters (一/one, 二/two, 三/three) were recalled by three children.

It is possible that a greater time frame for learning a new language (Chinese) is needed. As Bialystok (1997) indicates that the amount of time involved in practising a second language is one significant factor affecting acquisition. While the languages with alphabetic writing systems use letters to represent phonemes, the Chinese writing system consists of characters and each Chinese character consists of complex combination between pronunciation and phonetic and semantic

components (Chen, Shu, Wu, and Anderson, 2003). Children in this study needed to have more inter-structure knowledge of characters in order to memorise the characters as a whole.

Illustration of children's learning and reflection

Children were highly motivated to learn about Chinese Traditional Festivals, and their comments were certainly rewarding to the investigator who had undertaken a challenge to develop a thematic unit of Chinese Festivals aligned with New York State Learning Standards. The children decided to participate in this study because of: (a) the connection to cultural origin ("I came from China."), (b) parental desire ("My mom decided it and signed on the paper."), (c) learning motivation ("I want to learn how to speak Chinese."), (d) experience ("Because I know Chinese stuff, different stuff. I like Chinese stuff.), or (e) interest ("Because it's fun."). Both the factors of connection to cultural origin and experience with Chinese people or cultural products were associated with integrative motivation while the factors of parental desire and interest were related to instrumental motivation. As the Standards for Foreign Language (National Standards, 1999, p.3) indicated, for some people the purpose and use of foreign languages was to "seek greater understanding of other people and other cultures". Many other factors that might have influenced language and culture learning, as suggested by the socio-education model detailed by Gardner and MacIntyre (1993), included learning style, intelligence, previous language background, language aptitude, and strategy use. More data are needed to identify the effect of these factors on children's learning of Chinese culture and language.

Despite of their limited knowledge of Chinese festivals, as revealed in the diagnostic assessment (Appendix C), children conveyed their interests in writing Chinese characters, speaking Chinese, and making Chinese crafts. Children expressed their interests in learning some (a) Chinese characters ("I like Chinese words." "Learn some Chinese words." "When we did lantern riddles over there."), different stuff ("Learn different stuff."), (b) numbers ("I learn Chinese numbers three and four."), and (c) greetings ("Kong Xi Fa Cai, 恭喜發財, Happy New Year!). "Chinese characters are fun to learn because it's cool", said one child. Children expressed their intention to increase linguistic proficiency. On the other hand, the goal of appreciating the Chinese culture seems to be difficult to assess practically for beginner-level language students.

In this thematic unit, Chinese language acquisition parallels culture learning. The majority of children (seven out of the nine) were very interested in learning to speak the Chinese greetings although they had difficulty sounding out the four tones accurately. The greetings introduced in this thematic unit included Ni Hao (你好, How are you!), Zao An (早安, Good morning!), Zai Jian (再見, Good bye!), Kong Xi Fa Cai (恭喜發財, Happy New Year!). Chinese language adopts a morpho-syllabic system (Perfetti and Zhang, 1995). That is, each Chinese character represents a morpheme and is pronounced as a monosyllable (Wang, Perfetti, and Liu, 2003). Therefore, the pronunciation and tones of Chinese language are very different for those who only speak an alphabetic language (for example., English). There are five tones in Mandarin Chinese, including four major tones (i.e., the first, second, third, and fourth tones) and the neutral tone. Tone is a unique feature of spoken Chinese, and tone matching requires the learner to isolate the tone from its rhyme and then to differentiate between the tones (Wang, Perfetti, and Liu, 2003). Given the diverse tones, many beginning Chinese learners have difficulty in tone matching.

Children in this study seemed to have lower motivation in learning to write than to speak Chinese. "I like to speak Chinese language more than to write the words," said one child. "It's hard to write Chinese symbols," said another child. "I don't like writing. It's boring," said yet another child. Although children acknowledged the challenge of writing Chinese characters, they were willing to try. "When I see something, I copy it and work it out at the end." Drawing on children's concern, the rote reproduction of Chinese characters was only a by-product resulting from the reading of children's picture books or from tangible elements of the Chinese culture (e.g., red lucky banner or the New Year's couplets). Meanwhile, only the simple characters were

taught in this study, including the characters for 田 (field), 山 (mountain), 一 (one), 二 (two), 三 (three), 四 (four), 五 (five), 六 (six), 七 (seven), 八 (eight), 九 (nine), and 十 (ten). For the alphabetical readers, the simple characters can be learned much more rapidly and accurately than the compound ones (Wang, Perfetti, and Liu, 2003).

The character is the basic unit of the Chinese writing system (Wang, Perfetti, and Liu, 2003). Chinese is considered as a logographic writing system (Chen, Shu, Wu, and Anderson, 2003), and a Chinese character is composed of strokes (Wang, Perfetti, and Liu, 2003). Some Chinese characters are pictorial and are viewed as pictographs (Hansen, 2004). The Chinese-speaking children make significant progress in writing when they understand the structure of the characters (Shu, 2003). Therefore, in this study the structure of the Chinese characters has been introduced to the children in order to make the logographic writing system meaningful to them.

The artefact making activities allowed children to work with concrete materials, maintain active involvement, and further explore cultural meaning. In most cases, artefact making was children's favourite learning activities, and children seemed to enjoy learning by doing ("I like when we do projects, the one we just did." "Making stuff."). These activities provided children with authentic and meaningful learning experiences. Wallace (2006, p.216) asserted that "use of concrete materials and firsthand experiences are essential in learning complex concepts". Similarly, Bickart, Jablon, and Dodge (1999) indicated that young children's thinking relies on their actions, and they learnt much better through direct involvement with materials.

Among the five festivals, those children (seven, in total) interviewed expressed their preference of the festivals for the Lunar New Year, the Lantern Festival, and the Dragon Boat Festival. They linked these festivals to their favourite cultural artefacts. For example, the red envelope, firecracker, and dragon boat are all related to Lunar New Year; paper lanterns are linked to Lantern Festival; rice dumplings are associated with the Dragon Boat Festival; and both red and gold are considered as the favourite colours for Chinese people.

The project on the Chinese zodiac allowed children to learn the order of the years by pasting the 12 animals in a clockwise direction. "I never knew the order of the animals round in I just did," said one child. "The clock thing. Because it is fun," said another child. "When we did clock, put all the animals on the clock. It is great!" said the other child. They also learned the characteristics of each animal as well as the kind of animal that their birth year was named after. Eight of them were born in the year of rabbit, and one in the year of tiger.

The game of lantern riddles seemed to attract their attention. One child conveyed his excitement by saying "I like reading the lantern riddles." Another child said, "I like reading things." Riddles written on slips of paper were hung from decorative mobiles. These mobiles were made of the twelve animals of the Chinese zodiac, including a mouse, an ox, a tiger, a rabbit, a dragon, a snake, a horse, a goat, a monkey, a rooster, a dog, and a pig. The lantern riddles were selected from the well-known riddles for this age group². Sample riddles included: (1) I am a ruler, but I have two feet, not one; and (2) I smell, but I have no nose. Children were encouraged in reading the riddles aloud and then guessing the answer. The opportunity of reading riddles enhanced children's decoding ability.

Children were all very excited when they made and played with the shuttlecock, as shown in Appendix B. "I like the shuttlecock because it's fun," said one child. The shuttlecock is called Jian Zi in Chinese, which can be played by one person or with others. When playing, the shuttlecock is thrown into the air and kicked with the inside of the heel. The object was to keep the shuttlecock in the air as long as possible (Kalman, 2001). The materials needed were a cork, or a coin with a hole with a couple of feathers attached to it (Kalman, 2001). It may also be made

² Taken from the website <http://www.justriddlesandmore.com/kidsriddles.html>.

with two coins, with striped tissue paper covering the coins and fastened with a rubber band (Simonds, Swartz, and So, 2002).

The drawing samples presented in Appendix E illustrate children's preferred hand-on projects. Children in this study were encouraged to represent their learning by drawing or writing. The first drawing showed a girl's preference for a female puppet and the puppet theatre associated with the Mid-Autumn Moon Festival. The second drawing depicted a boy's picture of himself and his connection to those hands-on projects for different festivals, including paper lanterns, shuttlecock, a dragon boat, and fireworks. The third drawing and writing conveyed another boy's preference for the dragon puppet.

In sum, the findings reveal that (a) culture is a predominant part of this thematic unit, (b) this study is supportive of culturally responsive pedagogy, and (c) children can and do make progress in Chinese culture and language learning.

IMPLICATIONS

Given the diverse population in the United States, multicultural education is fundamental to recognise, preserve, and enhance cultural pluralism in American society. With an increasing number of Chinese-speaking students, multicultural education must expand to embrace this emerging population. This study suggests that the thematic approach is appropriate for designing the Chinese language program while curriculum maps may be used to align the learning standards, contents, skills, and assessment. The curriculum map may provide a realistic picture of the curriculum as well as account for student achievement. It provides the teacher with a useful tool to adopt this curriculum in his or her classroom practice.

This study also suggests that a Chinese culture and language course may meet the needs of the accountability era by integrating national and state standards into the curriculum design. Although the assessment of cultural learning is not easy, a clear sense of progress is provided given the connection of learning objectives to the learning standards. The expectation for learning in the form of standards gives guidance to the teacher by aligning the curriculum, carrying out the instructional activities, and administering the assessment (Lange, 2003).

Successful integration of culture into the curriculum may be a challenge to teachers. Therefore, it demands pre-service and in-service training opportunities for language teachers. Culture can be integrated into a language class from the inception of language learning. The teacher's role is not the purveyor of the good but rather a cultural mentor, guide, and partner in the development of both cross-cultural understanding and sensitivity to cross-cultural differences. In a culturally responsive classroom, teachers need to respond to their students by incorporating their students' cultural needs. The teacher need to expose the learner to the target culture by encouraging the learner to consider cultural differences, read culturally-embedded literature, and extend culture learning to the natural settings..

Children's literature can be a powerful tool for linking culture to language learning in the structured classroom. The literature accounts of customs, cultural heritage, and foods are useful in a Chinese-as-a-second language classroom. The cross-cultural literature can enhance children's understanding of the cross-cultural values and attitudes and further improve children's appreciation of people and their culture. Therefore, schools and homes need to provide enriched multicultural literature to minimise stereotypes about a culture as an objective of cultural enrichment.

In addition to the formal assessment, cultural artefacts can be good indicators of children's learning about culture. The craft-making activities give children an engaging way to learn more about the abstract concept of culture. Children in this study benefited from festival-related craft making. They were able to associate their favourite crafts or activities with a specific festival.

Therefore, the early childhood teachers need to provide concrete and direct experiences to help children explore more mature ideas about the world around them (Wallace, 2006).

Learning to speak and write Chinese can be a challenge to many English-speaking children. It requires the learners to differentiate between four major tones (Wang, Perfetti, and Liu, 2003), and they need encouragement to sound out the monosyllabic characters. Learning to write Chinese is an art as well as science. Each character needs to be written following a proper stroke order and be confined in a square box (Ng and Wu, 1990). Therefore, simple characters seem to be much easier to learn by the alphabetic readers than compound characters (Wang, Perfetti, and Liu, 2003). Considering the unique characteristics of Chinese language, the alphabetic learners can practise the monosyllabic pronunciation starting with the simple characters.

CONCLUSION

Summary of the Study

This study involved the development, implementation, and assessment of a culture-based thematic unit in a kindergarten classroom. Specifically, this study presented three major concerns: culture as the core in the development of the thematic unit of Chinese festivals, a culturally responsive pedagogy as a model of instruction, and the assessment of student learning by means of multiple methods such as diagnostic, formative, and summative assessments, cultural artefacts, and drawing or writing products.

The thematic unit of Chinese Festivals represents a step toward understanding the actual learning of Chinese-as-a second-language students. It is hoped that this study may be able to generate a much needed concern of Chinese language and culture program not yet a part of United States public schooling. This study is also an effort toward an understanding of multicultural education that is needed with respect to Chinese language and culture program. It is intended as a sample thematic unit that can be of use to those committed teachers who attempt to teach a Chinese language and culture course.

Limitations of the Study and Future Directions

One limitation of this study is the constraint of the time frame to implement the thematic unit. An eight-week intensive program is not really sufficient to obtain progress in the four learning goals. An extension in the duration of the curriculum implementation is needed for future studies. For example, two sessions per week for 10 to 15 consecutive weeks may be appropriate to implement this thematic unit. Future study needs to provide sufficient time to encourage children to engage in the second-language acquisition, craft making, and learning about cross-cultural heritage and traditions.

With an emphasis on culture in the language program in a multicultural society, culture can become the core of the curriculum, instruction, and assessment of a foreign language. Given the limited research on aspects of the curriculum, instruction, and assessment in the Chinese language program, future studies need to rethink the process of Chinese language and culture teaching as well as the ways Chinese language is used in society.

The following questions may act as guides to language acquisition:

- (a) What is the conceptual development of the Chinese language and culture program?
- (b) Which particular aspect of Chinese culture should be taught—history, festivals, civilisation, or other aspects?
- (c) How should Chinese culture be integrated into Chinese language learning?
- (d) Is there a sample lesson plan or theoretical model for teachers to follow?

- (e) What are the effective ways to evaluate Chinese cultural learning?
- (f) How is the Chinese language learned when culture is integrated into the language program?
- (g) How does an English speaker acquire Chinese culture? and
- (h) How can a student's learning benefit from a multicultural classroom?

Given the limited studies of student motivation regarding Chinese language learning, there is a need to examine the construct and assessment methods of motivation in the Chinese as a second language population. The self-report measure of motivation is not very reliable. Furthermore, the motivation may vary as a function of the setting, classroom climate, and student composition (Paige, Jorstad, Siaya, Klein, and Colby, 2003).

Finally, it is not easy to measure children's motivation and interest. Many factors influence language and culture learning. These include learning style, intelligence, previous language background, language aptitude, and strategy use (Gardner and MacIntyre, 1993). In order to understand better and improve Chinese culture and language learning, future research needs to identify the conceptual distinctions between learner factors and the complex relationships between motivation, interest, attitudes, learning style, previous language background, and behaviour appropriate for language and culture learning as well as the environmental factors of classroom settings and climate, student composition, and curriculum outline.

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APPENDIX A: SAMPLE CURRICULUM MAP OF THE CHINESE FESTIVALS

Week 1	
Topics or Guided Questions	<ol style="list-style-type: none"> 1. How did Lunar New Year begin? 2. How did dragons, lions, lights, and firecrackers become part of the farmer's celebration?
Content Knowledge	<ol style="list-style-type: none"> 1. Farmers celebrate the holiday to mark the end of winter and the beginning of spring (Flanagan and Zhurkina, 2003). 2. New Year greeting: Kong Xi Fa Cai (恭禧發財, Wish you be prosperous!) 3. The beast did not like loud noises, the red color, or bright lights.
Art, Craft or Literacy Activities	<ol style="list-style-type: none"> 1. Listen to and reflect on the story <i>Chinese New Year: Holidays and festivals</i> (Flanagan and Zhurkina, 2003). 2. Speak "Kong Xi Fa Cai (恭禧發財, Wish you be prosperous!)" 3. Use a black marker to trace two Good Luck Characters: Cun (春spring) and Fu (福fortune).
Learning Goals	Goal 1, 2, 3 and 4
Learning Objectives	<ol style="list-style-type: none"> 1. Students describe that Lunar New Year occurs at the end of winter and the beginning of spring. 2. Students identify the New Year celebration: dragon, lion, bright lights, firecrackers, and the color red. 3. Students can identify two characters: Cun (春spring) and Fu (福fortune).
National Standards for Foreign Language Learning	Standard 1.1 Standard 2.1 Standard 2.2 Standard 4.1
Assessment	<ol style="list-style-type: none"> 1. Ask short explanation question: "How did Lunar New Year begin?" "How did dragons, lions, lights, and firecrackers become part of the farmer's celebration?" 2. Individual interview to elicit students' reflection on this lesson.
Materials Needed	"8 x 8" piece of red paper, black thick marker or black acrylic paint.

APPENDIX B: FREQUENCY DISTRIBUTION OF CHILDREN RESPONSE TO PICTORIAL ATTITUDES SCALE

				No Answer or Missing Data
Story: Chinese New Year: Holidays and festivals (Flanagan and Zhurkina, 2003).	8	1	0	0
Speak “Kong Xi Fa Cai (恭喜發財, Wish you be prosperous!)”	7	1	1	0
Project: Use a black marker to trace two Chinese characters: Cun (春spring) and Fu (福fortune).	9	0	0	0
Project: Make a zodiac, and paste the twelve animals on a circle-shape paper.	9	0	0	0
Speak and write two Chinese characters: 田(field) 山(mountain).	6	1	1	1
Story: Listen to the legends about the Chinese Zodiac (in Hoyt-Goldsmith and Migdale, 1998).	6	2	0	1
Listen to and read the storybook <i>Festival time! Lanterns and firecrackers: A Chinese New Year story</i> (Zucker and Cohen, 2004).	7	2	0	0
Project: Make a paper lantern	9	0	0	0
Speak the greetings: 你好! (How are you!), 早安(Good morning!), 再見(Good bye!).	8	0	0	1
Listen to the books <i>Light the lights</i> (Demi, 1997) and <i>Paper Lanterns</i> (Czernecki, 2001).	3	4	1	1
Project: Make a dragon puppet.	9	0	0	0
Story: <i>Picnics, Kite Flying, and Tidy Tombs</i> (Simonds, Swartz, and So, 2002) and Qing Ming Festival (Kalman, 2001).	6	3	0	0
Project: Shuttlecock	9	0	0	0
Story: <i>Dragon Boat Festival</i> (Shui and Thompson, 1999), <i>Awakening the Dragon</i> (Chan and Zhang, 2004), <i>The tale of Qu Yuan</i> (Simonds and Swartz, 2002).	7	2	0	0
Sing the song “頭兒(head), 肩膀(shoulders), 膝(knees), 腳趾(toes).”	6	1	1	1
Project: Make a dragon boat and play dragon-boat racing	9	0	0	0
Story: An old legend that Chinese people hid message inside the moon cakes and passed the cakes around to inform everyone of a secrete plan protecting their homeland (Kalman, 2001).	6	1	1	1
Project: Make a shadow puppet and play the “puppet theater” in the class for children to play with.	8	0	0	1
Counting the Numbers: 1-10	8	0	1	0

**APPENDIX C: THE COMPARISON OF STUDENT PERFORMANCE BETWEEN
DIAGNOSTIC AND SUMMATIVE ASSESSMENTS***

Learning Goals/Assessment	Diagnostic Assessment	Summative Assessment
Learning goal 1: The child will recall or identify the customs and heritages of the five traditional festivals.	2	9
Learning goal 2: The child can speak the basic Chinese greetings and name the major parts of the human body	1	7
Learning goal 3: The child can count and/or write Chinese numbers.	1	6
Learning goal 4: The child will make the festival-related artifacts.	2	9

* Each cell shows the number of children who achieve the goal.

***d.f.*= 6, *t*= 8.33, *p*< 0.01

APPENDIX D: LEARNING GOALS OF THE CHINESE TRADITIONAL FESTIVALS

Goal 1: *The child will recall or identify the Chinese customs and heritages of the five traditional festivals—Lunar New Year, Lantern Festival, Ching-Ming Festival (Memorial Day), Dragon Boat Festival, and Mid-Autumn Moon Festival.*

NYSLS: Languages Other Than English, Standard 2--Cultural Understanding.

English Language Arts, Standard 1--Language for Information and Understanding.

English Language Arts, Standard 2-- Language for Literary Response and Expression.

Goal 2: *The child will speak the basic Chinese greetings and name the major parts of the human body.*

NYSLS: Languages Other Than English, Standard 1--Communication Skills.

NYSLS: The Arts, standard 1—Creating, Performing, and Participating in the Arts.

Goal 3: Children will count and write Chinese numbers.

NYSLS: Languages Other Than English, Standard 1--Communication Skills.

Goal 4: *The child will make the festival-related crafts, including door couplets, Chinese zodiac, candle-lit lanterns, lantern riddles, dragon puppets, shuttlecock, dragon boat, shadow puppets, puppet theater, etc.*



NYSLS: Languages Other Than English, Standard 2--Cultural Understanding.

The Arts, Standard 1: Creating, performing, and Participating in the Arts.

The Arts, Standard 2: Knowing and Using Arts Materials and Resources.


APPENDIX E: SAMPLE CHILDREN'S DRAWING AND WRITING

I Liked
the girl puppet
and the puppet
theater the best.



My favorite part of Taiwanese
Class was when we made the
dragon puppets - - - - -

fireworks



Dragon Boat

me

Lanterns

This is what
you kick

Recent continuing education policies in Hong Kong: A focus on short-term performance through inducements

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In recent years, due to economic restructuring, the problems Hong Kong has been facing are the 'knowledge deficit' in the workforce and a shortage of well-educated manpower. The Hong Kong Government has implemented a number of continuing education policies with an ultimate goal to encourage and help the workforce to strengthen themselves with improved knowledge and skills. These policies rely on short-term inducements such as providing monetary subsidies and loans. As the recipients of inducements differ in their capacities, preferences and objectives, there exist problems of variability that depreciate the intended outcomes. Moreover, the long-term needs are undermined. Because of the lack of an overall plan and coordination, there are areas of duplication and inconsistency among the policies, leading to counter-effective administration. In this article, the recent continuing education policies in Hong Kong are reviewed critically with respect to the problems and community needs as well as the policy objectives and possible solutions. The Government's promises and shortcomings are discussed.

Continuing education, education policy, policy analysis, policy review

INTRODUCTION

Continuing education conventionally means the education provided for people after they have left the formal education system. In Hong Kong, continuing education evolved in 1950s as remedial education for people who missed the chance to receive a basic education. After half a century, continuing education is considered as a lifelong process for people of all ages to acquire knowledge and skills. Throughout the history of the development of continuing education, the period from 1998 to 2004 was critical. Not only was there significant growth in the field, but also the Government assumed a more proactive role and formulated a number of policies. This article serves to review the policies where the following research issues are specifically explored.

Questions. *What are the problems and community needs that prompted the Government to formulate a number of policies on continuing education in recent years (1998 to 2004)? To what extent can these policies solve the problems and address community needs?*

Policies are essentially problem-driven (Anderson, 1990). They represent Government intentions, decisions and actions in response to the problems and community needs they seek to address (Cochran et al., 1999; Cochran and Malone, 1995). In recent years, the Hong Kong Government has assumed a more proactive role and formulated a number of policies on continuing education, in contrast to its earlier laissez-faire approach. These policies aim to strengthen the workforce with knowledge and skills in order to prepare them for the advent of a knowledge-based economy

¹ This article was extensively edited by Dr B. Matthews, Research Associate, Flinders University Institute of International Education.

after economic restructuring. In this article, I review these policies with respect to the problems, local community needs, policy solutions, planning assumptions and the policy formulation and implementation process.

Proposition. *The policies rely mainly on short-term inducements as instruments. There exist problems of variability as the recipients of inducements vary in their differing capacities, preferences and objectives. The long-term needs are undermined.*

The policies rely on short-term inducements, such as providing monetary subsidies and loans, which encourage and help the workforce to pursue continuing education courses in order to acquire knowledge and skills. As the policies place their primary focus on the short-term needs, the long-term needs are rather undermined. According to Elmore's concepts of policy instruments, the recipients of inducements may vary in their differing capacities, preferences and objectives (Elmore, 1987). The problems of variability inevitably exist, thus depreciating the outcomes of the policies. In this article, I investigate the solutions offered by these policies and highlight the promises and shortcomings.

Proposition. *As the policies evolved without an overall plan and coordination, there are areas of inconsistency and duplication, that lead to counter-effectiveness in policy administration.*

The Government took a so-called 'piece-meal' approach to the formulation of their education policies, where the 'problems', 'solutions' and 'politics' evolved separately. Problems were identified and the policy solutions were developed individually. Policies were then formulated and implemented separately, without much coordination with each other. Because they lacked an overall plan and coordination, there were areas of inconsistency and duplication among the policies. Counter-effective administration was the result. In this article, I analyse the policy making process using Kingdon's 'garbage-can' model (Kingdon, 1995).

The remainder of the article is organised as follows. The next section is an overview of continuing education in Hong Kong. There follows a section that summarises the policies on continuing education from 1998 to 2004. These policies are then reviewed and analysed with respect to the problems and community needs they seek to address, the policy solutions and the policy making process are discussed in the sections that follow. The article concludes with a perspective on the future development of continuing education in Hong Kong.

CONTINUING EDUCATION IN HONG KONG

The inception of continuing education in Hong Kong dates back to the 1950s when remedial education was provided to adults who missed the chance to receive a basic education. Continuing education is now considered as a lifelong process for people of all ages to acquire knowledge and skills for personal interests and academic and career prospects (OECD, 1996). Since the 1950s, there have been many changes in continuing education, both in the general perceptions and demands as well as in the Government involvement and policy making. These characterise four stages in the development of continuing education.

The Period from 1954 to 1978

In the first two decades of its development, continuing education was considered as remedial education for adults lacking basic and formal education. The Adult Education Section of Department of Education was established in 1954 to offer evening classes up to the secondary level using premises and facilities of Government schools.

During this period, a number of cutting edge continuing education institutions, taking the form of University extra-mural departments, were established. The Department of Extramural Studies (now the School of Professional and Continuing Education) of the University of Hong Kong was established in 1956 (HKU, 2006). The Department of Extramural Studies (now the School of Continuing Studies) of the Chinese University of Hong Kong and the Caritas Adult and Higher

Education Services were established in 1965 and 1966 respectively (CUHK, 2006; Caritas, 2006). The Division of Continuing Education (now the School of Continuing Education) of the Hong Kong Baptist College (now the Hong Kong Baptist University) was established in 1975 (HKBU, 2006). These institutions provided basic education and interest courses for the general public as well as high-level and intellectually oriented courses for well educated adults.

The Period from 1978 to 1988

During the period from 1978 to 1988, continuing education was perceived not only as remedial education but also as retraining education for those people who were out of work and were unable to embark on full-time formal education. They pursued continuing education courses in order to upgrade their qualifications and for better job opportunities.

In the late 1970s, the Government began paying attention to continuing education. In a white paper on education, it was mentioned that education was a continuing process and that the development of educational opportunities for mature students was welcomed (HKG-GS, 1981). A scheme was introduced to support voluntary organisations in order to encourage them to organise remedial courses, as a complement and supplement those offered by the Adult Education Section of the Department of Education. The Government still had a *laissez-faire* approach. Without taking any concrete action in the development of continuing education, the Government deemed that mature-aged students were expected to bear the learning costs from their own earnings and that continuing education courses should be self-financed.

During this period, there were changes in the Hong Kong economy, such as the decline and eventual contraction of the textile industry. Many workers lost their jobs and needed to be retrained. In view of the large demand for skill-based training and re-training, the courses offered by continuing education institutions were directed towards skill development. More structured courses, usually leading to formal qualifications, of longer duration were offered. At the same time, continuing education institutions began to expand. Two major educational institutions were established, the School of Professional Education and Executive Development of the Hong Kong Polytechnic (now the Hong Kong Polytechnic University) and the Spare Time Study Centre of the Hong Kong Federation of Trade Unions (HKPU, 2006; HKFTU, 2006). The latter primarily provided training for the labour workers.

The Period from 1989 to 1997

In the late 1980s, continuing education became better known to the public. It was perceived as a means for individuals to acquire knowledge for academic and skill development. There were significant demands on continuing education courses beyond the post-secondary level for two reasons. First, after the adoption of a compulsory nine-year education system, the overall education level in Hong Kong had been raised. Second, higher academic requirements and more technical knowledge for jobs were expected by employers.

In 1989, the Open Learning Institute of Hong Kong (now the Open University of Hong Kong) was established by the Government (OUHK, 2006). It received decreasing Government funding in the first few years of operation, and became wholly self-financed in 1993. This was considered as a break-through in the Government involvement in continuing education (Lee, 1997). In addition, the Hong Kong Council of Academic Accreditation was established in 1990 (HKCAA, 2006). The council advised the Government on the academic standards of post-secondary courses and qualifications and processed the registration of courses offered by non-local education institutions in collaboration with Hong Kong continuing education institutions.

During this period, there was significant expansion in continuing education institutions. For example, the number of students in the School of Professional and Continuing Education of the University of Hong Kong increased by more than 50 per cent from 1991-92 to 1996-97. A similar

magnitude of growth was found in other institutions such as the School of Continuing Studies of the Chinese University of Hong Kong and the School of Continuing Education of the Hong Kong Baptist University. The School of Continuing and Professional Education of the City Polytechnic of Hong Kong (now the City University of Hong Kong) was established in 1991 (CityU, 2006). Furthermore, commercial ventures also entered the field of continuing education. At the same time, the quality standards of continuing education courses became a concern (Chan and Holford, 1999).

While the Government neither coordinated the development of continuing education nor made the effort to promote continuing education or lifelong learning, in 1994, the leading continuing education providers established the Federation for Continuing Education in Tertiary Institutions with the intention to promote continuing education and coordinate the development of continuing education in Hong Kong (FCE, 2006).

The Period from 1998 to 2004

In 1998, Hong Kong experienced an economic downturn. Since that time, an economic restructuring has taken place. People were aware of the need to improve themselves in preparation for the advent of a knowledge-based economy. Continuing education was considered as a means to acquire new knowledge and skills for this purpose. Up to 1997, the development of continuing education had been left in the hands of major stakeholders which included the continuing education institutions and students. As a result, the development direction was driven by market demand and supply. In 1998, the Hong Kong Government became more proactive. The Chief Executive stressed in his policy address that continuing education was important so that Hong Kong could be developed into a knowledge and learning-based community (Tung, 1998). Within a few years, a number of policies were implemented.

In 2000, the Workplace English Campaign was launched to provide subsidies for employees to take English training courses. (HKG-GIO, 1999; OWEC, 2006). Then, in 2001, the Government set up a Continuing Education Fund to subsidise people who wanted to pursue continuing education courses (OCEF, 2006). From 2000-01, the Non-means Test Loans Scheme was extended to include continuing education students (Tung, 1999). The amount of money permitted as a deduction for self-education in salary tax assessment was significantly increased (Tsang, 2001; Tung, 2000). In order to set clear qualification standards for facilitating continuing education, a qualification framework was developed (HKG-EMB, 2002; HKG-EMB, 2004; Tung, 2000).

Since the launch of the Workplace English Campaign and the Continuing Education Fund, there had been a significant growth in continuing education courses. A major reason was that more people pursued continuing education by taking advantage of the subsidies, and as a result many courses were offered to cope with the demand.

During this period, new continuing education institutions were established. The Continuing Professional Development Centre of the Vocational Training Council was established in 1998 (VTC, 2006). The Office of Continuing and Professional Education of the Hong Kong University of Science and Technology and the Division of Continuing Education of the Hong Kong Institute of Education were established in 2000 (HKIED, 2006; HKUST, 2006;). The latter focused on the needs of school teachers. The Lingnan Institute of Further Education was established in 2001 (Lingnan, 2006). In addition, many private institutions were established.

RECENT POLICIES ON CONTINUING EDUCATION

This section examines the continuing education policies from 1998 to 2004. These include the launch of the Workplace English Campaign and Continuing Education Fund, the extension of Non-means Tested Loans, the establishment of a Qualification Framework and the increase in the self-development allowance in salary tax assessment.

The Workplace English Campaign

The Workplace English Campaign was formally launched in March 2000. The campaign had two elements (OWEC, 2006).

The first was the establishment of the workplace English competency benchmarks for employees who needed to use English in their workplaces and had the following job types: (a) clerks, (b) executives, administrators and junior professionals, (c) frontline service personnel, (d) low proficiency job types, (e) receptionists and operators and (f) secretaries. The second was a scheme that provided monetary subsidies for employees who needed to use English in the workplace and who found it necessary to take English language training courses to meet the relevant benchmarks of their jobs.

The objective of the campaign was to meet the need by strengthening the workforce in English language competency in order to maintain the competitiveness of Hong Kong as an international centre of business, finance and tourism. Its objective was to heighten public awareness of the importance of workplace English and raise the English standard in the workforce. The first element of the campaign was to identify English competency benchmarks required for various job types and to promote these benchmarks as a standard across different sectors; the second element was to encourage employees to pursue English language courses through monetary subsidies. A fund of \$62 million was allocated as it was planned that the campaign would benefit 30,000 employees.

The Continuing Education Fund

The Continuing Education Fund was formally launched in May 2002. It provided monetary subsidies to people aged between 18 to 60 years who were enrolled in some continuing education courses (OCEF, 2006). Prior assessment and registration of the courses was required. Moreover, these courses needed to be located in one of the following industrial sectors: (a) logistics, (b) financial services, (c) business services, (d) tourism, (e) language, (f) product and digital design, (g) inter-personal and intra-personal skills for the workplace, life skills, such as working with others as well as values and attitudes, and (h) creative industries.

The objective of the fund was to encourage and help people to pursue continuing education courses with monetary subsidies. In principle, only those continuing education courses which contributed to the economic development of Hong Kong were covered in the scope of subsidies. The target population was identified to be those people aged 18 to 60 years who enrolled in continuing education courses in the above mentioned sectors. Initially, degree-holders were excluded from the subsidies. This requirement was relaxed in 2003 (HKG-GIO, 2003). It was anticipated that at least 500,000 persons could benefit. A funding of \$5 billion was allocated.

Extension of the Non-means Tested Loans Scheme

From the academic year 2000-2001, the scope of the Non-means Tested Loans Scheme, which provided low-interest loans to students for the payment of tuition fees, was extended to cover students in continuing education courses (Tung, 1999). By providing financial assistance in the form of low-interest loans, people with financial difficulties were encouraged and enabled to take continuing education courses. According to the policy plan, interest on the loans would be charged at a no-gain-no-loss rate plus a risk-adjusted factor which sought to cover the Government's risk in disbursing unsecured loans.

Establishment of a Qualification Framework

In 2002, the Government began to establish a formal qualification framework because the existing qualification system appeared to be inadequate in fostering a vibrant, flexible and responsive environment that promoted lifelong learning. The qualification framework was a structure of

different levels of qualifications, whose standards were set to support the qualifications. It covered the mainstream academic, vocational and continuing education sectors, linked qualifications of different levels, and provided a platform for credit accumulation and transfer.

The objective of the policy was to define clearly standards of different qualifications, ensure their quality and indicate the connections between different levels of qualifications, so that people could draw their own roadmaps, set clear goals and directions to upgrade their skills and knowledge to obtain relevant qualifications. It not only fostered an environment conducive to continuing education but also encouraged the development of responsive curriculum by education and training providers to meet the needs of the students and industry (HKG-EMB, 2002; HKG-EMB, 2004). Implementation of the framework is still in progress.

Increase in Self-Development Allowance in Tax Assessment

The self-development allowance in salary tax assessment was first introduced in the budget year 1996-1997, so that salary tax payers might claim a deduction for self-education expenses. In 2000, the Government considered raising the maximum amount of the self-education allowance for deductions in the salary tax assessment to encourage people to pursue continuing education courses (Tung, 2000). Obviously, the targets were the workforce. This policy initiative became effective in the financial year 2001-2002, where the maximum amount of deduction for self-education in salary tax assessment was increased to \$40,000 (Tsang, 2001).

PROBLEMS, ISSUES AND COMMUNITY NEEDS

Policies are essentially problem-driven (Anderson, 1990). Policy solutions are problem-centred in the sense that policies are formulated in order to cope with the problems and community needs. In this section, I explore the problems and needs that brought about the continuing education policies.

The Challenge of Economic Restructuring

In 1998, Hong Kong experienced an economic downturn, a rise in unemployment and an increase in fiscal deficit. In order to stay competitive and preserve economic vitality, Hong Kong had to face the challenge of economic restructuring towards a knowledge-based economy (Tung, 1999; Tung, 2000). A knowledge-based economy is one which effectively applies knowledge for economic and social development and growth. The question was whether the Hong Kong workforce was prepared for a knowledge-based economy. The answer seemed to be negative due to the knowledge deficit of the workforce and the shortage of highly educated manpower.

Knowledge Deficit of the Workforce

In a knowledge-based economy, human talents are most important. Hence, a knowledge-based economy is characterised by a large proportion of highly educated working population. Yet, the overall educational level of Hong Kong workforce is rather low.

- Demographic characteristics show that a significant proportion (80 per cent) of the Hong Kong population aged 15 years and above has only achieved low and middle education levels (HKG-CSD, 2003; HKG-CSD, 2004).
- The illiteracy rate of Hong Kong is also rather high (1.02 per cent, 0.63 per cent and 0.52 per cent in 1995, 2000 and 2005 respectively), as compared to other Asian countries, such as Singapore and Korea (with a rate about 0.20 per cent in 2005) (UNESCO, 2004a).
- The gross enrolment ratio for tertiary education of Hong Kong was 25 and 26 per cent in 2000-2001 and 2001-2002 respectively, far below that of many developed countries, such

as Australia, Canada, France, the United Kingdom and the United States (above 50 per cent) (UNESCO, 2004b).

Shortage of Highly educated Manpower

Correlated with the knowledge deficit of the workforce, a shortage of highly educated manpower represents another barrier for Hong Kong to move towards a knowledge-based economy that is characterised by a large demand and supply of highly educated manpower. Yet, the manpower requirement and projection reports show Hong Kong in an inferior position.

- The manpower requirements at post-secondary and tertiary levels are increasing (884,000 in 2001 to 1,162,600 and 1,243,600 for 2005 and 2007 respectively) (HKG-EMB, 2000; HKG-EMB, 2003).
- There is a projected deficit of manpower at post-secondary and tertiary levels, (109,500 and 86,200 in 2005 and 2007 respectively) (HKG-EMB, 2000; HKG-EMB, 2003).
- There is a projected surplus of manpower at the secondary level and below (151,900 and 216,000 for 2005 and 2007 respectively) (HKG-EMB, 2000; HKG-EMB, 2003).

The Need to Strengthen the Workforce

Pinpointing the problems of the knowledge deficit in the workforce and shortage of highly educated manpower indicates that the community needs to strengthen the workforce with knowledge and skills. Continuing education is generally perceived as a means to achieve this goal. However, the current participation of continuing education is rather low. Surveys have identified some of the causal factors.

- Only about 14.6 per cent of the economically active persons attended job-related training courses in the previous 12 months, and about 16.3 per cent planned to attend job-related training courses in the following 12 months (HKG-CSD, 2002).
- The most critical motivational factors for pursuing continuing education were self-development and job skill improvement. These two factors were expected to become more and more significant (Shen, Lee and Chan, 2001).
- The reasons given were that the course fee were too high and a lack of money. These were the most critical factors for not pursuing continuing education, and these two deterrents were expected to become more and more significant (Shen, Lee and Chan, 2001).

Two Aspects of Policy Solutions

In order to strengthen the workforce, the recent policies on continuing education were directed at encouraging and helping the workforce to pursue continuing education courses. The policies provided two solutions. First, financial assistance was provided to people in order to encourage and help them to pursue continuing education, as shown in Table 1. Second, some standards were established to help people to set clear goals and directions to upgrade their qualifications, as shown in Table 2.

Table 1. Policy solutions by providing monetary assistances

Policy	Financial Assistance
Workplace English Campaign	To provide subsidies to employees who need to use English in their workplaces to take English courses
Continuing Education Fund	To provide subsidies to those people aged 18 to 60 years to take continuing education courses
Extension of the Non-means Tested Loans Scheme	To allow continuing education students to enjoy low-interest loans for payment of tuition fees
Increase in self-development allowance in tax assessment	To increase the maximum amount of allowance for self-development in continuing education

So far I have discussed the recent challenge of economic restructuring in Hong Kong. The problems of the knowledge-deficit of the workforce and the shortage of highly educated manpower as well as the emerging needs of the workforce have also been identified. These problems and needs prompted the Government to realise the importance of continuing education. As Kennedy (2002) commented, it was time that the policy-making community woke up to the scale and importance of the continuing education in Hong Kong. These problems also explained why the Government became more proactive and formulated a number of policies on continuing education.

Table 2. Policy solutions by establishing benchmarks or standards

Policy	Benchmark or Standard
Workplace English Campaign	To set the English competency benchmarks required for various job types and promote the benchmarks as standards across different industrial sectors.
Establishment of a Qualifications Framework	To define clear qualification standards and articulation ladders, so as to help people set goals and directions to upgrade their knowledge and skills.

POLICY TOOLS AND INSTRUMENTS

A policy tool or instrument is an authoritative choice of a means to accomplish a purpose (Anderson, 1990; Elmore, 1987). In policy-making, the choice of instruments depends on the intended policy outcomes and consequences. In this section, the policies are analysed, based on Elmore's (1987) concepts of policy instruments. It is shown that these policies rely mainly on short-term inducements in order to elicit short-term performance.

Elmore's Concepts of Policy Instruments

According to (Elmore, 1987), there are four types of policy tools or instruments, mandates, inducements, capacity-building instruments and system-changing policies. In the following sections the nature of these policy tools or instruments and their problems and shortcomings are described briefly. Mandates are said to be rules governing the behaviour of individuals and agencies, and are intended to produce compliance. Mandates assume that an action required is something all individuals or agencies should do, regardless of their differing capacities, and that the action would occur less often in the absence of explicit prescription. Mandates contain all information necessary for compliance, and create an adversarial relationship between the enforcer and the object, such that compliance is problematical in the absence of enforcement (Elmore, 1987).

Inducements are conditional transfers of money to individuals and agencies for the short-term performance of particular actions. Inducements assume that, in the absence of additional resources, one would not expect certain outcomes to be produced, and that money is an effective way to produce performance. Inducements are a form of procurement which means the conditional transfers of money in return for the production of goods and services. Inducements assume some commonality of interest between the source of the money and the recipient. Recipients of inducements vary in their capacity to produce desired results and in their own preferences and objectives. This leads to problems of variability (Elmore, 1987).

Capacity-building is something to be performed for the investment in future material as well as intellectual or human resources. It is basically a form of long-term investment which means the transfer of money for the purpose of investment in future benefits. Capacity-building carries the expectation of future returns, and as with all investment decisions, the returns are often uncertain, intangible and immeasurable and become a trade-off between the present and the future. Capacity-building can be a condition for the success of future policies. However, it creates the problem of reconciling the short-term results of investments with longer-term expectations (Elmore, 1987).

System changing refers to the transfer of authority among individuals and agencies that alters the system by which public goods and services are delivered. The expected effect of system changing is often a change in incentives that determine the nature and effect of those goods and services. Typically, system-changing policies alter the distribution of authority and money among providers of public goods and services. However, they pose problems, such as how to create new institutional arrangements as well as how to prevent existing institutions from using their competitive advantage to undermine new institutions (Elmore, 1987).

Inducement-Based Policy Solutions

The recent policies on continuing education mainly offer inducement-based solutions to provide monetary assistance to people in order to encourage and help them to pursue continuing education courses. The policies provide monetary subsidies and loans as their core elements, and rely on these inducements as the policy instruments. They are basically transfers of money to people who pursue continuing education courses. The act of pursuing continuing education courses is the short-term performance elicited by these inducements. Table 3 summarises the inducements provided by the policies.

Table 3. Inducements provided by the recent policies on continuing education

Policy	Inducements and Required Performance
Workplace English Campaign	Inducements: Subsidies of tuition or examination fees Performance: To pursue English language training courses and attain the required standard
Continuing Education Fund	Inducements: Subsidies of tuition fees Performance: To pursue a registered continuing education course, from a list of industrial sectors
Extension of the Non-means Tested Loans Scheme	Inducements: Loans for payment of tuition fees Performance: To pursue a continuing education course offered by a list of approved institutions
Increase in self-development allowance in tax assessment	Inducements: Allowance in salary tax assessment Performance: To undertake some self-development activities such as pursuing continuing education courses

Focus on the Short-Term Needs

Typically, inducements tend to be used for meeting short-term needs. Because resources are limited, attention is given to how to use the limited resources to achieve short-term goals. Resources, that require the financial funding, are allocated to launch the subsidies and loans schemes.

In policy planning, the Government made reasonable assumptions and estimated the amount of resources to be allocated and the number of persons to benefit, as shown in Table 4. Targets were set out, for example, 30,000 persons and 500,000 persons to be benefited from the Workplace English Campaign and Continuing Education Fund respectively. These were short-term targets to be met in a few years. It was shown that 74 per cent of the funds of the Workplace English Campaign and 20 per cent of the Continuing Education Fund had been used up and the funds were likely to be exhausted in a few years.

Problems of Variability

Since the recipients of inducements may vary in their capacity, preferences and objectives, inducements may create problems of variability (Elmore, 1987). Hence, in designing policies which rely on short-term inducements such as the policy instruments, it is important for the Government to make the right choice of a package of money and conditions that is sufficient to produce the desired performance, while maximising the quality and minimising the variability.

Table 4. Resources allocated in the recent policies

Policy	Resources Allocated and the Latest Status (in HK\$)
Workplace English Campaign	Resources: \$50 million (for 30,000 persons) Latest status: As at April 2004, \$37.2 million (74 per cent) had been used up, and 20,500 persons received the benefits (HKG-GIO, 2004)
Continuing Education Fund	Resources: \$5 billion (for at least 500,000 persons) Latest status: As at January 2005, \$1 billion (20 per cent) had been used up or earmarked (HKG-SFAA, 2005a)
Extension of the Non-means Tested Loans Scheme	Resources: No special funding is allocated, since the scheme operates on 'no-gain-no-loss' basis Latest status: As at 2003-2004, 39,226 applications were approved. Loans amounting to \$1,304 million were offered (HKG-SFAA, 2005b)
Increase in self-development allowance in tax assessment	Resources: Concession of tax income (amount not specified) Latest status: A concession of \$70 million is expected as for the year 2004-2005 (Tsang, 2001)

In the following, let me briefly elaborate on the problems of variability in the recent policies on continuing education.

- The policies provide monetary subsidies and assistance to people in order to encourage and assist them to pursue continuing education. The intended target group are those people who pursue continuing education if and only if they are encouraged and helped through the existence of monetary assistance. However, the recipients of the financial assistance may not be exactly this intended target group. Some are not encouraged to pursue continuing education even if subsidies or assistance are provided, while some others decide to pursue continuing education even if no subsidies or assistance are provided.
- The policies are ultimately intended to strengthen the workforce in order to prepare them for the advent of a knowledge-based economy. Hence, it is expected that the recipients of the monetary assistance would contribute what they have learned to their workplaces. However, there may be variations. For example, some receive the subsidies to study a continuing education course purely for personal interests, and not for job or career purposes. Some receive subsidies to study a continuing education course and plan to retire soon.

THE POLICY MAKING PROCESS

In this section, the policy-making process is analysed using Kingdon's so-called 'Garbage-Can' model (Kingdon, 1995). Following a brief introduction of the model, I illustrate and criticise the lack of an overall plan and coordination among the policies.

Kingdon's Garbage-Can Model

When we look into the policy-making of the recent policies on continuing education, it is found that the policies evolved separately, each with its own focal problems, aims and objectives, solutions, target groups and planning assumptions. The Government took a so-called piece-meal approach to recognising the problems and community needs, identifying policy objectives, formulating and implementing the policies individually. The situation can be explained by Kingdon's (1995) Garbage-Can model of policy making.

Kingdon's Garbage-Can model is an extension of Cohen's model of organisational choices (Cohen, March and Olsen, 1972). In Kingdon's Garbage-Can model, there are three separate streams of processes, namely, the problem, the solution and the politics (Kingdon, 1995). The problem stream captures the Government or policy-makers' attention on the issues and community needs. At the same time, there is a group of specialists that concentrates on solving the problems. Policy solutions are then generated to address the problems and community needs.

This refers to the solution stream. The politics stream is composed of public opinions, changes in administration and interest group campaigns. While the streams operate independently, they may connect at times. There a so-called policy window opens that leads to problem recognition, agenda setting and the creation of policies. The streams are combined in a 'garbage can' and the outcome is characterised by the problems, solutions and the participants in the mix.

The following section will elaborate on the problem, solution and politics streams of the recent policies on continuing education. The problems of inconsistency and duplication among these policies are highlighted.

The Problem Stream

In recent years, there has arisen a stream of problems that captured the Government's attention on continuing education. These problems have a specific focus and trigger specific community needs.

- The English language competence of the workforce needs to be enhanced in order to maintain the Hong Kong's competitive edge as an international centre of business, finance and tourism.
- There is a lack of benchmarks in workplace English for employees who need to use English daily in their work.
- There are problems of knowledge deficits in the workforce and a shortage of highly educated manpower. The people in the workforce need to upgrade their knowledge and skills in order to cope with the economic development of Hong Kong.
- A lack of clear standards of qualifications and indications on the articulation and relationship between different levels of qualifications makes it difficult for people to set goals and choose directions to upgrade their knowledge and skills.

The Solution Stream

Various solutions have been proposed to cope with the issues and needs.

- The establishment of workplace English competency benchmarks as a standard across all industrial sectors.
- The establishment of a scheme to encourage and help employees to pursue English language training courses by providing monetary subsidies.
- The launch of a fund to encourage and help people to pursue continuing education courses in a range of industrial sectors which would contribute to the economic development of Hong Kong.
- The establishment of a framework on the standards as well as a series of articulation ladders for people to set goals and directions to upgrade themselves.
- A release from the financial burden of the workforce in the pursuit of continuing education by providing low-interest loans and deductions in salary tax assessment was proposed.

The Politics Stream

There are some political and socio-economic factors that determine the plausibility and possibility of the policies on continuing education.

- Hong Kong has been facing economic restructuring. The people in the workforce need to strengthen themselves in preparation for a knowledge-based economy.

- In moving towards a knowledge-based economy, there is likely to be a shortage of highly educated people and a surplus of poorly skilled manpower. The consequences, such as high unemployment and discontent with the Government would be serious.
- Facing a high unemployment rate, it is both the Government and politicians' concern that low-skilled workers need to upgrade their skill base.
- The people in the workforce need to improve themselves for Hong Kong to maintain its economic vitality. This is a concern of both business enterprises and overseas investors.

Problems of Inconsistency and Duplication

In recent years, after the economic downturn of the 1990s, the windows of opportunity were opened to allow the problems, solutions and politics to come together. These problems and community needs were recognised. Policy solutions were generated accordingly. With support from both the Government (in funding) and politicians (in opinion), the proposed solutions were adopted and formulated as policies.

Because of a lack of an overall plan and its coordination, as implied by Kingdon's garbage-can model, there are areas of inconsistency and duplication among the existing policies. For example, although the policies provide financial assistance to encourage and help people to pursue continuing education courses, different modes of assistance are provided. Some provide assistance in the form of subsidies while some others provide assistance in the form of loans and tax reduction. Not only are the amounts of assistance different among the policies, but also the administrative procedures and operations, such as in the processing of claim applications and the mechanism of monitoring and control are different. Although the targets are mainly the workforce, the eligibility criteria are different between the policies. Moreover, there are areas of duplication. The policies are administered separately with overlapping areas of operation. This frequently leads to counter-effectiveness in policy administration.

CONCLUSION

The period from 1998 to 2004 is critical to the development of continuing education in Hong Kong. In contrast to its *laissez-faire* approach in earlier years, the Government has assumed a more proactive role and has formulated a number of policies, in which significant resources amounting to several billion dollars have been allocated. In this article, the recent policies on continuing education are reviewed from three aspects. The first considers the problems and community needs for continuing education. The second examines the inducement-based policy solutions. The third aspect describes the overall policy-making process.

Policies are essentially problem-driven and problem-centred. In response to the problems and community needs of strengthening the workforce, the Government formulated a number of policies on continuing education, such as the Workplace English Campaign and the Continuing Education Fund. It is not difficult to understand why the Government has become more proactive, as the significance of the problems and needs are of concern. If the problems are not resolved, the consequences could be serious. The current economic vitality and competitiveness would no longer be maintained and high unemployment would result.

Among the recent policies on continuing education, the policy solutions were mostly short-term inducements, such as providing financial subsidies and loans. Inevitably, inducements were an effective means to elicit short-term performance (for example, pursuing continuing education courses) if the performance could not be produced otherwise. As Elmore's (1987) concepts of policy tools or instruments implied, inducements tended to be used for meeting short-term needs. This explained why the Government's attention was placed mainly on how to use the limited resources to achieve the short-term goals. Also implied by the concept of inducements, were problems of variability. These have been thoroughly investigated.

On the other hand, the overall policy-making process was rather 'piece-meal' in the sense that, once a specific problem was recognised, a specific policy was formulated to cope with it. In this article, the situation was elaborated using Kingdon's 'garbage-can' model. Because of a lack of an overall plan and coordination between the policies, there were areas of inconsistency, such as in the amount, mode and eligibility criteria of subsidies. There were also areas of duplications, such as the overlapping scope of the subsidised courses and the entitlement of more than one assistance scheme for the same person.

Looking forward, the policy focus needs to be placed more on the long-term goals, strategies and measures. At present, the development of continuing education in Hong Kong is still market-driven and lacks clear direction. As a consequence, continuing education institutions tend to offer profitable or, at least, affordable courses. Unquestionably, a well-coordinated plan would not only balance the interests of various stakeholders but also avoid inconsistency and duplication among education policies. It would be desirable, but probably controversial if the Government intervened by assuming a regulatory role to ensure the healthy running of the continuing education sector as well as assuming a directional role to maintain the long-term development of continuing education.

Note

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Development and validation of a multiple format test of science process skills

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The purpose of this study was to develop a multiple format instrument, in order to measure the development of 12 science process skills. For this purpose a questionnaire with 15 constructed response (CR) type items and one hands-on task was developed. In its final form it was administered to a total of 80 Grade 9 students in four different high schools in metropolitan Ankara, Turkey. The test administration time was set at 90 minutes. The reliability of the instrument was also established and found to be high (Cronbach alpha = 0.88). Initial results suggested that the procedures followed in this study could provide guidance for researchers working on the development of performance tests and activities. Secondly, since the instrument developed in this research study was curriculum-independent it would be useful for curriculum developers who were seeking to know if a science curriculum under development would be able to foster students' attainment of science process skills. Thirdly, the results appeared to imply that a multiple format instrument that included both a hands-on task and paper and pencil items could be successfully developed and used.

Science education, science process skills test (SPS), measurement and assessment, test development, multiple format tests

INTRODUCTION

Although studies on assessment of science process skills (SPS) began in the west in the early 1960s, the much needed scholarship on this subject in Turkey was delayed until the 1990s. The existing two studies conducted in Turkey (Arslan, 1995; Geban, Aşkar and Özkan 1992) were based on translation and adaptation of foreign studies. Therefore, we intended to take up the challenge of developing and validating an original SPS instrument in Turkey. We hoped that our experiences throughout this process might also be of some value to other researchers both in and outside of Turkey. Here we report the unique journey that we followed in developing the multiple format test of science process skills (MFT-SPS) and the rationale behind the study, beginning with a review and interpretation of the current state of the literature in the context of developing SPS assessment instruments.

¹ This article was extensively edited by Dr B. Matthews, Research Associate, Flinders University Institute of International Education.

The Place of Practical Work in School Science

In the post-Sputnik era inquiry methods in science education have become more visible and popular. More recently, in English speaking countries many curriculum initiatives proposed and included student inquiry techniques in science course syllabi. For example, in the United States the Science as Inquiry strand has been adopted as one of the seven content standard areas in the National Science Education Standards (NRC, 1996). Likewise, the United Kingdom adopted Scientific Inquiry as a main learning area in science and Australia has a Working Scientifically component integrated into the state curricula. Science curricula for elementary and middle schools in Turkey also emphasise, although in somewhat unsystematic way, science process skills (Board of Education, 2000).

The Relationship Between Learning and Assessment of Performance

There is an undeniably deep relationship between intended learning objectives and outcomes cited in science curricula and suggested assessment methods. Assessment and learning are two sides of the same coin. The methods used to collect educational data define in measurable terms what teachers should teach and what students should learn (NRC, 1996, p.76). Thus, considering that assessment drives student learning many curriculum developers also pay attention to the appropriate assessment of students' learning of practical skills, (for example, Ludeman, 1975, cited in Lavinghousez, 2004).

Recently there has been considerable reaction to and criticism of the traditional paper and pencil tests and a movement towards other types of assessment. Consequently, assessing students' actual performance has been highlighted more frequently. These critics proposed that "if you want to determine if [students] can perform a task, have them perform the task." Specifically, in the context of student performance in school science laboratory, "if you want to determine if students can conduct an experiment, have them conduct an experiment" (Gronlund, 1998, p. 2).

The Place of Measuring the SPS in an Authentic Way

Hofstein and Lunetta's recent review (2004, p.43) of the research in school science laboratories shows that scholarship in the field failed and to some degree still fails to assess appropriately the proposed learning outcomes that should be attained as a result of laboratory activities. They assert that

If we truly value the development of knowledge, skills, and attitudes that are unique to practical work in science laboratories, appropriate assessment of these outcomes must be developed and implemented continuously by teachers in their own laboratory-classrooms.

Harlen (1999) also emphasised similar concerns and asserted that, science process skills were inseparable in practice from the conceptual understanding involved in learning and applying science and played a central role in learning with understanding. Consequently, this is why developing and assessing science process skills is so important. Although there are difficulties in implementation of authentic skills assessment the technical problems may be solved where there is a will to do so.

Hofstein and Lunetta (2004) stress the importance of including authentic and alternative assessment methods in measuring outcomes of school science programs. Nevertheless, they assert that even today in an era of highly emphasised standards approach to science education, most of the assessment of students' performance in the science laboratory continues to be confined to conventional, usually objective, pencil and paper measures and that efforts to develop tests in accordance with the mandates of the standards has not generally incorporated the assessment of performance and inquiry (National Research Council, 1996).

As Harlen (1993, p. 57) states, curriculum developers take it for granted that SPS are in fact developed by learning and experience rather than being inborn. If this is true then the question of how well they are developed by instruction arises naturally for educators. Solano-Flores (2000), for example, has developed an activity that promotes and assesses science process skills through experimentation. Several other authors have also developed activities, suggested ways to assess and include SPS in their instruction (Bailer, Raming, and Ramsey, 1995; Gable, 1993; Oslund, 1992; Rezba, Sprague, Fiel, Funk, Okey, and Jaus, 1995). Several standardised tests have been developed in the past for the purpose of answering this question and provide science educators with an instrument to measure the outcome of teaching and learning practices taking place in their classrooms.

Tests of SPS in the Science Education Literature

A very careful and detailed examination of the current literature in science education yielded the finding that there were more than a dozen SPS assessment instruments already available. These instruments may be examined in two groups: those developed for a specific curriculum and those that addressed a broader range of needs and applicability. Five curriculum specific SPS assessment instruments are presented in Table 1. It should be noted that SPS instruments of this type were created during the 1960s and 1970s. Therefore, they can be attributed to the curriculum development efforts and trends of that era.

Table 1. Curriculum specific SPS assessment instruments^a

Authors	Title	Year	Intended Grade Levels	Test Format	Curriculum	Number of Skills assessed	Number of Test Items
Walbesser ^b	The Science Process Instrument	1965	K-3	An individually administered performance measure	SAPA	UD	UD
Lavinghousez	Biology Readiness Scale (BRS)	1972	5	Multiple Choice	BSCS	UD	UD
Riley	The Test of Science Inquiry Skills (TSIS)	1972	5	Multiple Choice	SCIS	4	50
Ludeman	The Science Process Test (TSPT)	1974	6	Multiple Choice	SAPA	UD	36
McLeod, Berkheimer, Fyffe, and Robison	A Group Test of Four Processes	1975	6-7	Multiple Choice or numerical fill in the blanks	SAPA	4	79

^a 'UD: undetermined' across a given test indicates that despite all our efforts we were not able to determine the specified characteristic of that test.

^b Source: Burns, Okey and Wise (1985) and Walbesser (1966).

Table 2 shows nine non-curriculum specific SPS assessment instruments. It can be seen that the dates of creation of these instruments cover a broader range of years and they are more numerous compared to the former group. It can also be noted that instruments in this group were developed mostly after the 1970s.

More recently a new trend has emerged in the literature: assessing SPS through hands-on activities while carrying out experiments. Although scholarship on a more basic level, namely on the theory of performance assessment (Ayala, Shavelson, Yin and Schultz, 2002; Klein, Stecher,

Shavelson, McCaffrey, Ormseth, Bell, Comfort, Othman, 1998; Solano-Flores, Jovanovic, Shavelson, Bachman., 1999; Stecher, Klein, Solano-Flores, McCaffrey, Robyn, Shavelson, and Haertel, 2000) has drawn considerable attention, there are only a few standardised instruments of this type reported in the literature (Beaumont-Walters and Soyibo, 2001).

Table 2. Non-curriculum specific SPS assessment instruments^a

Authors	Title	Year	Intended Grade Levels or Age	Test Format	Number of Skills assessed	Number of Test Items
Tannenbaum	Test of Science Processes	1968	8	Multiple choice	8	96
Fyffe ^b	UD	1971	Elementary School	Multiple choice	2	79
Robison ^c	UD	1973	UD	UD	2	UD
Molitor and George	The Science Process Test (SPST)	1975	4, 5, 6	Multiple choice	2	18
Dillashaw and Okey	Test of Integrated Process Skills (TIPS)	1980	7-12	Multiple choice	5	36
Tobin and Capie	Test of Integrated Process Skills (TIPS)	1982	6-College	Multiple choice	1	24
Berger	UD	1982	ages 12-14	Computer Based	1	UD
Burns, Okey and Wise	Test of Integrated Process Skills II (TIPSII)	1985	Middle and High School	Multiple choice	5	36
Smith and Welliver	Science Process Assessments for Elementary School Students	1986	Elementary School	Multiple choice	13	40
Smith and Welliver	Science Process Assessments for Middle School Students	1994	Middle School	Multiple choice	13	50
Solano-Flores	The "Bubbles" Task	2000	5-6	Hands-on Activity	UD	1
Beaumont-Walters and Soyibo	Test of Integrated Science Process Skills TISPS	2001	9-10	Multiple Assessment Format	5	14+2

^aUD: undetermined' across a given test indicates that despite all our efforts we were not able to determine the specified characteristic of that test.

^{b, c}Source: McLeod, Berkheimer, Fyffe, and Robison (1975).

A Test of Integrated Science Process Skills (TISPS) (Beaumont-Walters and Soyibo, 2001), shows a great resemblance to the Multiple Format Test of Science Process Skills (MFT-SPS). It contains eight written performance items and two hands-on performance tasks. The written performance items in TISPS measures subcategories of five specific skills, namely, recording data, interpreting data, generalising, identifying variables, and formulating hypotheses. On the other hand, the two hands-on performance tasks test these five skills together. Three hours are given to complete the three parts of TISPS, that is, the written test and the two hands-on activities, allow one hour for each part.

As seen in Tables 1 and 2 most of the SPS assessment instruments have been designed in a multiple-choice format due to their relatively easier applicability as an assessment tool and that

they require less time for evaluation. However, several researchers have highlighted the need to develop such instruments in alternative formats. The suggested techniques include systematic observation of students' laboratory work (Lunetta, Hofstein, and Giddings, 1981), computer simulation (Berger, 1982), technological applications (Kumar, 1996), and open-ended questions (Gabel, 1993). Also, Beaumont-Walters and Soyibo (2001) draw attention to the fact that although the commonly used multiple-choice test format has been criticised, only a few researchers have attempted to develop tests of SPS that also contain hands-on tasks.

A thorough discussion of contextual appropriateness of educational tests is beyond the scope of this article, but it is done extensively elsewhere. For example, Martinez (1999) comments at length and has cited many references on the subject. However, it is wise to point out some key issues here. As Martinez asserts that there is a strong relationship between the response format of test items and the nature of the measured construct and there is no absolute superiority of one format over another. An important factor in determining the test format selected is the objectives that are set forth for testing. Then, the question of 'how to test?' would demand an answer from 'what to test?'

Martinez (1999) compares multiple-choice (MC) and constructed response (CR) item formats on several dimensions and concludes that MC and CR formats have contrasting features and characteristics. While CR format (sometimes referred to as supply type or supply response format) is highly desirable on the cognitive features dimension it has certain drawbacks in the item and test characteristics and economy dimensions when compared to the MC format. Therefore, preparing and administering an extended CR format test requires a sacrifice on item and test characteristics, and economy in order to be able to cover a broader cognitive range and achieve higher structural fidelity and effectiveness for diagnosis. CR items are best for encouraging students to organise, integrate, and express their own ideas since students must produce their own answers; and in doing so students "are free to decide how to approach the problem, what factual information to use, how to organise the answer, and what degree of emphasis to give each aspect of the response" (Gronlund, 1998, p. 100).

Experimenting is a highly complex learning outcome and Gronlund (1998, p. 18) suggested that a combination of assessment methods might be more appropriate in such situations. During such assessment procedures the evaluator depends largely on his or her judgment about whether or not a specific action (performance) is sufficiently accomplished. Therefore, the use of checklists may facilitate the procedure.

PURPOSE

The instrument developed for this study, entitled the Multiple Format Test of Science Process Skills (MFT-SPS), was based upon the scholarly work of the science education researchers (Ayale et al., 2002; Klein et al., 1998; Solano-Flores et al., 1999; Solano-Flores et al., 2000) mentioned above. The purpose of this study was to develop, validate and establish the reliability of an instrument to measure students' SPS which specifically used CR items as well as hands on tasks, to assess students' skills in an inquiry-oriented setting, and to cover as many skills as possible without comprising practicality. Furthermore, the ongoing need for an original SPS instrument in Turkish prompted the researchers to undertake this research study. Therefore, a second purpose of this study was to provide Turkish science educators with an instrument that could provide information on the current situation with respect to the development of the SPS in individual classrooms and schools.

DEVELOPMENT OF MFT-SPS

The procedure followed throughout this study for developing a summative SPS instrument resembles the one that was suggested by Spector (1992, pp. 7-9). Starting with defining a construct, the process includes five steps in a sequential-recursive way that might be needed: (a)

designing the scale; (b) pilot testing; (c) administration and item analysis, (d) validation; and (e) establishing reliability criteria.

Defining the Constructs to be Measured

Teaching science process skills has a special importance in the science curricula. ‘Science Process Skills’ (SPS) in science education are characterised as fundamental in facilitating learning, teaching of scientific research methods, motivating students, developing responsibility for personal learning, and improving the retention of learned knowledge in the long term (Çepni, Ayas, Johnson and Turgut, 1996, p. 31).

The importance of procedural knowledge, as opposed to declarative or factual knowledge, is emphasised in all subject areas for meaningful learning to occur (Eggen and Kauchak, 2000, pp. 249-253). Therefore, MFT-SPS are an integral part of studying science. From an educator’s point of view acquiring these skills enables students to become active learners (Burns, Okey and Wise 1985).

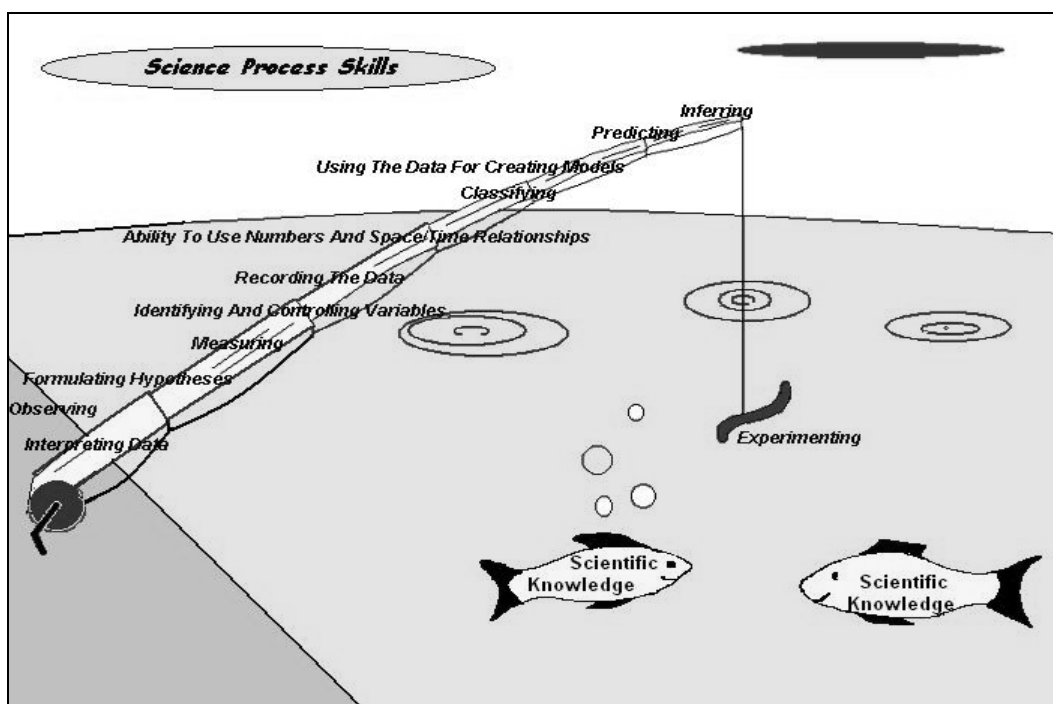


Figure 1. A representation of basic and integrated science process skills

We consider that SPS operate together to form a powerful tool in science in order to obtain scientific knowledge. The famous Chinese proverb (illustrated in Figure 1 in the context of SPS) reads: ‘Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime.’

In relation to science education, teaching science process skills is as important as teaching a person how to fish in order to be able support him or herself throughout a lifetime in science education.

A number of authors identified and classified different sets of SPS; for example Esler (1977), Gabel (1993) and Rezba, Sprague, Fiel, and Funk (1995). In this study, SPS are taken to cover the following 12 skills: formulating hypotheses, observing, manipulating materials, measuring, identifying and controlling variables, recording the data, demonstrating the ability to use numbers in space and time relationships, classifying, using the data to create models, predicting, interpreting data, and inferring information or solutions to problems.

The essential aspects of SPS as a construct were determined through broad research on the related literature in order to be able to define it “clearly and precisely” (Spector, 1992, p.7). We have seen in the literature that although most researchers listed and defined the constituents of SPS they generally avoided defining the construct itself. Harlen (1999) referred to SPS as certain mental and physical skills sometimes named differently in the literature as procedural skills, experimental and investigative science, habits of mind, and scientific inquiry and abilities. She metaphorically described SPS as the face of three-dimensional objects which were an inseparable part of the object itself, but still could be perceived and felt separately. According to Burns et al. (1985, p.169) the science “process skills represent the rational and logical thinking skills used in science. Competence in the process skills enables students to act on information to produce solutions to problems.” In the same way, Ostlund (1995) defined SPS as the tactics and strategies scientists use when they were engaged in investigation to gain knowledge of natural phenomena. Similarly, Lind (1998, introduction) stated that

Process skills are the thinking skills that we use to process information, think through problems, and formulate conclusions. These are thinking skills that scientists use when they work. By teaching students these important skills, we enable them to learn about their world. The process skills are basic to thinking about investigating the content of science.

Another way to determine how various researchers in their studies define this construct is to look into the skills that they take as constituent of SPS. An examination of 14 such studies shows that there are as many as 18 different individual skills characterised within SPS. Most commonly cited SPS are observing, classifying, measuring, inferring, predicting, communicating, using number relationships, making models, interpreting data, identifying and controlling variables, formulating hypotheses, and manipulating materials. These 12 SPS are taken to define the constructs in this study.

Hence, the first step in the development of the instrument has been to determine the expected student behaviours for each one of these skills. An examination of the literature yielded a total of 20 behaviours associated with the 12 skills under examination (see Table 3 for the test content). This means that at least some of the skills are related to more than one type of behaviour that needs to be displayed.

Designing the Test

Deciding on the appropriate response types

Lunetta, Hofstein, and Giddings (1981) provided four ways of evaluating students’ science laboratory skills: written reports, test items, practical tests, and observational assessment. According to these authors the grading of written reports is often subjective and based on a narrow range of data. Besides they do not provide direct information on students’ skills. Test items can be prepared for evaluation of most phases of laboratory activities. But assessing skills required in the performance phase cannot be adequately fulfilled if only test items are used. Alternatively, practical tests are used in hands-on activities where students are required to use tools and equipments and interact with objects under examination. For evaluation purposes performance checklists are utilised during practical tests. Lastly, observational assessment can be used in order to avoid serious limitations set by the previously mentioned test types on the depth of skills that can be measured. Lunetta, et al. (1981, p. 25) noted:

In observational assessment, the teacher unobtrusively observes and rates each student during normal laboratory activities. Observations can be recorded over an extended period of time, or they can be made after a single lab activity..

Collecting adequate observational data and evaluating students requires paying sufficient attention to their activities. Therefore, this feature sets a limit on the number of students to be

evaluated by this method if only one teacher rates all of them concurrently. Also, observational assessment needs a careful planning, a prepared checklist, and a pre-organised rating rubric.

In this study an observational assessment technique was adopted in order to be able to collect direct information on students' SPS for the hands-on task introduced. Observing students during their laboratory activities was important because several features of the skills examined could not be revealed otherwise. Table 3 lists the required SPS skills and their associated behaviours.

Table 3. The 20 behaviours associated with SPS under examination

SPS	Associated behaviours
Observing	1. Can determine notable similarities and differences between objects or events. 2. Can choose the necessary tools for observation and use them skilfully. 3. Can evaluate the results of an observation and associate the ones related to the problem in hand.
Interpreting Data	4. Can interpret experimental data (i.e. can find the slope of a curve and determine the associated mathematical expression).
Measuring	5. Can skilfully use appropriate measuring tools in different situations for measuring quantities, such as length, time, volume, and temperature. 6. Can express measurements in recognised units.
Ability to Use Numbers and Space/Time Relationships	7. Can describe positions, forms, symmetries, and spatial arrangements of objects. 8. Can interpret and express the meanings of mathematical relationships. 9. Can use numbers and numeric relationships skilfully during problem solving and experimenting.
Using Data For Creating Models	10. Can display experimental or observational data in different forms such as graphics, pictures, and tables.
Predicting	11. Can make predictions based on prior knowledge and obtain data about an object or an event's future state.
Classifying	12. Can classify objects and events according to similarities or differences. 13. Can state criteria for making the classification.
Manipulating Materials	14. Can select appropriate materials for the experiment to be done and set up the experimental apparatus accordingly.
Formulating Hypotheses	15. Can construct a tentative and testable statement. 16. Design an experiment to test a hypothesis.
Identifying and Controlling Variables	17. Can determine all the variables in an experiment, for example, the dependent, independent, and controlled variables. 18. Can manipulate variables during experimentation.
Data Recording	19. Can record data in appropriate and alternate forms by using verbal, numerical, illustrative or audio-visual techniques and through tables, drawings, and illustrations.
Inferring	20. Can draw conclusions about the result(s) of an observation or experiment.

Writing the test items

Harlen (1999) asserted that skills needed to be used in relation to some content, but the nature of the content creates a difficulty for the assessment of students' use of the related skill. Likewise, the context of the task also influenced performance, as it did in the assessment of the application of the concepts. For these reasons, when forming and wording the test questions special attention was paid in order not to require any background knowledge for answering the questions. Furthermore, if specific terms or concepts were inevitably used in the wording of questions, then their definitions were also given. Thus, items included familiar objects or contexts for the students.

Our previous experiences with students in laboratory courses also guided our selection of conceptual contexts. For example, the inclusion of the hands-on spring-mass activity (a demonstration of Hooke's Law) was chosen based on our experience that first year undergraduate students had needed little or no guidance in understanding and performing the test. Also the current Year 10 high school physics curriculum included this activity. Another factor in deciding

on this item was that we wanted to give the students an activity which had not been covered in earlier years of their schooling.

The second step was to form an item pool of test questions and activities in order to assess students' SPS. Twenty-three questions were created to assess the predetermined 20 process skills. Also, two experimental activities were included in the item pool. However, the form of the questions had to be decided in advance and a thorough evaluation of the issue confirmed that assessing SPS by different test formats had shortcomings. Ostlund (1992, p. v) drew attention to the fact that science was more than a mere collection of facts, principles, or tools for measurement; and emphasised the importance of teaching such knowledge in relation to "the procedures of scientific inquiry". She also pointed out that "to be effective, methods for testing student achievement must provide students with hands-on materials and the opportunity to demonstrate their use of SPS."

Establishing the criteria: Preparing a checklist and a scoring rubric

Students' written and observed performances were coded as [2], [1], or [0] according to the level of fulfilment of the expected responses. [2] denoted full completion, [1] denoted execution of some of the expected responses and [0] denoted a no response, an unsuccessful execution or an incorrect response. These codes were also used as the scoring scheme. The expected responses associated with each test question are given in Table 4.

Pilot testing

The draft version of the instrument was pilot tested with a group of 20 students in order to identify the questions that students might have difficulty in understanding with respect to the language (McMillan and Schumacher, p.267). Another purpose of the pilot testing was to specify an appropriate time length for test administration.

The predetermined 20 behaviours to be assessed during test administration were evaluated either from written responses or from direct observation of student activities. For the purpose of concurrent assessment of 20 students a checklist was developed. This checklist included 70 distinct responses associated with the required 20 behaviours for the 23 pilot test questions and the two experimental activities. Table 4 lists some of the possible responses to the test questions.

After the pilot testing it was seen that,

- (a) the students needed a more detailed set of instructions at the beginning of administration;
- (b) some of the questions were above the students' level;
- (c) the use of language and wording of some of the questions needed to be clarified;
- (d) the test, in its draft version, was too lengthy to be completed in a reasonable time period;
- (e) the test needed to be administered in a laboratory rather than in a classroom;
- (f) the test could be administered to a group of 20 students at most in order to be able to evaluate adequately each one of them concurrently; and
- (g) some equipment and materials needed were not available in the schools when the test was administered and they had to be brought by the researcher.

Therefore, the questions that were identified as posing difficulty in understanding for the students, or seen to be above the students' level, or that none of the students could answer correctly, or assessed the same skill as another question, but took a longer time to complete, or were not as concise, or required more equipment were eliminated leaving only the more practical and credible tasks in the test. The hands-on task of finding the relationship between the mass attached to the end of a spring and the extension of the spring was chosen specifically because it was seen (a) to

be safe to conduct; (b) fast and easy to complete; (c) easy to set and carry around the necessary equipment; and (d) did not require more than basic background knowledge.

Table 4. The expected responses associated with selected test questions

Item	Expected Response	Associated SPS
1	Describing the similarities between two sample leaves as items Describing the differences between two sample leaves as items Using the magnifying lens	Observation Observation Observation
4	Interpreting the graph to conclude that the maximum temperature is at the 13.00 is 17°C . Interpreting the graph to conclude the temperature at 12.00 is 15°C Interpreting the graph to conclude that the temperature at 11.00 and 15:00 are both 12°C	Interpreting Data Interpreting Data Interpreting Data
5	Measuring the edges of the triangle properly Replacing these measured values in the formula giving the surface area of the triangle Using appropriate units for the formula. Finding the surface area of the second object using the graph paper.	Measurement Using numbers and Space Relationships Measurement Measurement
6	Scaling and naming the axes properly Drawing a proper graph using the data Predicting (interpolation) the height of the candle 75 minutes after the observation has started by using a graph Predicting (interpolation) the time elapsed for the candle to reach the height of 20 cm after the observation has started using a graph Predicting (extrapolation) the time elapsed for the candle to reach the height of 0 (zero) cm after the observation has started by using graph	Creating Models Creating Models Prediction Prediction Prediction
7	To draw the space swept by the circle (a sphere) To draw the space swept by the circle (a tore)	Using the number or Space Relationship Using the number or Space Relationship
9	To be able to draw the shortest paths from A to B (If the bug is unable to fly) To find out the length of the paths (If the bug is unable to fly) To be able to draw the shortest paths between A and B (If the bug is able to fly) To find out the length of the shortest way between A to B (If the bug is able to fly)	Using the number or Space Relationship Using the number or Space Relationship Using the number or Space Relationship Using the number or Space Relationship
16	Choosing proper materials and setting up the experiment To have done correct measurements using appropriate tools Stating a hypothesis of the relationship between the length of spring and the mass of the weight To test the hypothesis using different methods To create a table using the data obtained from the experiment To draw a X-m graphic using this table To draw a conclusion about the relationship between the length of spring to the mass of weight To write a report	Manipulating Materials Measuring Formulation of Hypotheses Formulation of Hypotheses Recording Data Creating Models Inferring Recording Data

Students' responses to the pilot test were analysed qualitatively. As a result of the analysis a classification scheme based on similarity was formed. An answer key was prepared according to this classification. Then, the test format was established by soliciting opinions and comments from experts (four experienced physics teachers and four college professors). The final version of the test included 15 questions and an experimental activity (see Appendix A for sample test

items). While the students in a group engaged in doing the experimental activity part of the test that took about 30 minutes, the rest of the group was answering the written section. Then the two groups exchanged their tasks.

Evaluation of Student Responses

The first question of the test (see Appendix A) is related to the skill of observation. It asks students to examine two different plant leaves and to describe their similarities and differences. The checklist (see Table 4) includes three expected responses for this question. If a student's responses are coded as [1], [2], and [0], then the student receives 3 points from this question, which is the sum of code numbers. Scoring was done by giving 0, 1, or 2 points for each expected student behaviour according to the degree of accomplishment.

Test Administration and Item Analysis

Upon the completion of the final version of the test, it was administered to a total of 80 ninth grade students in four equal groups of 20 from four different schools at the beginning of the school year. The four schools were selected to reflect the variety in the Turkish public education system. There were three types of schools in the system. Type I schools accepted all students without selection criteria living within the school vicinity, Type II schools accepted students through a selection examination, and Type III schools accepted students by the level of the student GPAs. Additionally, two Type I schools were included in the study from higher and lower socio-economic neighbourhoods.

Students for the test application were randomly selected. Students participated voluntarily, however we tried to include as many girls as boys in all groups.

For the purpose of test administration, rooms were arranged in schools as shown in Figure 2. Ten desks were placed around an equipment table. In order to save on the test administration costs and time students in a session were assigned to two equal groups of ten. Two students were seated at a table, one from each group. While students in one group completed the test in the given order, the students in the other group were instructed to do the test in the reverse order. This permitted the administration of the test with less equipment. Thus, the two groups were able to use the same equipment at different times when doing the experimental activity (see Question 16 in the Appendix). Completing the experimental activity took about 30 minutes and the rest of the test (the first 15 questions) took 60 minutes.

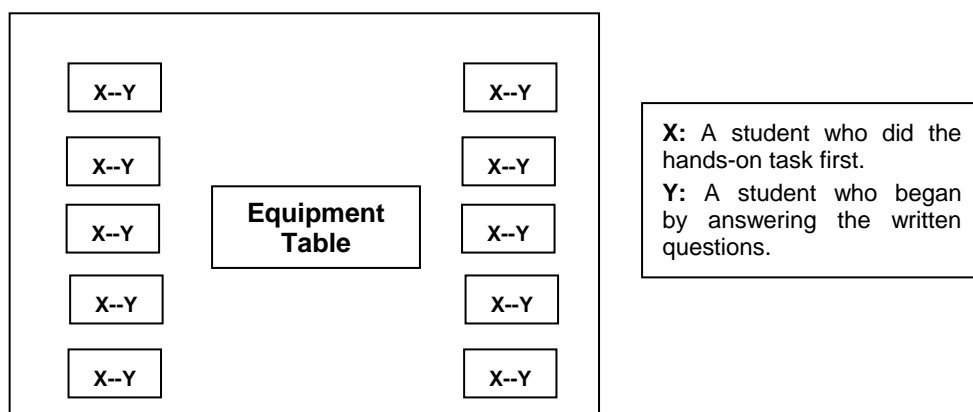


Figure 2. Students were placed at desks as shown in the diagram

The unsynchronised test administration allowed the observation of students and the response to their requests and questions easier. It also allowed the test equipment for 10 students to be used by 20 within the same period of test administration. The students were instructed that the time

given to complete the tasks was two class periods (90 minutes). See Appendix C for instructions to students.

Students were asked to work individually. A student doing the hands-on task first was assigned to a table together with a student who began by answering the written part as shown in Figure 2. The necessary equipment was placed on the teacher's desk in front of the student desks as shown in Figure 3. These were: 20 magnifying lenses, 10 1-metre rulers, 20 30-cm rulers, different weights (more than three masses for each student), 10 spring scales, 10 steel springs with known spring constants, string, 10 table-clamps, 10 steel rods, 10 rod supports; plenty of graph paper, blank papers, glue, and scissors. Also for the test Items 1 and 6 the students were provided with two different types of plant leaves and two different shapes made of cardboard.



Figure 3. The equipment used in the experimental activity

Validity and reliability of the MFT-SPS

In order to attain a desirable content validity a rubric was prepared before the pilot testing and expert opinion was solicited about whether the individual test items were appropriate. Student scores were processed with SPSS software (Version 9.0). The reliability coefficient Cronbach- α was found to be 0.88 on the basis of answers given by 80 grade nine students from four different high schools.

Characteristics of the MFT-SPS

The characteristics of the MFT-SPS are as follows.

- Includes 15 Constructed Response (CR) items and one hands-on activity,
- Takes two class hours to complete (approximately 100 minutes),
- Suitable to administer to groups of 20 students in a single session,
- Requires the following equipment: 20 magnifying lenses, 10 one-metre rulers, 20 30 centimetre rulers, different masses (at least three masses for each student), 10 spring scales, 10 steel springs with known spring constants, string, 10 table-clamps, 10 steel rods,

10 rod supports; graph papers, blank papers, glue, and scissors. Also for the test Items 1 and 6 the students were provided with two different types of plant leaves and two different shapes made of cardboard.

- Has a high reliability (Cronbach $\alpha = 0.88$).

MFT-SPS can be useful in the following contexts:

- (a) defining goals in curriculum development efforts;
- (b) determining whether students are well prepared to work in a laboratory setting, that is, can they learn by doing;
- (c) determining students' SPS at the beginning of instruction;
- (d) as a summative measurement instrument;
- (e) determining whether a particular curriculum fosters students' SPS sufficiently; and
- (f) as an assessment tool at the upper levels of Bloom's taxonomy, beyond the knowledge and comprehension levels.

RESULTS

The results obtained from an application of the MFT-SPS

The MFT-SPS was administered to 80 Grade 9 students in four groups at the beginning of the school year. Table 5 lists the descriptive statistics of the results. Data reveals that student scores are very low on all SPS except for the skills involving the manipulation and classification of materials.

In this paper a valid and reliable instrument that can be used to determine students' SPS is reported. SPS are used in relation to some content and thus performance on the skills is inevitably influenced by the nature of the subject content (Harlen, 1999). The MFT-SPS requires a minimum of background knowledge in science subjects in order for the students to be able to respond to the questions appropriately. On the other hand, students need to use logical thinking and research skills.

The MFT-SPS is the first SPS test ever developed in Turkey. Previously, multiple-choice tests developed in the United States were translated and adopted into Turkish. Originally the Test of Integrated Process Skills II – (TIPS II) (Burns, Okey, and Wise, 1985) and the Test of Logical Thinking – (TOLT) (Tobin and Capie, 1981) were the main sources of questions (Arslan, 1995; Geban, Aşkar and Özkan, 1992).

Measuring students' learning of the SPS in different types of schools

The analysis of variance shows that there are no statistically significant differences between the students in different schools in the skills of observing, classifying, and inferring; however, the differences are statistically significant on skills involving measurement, using number-space relationships, predicting, and recording data. Results of variance analysis are provided in Table 6. In order to identify among which group of subjects (i.e. schools) there is a statistically significant difference with respect to their mean scores a Tukey test was performed (the post hoc analysis) the details of which lie beyond the scope of this manuscript but have been published elsewhere (Temiz and Tan, 2003a and 2003b). This shows that the MFT-SPS is a useful instrument in detecting differences in skills attainment as a result of students' science learning in different types of schools and therefore has the capability to provide teachers with feedback in order improve the effectiveness of their own teaching as suggested by Hofstein and Lunetta (2004).

Table 5. Descriptive Statistics for MFT-SPS (N=80)

Science Process	Question numbers in MFT-SPS	Mean Score*				Standard Deviation			
		School Type**				School Type**			
		I ^a	I ^b	II	III	I ^a	I ^b	II	III
Classifying	10	82.5 0	87.5 5	95.0 0	91.2 5	33.5 4	103.6 1	15.3 9	27.2 4
Overall		89.08				55.76			
Manipulating Materials	16	72.5	72.5	77.5	80	25.5 2	25.52	25.5 2	25.1 3
Overall		75.63				25.15			
Observing	1, 2	35.6 3	31.2 5	37.5	39.3 8	18.2 6	24.16	17.2 1	30.9 6
Overall		35.94				23.06			
Formulating Hypotheses	16	32.5	15	37.5	38.7 5	36.3 6	28.56	36.7 2	37.5 9
Overall		30.94				35.63			
Inferring	16	27.5	15	35	30	37.9 6	28.56	40.0 7	29.9 1
Overall		26.88				34.63			
Interpreting Data	3, 4	25	18.7 5	28.7 5	27.5	11.6 5	13.14	11.8 9	13.3 6
Overall		25				12.89			
Identifying and Controlling Variables	11, 13, 14	16.6 7	13.7 5	31.2 5	25	19.3 1	15.36	21.9 4	20.2 3
Overall		21.67				20.22			
Predicting	6	17.5	8.33	30	26.6 7	14.7 8	12.68	23.3 2	22.5 6
Overall		20.63				20.41			
Creating Models	6,, 15,, 16	18.5	12	27.5	23	22.0 7	22.38	21	14.9
Overall		20.25				20.74			
Recording Data	16	18.7 5	11.2 5	22.5	26.2 5	13.7 5	18.98	7.69	20.6 4
Overall		19.69				16.73			
Measuring	5,, 16	20.6 3	9.38	25.6 3	23.1 3	6.12	5.55	13.1 3	9.31
Overall		19.69				10.85			
Using Numbers/Space Relationships	5, 7, 8, 9, 12	9.79	3.96	24.5 8	15.8 3	9.39	6.12	11.4 6	11.4 4
Overall		13.54				12.34			

* Mean student scores are out of a hundred.

** Twenty students from each school participated in the study.

^{a, b} Different schools of the same type.

CONCLUSION

State of the Current Literature

We believe that by reviewing a large body of literature we have been able to provide an overview of the past scholarly work in the area of science education. However, as can be seen in Tables 1 and 2 the earlier work has become almost unreachable in time. Despite all our efforts we were unable to obtain some essential information contained in other publications. However, we cannot claim that our review was exhaustive. Our efforts show that finding such information about the earlier work has become more difficult. Therefore, we feel an urgent need to prompt the science

education community to gather, store and share in appropriate forms of such work before it becomes extinct.

During the development of the MFT-SPS it has been seen that preparing an SPS and measuring student performance is necessary despite the potential difficulty of application. Although the MFT-SPS takes two class hours (90 minutes) it is not time wasted. Particularly considering that students also learn during test administration. Another thing to note from our experience is that when students are engaged in such tasks they focus their attention more on the task and less on issues that may cause difficulties in classroom management. Using simple everyday materials also makes preparation of such student tasks easy to organise and administer. In the future for further developing the MFT-SPS we need to use a larger sample of students. Also since there was only one rater in this study, more raters would need to be employed in order to establish the inter-rater reliability.

Table 6. Results for the Analysis of Variance Tests (ANOVA)

Science Process	Source of Variance	Sum of Squares	Degree of Freedom	Mean Square	F	p
Classifying	Between Groups	1710.938	3	570.313	0.798	0.499
	Within Groups	54343.750	76	715.049		
	Total	56054.688	79			
Manipulating Materials	Between Groups	843.750	3	281.250	0.435	0.728
	Within Groups	49125.000	76	646.382		
	Total	49968.750	79			
Observing	Between Groups	726.563	3	242.188	0.446	0.721
	Within Groups	41265.625	76	542.969		
	Total	41992.188	79			
Formulating Hypotheses	Between Groups	7210.938	3	2403.646	1.962	0.127
	Within Groups	93093.750	76	1224.918		
	Total	100304.688	79			
Inferring	Between Groups	4343.750	3	1447.917	1.218	0.309
	Within Groups	90375.000	76	1189.145		
	Total	94718.750	79			
Interpreting Data	Between Groups	1187.500	3	395.833	2.520	0.064
	Within Groups	11937.500	76	157.072		
	Total	13125.000	79			
Identifying and Controlling Variables	Between Groups	3812.275	3	1270.758	3.600	0.017*
	Within Groups	26827.003	76	352.987		
	Total	30639.278	79			
Predicting	Between Groups	5704.861	3	1901.620	5.312	0.002*
	Within Groups	27208.333	76	358.004		
	Total	32913.194	79			
Creating Models	Between Groups	2625.000	3	875.000	2.120	0.105
	Within Groups	31370.000	76	412.763		
	Total	33995.000	79			
Recording Data	Between Groups	2460.938	3	820.313	3.172	0.029*
	Within Groups	19656.250	76	258.635		
	Total	22117.188	79			
Measuring	Between Groups	3085.938	3	1028.646	12.571	0.000*
	Within Groups	6218.750	76	81.826		
	Total	9304.688	79			
Using Numbers/Space Relationships	Between Groups	4661.458	3	1553.819	16.024	0.000*
	Within Groups	7369.792	76	96.971		
	Total	12031.250	79			

* The mean difference is significant at the 0.05 level.

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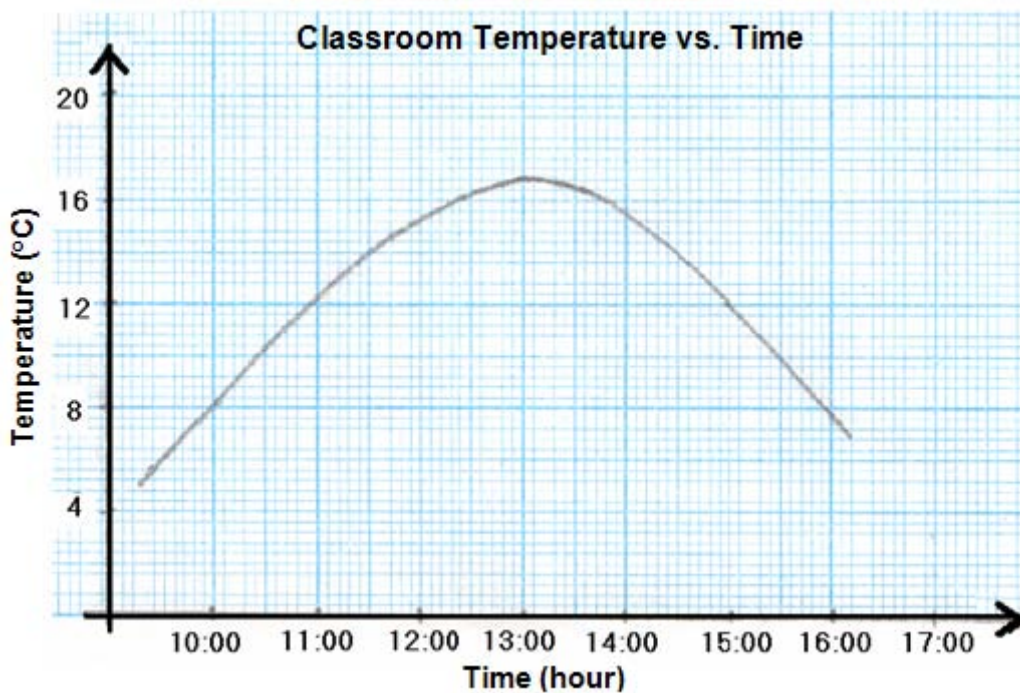
APPENDIX A: SAMPLE TEST ITEMS

1) Please examine the two leaves shown below and describe their similarities and differences.

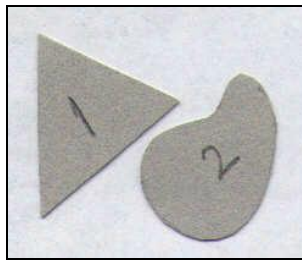


4) Suppose that a student measures the temperature inside his classroom from 10 AM until 4 PM periodically at every hour. Using the data. He draws the graph shown below. Answer the questions below according to his graph:

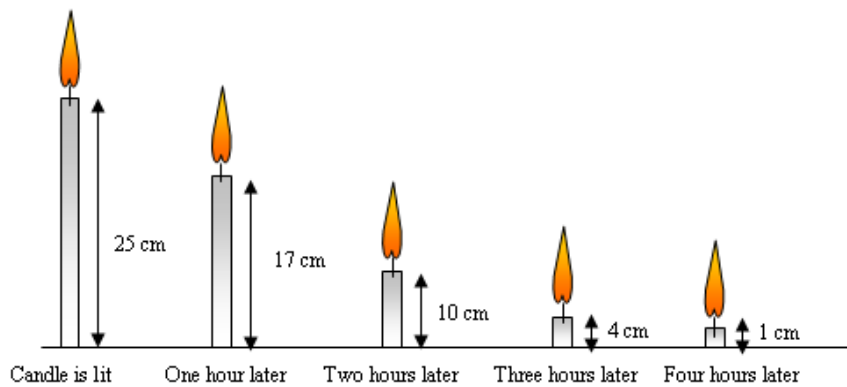
- (i) At what time(s) does the temperature reaches its maximum value(s)?
- (ii) What was the temperature at 12 noon?
- (iii) At what time(s) is (are) the temperature 12°C ?



5) Find the surface areas of these objects and explain the method you use?



6) A 25-cm candle was lit and observed during a one-hour period. The height of the candle varied as shown below:

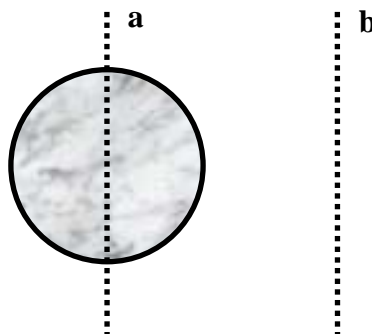


Using these results;

- i) Draw a graph corresponding to the change in height of the candle.
- ii) What is going to be the height of the candle 75 minutes after it was lit?
- iii) How many minutes after the candle is lit its height is going to be 20 cm?
- iv) After how many minutes will the candle burn out completely (i.e. its height becoming zero cm)? Please explain your reasoning.

7) The disk shown in figure on the right sweeps different spaces if turned around the axes a and b. According to this:

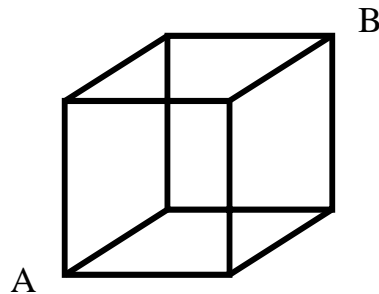
- i) Name the shape formed if the disk is rotated a half turn (180°) around the axis-a. Draw the figure formed by this rotation?
- ii) Name the shape formed if the disk is rotated around the axis-b a full 360° ? Draw the figure formed by this rotation?



9) A bug is at corner A inside a cube shown below. The length of one side of the cube is 50 cm. The bug wants to escape from the cube, but there is only one exit which is at corner B. According to this:

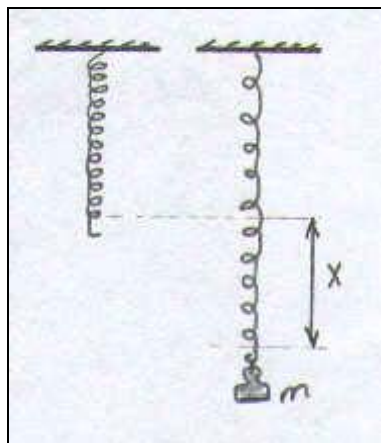
If the bug is unable to fly.

- i) What is the shortest path it has to go to reach the exit at the corner B? Please draw all such shortest path(s) on the figure.
- ii) How many distinct paths are there of this sort? What would be the length of the shortest path in cm?
- iii) If the bug is able to fly.
- iv) What is the shortest path the bug can go to reach the exit at the corner B.? Please draw all such shortest path(s) on the figure.
- v) How many distinct paths are there of this sort? What would be the length of the shortest path in cm?



16) Do an experiment using the equipment provided to you in order to find out a relationship between the extended length of the spring and the mass attached to it vertically. Write a report on this experiment which must include the following:

- i) Name every piece of equipment you use during this experiment.
- ii) Describe how you do the experiment.
- iii) Describe the experimental set-up.
- iv) Describe the data you expect to obtain in this experiment.
- v) Describe how you would interpret the findings.
- vi) Describe your conclusion.



APPENDIX B: INSTRUCTIONS FOR STUDENTS

Dear student,

You are about to take a test which is intended to measure your science process skills. These are commonly defined as experimenting like a scientist:

- (a) observing,
- (b) manipulating materials,
- (c) measuring,
- (d) identifying and controlling variables,
- (e) recording the data,
- (f) drawing a graph,
- (g) inferring information from the data, and
- (h) drawing a conclusion.

You are given two class periods to complete this test (about 90 minutes).

Now the following ten students, whose names I will call, will go to the laboratory tables and start doing the hands-on task given in the test booklet. The rest of the group will start doing the written part of the test first. After completing these, you will change places and do the remaining part of the test in your test booklet.

The necessary equipment that you will need to use during the hands-on task is on the table at the centre. You are free to choose and use any equipment that you think you might need. If you need equipment that is not on the table please ask me.

If you need assistance while answering the questions please raise your hand.

Everybody is required to work individually so do not seek assistance from your fellow students.

Please pay attention and do your best while completing this test.

Thank you very much for your time and effort.