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Examining the Effectiveness of Executive Coaching on Executives

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Executive coaching is one of the fastest growing executive development processes in adult learning. While it has been suggested by some authors that executive coaching has developed into an industry overnight, the process appears to have been more gradual. There is general agreement however, that as a learning process, executive coaching is still 'forming its identity'.

Due to new organisational cultures and structures placing a premium on the executives who head public and private corporations, executives must expand their knowledge base to analyse and comprehend the many changes that are happening around them. Not all executives are able to adjust easily to these expectations, or balance the many competing demands and pressures their position may entail. In such circumstances organisations are often willing to provide an executive coach for senior managers.

While the field of one-to-one executive coaching is expanding quickly, there is a dearth of research on this subject. This paper seeks to explore the impact of executive coaching on five executives, and takes two broad directions. Firstly, conversations with executives were examined to identify the views that emerged from the data. Secondly, the conversations were examined in the light of a model of evaluation devised by Guskey. Both perspectives combined to provide an overview of the executives, their work, and what learning may have occurred.

Learning, executive coaching, professional development, effectiveness/evaluation

The assistance of Associate Professor Colin MacMullin with this article is acknowledged.

INTRODUCTION

A number of authors (Goldsmith, Lyons and Freas 2000; Zeus and Skiffington, 2000), have suggested that coaching is an expanding area of executive development. In recent years there has been a rapid growth in the use of one-to-one executive coaching according to Burdett (1998); Koonce (1994); Peterson (1996); Redshaw (2000); Saporito (1996); Stratford (2001); and Synder (1995) cited in Olivero, Bane & Kopelman, (1997:461). The preferred definition of executive coaching for this study is that of Kilburg (1996). In his review of the executive coaching literature Kilburg as cited in Brotman, Liberi and Wasylyshyn, (1998:41) defined executive coaching as:

> a helping relationship formed between a client who has managerial authority and responsibility in an organisation and a consultant who uses a wide variety of behavioural techniques and methods to help the client achieve a mutually identified set of goals to improve his or her professional performance and personal satisfaction and, consequently to improve the effectiveness of the client's organisation within a formally defined coaching agreement.

Lately organisational transformations as a result of mergers, downsizing, acquisitions, and various other pressures have become common place (Giglio, Diamante and Urban, 1998). Problems occur when executives who may be having difficulty with change or its related organisational impacts such as the need for enhanced skills, performance and development, require assistance.

To date the study of executive coaching has typically centred around the various types of coaching. Such studies have examined the characteristics of successful coaches Hall, Otazo and Hollenbeck (1999); business coaching McGovern, Lindemann, Vergara, Murphy, Barker & Warrenfeltz (2001); executive coaching, Bowerman and Collins (1999); the practice and techniques of coaching Thach and Heinselman (1999); coaching and learning and so on (Goldsmith, Lyons and Freas 2000; Zeus and Skiffington 2000).

Thomas Guskey has been writing for some time about the importance of seeking evidence of effectiveness in professional development programmes (see Guskey 1985; Guskey 1986; Guskey 1990; Guskey 1991; Guskey and Sparks 1996; Guskey 1998). While Guskey's focus has been on professional development for teachers and schools, his research on accountability and evaluation also have application beyond the school environment. This study adopted Guskey's (1998:2-3) summative evaluation stage (or evaluation which is conducted at the completion of a programme or activity). The present study sought to explore the impact of executive coaching on five executives and their work.

METHOD

Subjects

The participants in the study were five executives employed in the public or private sectors in South Australia, and who had undertaken executive coaching six to twelve months ago. The participants were informed that their responses would be confidential and that aliases would be assigned to them.

'Tony' was a senior executive in a very high profile and important industry in South Australia. He was nominated by colleagues as a young, progressive member of that industry. 'Susan' was a very senior member of the public sector who had worked in executive roles in a number of government agencies. She was nominated by colleagues due to her experience and enthusiasm. 'Ian' was the managing director of a very long standing and successful business. He was nominated by colleagues due to his foresight and willingness to share information and ideas. 'Kay' was a senior member of the public sector who held an important and strategic role in a government agency. She was nominated by colleagues as a helpful and cooperative member of her organisation. 'Ben' was a senior member of the public sector who had recently moved agencies in order to undertake a new role. He was nominated due to his motivation and ability to encourage other colleagues.

The five critical levels of Guskey's professional development evaluation: *participants' reactions; participants' learning; organisational support and change; participants' use of new knowledge and skills;* and *learning outcomes* will be applied to the data emerging from the participant interviews.

Procedure

The data were collected by conducting taped interviews with the participants using a set of question prompts arising from the research question and the literature. Two interviews were undertaken with each participant.

During the first interview the researcher used question probes and follow-up questions to explore the participants' stories about the context of their coaching experiences, the relationships that developed with their coaches, and to appraise the impact of the coaching on the participants and their work. Between one to three weeks after the first interview a second interview then took place with each participant. In this interview specific themes, ideas and concepts arising from the participants' first interview were further explored, and the participant's reactions to events were used as a means of obtaining more in-depth information on matters already discussed. After the interviews were completed and interview transcripts prepared, the transcripts were forwarded to each participant to review, critique, check for accuracy and to determine whether any matters raised required clarification. Follow-up contact was made with two participants to clarify some specific points.

Analysis

Data analysis strategies consisted of noting major ideas and concepts and the emergence of recurring patterns. Initially one transcript was examined and noted specifically for codes, concepts, themes and ideas in order to develop and compare major coding categories. Codes and themes were added, dropped, or refined as necessary during subsequent readings of the transcripts. Issues of interest and importance, key words, and the identification of direct quotes all of which could be used in the reporting of the study were also noted. The same coding process was then applied to the balance of the interview transcripts and seventeen major themes eventually emerged.

The data were analysed from two perspectives. Firstly, searching for themes and sub-themes, which were then further refined and collapsed into six overarching themes and then into three principal categories with a series of sub-themes. Secondly, by reference to Guskey's (1998) five critical levels of professional development evaluation namely: participants' reactions; participants' learning; organisational support and change; participants' use of new knowledge and skills; and learning outcomes.

RESULTS

The results are presented under the headings of The Themes, and Guskey's Model of Evaluation.

The Themes

During analysis of the interview data three major themes emerged. These themes were labelled ***the context of coaching; the experience of coaching; and reflections.*** Each of the major themes was an umbrella for a number of sub-themes.

Theme 1- The context of coaching

This theme was an umbrella for the following sub-themes: *'getting started'; familiarity with, and expectations of executive coaching; culture of the organisation; the coaches' familiarity with the organisational culture; and the use of internal or external coaches.*

'Getting started'

The first issue to be discussed related to how the participants were introduced to executive coaching. Involvement was by way of internal advertisements, introductions by managers or human resource personnel or by attending other courses that led to coaching. The motivation for undertaking coaching varied for the participants and comments such as: "*…I was looking*

for something different. I was looking for something that was really working with me on some job issues that I had specifically at that time,' and '[Something] *that could be offered at a time when I needed it, and focussed on my specific needs, and it met all of those requirements"(Susan),* provide an indication of the participants' aspirations for undertaking coaching.

Familiarity with, and expectations of executive coaching

Prior to commencing coaching only two out of the five participants had some comprehension of the idea of executive coaching, either from colleagues who had undertaken executive coaching, or from being introduced to the idea by their employer.

Four of the five participants appeared to have some expectations of the executive coaching experience. Susan explained, *"I wanted it to be fairly pragmatic…I didn't want lots of holding my hand and going along. …I wanted someone who was fairly challenging…".* Kay expected for instance, *"…a structured discussion; a purpose-driven process",* and Ben *"…someone I could talk to and explore ideas with….".*

Understanding the culture

The culture of the coaching environment into which an executive coach entered particularly an external coach, played an influential role in the participants' undertaking of coaching, and their feelings of accomplishment or otherwise with the coaching programme. The individual coach's familiarity with the participant's organisational culture also played a major role in the coaching experience. Discussion about 'culture' revealed two major issues: (a) the organisational culture that the participants were in: "*There certainly is a culture here that coaching is a good thing to do" (Susan);* and (b) a coaches' familiarity with the organisational culture: "*Yes – because they might need to change the culture" (Ian).*

Internal and External Coaches

All participants agreed that it was more appropriate to use an external, rather than an internal coach. This view primarily related to issues of the suitability of internal coaches, and confidentiality.

Theme 2 – The coaching experience

The major issues raised in this theme *were the focus of the coaching; the coaches' process, style, skills and technique; timing; and the potential threats or risks of executive coaching to the respondents.*

The focus of coaching

The overarching purpose of the participants' coaching tended to centre on the broad headings of leadership and management. Common areas of concentration for all participants were on time management and supervision and delegation skills. Other leadership and management skills that emerged were the development of higher level administrative skills, handling conflict, being more proactive in management and articulating a business vision to staff.

The Coaches' process and style, skills and techniques

The coaching process for each participant, although variable revealed a similar procedure of: engagement of the coach, the undertaking of psychological or related assessments (if used), negotiating the areas for coaching, and then commencing the coaching. Some elements appeared common such as the coach's encouragement of wider reading of reference books or other reading material which included specific learning models, and an expectation of 'homework', individual reflection and reporting back.

The coaches' style tended to vary depending on their background, which included psychology, consultancy, business or education. One coach used special language or phrases to convey simplified messages about potential strategies, which then acted like behavioural cues for the participants. Susan summarised the situation as follows: "*…there are triggers to trigger my remembering of the framework…",* and "*…another one was about looking at problem solving situations. If you are going to fail, fail early…. Now what that is about is a process of analysis or risk-assessment in a situation…".*

Comments about the skills and techniques used by the coach were particularly relevant. The four main points that arose during the interviews were a coach's ability to listen carefully; to communicate well and maintain a coaching focus; to develop trust with their client, and to challenge their 'comfort zone'. The ability for the coach to develop and maintain a trusting relationship was of high importance, and was explained in this way: "*You've got to trust your coach, I think that's important; …because some of the stuff got pretty close to home…" (Ben),* and *"I think that it was very important because it* [the coaching] *wouldn't have worked without it" (Susan).*

Timing

A further decisive issue for the participants was the timeliness of the coaching experience both in terms of the participants' readiness and acceptance of the products of their coaching, and also the importance of the presentation of 'just-in-time' skills.

Just as one participant saw the timeliness of his coaching being critical: *"…it all sort of happened at the right time…"(Ben),* another participant questioned her readiness for coaching: *'…I think…executive coaching is often offered at the stage where a manager thinks someone is ready for the next step…I was presumed to be at the next step" (Kay).*

Potential threats or risks of executive coaching to the respondents

Comments about the potential threats or risks of executive coaching were also mentioned: "*You need to have broad enough shoulders to accept the potential criticism that comes from it,* [executive coaching], *and some people do that better than others" (Tony).*

Theme 3 – Reflections

The issues raised in this theme covered the *positives and negatives of coaching* and *some possible effects of the investigation on the participants.*

The positives and negatives of coaching

Comments about the positive aspects of coaching were described as: "*The opportunity to do it* [coaching], *to expand and think further" (Ben); "I guess I learnt a lot about myself" (Kay),* and *"…you have someone who has an interest in you, but has no investment in you other than*

successful outcomes"(Ian). Negatives of coaching were described as follows: "…[coaching] *eliminated other* [developmental] *opportunities, because I have been seen to have been given some training and support"(Kay),* and *"I actually found the homework quite taxing…"(Susan).*

Some possible effects of the investigation on the participants

Two participants described some possible effects of the investigation on them: *"I think, at the time, I didn't think of* [the potential value of coaching], *a lot, and now I think through the conversations with you* [the researcher] *I can pick out some of the good bits and some real positives and I shouldn't undersell those…" (Kay);* and *"…the only thing I want to say is to thank you* [to the researcher] *for the opportunity of sitting down after…12 months and be*[ing] *required to think about it again (Ben).*

While a range of positives of the coaching experience were acknowledged such as new ways of thinking, exposure to recent information, personal growth, and development of self-worth and self-awareness, a range of negatives were also outlined. The negatives of coaching identified are important, as often they receive little exposure in the literature. For participants, negative issues were vagueness; a coach's unfamiliarity with the organisational culture; a lack of time for reflection, or transferability of skills; limited respect for the coach; learning only at the abstract level; the personal exposure of coaching; and the 'coaching envy' of colleagues. These are important factors to be identified, as they can detract from coaching effectiveness.

Guskey's Model of Evaluation

As outlined previously the five critical levels of Guskey's professional development evaluation were applied to the data emerging from the participant interviews.

Level One - Participants' reactions to executive coaching

All participants expressed the view that their executive coaching was meaningful. Several key reactions emerged. Most participants commented how coaching had made them more aware of the delicate balance between their work and family life. Other reactions were the potential of coaching to provide intellectual input and new personal and professional insights; that the individual tailoring of coaching encouraged successful learning; and that the personal relationship developed between the coach and the participants relied heavily on the issue of mutual trust.

Level Two – The participants' learning

The participants revealed that both personal and organisational learning occurred during the coaching process. One participant discovered that personal and organisational learning were really indistinguishable, and that if a person's personal repertoire of skills was increased, these skills would inevitably be used in the workplace as well as personally. Other participants found that such learning was, *"…empowering you to virtually go into any organisation" (Ben),* and could be applied in their day-to-day lifestyle. Specific learning for one participant included exposure to new information technology applications, a "comfortableness" about her style of operating, and learning how she liked to learn.

Level Three – Organisational support and change

One particular matter was that all participants suggested that they had not necessarily felt organisational support in endeavouring to *immediately* implement the new learning they had

acquired through coaching. Factors which impacted on this were identified as their organisational culture or policies, the lack of engaging other personnel in their office in their coaching experience, and changing roles within their work environment. Although some participants suggested that coaching gave them the impetus and motivation to confront change in their work place one participant also described what she saw as the necessary exclusivity of executive coaching and thought that as "*…the model and material is given on a personal basis, the opportunity to have generic discussions about it is not so readily available" (Kay).*

Level Four – Participants' use of new knowledge and skills

The question of whether the participants were using what they had learned in coaching was a critical factor of the coaching evaluation. As previously identified in Level One, two participants referred to the impact that coaching had on more than one component of their life. For Susan it was the balance between her work "compulsion", and home and family life; and for Tony a recognition that "*…you have to mange your life as well as your career*". Susan explained that she was taking her coaching learning into the broader environment of an external committee, and Tony reflected that coaching had made him more aware of the difficulties involved in endeavouring to implement change too quickly, as well as the balance expected between technical and managerial skills.

Level Five – Participants' learning outcomes

All participants were unanimous that some specific elements of executive coaching had considerable impact on them. Comments were from both a personal and organisational perspective, and included: development of a self-belief, self-awareness, and confidence; the ability to reflect on what was learnt using an adult learning model; a realisation of inherent talent, and an ability to maximise personal potential. Other learning outcomes were described as promoting new thinking, and looking at things from a very different perspective. Three participants thought that the coaching was cost effective either due to the added return to their organisation on its investment; or that coaching could be applied to specific areas requiring development. The participants also stated that they preferred a style of learning that occurred outside of attending a course.

DISCUSSION

The participants commented about various aspects of coaching that had an impact on them both professionally and personally. As a result of her coaching experience one participant had changed both her professional and personal mode of operating by confronting some habits or patterns of relating and seeing the world. Another participant realised the necessity and importance of balancing the 'human' side of senior management with the technical skills required.

The findings that emerged from the data themselves and the application of Guskey's model provided a close examination of the personal and professional impact of executive coaching on the participants.

Several critical issues arose from the data. These were that there is an interplay between the organisational culture of the environment of the person being coached and the outcomes of the coaching process at a variety of levels. One of these is that a coach needs to be familiar with the organisational culture of their client in order to understand the key challenges and issues facing the person being coached. Related to this is the assertion that all of the participants in this study felt that coaching should be undertaken by a coach external to the organisation.

External coaches therefore have to either have a knowledge of the organisational culture they are entering or quickly gain that knowledge.

The abilities and skills of a coach to develop and maintain a trusting relationship with their client was described as being of the greatest importance by all participants. If such a relationship was established, this enabled the coach to challenge the participants' 'comfort zone', and move them to behavioural change and transformation not only in their working lives, but also on occasions in their personal lives. If a sufficient level of trust was not developed, this had a major impact on the coaching outcomes.

The timeliness of coaching from a range of perspectives was also seen as an important component of the coaching experience. Timeliness was seen in relation to an executive's career, personal or organisational needs, their own availability, and the opportune acquisition of 'just-in-time' skills. The importance of individualised and one-to-one coaching as a preferred method of adult learning was also identified.

A range of positives and negatives of the coaching experience were noted. The positives of coaching included an introduction to new ways of thinking and personal growth, and exposure to recent information. The negatives of coaching included unfamiliarity of a coach with the organisational culture, lack of time for reflection and the personal exposure of coaching.

In this study, application of Guskey's model of evaluation aided analysis of the findings, and revealed a deeper level of understanding of the impact of coaching on the executives. At the same time, an interrelationship between the data from both sources was revealed.

At Level One – participants' reactions to executive coaching - this study questioned whether the Guskey Model, which is usually classified into three broad categories: planning, formative and summative evaluation, should be applied in its entirety rather than using only one of its categories. The concern was that by undertaking a summative evaluation only the participants' coaching needs, desires or motivations for instance, which might have been outlined at the planning evaluation stage, may not have been revealed.

Application of Level Two – Participants' learning - strengthened the view that coaches need to provide clear, specific and achievable learning goals and an on-going measurement and de-briefing of learning or behaviour change against those goals. In evaluating at Level Three – Organisational support and change - it was clear that executive coaching needs to place emphasis on the cultural context of organisations. Whether or not coaching participants can influence this culture, or at least align any personal or professional change with the organisation's mission to a large degree depends on consideration of the crucial nature of an organisation's culture and environment.

As stated in Level Two, on-going measurement of achievement is very important. Evaluation of Level Four – the participants' use of new knowledge and skills - clearly emphasised the significance of the process of measuring professional development at various time intervals. This procedure could readily be woven into coaching programmes. Level Five – The participants' learning outcomes - endeavoured to determine the impact of programme learning. The participants all agreed that varying aspects of the coaching experience had a great learning impact professionally and for some, personally. The key strength of Guskey's model lay in its ability to follow a staged and systematic evaluation that is thoughtful, intentional and purposeful.

CONCLUSION

The role of the organisational culture, and the support or otherwise of the organisation and its people is critical to coaching success. As evidenced by the Guskey evaluation, unless coaching is accepted within an organisation as a viable personal development programme, and an adult learning model, the learning that has been undertaken, and the behaviour change that might have occurred, may be in vain.

Of the four key coaching skills identified by the participants, the most crucial ones were the skill of developing and maintaining a trusting relationship, and a coach's ability to challenge thinking and move people out of their 'comfort zone'.

The challenge to executives, organisations and coaches, is to recognise that executive coaching as a formal executive development activity is a young professional practice that is 'still forming its identity' (Pinchot & Pinchot, 2000). For this reason scope exists for organizations and individuals to acknowledge that as a growing area of human resource development, executive coaching is still developing the appropriate behavioural techniques and methods to improve professional performance, personal satisfaction and organisational effectiveness (Kilburg, 1966).

Based on the findings of this research, it is important that the Guskey model be used to examine the views of other personnel such as Board members, peer directors, managers, clients, personal assistants and other related staff of the participating executives in this study. Additional research also needs to be undertaken in the areas of the impact of executive coaching and organisational change, and coaching standards, ethics and values.

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An Investigation of College English Teaching in Four Universities in China

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The author joined an investigation of College English teaching organised by the Education Department of a province in southern China. Using questionnaires and interviews with College English teachers and students in the four universities in the capital city of that province, the author finds that among the problems existing in College English teaching, teachers' workload is the key issue. In the light of the analysis of this finding and discussion of language classroom teaching, suggestions are given for the improvement of College English teaching in China.

College English in China, workload, language teaching, preparation for teaching, class size

INTRODUCTION

College English in China refers to a compulsory English course for non-English majors in universities. To discuss College English teaching, we might first consider two basic issues: What is language? and, What is language teaching?

Crystal (1971) views language as human vocal noise (or the graphic representation of this noise in writing) used systematically by a community for purposes of communication. Emmitt and Pollock (1997) define language as a system of arbitrary signs agreed to by a community of users, transmitted and received for a specific purpose in relation to the shared world of users. Although there are differences in its definition, language as a system of linguistic symbols for communication is commonly accepted (Sapir 1921; Finocchiaro 1964; Wood 1964; Gimson 1970; Wardhaugh 1972; Mussen, Conger and Kagan 1979; Robins 1990).

When talking about language teaching, Brown (1994) argues that it is guiding and facilitating learning, enabling the learners to learn and setting the conditions for learning. Language teaching means that language is both what is being taught and the means by which it is being taught (Allwright and Bailey 1991; Cook 1991; Ellis 1992). In the classroom, almost the whole teaching effort should be directed towards creating contexts for language use, by such means as listening and reading activities, discussion, communication tasks and role playing (Littlewood 1984). Ur (1996) compares the lesson time available for the activity to a container, suggesting that this container should be filled with as much 'volume' of language as possible and time during which learners are not engaging with the language being practiced for whatever reason is time wasted as far as the practice activity is concerned. This is because 'the language of the language classroom is distinctive because it is designed for language learning to take place' (Cook 1991). According to Harmer (2000), a good language teacher maximises Student Talking Time and minimises Teacher Talking Time.

It can be seen from the above that, since language is for communication, practice should be a key feature of language teaching.

College English has been taught in China for nearly 23 years, during which time great changes have taken place: there have appeared three College English Syllabi and dozens of College English textbooks. The first generation of teachers of College English have all retired from their schools and most of the second generation likewise. College English teaching has been a career for several generations of teachers. Since 1998, given the fact that most parents spend as much as they can on their only-one-child's higher education, most colleges and universities in China have increased their enrolment to promote economic development. As far as College English teaching is concerned, if teaching resources have been increased to match the increased enrolment, there will not be much difference in the situation. Otherwise, the increased enrolment will lead to changes in many aspects of classroom teaching, including teachers' workloads, teacher-student ratios, and class sizes, which may finally affect the quality of teaching.

What is College English teaching like? Are there any influences of the increased enrolment on College English teaching and, if so, what are they? In May and June 2001, the Education Department of a province in southern China organised a wide-ranging investigation, including a review of College English teaching, in which the author participated as a researcher. The following study reviews College English teaching after increases in enrolment in the four universities which the author investigated in the capital city of that province.

RESEARCH QUESTIONS

"Language is central to learning and learning is central to teaching" (Emmitt and Pollock 1997: 206). In discussion of teaching, teachers and learners are inseparable. Celce-Murcia and Olshtain (2000) point out that learners are not only the focus of the curriculum, but also full participants in its development. With regard to teachers' work, Connell (1985) argues that it is governed by such constraints as the nature of classroom and other settings, class sizes and the timetable, which embody particular social relations and politics, and that it is divided in ways reflecting experiences, sex, administrative involvement, and the histories of particular schools. Nunan (1989) also believes teachers' training and personal characteristics influence their thoughts, judgements and decisions, which in turn guide what they actually do in class. However, education is greatly influenced by ICT (Information and Communication Technologies), just as Head and Merttens put it in the preface to Abbot's book:

> It is now abundantly clear that the development of information and communication technologies is very different. Schooling and teaching will be forced to change in a variety of ways…(Abbott 2001: xiii)

The above studies throw some light on the research questions by focusing on the following six aspects:

1. College English teachers' workloads;
2. Class sizes;
3. Teacher-student ratios;
4. Data on College English teachers, including age, gender, degree and academic rank;
5. Computers used for College English teaching; and
6. Students' ideas and suggestions on College English teaching.

The research questions asked are listed below:

a) How many College English teachers are there in your university?

b) How many students are learning College English at present?

c) How many class periods does one College English teacher teach each week?
d) What are the class sizes?
e) What are the teacher-students ratios?
f) What degrees do College English teachers hold?
g) How many teachers are professors, associate professors, lecturers and assistants?
h) What is the situation of College English teachers with respect to age?
i) What is the situation of College English teachers with respect to gender?
j) How many computers do you have for College English teaching?
k) What is the feedback from the students on College English teaching?

ABOUT THE FOUR UNIVERSITIES

In terms of academic features and enrolment, two universities were at a national level. However, in terms of leadership there was a shift for one of the universities only nearly two years ago: from being directly under one ministry of the Central Government of China to being under one province in southern China. Such a shift resulted from the reform in higher education that except for the Ministry of Education, other ministries, generally speaking, should not have their own universities. Of the other two universities at provincial level, one had become a university as the result of the combination of three three-year-colleges just one year before the investigation.

METHODOLOGY

From 20 May to 1 June 2001, we made an investigation on College English teaching in four universities (U1, U2, U3 and U4) in the capital city of a province in southern China. The Education Department of that province designed the questionnaires and distributed them in mid-April. In each of the four universities investigated, we first collected the questionnaires conducted by the College English Teaching Department and listened to the Vice Chancellor's report on College English teaching. Then we held interviews with College English teachers and students respectively. Of the 102 College English teachers in the four universities we interviewed 42, the remainder either being too busy teaching or on leave. Of the 17153 students learning College English as a compulsory course, we randomly selected 54 for interview. In each interview, we were sitting in a circle with the students and the atmosphere was very friendly and conducive to frank talk.

ANALYSIS OF RESULTS

The results of the investigation can be classified into four aspects:

1. the situation of College English teaching (shown in Tables 1-3);
2. the situation of College English teachers (shown in Tables 4-7);
3. computers available to College English teachers (shown in Table 8); and
4. students' feedback on College English teaching.

The situation of College English teaching

Table 1 shows College English teachers' workload, which is divided into two parts: the rated workload and the actual workload. The rated workload refers to how many class periods one teacher should teach each week. Without finishing the rated workload, a teacher cannot be expected to get his/her full salary. The actual workload is how many class periods one teacher

does teach each week. Theoretically, once teachers finish their rated workload, they have completed their work. However, nobody stops at his/her rated workload. As the College English teachers' rated workload varies with each of those four universities, their actual workload also varies.

Table 1: Teachers' Rated and Actual Workload

University	Teachers	Rated Periods/Week	Actual Periods/Week
U1	9	10	12
U2	34	10	12
U3	18	9	16
U4	41	8	15
Total	102	920	1419
Average	25.5	9	14

From this table, we can see that each teacher actually overworked on average by 55 per cent each week. Such a situation shows that these four universities are lacking in College English teachers, as shown in Table 2.

Table 2: Staffing Levels

University	Teachers		Understaffed Number	Understaffed Percentage
	Actual	Required*		
U1	9	11	2	18
U2	34	41	7	17
U3	18	32	14	44
U4	41	77	36	47
Total	102	161	59	37

* i.e. number of teachers required in terms of rated workload

It can be seen from Table 2 that College English teachers have fallen far behind the demand of College English teaching in number in those four universities.

Table 3: Teacher- Student Ratio and Class Size

University	Students	Teachers	Teacher-student Ratio	Class Size
U1	818	9	1:90	40-60
U2	5903	34	1:173	39-53
U3	3492	18	1:194	45-65
U4	6940	41	1:169	55-69
Total	17153	102	1:168	45-62

The average class sizes in these four universities show that, in a class period of 50 minutes, each student at most could have only about one minute to speak. Among other things, teacher-student ratio involves a teacher's workload of correcting students' homework. According to our interviews with teachers and students, College English teachers in these four universities usually assign homework to their students every other 1.5 weeks. The usual homework includes translation, sentence making, reading, cloze and so on. With the average ratio of 1:168, a teacher has to spend 336 minutes even if he/she spends only two minutes on each student's homework. Besides, each College English teacher has to correct his/her students' compositions at least once each semester, which is the most time-consuming job. According to National Council of Teachers of English (1998), 'A teacher with 125 students who spends only 20 minutes per paper must have at least

2,500 minutes, or a total of nearly 42 hours'. If so, a teacher with 168 students has to spend 3, 360 minutes, namely, 56 hours on his/her students' compositions.

Tables 1 to 3 reflect the situation of College English teaching in those four universities, in which it can be seen that College English teachers' workload is heavy.

Why is College English teachers' workload so heavy? If we look at the College English teachers' workload from a historical perspective, we might have a better understanding of this issue.

Foreign language teaching in China was greatly influenced by the government's political agenda. During the Cultural Revolution (1966-1976), foreign language teaching was more absent than present because of the participation of both teachers and students in that political movement. Before the Cultural Revolution, Russian was taught in China due to the brotherhood relationship between China and the former USSR and most teachers of foreign languages therefore taught Russian rather than English. After the end of the Cultural Revolution, given the fact that English was becoming an international language, the Chinese Government decided to teach English as a major foreign language all over the country.

However, where could China find so many teachers of English to meet the needs of English teaching in colleges and universities? From the very start, China was facing a serious situation: the lack of teachers of English. It goes without saying that the workload of College English teaching was heavy from the very beginning: while teachers of mathematics, physics and chemistry had three or four class periods each week, teachers of College English had eight class periods per week. The increased enrolment has never been accompanied by a large enough increase of College English teachers to meet the demand for English teaching. Thus, the only way to match the enlarged enrolment is to increase College English teachers' workload, making the original heavy workload even heavier.

The situation of College English teachers

Teachers in colleges and universities in China consist of professors, associate professors, lecturers and assistants. Of the 102 College English teachers in these four universities there was no professor. Of the 14 associate professors, according to our interviews, ten were 50 or more years old. This means that 71 per cent of the associate professors were coming near to their retirement ages: fifty-five for women and sixty for men. Table 4 shows the imbalance of College English teachers in academic ranks.

Table 4: College English Teachers in Academic Ranks

University	Professor	Associate Professor	Lecturer	Assistant	Total
U1	0	3	3	3	9
U2	0	5	19	10	34
U3	0	2	9	7	18
U4	0	4	13	24	41
Total	0	14	44	44	102

College English teachers' academic qualifications are low in all four universities, which can be seen from Table 5. Table 6 shows that College English teaching was mainly carried out by younger teachers in their thirties and twenties. From Table 7, we can see that women teachers predominated in College English teaching in those four universities.

Tables 4 to 7 show the situation of College English teachers in their academic rank, qualification, age and gender. That women constitute the majority of College English teachers (as shown in

Table 7) is quite common in China. Such an imbalance, with women being in the majority, also exists in English major students in English Departments in almost every college and university in China. The imbalance in age in College English teachers (as shown in Table 6) might be explained historically. During the Cultural Revolution from 1966 to 1976, few English majors graduated from colleges and universities.

Table 5: Academic qualifications of College English teachers

University	Bachelor's Degree	Master's Degree	Ph.D	Total
U1	9	0	0	9
U2	31	3	0	34
U3	17	1	0	18
U4	41	0	0	41
Total	98	4	0	102

Table 6: College English teachers by age

University	50 & over	40-49	30-39	Under 30	Teachers
U1	3	0	2	4	9
U2	3	8	8	15	34
U3	1	2	7	8	18
U4	3	3	8	27	41
Total	10	13	25	54	102

Table 7: College English teachers by gender

University	Men	Women	Teachers
U1	3	6	9
U2	14	20	34
U3	5	13	18
U4	14	27	41
Total	36	66	102

During our interviews, the College English teachers complained of one 'heavy' and two 'lows': heavy workload (as shown in Tables 1-3), low academic ranks (as shown in Table 4) and low degrees (as shown in Table 5). The teachers complained that their heavy workload actually prevented them from having enough time and energy to prepare for the Postgraduate Entrance Examination as well as having enough publications for their promotion. Table 4 shows the imbalance of College English teachers in their academic ranks. The higher the rank, the more difficult it is for College English teachers to achieve promotion. Thus, it can be seen that there is a relationship of cause and effect between Tables 1-3 and Tables 4-5, and that teachers' workload is the key issue.

As a rule, each student could at most have a little over 20 classes per week. As shown in Table 3, however, each College English teacher has an average of 14 class periods to teach every week, and therefore is likely to have class periods every day. Writing academic papers usually takes quiet hours without disturbance. Having classes every day means not only spending hours in the classroom, but also writing lesson plans and correcting students' homework and so on. With such a heavy workload, it seems impossible for College English teachers to do research and prepare enough publications. According to our interviews with College English teachers, it is College English teachers who teach the most but are the lowest in rank in their universities. However, when it comes to teachers' promotion, it is not how many class periods a teacher teaches but how many publications a teacher has that really counts.

When we were interviewing the College English teachers, academic rank was the issue they were most strongly dissatisfied with. Almost all teachers had the same complaint: 'If teaching is the centre of a university, why is it that those who teach the most get the least promotion?'

In addition to workload, we can consider the issue of the College English teachers' lack of publications from other two perspectives:

1. Fewer journals for College English teachers

   English learners in colleges and universities in China fall into two sections: those who study English as their major are called English majors; and those who study English only as one of their compulsory courses are called non-English majors. Therefore, teachers of English in higher learning are also divided into English major teachers and non-English major teachers now commonly called College English teachers. In almost every college and university, College English teachers are the largest subject group. But it does not necessarily follow that they have the most professional journals. It is estimated that there are about 50,000 College English teachers in China. According to the *Newsletter of College Foreign Languages Teaching* in 1999 No. 1, there are thirty-one journals for English teachers. However, journals focusing on College English teaching number less than ten. As far as the ratio of teachers to academic journals is concerned, College English teachers appear significantly disadvantaged in terms of opportunities to publish.

2. Negative influence of the second foreign language test on English teachers

   In China, anyone who wants to be promoted in his/her professional title has to pass a certain level of foreign language test. Non-foreign-language majors usually have to pass English test, while English majors have to pass their second foreign language test.

   Passing the second foreign language test as the precondition for promotion takes much from the very limited time and energy of College English teachers and is actually meaningless in terms of improvement of their English. Given the fact that teachers of other courses have to pass their English test as the precondition for promotion, it seems fair. However, if we consider the difference between English majors in learning their second foreign language usually for 1.5 years in schools and non-foreign-language majors in learning English for 10 years, we may see that the second foreign language test for College English teachers is more of a burden that makes them suffer rather than providing anything beneficial.

   It is commonly accepted that one cannot learn a language well without knowing its culture. Emmitt and Pollock (1997) argue that language is rooted in culture. While culture influences the way in which language is used, language influences the ways in which the individual perceives, thinks and acts. Crystal (2000) also points out that there is considerable identity between language and the culture of which it is a part. Yet, the majority of College English teachers in China learn English in China, teach English in China and finish their postgraduate studies in China. In other words, most College English teachers have not had any experience or exposure to real culture in English speaking countries. By this, the author does not mean that their English is poor, but they can never stop their English learning. Improving their English is a lifelong career for these teachers. They should be encouraged to make full use of their very limited valuable time and energy under the pressure of their heavy workload to do research on English teaching and learning, which would be helpful both in their English improvement and in their publications. From the interviews with College English teachers, all of them complain about the so-called second foreign language test. To emancipate College English teachers from the disturbance of their second foreign language test, it seems to be reasonable that the second foreign language test for College English teachers should be cancelled.

Computers available to College English teachers

In all four universities, we found that computers used for College English teaching are scarce, as seen from Table 8.

Table 8: Availability of Computers for College English Teaching

University	Teachers	Computers	Teachers : Computers
U1	9	1	9:1
U2	34	8	4 :1
U3	18	4	5 :1
U4	41	3	14 :1
Total	102	16	6 :1

In the age of information technology, each teacher should have one computer. Inadequate computer facilities reflect the low status of College English teaching and difficult financial situation in the four universities, leading to unsatisfactory teaching conditions.

Students' feedback

When we interviewed students, we sought comments on the teaching of their teachers and their ideas and suggestions for the improvement of College English teaching. According to the author's notes during each interview, students' comments on teaching were positive. Instead of criticising their teachers, they appreciated their teachers' hard work, responsibility and patience in teaching and coaching them. However, they provided the ideas and suggestions, that:

a) they wished their teachers could add more English speaking exercises or activities to classroom teaching;

b) the English language environment on campus should be enriched with various kinds of English activities after class, such as English corners, English speaking contests, English short plays, English evenings and so on; and

c) more students should be allowed to participate in the College English Test (CET) Spoken English Test.

Emmittt and Pollock (1997) argue that the factors influencing the learning of a second language can be categorised as those centred around the learner and those that are centred around the environment. Students' ideas and suggestions reflect not only their desire to improve their speaking ability in English but also the failure of College English teaching to meet the students' needs in those four universities. However, given the class size of 45 to 62 in the four universities, it seems difficult for teachers to meet their needs in class. To enrich the English language environment on the campus involves the school's financial support and their teachers' active work. Judging from the computers used by College English teachers (as shown in Table 8), it seems that the financial situation in those four universities was not satisfactory. Besides, the fact that each teacher has 14 class periods to teach might prevent them from having enough time and energy to plan extra-curricular activities. CET Spoken English Test is a kind of College English Test (CET). At present, College English Test consists of three kinds of test: CET Band 4; CET Band 6; and CET Spoken English Test. While CET Band 4 and 6 mainly test students' abilities in listening, reading and writing, CET Spoken English Test focuses on testing students' English speaking ability. CET Spoken English Test started in 1999. It is organised by a CET Committee. Because such a test is time-consuming and involves a lot of teachers, it cannot be done on a large scale. Therefore, the CET Committee decides that in order to guarantee the test quality, at present, only those whose scores in CET Band 4 are above 85 are entitled to participate in the CET Spoken English Test. Just like CET Band 4 and 6, CET Spoken English Test is also a national

test. It is not the university that has the right to decide who will take part in the CET Spoken English Test.

DISCUSSION

In the light of the analysis of the investigation results, of the problems existing in College English teaching in the four universities, the key issue is the College English teachers' workload, which, according to our interviews with College English teachers in those four universities, was usually calculated only on the basis of their actual class periods. How should we look at language teachers' workload? This part will discuss the problem from a theoretical perspective in terms of: preparing for language teaching; and language classroom teaching and class size.

Preparing for language teaching

On the surface, we may say that language teaching is a process involving the hours a teacher usually spends in a classroom with his or her students for the sake of implementing certain language teaching tasks. However, when we think of this issue a little more deeply, we may see that teaching involves much more than the hours spent in a classroom, for: (a) academic qualification is the precondition for those who want to be teachers; (b) once people become teachers, it does not follow that they can start their teaching for any students, on anything, in any classroom, or at any time, because teaching is scheduled. Before teachers start their teaching, they should know whom, what, how, where and when to teach. In other words, teachers have to do preparation beforehand, which mainly focuses on lesson planning and a lesson plan is usually produced as a result.

Ur (1996) argues that lesson planning is an important component in foreign language teaching. Whether a lesson went according to its lesson plan, in Ur's opinion (1996), can be viewed as one of the criteria for evaluating the effectiveness of the lesson. Ellis (1999) suggests that teachers plan their lessons by making selections about what to teach, how to teach, and the nature of social relationships they want to encourage. Allwright and Bailey (1991) argue that, when teachers plan a lesson, they should decide especially what they hope to accomplish in terms of the input, the practice opportunities, and the atmosphere of the classroom. Hadley gives six guidelines on how to plan lessons:

1. Consider the content that is to be taught for a given class day.
2. Prepare an outline of what you intend to do during the lesson period.
3. Check for flow and integration of classroom activities.
4. Provide variety in classroom tasks.
5. Evaluate your plan after class is over (Hadley 1993: 488).

Du (1995) suggests three-dimensional lesson plans, which reflect: (a) a lesson plan on the basis of teacher-students-material before class; (b) the class on the basis of teacher-plan-students, and (c) the evaluation on the basis of feedback-class-plan after class. While Ho (1995) regards the use of lesson planning as a means of reflection, Celce-Murcia and Olshtain (2000) point out that by critically examining their own lesson plans, teachers may improve themselves in their professional development. Ur (1996) mentions that most experienced teachers actually prepare lessons twice: they have ready in advance a general syllabus of what they want to do in class; and then they plan the actual sequence of components and prepare supplementary materials a day or two before.

It can be seen from the above that lesson planning is a precondition of teaching. Although it does not happen in a classroom, it involves the classroom, teaching materials, learners, activities and

their integration, varieties, sequences, atmospheres and so on. As lesson planning involves so many factors, it is usually time-consuming. To some extent, when other things are equal, the quality of a lesson is decided by the quality of a lesson plan. Wajnryb (1992) believes the function of a lesson plan is to bridge the gap between the ideal and the real and a teacher uses a lesson plan before the lesson for planning, during the lesson for checking /consulting and after the lesson for evaluating. Being a teacher does not mean teaching only at one time. After class, a teacher has to think of some questions about the class(es) he/she has just finished:

a) Did the lesson go according to the plan?

b) Why was the lesson a success or a failure? and

c) What should I do when I teach next time?

Thus, we can see that the end of one teaching cycle also means the beginning of the next one. It seems that teaching actually consists of three stages: before-class stage, in-class stage, and after-class stage. The combination of these three stages constitutes the cycle of teaching at one time. The fact that a lesson plan goes through each of these stages shows its importance. Without a lesson plan, teaching cannot occur. Therefore, language teachers usually have to spend much time and energy on a lesson plan. Everett-Ross (1986) says that developing lesson plans requires a substantial investment of time, but it is an investment that will prepare the teacher to succeed in the classroom.

According to what has been discussed above, lesson planning is indispensable to teaching. Therefore, when we consider College English teachers' workload in the four universities the author investigated, we should include not only their class periods, but also their lesson planning. If so, College English teachers' workload in those four universities was far more than 14 class periods per week.

Language classroom teaching and class size

Table 3 shows that the average class sizes in the four universities the author investigated were 45-62. Are such class sizes all right for College English teaching?

Class size varies with different situations and is often controversial. It seems that class size involves two aspects: the financial situation; and the quality of teaching. It is easy to understand the first aspect: the smaller the class size is, the more investment is involved. By quality of teaching, the author means that class size depends upon the nature of the lecture. On the one hand, class size can be as large as possible as long as students can see and hear clearly, if a teacher's lecture is like a report and students come to the lecture only to listen to what the teacher is talking about, with little or no interaction between the teacher and students. On the other hand, class size has to be small, if a teacher's lecture involves a lot of practice, say, interactions.

Ellis (1992) believes that language classroom teaching consists of two stages: presentation and practice. While presentation is to help the learner acquire new linguistic knowledge or to restructure knowledge that has been wrongly represented, practice is to activate the new knowledge to the point where it can be used automatically and correctly in normal communication. Broughton, et al (1980) suggest that the language student is best motivated by practice in which he/she senses that the language is truly communicative, that it is appropriate to its context, that the teacher's skills are moving him/her forward to a fuller competence in the foreign language. Allwright and Bailey (1991) believe that interaction has to be managed by everyone taking part, not just by the teacher, because interaction is not something a teacher just does to learners, but something people do together, collectively. Ur (1996) argues that activities in class should be varied, for if a lesson is entirely taken up with one kind of activity, interest is likely to flag, but a

varied lesson is likely to cater for a wide range of learning styles and strategies, and may delay onset of fatigue by providing regular refreshing changes in the type of mental or physical activity demanded. The importance of practice is also emphasised by Kimble and Garmezy (1963), Gaies (1980), Littlewood (1981), and Hadley (1993).

From the above arguments, we can see that the key feature of language classroom teaching is *interaction*, *activity*, *communication*, or *practice* and that 'language lessons are co-productions' (Allwright and Bailey 1991: 29). Therefore, effective language teaching is responsive to the needs and interests of the individual learner (Mitchell 1994), for 'ultimately language is not learnt by groups, but by individuals'(Cook 1991: 72). When explaining the alternative view (there are many ways to achieve success and it is not possible to draw up a single profile of the successful learner), Ellis (1999) argues that this view of individual learner differences has important implications for language instruction because it recognises that different learners can achieve the same level of success if the instruction matches their own preferred approach to learning. Hadley (1993) also believes the importance of paying attention to individual learner differences and says that instruction should be responsive to the affective as well as the cognitive needs of students, and their different personalities, preferences, and learning styles should be taken into account.

From the above discussion, we might be able to draw a conclusion that language teaching is not like a report; it needs not only interaction but also attention to individual learner differences. Therefore, language class size has to be small.

Goettler-Sopko (1990) believes that small classes are superior to large classes in producing more desirable teaching practices and has come to the following conclusion.

1. Smaller class size seems to result in higher achievement among students who are academically disadvantaged.
2. Students with lower academic ability seem to do better in smaller classes.
3. It may be that class size affects student attitudes more significantly than it affects achievement.
4. A direct effect of large class size is to lower the morale and increase the stress of teachers.
5. There is typically little to be gained from reductions in class size that do not bring class size below 30.

According to National Council of Teachers of English (1998), reduced class size provides students with many benefits: greater opportunities for participation, greater individual attention and improved instruction. Student achievement increases significantly in classes of fewer than 20. Smaller class size, complemented by diverse teaching methods, creates better student performance, more positive attitudes, and fewer discipline problems.

In his research, Ciscell (1991) presented with the junior and senior education majors (N = 218) a list of issues, such as large class size, low salary, lack of parent support, and too much paperwork, and asked them to rank the problems in terms of which were most likely to interfere with their teaching performance. He found what the students were most concerned about was class size. The idea that small class size is beneficial for learning and teaching are also expressed by Connell (1985), Hantrais (1989), Biggs and Moore (1993), Rothkrug and McGhee (1996), Hickey (1998), Cunningham and Allington (1999).

Chaudron (1988) cites figures from various sources about teacher talk: teacher talk takes up 77 per cent of the time in bilingual classrooms in Canada, 69 per cent in immersion classes, and 61 per

cent in foreign language classrooms. Hullen (1989) found 75 per cent of the utterances in German classrooms came from the teacher. In terms of time allocation, the more time teacher talk takes up, the less time students will have; but the less time teacher talk takes up, the more time students will have. Therefore, teacher talk is inversely proportional to the time students have in class period. From the above we can see that the minimum of teacher talk is 61 per cent. For the sake of easy calculation, if we suppose that teacher talk takes up 60 per cent (compared with Chaudron's and Hullen's data, this is the maximum of time we can give to our students) in a class period of 50 minutes, then 30 minutes is taken up by a teacher and 20 minutes is left for students. If we consider giving each student only one minute for interaction in class, the maximum of class size should be no more than 20. In the four universities the author investigated, if teacher talk takes up 60 per cent, only 20 minutes is left for students and each student in the class size of 45 or 62 has only 27 seconds or 19.4 seconds for interaction! Obviously, such class sizes are far too large for what language teaching should be.

It can be seen from the above that language classroom teaching, is taught through language, needs a lot of practice; and language teachers should pay attention to individual learner differences. Therefore, language class size needs to be small. As mentioned before, there were 102 College English teachers in those four universities. But, on the basis of the average rated workload of nine class periods per week and the average class sizes of 45 to 62, there should be 161 College English teachers. However, when class size becomes small, even 161 teachers cannot meet the need.

CONCLUSION

'Can language be taught?' Cook (1991) thinks that asking such a question is like asking a doctor whether medical treatment benefits patients. Cook argues that in places where L2 has no function in the society, teaching is the chief or only source of L2, for whatever learners know, whatever learners can say or understand, is the effect of teaching. Language instruction does make a difference (Long, 1983; Ellis, 1999). It is true of China. The result of the investigation in those four universities in the capital city of the province in southern China can be used as a sample to consider College English teaching all over the country.

Of all the resources of College English teaching, teachers are the most important. Their improvement in English might have positive impact on the improvement of the quality of College English teaching. Yet, in the four universities, heavy workload prevented College English teachers from having further improvement by either postgraduate studies or doing researches. The investigation shows that teaching resources fail to meet the needs of College English teaching after increases in enrolment in those four universities. Of all the problems existing in College English teaching, the key issue is teachers' workload, which means not only what teachers do in class, but also before and after class in relation to their classroom teaching. Since a lesson plan goes through all three stages of a teaching cycle, lesson planning should be regarded as a very important integrated part of teachers' workload. This means that College English teachers' workload in those four universities was even heavier than expected, because it was far more than 14 class periods each week. Due to the uniqueness of language classroom teaching, class size needs to be small. In the four universities investigated, the actual College English teachers were 102, but the required teachers should be 161. Small class size means that even if there were 161 College English teachers in those four universities, it is still far from being enough.

In the situation where College English teachers are in great shortage, it cannot be expected that the quality of teaching can be guaranteed. At present, to solve the issue of heavy workload is to solve the shortage of College English teachers. On the one hand, the Chinese government should take more efforts in training of College English teachers to meet the social needs, while colleges and

universities should take effective measures to attract more talents to be College English teachers; on the other hand, enrolment should not be increased at the cost of quality of teaching and therefore should be controlled to match the teaching resources. However, while enough teachers might solve the issue of heavy workload and make it theoretically possible to guarantee the quality of teaching, in the long run, the situation should be created where there are more people who are competent and wish to be College English teachers than are necessary. Only in this way, there will be competition, by which those who are more competent can teach College English, which may finally in turn fundamentally improve the quality of College English teaching in China.

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International Education Developments in Singapore

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This paper considers contemporary higher education in Singapore and its relationship to the larger international context. It shows that international education has been established as a result of fundamentally different motives than the current full fee-paying programs found in western countries. It argues that on-shore international education in Singapore is a catalyst to prepare local institutions for the next wave of the nation's economic development, as it is orients itself to be the regional hegemonic player in a 'knowledge economy' driven by a world class tertiary sector. Considerations of history, culture and economic development add substance and depth to the claim that Singapore, by necessity and design, is on the verge of creating a unique 'hub' of international education which will challenge traditional western models that have been so dominant throughout the final years of the last millennium.

Singapore, International Education, Internationalisation, Postcolonial Education

INTRODUCTION

The story of modern Singapore is a remarkable one. After more than one century of colonial rule that established Singapore as an important trading entrepot, the small island emerged as a sovereign nation in 1965 with challenges on a number of fronts that did not auger well for a prosperous future. With the departure of the British and much of their established trade, the newly-independent Singapore inherited a poorly-educated, poverty-stricken workforce beset by chronic unemployment. In a setting characterised by regional disquiet, Singapore was expected to struggle to create "a cohesive and robust sense of nationhood and economic growth" (Gopinathan, 1997a, p.33). In less than four decades, however, Singapore has emerged as one of the strongest of the Asian 'tiger' economies and in 1997 it was classified by the International Monetary Fund (IMF) as an 'advanced economy' (Ministry of Information & the Arts, 1998, p.3).

To a casual observer, such a phenomenal ascendance appears paradoxical, given that the island has no resources apart from its land mass of 687 square kilometres and its four million multi-racial, mutli-lingual and multi-religious inhabitants. For a country which imports half of its water, most of its food, and all of its energy, it seems a most unlikely candidate for being the strongest economy in southeast Asia, with a per capita growth that exceeds most industrialised countries. Upon closer inspection, however, it is clear that it is not by accident that Singapore has achieved so much in such a short time against such odds. As far back as the 1960s, the government began promulgating a development-driven ideology in sectors thought to possess the greatest growth potential for the realisation of national goals (Gopinathan, 1997b, p.588). Since then, the policies embraced by the long-serving People's Action Party have led the country through several discernable economic phases to develop and maintain a competitive advantage in an increasingly globalised world.

Underpinning Singapore's success was the Government's recognition that from the very outset, the island's only real potential was its human resource and that this would ultimately have to be the main foundation of the economy. Consequently, a commitment was made in the mid-1960s to

upgrade human capital through investments in education and vocational training (Bercuson, 1995, p.4). As a result, Singapore has a well-developed state education system which comprises primary, secondary and tertiary sectors that provide "human resources to meet the country's imperative for an educated and skilled workforce" and "inculcate sound moral values in the face of rapid progress and change" (Ministry of Information & the Arts, 1998, p.206). Development of the polytechnics and universities has been a particular focus for the Government as these institutions are the major supplier of Singapore's skilled, technical expertise.

This paper evaluates contemporary higher education in Singapore and its relationship to the larger international context. It shows that international education in Singapore's post-secondary institutions is quite established but as a result of fundamentally different motives than the current full fee-paying programs found in western countries such as Australia, New Zealand, Canada, the United Kingdom, and the United States. It argues that the *raison d'être* of on-shore international education in Singapore is to help prepare local institutions for the next wave of the nation's economic development, as it orients itself to be the regional hegemonic player in a 'knowledge economy' driven by a world class tertiary sector which will transform Singapore into the 'Boston of the East' (The Straits Times, 29 Jan 1997). Juxtaposed against the current influx of mainly ASEAN[i] students, many Singaporeans have historically had little choice but to study overseas because of the intense demand for limited higher education places in Singapore. Throughout the paper, considerations of history, culture and economic development will add substance and depth to the claim that Singapore, by necessity and design, is on the verge of creating a unique 'hub' of international education which will challenge traditional western models that have been so dominant throughout the final years of the last millennium. The journey is not without its challenges, however, and issues of competition, nationalism, and Singapore's relationship with the 'east' and 'west' loom as matters which the nation will have to address if it is to achieve long-term success as a sophisticated provider of international education as the means to attract, and develop talent-pool to create, own and exploit innovation and products.

SNAPSHOT OF SINGAPORE

To understand Singapore's engagement with contemporary international education it is important to appreciate the unique forces which have shaped the nation to what it is today. Events in the past two hundred years in particular have had significant bearing on how the country's present Government has positioned itself with regard to its politics, defence, economic development, education, international relations and infrastructure.

Geography, History and Life under British Rule

Singapore is a small, flat island which is conspicuous by its diminutive size, measuring only 42 kilometres by 23 kilometres. It lies close to the equator at the southern tip of the Malay Peninsula and has a hot and humid climate with abundant rainfall all year (NOOSR, 1996, p.1). Although records indicate indigenous and Chinese settlement as far back as the third century AD, the foundation for modern Singapore was set in the early 1800s when it became the centre of government for the British 'Straits Settlements' and the major port in the region. Toward the end of the 1800s, the advent of the steamship and the opening of the Suez Canal heralded unprecedented trade opportunities and economic growth for Singapore and this attracted many immigrants. As the nineteenth century drew to a close, Singapore's population soared above

[i] ASEAN: Association of Southeast Asian Nations, of which Singapore is a member

80,000 and was comprised of 62 per cent Chinese, 16.5 per cent Indian, 13.5 per cent Malay, and 8.5 per cent 'others', including Europeans (Ministry of Information & the Arts, 1998, p.15).

The Call for Independence

The flourishing economy and regional peace was shattered when the Japanese seized the island in 1941 when they invaded the Malay Archipelago that included Indonesia, Malaya, Borneo and Singapore. Although Allied Forces reclaimed Singapore three and a half years later and proclaimed it as a British Crown Colony, the chaos precipitated by World War II would change things forever. Countries and colonies in the region had to redefine themselves and the way they interacted with neighbours and powers further afield. By 1955, the emergence of communist insurgents in the region and the insistence of the local merchant class for a presence in the Government resulted in the British supporting a revised constitution which paved the way to internal self-government in 1959 (NOOSR, 1996, p.2). The People's Action Party (PAP) collected 53.4 per cent of the votes of the first general election and Lee Kuan Yew was installed as Singapore's first Prime Minister. The way forward was not entirely without friction, however, and in a bid to sever colonial ties with the British and to quash the possibility of communist takeover, Singapore agreed in 1963 to merge with Malaya as part of a larger federation which included Sarawak, North Borneo and Brunei. Due to political tensions, Singapore was forced to leave the Malaysian Federation and became a sovereign state in its own right on August 9th, 1965 and a member of the Commonwealth in the same year. In that same year it proclaimed its independence as a republic (Ministry of Information & the Arts, 1998, p.17).

The Reluctant Republic takes the Bull by the Horns

The proclamation of the republic was made more with trepidation than with celebration, for it had not been a long-standing goal of Singapore's Government. Indeed, observers in the region commented that the small island nation was nothing more than a political joke (Minchin, 1990, p.163). Prime Minister Lee, 42 years of age at the time, reflects that the expulsion from the Malaysian Federation brought home the enormity of the 'twin challenges' of building a nation "out of a disparate collection of immigrants from China, British India and the Dutch East Indies" at a time when its economic development would require much greater returns than the rapidly diminishing role as regional entrepôt could provide (Lee, K.Y. 2000, p.19). In the face of what appeared to be overwhelming odds, a strengthened PAP under the strong leadership of Lee Kuan Yew mobilised itself to address the issues at hand.

Making the most of its strategic location in a stable and growing global economic environment, Singapore embarked on a program of rapid industrialisation by introducing open trading systems and flexible labour markets to court foreign enterprises to locate manufacturing facilities on the island. The Government's support for such market-leading policies was to be a hallmark for successive phases of Singapore's economic development which saw it go from being a semi-closed, low wage producer of mainly labour-intensive goods to a very open, high-wage producer of high-technology, capital-intensive products, and diversification into value-added business and financial services from the mid-1980s (Bercuson, 1995, p.11). Singapore's outstanding economic success is all the more evident by the climb from a per capita Gross Domestic Product of US$400 in 1959 to more than US$12,000 in 1990 and US$22,000 in 1999 (Lee, K.Y. 2000, p.13).

THE ROLE OF EDUCATION IN SINGAPORE'S DEVELOPMENT

Whilst Singapore's economic policies were a catalyst for stunning growth, the Government's focus on developing a 'first world' infrastructure provided the environment for success and, to

this end, high levels of expenditure were committed to housing, defence, transport, and communications (Carling, 1995, p.21). It was, however, the development of Singapore's human resource which Prime Minister Lee said would determine whether the nation would "sink or swim" (Minchin, 1990, p.242). Only an educated and skilled labour force would be able to respond to the opportunities made available by the developing world economy and provide Singapore with a competitive advantage over other countries in the region.

Although the British had presided over Singapore's education system during the 1800s and into the 1900s, Gopinathan (1997b, p.593) points out that the island's education history during colonial rule is one of 'benign neglect, ad hoc policy making and indifference to consequences'. Schools were segregated on the basis of language and the Chinese, Malay and Indian schools shared no common curriculum with the English schools and were significantly underfunded. It is little wonder that at the time of Singapore's independence, its poorly-educated population showed little potential to respond to the challenges that lay ahead. Regardless of the state of disrepair of Singapore's education at the time, one of Prime Minister Lee's abiding concerns was to restructure the system and harness it to nation-building. In the 1960s, the Government pursued a tripartite system of academic, vocational and technical schools to support the country's basic economic policies. Throughout the 1970s, increased industrialisation saw a diversification of secondary education away from the academic stream in favour of technical skills. Into the 1980s and 1990s, the focus was well and truly on "technically/vocationally trained manpower" and this resulted in significant investment in post-secondary institutions such as polytechnics and universities (Gopinathan, 1997a, pp.36-38).

The advantage of the unicameral nature of Singapore's Government was (and remains to this day) its ability to have direct intervention in the operation of its civic institutions by way of policy. Quite simply, the Government decided that the 'national good' would be served by primary education which would inculcate in the youth a "love of Singapore" whilst secondary and tertiary sectors would be "planned in terms of projected economic growth and manpower requirements" (Tan, O.S. 1996, p.23). To this end, there was never any question that the latter would be anything but focused on technical (and later business) education at the expense of disciplines such as the arts, which would have to "catch up later" (Lee, K.Y. 2000, p.13). Whilst it could be claimed that this is an example of the 'cold-blooded' style in which Singapore's policies are formulated, it could equally be maintained that PAP's style of 'democratic socialism' has been necessary to have the nation evolve from a 'fragile state' at the time of independence, to being a 'strong state' at the turn of the 21st century. Arguments aside about the merits or otherwise of 'social engineering', it is clear that Lee's blend of democracy which promoted private ownership yet kept private interests subordinate to those of the state has "liberated his people into the upper reaches of modernity" (Minchin, 1990, p.243). Put succinctly, Singapore's success is founded on its ability to remain vigilant for opportunities in the global marketplace whilst concurrently employing a hard-nosed pragmatism in its domestic policies, and it is this focus which is evident in its education processes.

SINGAPORE'S INTERNATIONAL EDUCATION EXPERIENCE

Whether in its colonial past or as the Republic of Singapore, the nation's history and prosperity is intimately related to its engagement with the outside world. It is hardly surprising, therefore, that the country exhibits a rich tapestry of experience with international education. Whether one's definition of international education is 'acquiring another language', 'completing part or all of studies overseas', 'education by correspondence', or 'education as aid', it is clear that Singapore is not a newcomer to ideas associated with cross-border movements of ideas, institutions, teachers and students. Indeed, it will be shown that contemporary international education in Singapore

shares many of the characteristics associated with other countries which are stakeholders in international education, such as 'promotion and marketing of courses', 'onshore international student programs', 'study abroad and exchange programs', and 'development of links with institutions abroad', as well as a myriad of administrative and management processes behind each of the above.

To begin with, Lee Kuan Yew's own education background and experience as a politician provides a fascinating insight into the richness of international education which can be found in Singapore. He was born in Singapore into Chinese culture but "westernised through upbringing and education" at an English-speaking school (Minchin, 1990, p.ix). He topped Malaya in the senior Cambridge exam and obtained a law degree with highest honours from Cambridge University as an international student between 1946 and 1949 (Tamney, 1996, p.3). In the early 1960s, in a bid to ensure that Singapore's education system was emulating successful foreign models, he "visited Briton's Eaton, some of its North American equivalents and even certain schools in Eastern Europe" (Minchin, 1990, p.259). Then, in 1968, after nine years in office as Prime Minister, Lee took a sabbatical at Harvard "to get some fresh ideas and reflect on the future" during which he "learned much about American society and economy" (Lee, K.Y. 2000, p.73). In addition to speaking English, Lee also speaks Malay and learned Mandarin and the Hokkien dialect as an adult. Although Prime Minister Lee's extraordinary personal experience cannot be extrapolated to the experience of all Singaporeans, it elucidates certain themes related to international education that are pervasive in Singapore to this day, viz. value ascribed to education with an outward-looking perspective, whether it be learning other languages or studying abroad to relate with different cultures and examine their ideas.

Language in Singapore

One of the foundations of Singapore's ability to engage with other nations is the ability of its students and workforce to communicate in English, the *lingua franca* to a large extent of both international education and business. Although the British brought the English language to the region, they did not require that it had to be taught in Chinese, Malay and Indian schools. After independence, however, Lee insisted that English had to be used as "the language of the workplace and the common language" because "as an international trading community, we would not make a living if we used Malay, Chinese or Tamil" (Lee, K.Y. 2000, p.170). Whilst it was a controversial issue at the time, the resultant national education system has unified English and non-English medium schools into a single system with a bilingual policy which teaches English as 'the language of commerce, technology and administration', as well as 'languages of cultural heritage such as Malay, Chinese (Mandarin) and Tamil' (Ministry of Information & the Arts, 1998, p.206). This gives Singapore's students and workforce a number of distinct advantages:

- Students can travel abroad to a variety of English-speaking countries to study
- Students can travel abroad to the country of their 'mother tongue' to study
- Singaporeans can take advantage of distance education or academic programs run in English by foreign institutions on-site in Singapore[ii]
- Businesses and government in Singapore can engage with a variety of English-speaking countries

[ii] For example, Adelaide University degrees are offered through the Ngee Ann Adelaide Education Centre; Flinders University degrees offered through the Singapore YMCA; the Royal Melbourne Institute of Technology runs degree programs with the Singapore Institute of Management

- Businesses and government in Singapore can engage with their counterparts in countries where the respective 'mother tongue' is spoken

Whilst command of English is undoubtedly critical for Singapore's ongoing success, it is important to note that mastery of other languages is valued as well, including many European languages. The most significant thrust at present is the teaching of Mandarin, given the economic developments in the Peoples Republic of China. Approximately 77 per cent of Singapore's current population is ethnic Chinese and the Government has actively promoted Mandarin in preference to Chinese dialects which have traditionally been used (Gopinathan, 1997a, p.49). As well as the obvious potential that this has for business, the idea of language as a 'carrier of values' cannot be discounted. Lee Kuan Yew relates that when he met students from China when he was studying in England, he became conscious of how deculturalised he felt, given that he had been educated in a 'stepmother tongue' and could not speak to the Chinese in Mandarin or any common dialect. Having never been formally tutored in Asian cultures and yet not belonging to the British culture either, he felt "lost between two cultures" (Lee, K.Y. 2000, p.169). Lee's personal experience was the basis for Government policy which pursued the teaching of Mandarin and other 'mother tongue' languages. Again, it is clear that Singapore is forever 'looking out' on a number of fronts (e.g. education, language, business, culture) whilst building itself as a nation. It is also clear that Lee Kuan Yew was a major determinant of Government policy and, as such, the direction of the republic[iii].

Singaporeans Begin Studying Abroad

The post-war period witnessed Singapore joining the global trend of large numbers of students moving between countries to obtain their tertiary education. One reason for this was that tertiary sectors in many emerging nations like Singapore did not have the latest technical expertise which was eagerly sought to assist in industrialisation. Another is that the number of tertiary places available to local students in Singapore was limited by virtue of there being only two tertiary institutions on the island, the English medium University of Singapore [est 1905] and the Chinese medium Nanyang University [est 1956][iv] (Ministry of Education & the Arts, 1998, p.208). "Nanyang" or its equivalent "Nantah" refers specifically to the early overseas Chinese who immigrated to Singapore. The third reason for Singaporeans studying overseas was the outcome of political motives of other countries which were keen to have stability in the face of the 'communist threat' in the region. The Australian Government was willing to offer aid to strengthen social, administrative and economic processes in the less affluent Commonwealth countries in south and southeast Asia and a significant part of this initiative was the granting of scholarships under the Colombo Plan (Australia commemorated the 50th Anniversary in July 2001, in Malaysia) for students from recipient countries such as Malaysia, Indonesia and Singapore to study in Australia (Burns, 1958, p.40). Thus began a steady flow of Singaporean students to Australia. In addition, Commonwealth scholarships were offered to Singaporeans for study in New Zealand, Canada and the United Kingdom (Lee, H.L. 2000, p.1).

The early days of travel for sponsored study were instrumental in establishing not only educational outcomes, but also a familiarity with other countries, cultures and systems of education. Although 'education as aid' diminished in the 1970s and 1980s as Singapore's economy strengthened, the flow of students to overseas institutions continued unabated as rising per capita

[iii] At the end of 1990, Lee Kuan Yew resigned as Prime Minister and was invested into the new position of Senior Minister which is located in the Prime Minister's Office

[iv] These two institutions merged to form the National University of Singapore in 1980

earnings and increases in disposable income meant that families could self-fund the overseas study of their children.

Singapore's Polytechnics and Universities

The establishment of Singapore's polytechnics and universities has been pivotal in building on the nation's engagement with international education on a number of levels. They have provided Singaporeans with opportunities to study abroad and presently are host to a sizeable population of international students. The Government's financial contribution to this sector is significant and it subsidises all academic programs, both for local *and* international students. Entry is extremely competitive at all levels and can be put down to higher qualifications offering "wider occupational opportunity with commensurate benefits in terms of income and status" (Gopinathan, 1997a, p.40). Given the nation's focus on developing the economy, the academic programs at all universities and polytechnics are heavily biased towards technology and business:

Table 1. Post-secondary Institutions in Singapore

Institution and Year Established	Academic Focus
Singapore Polytechnic (1954)	Architecture & Built Environment, Business, Computing, Engineering, Electronics, Transport
National University of Singapore (NUS) [Singapore U and Nanyang U merged in 1980].	Arts, Architecture & Building, Business Administration, Dentistry, Engineering, Law, Medicine, Science, Social Sciences
Temasek Polytechnic [1990]	Business, Design, Engineering, Information Technology & Applied Science
Nanyang Polytechnic [1992]	Business Management, Engineering, Information Technology, Health Sciences
Nanyang Technological University (NTU)) [Nanyang Technological Institute, (est.1981 merged with the Institute of Education (est.1973) in 1991]	Accountancy & Business, Communication and Information Studies, Engineering and Teacher Education in the National Institute of Education (1991)
Open University (run with Ministry of Education) collaborates with the Singapore Institute of Management [SIM] whose degrees are conferred by the Open University in the United Kingdom) since1993.	Arts, Business, Management, Computer Science (SIM is a well-respected, not-for-profit professional institute which also offers Certificates, Diplomas, Degrees, Masters and Doctoral programs in collaboration with universities in Australia, China, the United Kingdom, and the United States. It is largely set up for part-time study and there is no provision for enrolment of international students)

Compiled from Ministry of Information & the Arts (1998), pp.209–227.
Note that Singapore Management University was established in 2000 and will be discussed later in the paper

The polytechnics provide 'para-professional training', which is "distinguished by a combination of practical, hands-on training, overseas/local industry attachments, and research and development work" (Contact Singapore, 2000a, p.3). A less-glossy description is that they produce "technically-competent workers" with "sub-degrees" to fill the "middle section in industry" (Davie, 2000, p.1). In 1998, the four polytechnics had 48,734 full-time students and attracted S$410,148,000 in Government recurrent grants and S$287,034,000 in developmental expenditure (Education Statistics Digest, 1999, Tables 15 & 28). Entry is via GCE 'O' or 'A'-Levels[v] or equivalent and is extremely competitive, with only 40 per cent of applicants gaining a polytechnic place. Students are awarded a diploma after two to three years of full-time study. Advanced (or

[v] Singapore-Cambridge General Certificate of Education 'Ordinary' (GCE 'O') Level, Singapore-Cambridge General Certificate of Education 'Advanced' (GCE 'A') Level

postgraduate) diplomas are also offered and usually take one year of full-time study after completion of the diploma and work experience.

The universities, on the other hand, offer a wide range of undergraduate and postgraduate programs and provide Singapore with a highly-skilled, professional workforce. In 1998, NUS and NTU had an enrolment of 32,109 full-time students and attracted S$551,470,000 in recurrent expenditure from the Government and S$356,166,000 in developmental grants (Education Statistics Digest, 1999, Tables 16 & 28). Entry is via GCE 'A'-Levels or equivalent and students are awarded a degree after three to four years of full-time study, after which they enter the workforce or, if their results are outstanding, can proceed to postgraduate programs. Neither the polytechnics nor the universities are involved in providing distance education and this is not surprising given that their focus has been largely to satisfy Singapore's workforce requirements.

Pathways to Overseas Study for Singaporeans

Degrees from prestigious foreign universities are seen very much as a passport to the upper ranks of the civil service and business in Singapore (Tan, O.S. 1996, p.23). Countries such as Australia, Canada, New Zealand, the United Kingdom, and the United States are popular destinations and offer a range of foundation (GCE 'A'-Level equivalent), diploma, and degree programs for full tuition fees which attract two distinct groups of Singaporeans. The first group is those who choose to study overseas from the outset, either as a scholarship recipient or as a private student. The second group comprises students who, because of the fierce competition for entry to the polytechnics and universities, have no choice but to travel overseas to study by virtue of not obtaining a place in a home institution, whether at a pre-university college, a polytechnic, or in an undergraduate or postgraduate program at university.

At present, polytechnic diplomates are active travellers to overseas destinations to upgrade their qualifications to the degree level. One study indicates that up to 30 per cent of Singapore Polytechnic diplomates upgraded to a degree within five years of being awarded their diploma, and that the bulk of these had to seek their education overseas (Fong, 2000, p.4). It appears that whilst the Government encourages lifelong learning, it also values the 'manpower'[vi] potential and the investment made in an individual student once they are qualified at a certain level. For example, although it is possible for polytechnic diplomates to continue onto university in Singapore, places are extremely limited and they must have two years of work experience behind them. In addition, they may be only granted exemption from the first year of the university course (NOOSR, 1996, p.14), whereas many Australian universities grant up to two years advanced standing for a three year polytechnic diploma.

Although the Government presently seems to restrict most Singaporeans from staying in the educative process for successive qualifications in Singapore, it does not impede them from studying overseas to obtain the qualification(s) that they desire, even although this results in significant technical and capital outflow from the country. The corollary is that the students return home with a greater level of skill and expertise and this is a positive outcome for Singapore. In addition, their education overseas should instil in them a greater understanding of other cultures and a range of different perspectives on various issues. Given that Singapore's prosperity is based firmly on its relationships with other countries, the value of overseas experience cannot be overstated.

[vi] The Ministry of Manpower is one of fourteen Ministries in Singapore's Government. 'Manpower' is commonly used in Singapore to describe 'labour' or 'workforce' and is gender-inclusive

It is also worth mentioning that there has been a proliferation of exchange places and overseas industry attachments, which are part of polytechnic and university education in Singapore, especially in the last few years. The trend is for increasing numbers of students to spend part of their study program overseas.

International Students in Singapore

One of the obstacles which hinders an appreciation of the extent of the international student program in Singapore is the apparent lack (for public consumption at least) of any definitive statement on the program by the Government or the institutions themselves. For example, although it is estimated that there are approximately 11,000 international students currently studying in Singapore's polytechnics and universities[vii], an exhaustive search failed to uncover statistical analyses or any in-depth investigations into current policies of the Government or its institutions, nor documentation of the international student experience. The category of 'international students' simply does not appear in the Education Statistics Digest (1999). To be sure, a plethora of media and website information provide snippets from which various themes can be extrapolated, but the dearth of analysis is glaring. This is most likely a reflection of the fact that Singapore's international student program is still relatively embryonic, let alone its institutions being small in number and half of them established only in the past decade. What the scraps of information do suggest is that the country's international student program plays an important part in supplementing Singapore's workforce as well as being part of a larger plan to help it achieve prominence as knowledge economy. Hence, the policy to enlarge the enrolment of students in both universities to about 30,000. This in turn increases the recruitment of some ten thousand more postgraduate doctoral students, both local and foreign to sustain the pool of researchers that are needed in science and technology.

There are two features of the international student program which are most striking. The first is that the international students (who come mostly from other ASEAN countries) pay only 10 per cent more for tuition than Singaporeans. For example, at Nanyang Polytechnic, a Singaporean pays S$1,800 per year whilst an international student pays S$1,980. The Government subsidy for the international student is S$8,720 (Nanyang Polytechnic, 2000, p.1). At Nanyang Technological University, a Singaporean pays S$5,500 per year and an international student pays S$6,050[viii]. The Government subsidy for the international student is S$13,950 for non-laboratory-based programs and S$18,800 for laboratory-based programs (Nanyang Technological University, 2000, p.4). Although tuition fees vary slightly between institutions, a calculation of the estimated number of international students in Singapore multiplied by the amount of Government subsidy per student suggests that the international student program is being supported by at least S$130 million per year; by no means an insignificant investment. The second striking feature of Singapore's international student program is that all students who take advantage of the Government subsidy (called a Tuition Grant) are bonded to stay and work in Singapore for three years after completing their study. The only way to forego this legally-binding commitment is either to pay the full tuition fee whilst studying or 'pay out' the balance of the tuition grant at some stage during the three years work in Singapore; by all accounts, not common practices. The

[vii] Although a search failed to find this figure in print, it can be extrapolated from various media releases and the websites of some institutions that each polytechnic has 10% international students and each university has 20% international students. Dividing total enrolments by the respective percentages gives approximately 11,000 international students

[viii] The only exceptions are for medicine and dentistry (at NUS), for which for local and international students pay $15,450 and $17,000 respectively per annum

Government does not recoup any of the tuition grant from subsequent wages and the nature of the work does not have to be related to the area of study (Ministry of Education, 2000a, pp.1-9).

Clearly, these features are very different to the international student program in Australia, where students pay full tuition fees and more or less have to leave the country as soon as the requirements of the academic program are satisfied. Indeed, the nature of the tuition grant is reminiscent of the Overseas Student Charge (OSC) in Australia, which was the precursor to the FFPOS[ix] program. Of interest, the report from the Jackson Committee in the mid-1980s recommended that the OSC be phased out because it represented a 'hidden subsidy' of approximately A$70 million per year which was funded by Australian tax-payers and that, instead, Australia could attract significant income by developing the tertiary sector as an 'export industry' (Jackson Report, 1984, pp.10–11).

Why, then, is Singapore beginning its foray into an onshore international student program based on an 'outdated' model, when it could be reaping significant gains from an exclusively full fee program? After all, full fees for only 11,000 international students would result in a yearly income of over S$178 million. Furthermore, what benefit is there to have international graduates stay on to work for three years if they do not have to repay any money to the Government? Whilst these features of Singapore's international student program seem like poor business sense on the surface, the answers are twofold and lie in Singapore's need for a skilled, foreign workforce, and its institutions having to achieve world-class standing so that the Government can pursue its plan to develop its tertiary sector as a platform for the 'knowledge economy'. In short, Singapore is making a major investment in its future on both counts and its international student program is anything but 'poor business sense'. Whilst an absence of a cohesive source of information about the international student program gives a sense of a lack of coordination at the policy level, the Government is in fact driven in its focus and clear in its objectives. By this token, Singapore goes global with its network of foreign alumni who not only graduate from the universities but also, would have lived and worked in Singapore.

With respect to having international students stay on to work for three years, the idea of foreigners working in Singapore is not a new one. For many years, the Government has maintained that Singapore needs a controlled, revolving pool of foreign workers to complement the local workforce for continued economic growth, especially as the indigenous workforce is growing slowly and ageing rapidly (Ministry of Information & the Arts, 1998, p.247). Indeed, the Government's Population Census 2000 puts the non-resident population at 754,524 out of a total population of 4,017,733 (Singapore Census of Population, 2000, Table 1). The foreign workforce provides a range of services, from labour for construction and infrastructure development to high-level expertise in the manufacturing and business sectors. The Minister for Education, Teo Chee Hean, maintains that foreign students should be seen as an investment to stay competitive in the global economy, not only for the contribution they make during their three years of work, but also because of the strong links they make with people, industry and business for years to come (Teo, 2000, p.1).

GEARING UP FOR THE KNOWLEDGE ECONOMY; SINGAPORE AS A MAJOR EDUCATION HUB

Singapore is on a mission to develop a knowledge-based economy which will transform it into a global hub of knowledge-driven industries with world-class capabilities. The various Government

[ix] Full Fee Paying Overseas Student program, a significant feature of which was that institutions could keep full tuition fees for their own discretionary use

Ministries have dedicated significant resources to programs such as Singapore 21 Vision, Industry 21 Plan, Technopreneurship 21, and Manpower 21 Blueprint which provide frameworks to drive the 'twin engines of manufacturing and services' with a strong emphasis on technology and innovation. An integral part of the vision of the knowledge-based economy is for Singapore to become a world-class education hub by 2010, which will be internationally renowned for its intellectual capital and creative energy. As such, Singapore has invited a number of the "world's top universities" to set up centers of excellence and research on the island with strong industry links which will offer added diversity and choice for local and international students (Singapore Economic Development Board, 1999, pp.1–14). They are:

- Harvard Business School
- Chicago Graduate School of Business
- Massachusetts Institute of Technology
- Cornell University
- John Hopkins Medical School
- New York Institute of Finance
- INSEAD
- Wharton Business School
- Georgia Institute of Technology

These prestigious western (and mostly American) institutions will be joined by three prominent eastern institutions to offer the 'crème de la crème in education' across a spectrum of disciplines, ranging from business and management to medicine, engineering and applied sciences. Those eastern institutions are the National University of Singapore, Nanyang Technological University, and Singapore Management University. Suddenly it becomes very clear why the local institutions are desperately engaged in the pursuit of excellence in education and world-class standing. It also explains why media reports and websites of institutions are replete with references of NUS and NTU becoming the "Harvard and MIT of Asia" (Han, 1999, p.112). When NUS Vice-Chancellor, Professor Shih Choon Fong, weighs in by publicly declaring that "NUS will be to Singapore what Stanford is to Silicon Valley" (Business Times, 2000, p.1), there is no doubt that universities (and polytechnics) in Singapore have received very clear directions from the Government that they are an important part of the commitment to making Singapore into an international education hub.

Singapore Management University

Whilst discussion has dealt with Singapore's established institutions, it is worth noting some characteristics of SMU, which was opened in 2000 and is an indication of things to come in the proposed education hub of the region. SMU concentrates exclusively on business programs and is Government funded but privately managed. It works in collaboration with the "America's best business school", the Wharton School of the University of Pennsylvania, and has adopted its curriculum as well as features of other top American business schools (Contact Singapore, 2000b, pp.1-2). It is anticipated that such an association will "help lay the foundation for SMU to build its reputation and develop as an institution of academic, research and entrepreneurial excellence" (Teo, 2000, pp.1-3). The enrolment in its inaugural year is 306 and each student has the opportunity to study abroad for six months as part of the SMU degree. When enrolments increase over the next few years, SMU aims to have at least 75 per cent of its students engage in exchange with partner universities around the world (Lee, J. 2000, p.1). With regard to international students at SMU, the Government is encouraging a 20 per cent international student enrolment

and is prepared to subsidise their tuition fees with the same grant that is available to international students at NUS and NTU.

The arrival of SMU has brought home the reality of NUS and NTU having to compete with the 'new breed' of institutions which will be established in Singapore by 2010. The response by NUS Vice-Chancellor, Professor Shih Choong Fong, is that "it does not make sense to compete locally or regionally anymore; we must compete in the international arena" (Davie and Quek, 2000). If this is to be the case, then it is little wonder that both NUS and NTU are moving quickly to establish themselves as world-class universities.

NUS and NTU as World-Class Institutions

In 1997, an international advisory panel was set up to advise the NUS and NTU on the future direction of university education in Singapore and, specifically, how both institutions could achieve world-class standard (Han, 1999, pp.106-107). Recommendations included:

- Have more flexible admission criteria and charge affordable fees to attract the best from around the world
- Tie up with world-renowned institutions to collaborate on research and postgraduate education
- Broaden undergraduate curricula to provide students with a broader appreciation of non-technical issues and a deeper understanding of natural and social sciences
- Create an improved environment for teaching and research so NUS and NTU can hire the world's best professors and researchers

In summary, NUS and NTU (and the polytechnics) have recently started to think about what it will take to operate like 'global institutions' instead of local ones which reflect only local demands and conditions. This has meant embracing new paradigms in a bid to increase their international standing, so that they can compete in the 'international arena'. To their credit, there are tangible signs of infrastructure changes such as the formation of 'international relations offices' and 'international business centres' at all institutions, as well as the establishment of many formal links with overseas institutions. The latter has resulted in the broadening of offerings for student exchange and a commitment from the institutions to increase the number of Singaporeans studying part of their home degree abroad. There have also been 'Harvard style' changes in the curriculum, with students being allowed to combine their major field of study with subjects from other disciplines (Han, 1999, p.107). In addition, there are efforts to address issues of pedagogy where "instead of being a guardian/ruler, the teacher is now regarded as a mentor at school" to produce students who are creative and critical thinkers (Contact Singapore, 2000c, p.2). But perhaps the most resource-intensive initiative thus far arising from the 1997 recommendations by the international advisory panel, has been subsidised expansion of the international student program in Singapore with the clearly-stated aim to 'recruit top talent' to enhance the reputation for excellence of local institutions (Davie, 1998, p.1). The Government is in the process of finalising its decision on Singapore's fourth university in the near future, on the firm commitment to the goal that "every good national higher-education system must provide a broad spectrum of institutions to achieve multiple goals"(Quek, 2002). The proposed university will have a practical, technical bent and strong industry links. In addition to degree programmes in engineering, info-communications technology and applied science, as well as foundation subjects such as mathematics and science, along with courses in business and management, the Centre for multi-disciplinary study would offer electives ranging from innovation and entrepreneurship to social sciences.

As such, the universities have been actively promoting study in Singapore by visiting institutions in neighbouring ASEAN countries to tell students that 'there are good universities in the east' and that they should not instinctively look to the west for tertiary education. For example, NUS has recently spent over S$200,000 hosting a camp in Singapore for top students from 49 schools from 10 countries in the region to 'woo foreign students' (Straits Times, 1999, p.31). The Government, too, has assisted by promoting study in Singapore through an outreach division called Contact Singapore, which has a significant website presence which outlines the attractiveness of Singapore as a place to study, work, and live. In addition to the generous Tuition Grant attracting excellent students, the Government also provides thirty undergraduate scholarships at a total cost of S$12 million each year for students from ASEAN countries to study at NUS and NTU (Straits Times Interactive, 2000, pp.1-2).

In 2000, the Minister for Education reported that both NUS and NTU had met their targets of 20 per cent enrolment of international students (Channel NewsAsia, 2000, p.1). This appears to be the limit at which the Government is prepared to subsidise the program to achieve goals associated with building the reputation of Singapore's institutions. Public perception is that the increasing numbers of international students are depriving locals of places, but it is clear that the Government's international student program is a separate 'package' running parallel to the education of local students. Senior Minister of State (Education), Dr. Aline Wong, stated that "foreign students who enrol in institutes of higher learning are, on the whole, better qualified than their Singapore peers and they will raise the quality of the institutions and add to the vibrancy of the academic environment". Further, she maintained that all local students who *qualify* for a university place would gain entry to a Singapore university and that places would always be competitive due to their number being determined by 'projected manpower needs' (O.B. Tan, 2000, p.47).

It is clear that Singapore's international student program is focused on 'spreading the word' about Singapore's institutions around the globe. The program has concentrated on enrolling students from neighbouring countries in the first instance, because of the perception that students from western countries do not yet see Singaporean institutions as attractive options for a full degree in terms of relative standing and career enhancement. Many students from western countries are, however, beginning to gravitate to Singapore for exchange opportunities. The Government's subsidy program is akin to the aims of the International Postgraduate Research Scholarship (IPRS) in Australia, where excellent students from abroad are sponsored to undertake postgraduate studies at Australian institutions. A main aspiration of the IPRS is that Australia's reputation as a provider of postgraduate tertiary education will be enhanced by the academic careers of the IPRS students and positive word-of-mouth marketing.

Competitive Advantages of Singapore as a Hub for International Education

For over a decade, the mainstay for international student programs in countries like Australia has been the hundreds of thousands of students from Asia, the region with the mantle of "the golden goose of higher education" (Prince, 1997, p.3). With their own countries either not having enough university places to satisfy demand or with policies restricting entrance to universities, the flow of students from the east to the west for education has been a multi-billion dollar phenomenon to the point where a term like 'education industry' is common usage. Given the focus and energy that is presently being invested in getting Singapore's institutions to achieve world-class standing and attracting prestigious western universities to establish themselves on the island, there is every possibility that Singapore will emerge as a significant competitor to countries like Australia, New Zealand, Canada, the United Kingdom, and the United States over the next decade. Furthermore, by 2010 educational opportunities in Singapore may be very attractive to students not only from

ASEAN countries, but also from other countries across the globe (including the west) who will be willing to pay full tuition fees to obtain tertiary qualifications from the range of high-quality institutions on offer in the hub. Looking ahead, the characteristics that tertiary education in Singapore would offer by the end of this decade are:

- World-class tertiary institutions that are linked to high tech University-R & D Science Parks and Science Hub (the Biopolis)
- Tuition in English, with opportunities to specialise in Mandarin and other languages
- Education that inspires independent, creative and critical thinking
- Education in an Asian country with strong ties to the west
- Education which is competitively-priced
- An environment with a high degree of personal safety
- A clean, green, and healthy space for work and play
- A politically-stable country
- Likelihood of work in Singapore or the region after completion of study
- Excellent opportunities for exchange studies with a multitude of institutions around the globe
- Excellent workplace attachments with leading knowledge-based industries
- Opportunities for cultural interaction that are matched by an internationally vibrant, rich multi-cultural Arts environment
- Advantages of a compact, modern city
- Easy access to international destinations via Singapore's world-class travel hub

These features have the potential to see rapid growth in Singapore's on-shore international education program of the order which was experienced in Australia in the early 1990s, viz. from under 10,000 in 1987 to over 120,000 less than a decade later (DEETYA, 1996, p.9).

ISSUES FOR SINGAPORE AS A HUB OF INTERNATIONAL EDUCATION

Although the pace of reform in education in Singapore is exciting, the developments also herald a number of challenges which need to be explored if the country is to make the desired transition from a provider of post-secondary education to mostly local (and lately ASEAN) students, to a hub of education services for Singaporeans and students from around the world. Apart from competition from other emerging international education providers, questions of education and nationalism, eastern and western influence, and level of discourse on international education loom as issues which will impact in some way on Singapore's competitiveness in promoting its international education program.

Malaysia as an International Education Hub

Whilst Singapore has justly received accolades for the major economic progress and technological advancement that it has made since the 1960s, Malaysia has also been busily pursuing its own development-driven ideology with vigour. Singapore's raft of policies to transform it into a knowledge-based economy are matched by Malaysia's 'Vision 2020' which promotes strategies to have the country shift from a production and industrial-driven economy to a knowledge-driven one "in order to remain competitive in a globalised world" (New Straits Times, 2000, p.2). A major foundation of the plan is to 'strengthen the higher education system in areas of science and mathematics and the English language, as well as to expand vocational and technical education to cope with developing knowledge and skill requirements' (Yip, 1997, p.1). Malaysia also sees itself

as a future hub for educational services, with 20-30 per cent of total university places going to fee-paying international students (Channel NewsAsia, 2000, p.2). As such, Singapore can expect keen competition for international students from its close neighbour as the decade unfolds (as well as continuing competition from traditional western education providers).

Role of Education in Singapore

Since Singapore's independence, the major role of education has been to secure the nation's prosperity by inculcating a sense of nationalism in Singapore's youth and training workers according to the needs of the labour force. The idea of Singapore being a hub for educational services brings into question how the country will assimilate growing numbers of international students from different cultures into a system that has served, to this point, such strong internal needs. To demonstrate the clash of the domestic imperative with new international role of Singapore's institutions, a British exchange student studying chemical engineering at NUS related to me that whilst aspects of the program were excellent, he found the content in some non-technical modules which covered the 'role of citizenry' a bit too 'propaganda-like'. This incident, although anecdotal, illustrates a dilemma that the Government and its institutions may face as growing numbers of international students come to study in Singapore. In a country where the stated objectives of the Ministry of Education (2000b, p.3) for post-secondary education for Singaporeans include "be morally upright and responsible to family, community and country", "be constituents of a gracious society", and "be committed to improving society", the Government will have to give some thought of how it will simultaneously instill such values into local students without alienating the cohort of international students.

Eastern and Western Influences

Since its independence, Singapore has built a reputation as a contradiction in terms by embracing western economic models and technology, whilst concurrently eschewing western ideals in favour of 'eastern' or 'Asian' values (NOOSR, 1996, p.3). The bottom line is, however, that Singapore is a tiny, resource-poor island in southeast Asia which has had to eke out its own version of 'reality' in a post-war economic and technological environment which has been thoroughly dominated by the west. When seen in this light, the comment that "Singapore is an ongoing experiment in alternative ways of living" (Tamney, 1996, p.196), implies that the country is continually in a state of flux to maintain its relevance to the outside world which will always dictate Singapore's heading, whether it be a powerful 'west' leading global development, or at some stage, a powerful 'east'. At present, "life in Singapore is being shaped by the demands of international capitalism, not by Asian traditions" (Tamney, 1996, p.183) and this is evident in Singapore's education.

In the process of gearing up to be a hub for international education, the Government has embarked on a series of changes in its education system which, by Singaporean standards, are quite radical and will have a significant impact on the local population. Although not so extreme by western measures, the introduction of the 'Harvard-style' curriculum changes alluded to at NUS and NTU, plus less focus on academic achievement for entrance to university are dramatic departures from the norm in Singapore (Han, 1999, p.109). Perhaps the most far-reaching change, however, is the idea of changes in pedagogy to produce students who are 'creative, critical and independent thinkers', taught by teachers who "may not necessarily know more than the pupils who would have access to sources of information such as the Internet" (Han, 1999, p.105). This single concept has enormous ramifications not only for education but also for society as a whole in the longer term, for it is a quantum leap in culture and a direct expression of how Singapore will engage with the world through its knowledge-based economy.

Discourse on International Education

One of the striking observations made whilst researching this paper is that there is a paucity of information to bring together themes of international education in Singapore. There is no questioning the volume of facts or plans emanating from government departments, Singaporean institutions, and the media in print and electronic form. The buzzwords of 'excellence in education', 'world class' and 'international education hub' are ubiquitous, as are the offices in post-secondary institutions which are devoted to 'international relations' and 'international cooperation'. What is missing, however, is discourse of the type which would promote a deeper understanding of 'international education in Singapore' itself, viz. an evaluation of issues concerning education policy, pedagogy, curriculum and the international student experience, which would make apparent the subtleties and complexities of having large populations of students from other countries study in Singapore. An explanation for this is that because Singapore presently has only seven post-secondary institutions which have recently engaged in international student programs with a relatively small number of international students per capita head of population, a 'critical mass' has not been reached which would direct attention to the nation's international education experience. In view of Singapore's relatively complex mix of different ethnic groups, languages and cultures and freedom to pursue different religious beliefs and practices, all the more, foreign students will need to be guided progressively into assimilating the different way of life and to coping with the differences in their ways of knowing, in the new socio-political environment.

By contrast, in Australia there are close to forty universities and a myriad of colleges, ELICOS centers, and public and private schools which are host to well over 180,000 onshore international students (Kemp, 2001). Whilst a large number of international students in itself should not be a necessary condition for discourse on issues concerning international education, it is certainly a catalyst for investigation and evaluation. For example, one outcome of a significant on-shore international program is the direct employment of service providers, educators, marketers, administrators and managers. In Australia, this has led to the emergence of organisations such as ISANA: International Education Association, the ELICOS Association, IDP Education Australia, and Australian Education International which act as touchstones for association, networking, professional development, and information for staff and students alike. Furthermore, between ISANA, IDP and the National Liaison Committee, (the peak representative body for international students in Australia), there have been approximately forty national conferences in Australia on international education themes since the late 1980s and this has been a powerful force in bringing issues in international education into focus. As far as it can be ascertained, in Singapore no associations carry out functions of the same ilk as those undertaken by ISANA, the ELICOS Association, and the NLC.

Whilst the lack of discourse into aspects of international education is not necessarily a criticism given the recent introduction of the on-shore international student program, it does highlight a certain superficiality of treatment of international education issues in Singapore to this point. It would be a shame for Singapore and its international students alike if the energies invested into program over time remained as 'another task to do', as prescribed by Government plans for the requirements of the knowledge-based economy.

CONCLUSION

This paper has considered the role of higher education in Singapore and, in particular, its relationship to the larger international context. It has shown that because of Singapore's necessary engagement with other countries, it has significant experience with various aspects of international education, which have their origin as far back as British colonisation in the 1800s. Most of

Singapore's international education experience began, however, in the post-war years with Singaporeans being sponsored to other Commonwealth countries as part of aid packages. As Singapore's economy started to flourish, 'education as aid' diminished and students began to fund their own overseas studies. The outflow of local students intensified throughout the 1980s and 1990s as a result of many not being able to secure a place in relatively small number of home institutions which were geared to meet projected requirements for the labour force, with a focus largely on technical and business studies.

The most significant development in recent times is the Government's plan to transform Singapore into a knowledge-based economy, which will see it strengthen its position as a regional services hub as well as a manufacturing base for multi-national companies. According to the current Prime Minister, Mr Goh Chok Tong, "our goal is to turn Singapore into a magnetic hub of people, minds, talents, ideas and knowledge" (Contact Singapore, 2000d, p.1). Part of the overall initiative is to make Singapore a hub for international education which will give Singaporeans and international students the opportunity to study with prestigious western institutions which have been invited to set up centres of excellence and research in Singapore.

For Singapore, it is an opportunity to once again raise its 'human capital' (just as it did with technical and vocational training after the 1960s) by offering Singaporeans access to world-class institutions. It will also enable it to make inroads into the 'education industry' which has been the exclusive domain of the west for over a decade. The local universities and polytechnics are part of the plan to have Singapore offer the best of 'eastern' and 'western' education and are presently engaged in restructuring activities to raise their standard to 'world-class' by 2010. The Government has assisted by offering significant subsidies to top international students from the region in a bid to enhance the reputations of Singaporean institutions and spread the word about the benefits of living and studying in Singapore. The condition for all international students taking advantage of the Government tuition grant is that they stay in Singapore and work for three years.

When Lee Kuan Yew began his four decades at the helm of the People's Action Party in the 1960s, the future of Singapore looked tenuous to say the least. Between the political uncertainty, the lack of an established economy, the third-world infrastructure, and the poorly-educated workforce, there was little to suggest that the country had much potential for development. After all, it was a tiny, resource-poor island with a largely-immigrant population that had no strong indigenous roots to the land, nor any history of a fierce struggle for independence which might have provided a sense of nationalism to make something of its circumstances. With such a gloomy forecast, to say that it has merely been 'successful' in light of what has transpired in the interim seems something of an understatement. The confluence of the legacy of the English language from a colonial past, a favourable global economic climate, and a unicameral Government promulgating hard-nosed domestic policies in the pursuit of development-driven ideologies, has projected Singapore onto the 'world stage' in terms of its export-led trade and its business and service sectors. This has afforded Singaporeans a high standard of living.

Can Singapore meet its international education objectives? Singapore has an excellent track record in setting and achieving national goals and it is clear that its plan to become a knowledge-based economy is attracting a considerable amount of attention, activity and resources. It has demonstrated in the past that it is tenacious, yet measured, in the pursuit of initiatives for the 'national good'. It currently has the world's second busiest seaport and the seventh busiest airport. For a population of only four million, this is a remarkable achievement and demonstrates how it has made itself relevant, indeed indispensable, as a hub for manufacturing, commerce, trade, and transport. It may soon have tens of thousands of international students from around the globe

as part of a thriving hub of international education. The challenges which have been outlined, however, are very real and it remains to be seen how Singapore will respond to them.

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Evaluating the Quality of an Elementary School in Rural Thailand: Villagers' Perspectives

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This paper aims to understand how a marginal group of people, especially parents in a rural area in Thailand, defines and evaluates the quality of their school. Although quality of schooling is an elusive and complicated concept, each stakeholder has a point of view on how to make a good school. This is due to the fact that education belongs to all parties in a society. A qualitative approach was employed to grasp parents' perspectives on the quality of schooling. Five families in a rural area in a northern province in Thailand participated in the study. Five distinguishing aspects emerged: post schooling success, immediate schooling success, teachers' dedication, students' discipline, and the relationship between school and community.

Educational Quality Assurance, Quality of Schooling, Educational Accountability

INTRODUCTION

The global "Education for All" initiative of the 1990s, as well as other policy initiatives of the last two decades, has stressed the importance of improving the quality of education. In developed and developing countries alike, educational evaluators have been faced with heightened attention to the perennial question of what is meant by "improving educational quality." There also is a movement of decentralisation for raising levels of participation in decision making and for giving people more of a chance to shape the context of their own lives. The notion of decentralisation is that educational management is shaped by local communities, teachers, and principals of the schools in terms of curriculums and teaching methods (Carnoy, 2000).

In addition, globalisation as phenomenon by which social, economic, and culture aspects of people are universally changed (Stromquist & Monkmen, 2000) is praised for opportunities by holding out the promise of increasing productivity and higher living standards (World Bank, 1999). The global village consists of local and state systems that are connected through individuals whose lives are shaped simultaneously by both systems (Esterik, 1996). Education policy, especially as a major part in the policy of national development in both developed and developing countries, will be focused more on issues of attaining sufficient quality. Education indeed allows marginal populations to participate in and enjoy the fruits of global development, while at the same time to safeguard the integrity of their communities and natural environment (Nielsen & Cummings, 1997).

Up to the present day, the concept of educational quality has existed in people's minds for the most part only as a broad and general idea (Suryadi, 1992). According to most of the decentralisation movements, the level of participation should be focused on the grassroots level. One of the primary challenges for evaluators of community-based programs is the design and implementation of assessments that are useful and relevant, as well as rigorous (Patton, 1997). Moreover, the community-based evaluation will be able to focus on the cultural reality dimension,

sharing similarities with the best practice of general human service evaluation (Telfair & Lauar, 1999).

Thailand, like many other countries, has focused on questions of improving the accessibility and quality of education. The Thai government announced the National Education Act in September 1999. One of the important aspects of the national act is that the local administration organisation shall have the right to provide education at any or all levels in accordance with the readiness, suitability and requirements of the local area. This is a giant step for decentralisation in educational sectors in Thailand. In keeping with the increasing emphasis in evaluation on understanding the views of local stakeholders, this research tries to better understand how rural villagers in Thailand perceive and evaluate the quality of primary education offered.

Chambers (1983) supported the idea that those who live in the remote areas, the ethnic and linguistic minorities, the marginal or nomadic populations, have indeed been last in terms of the quality of the educational services provided to them. If we are at all serious about reaching the last frontiers of education for all in this century, they will need to be put first in terms of satisfying their views of needed improvements in education quality.

There is an argument supporting participatory development asserting that participation may be strong in the planning phase of a program but decline in later stages (Gaventa, Creed and Morrissey 1998). However, I firmly believe that presenting the villagers' perspectives at the launching of the Thai National Education Act will demonstrate the expectations of villagers to encourage the evaluators and the policy makers to do more studies about how to assess educational quality. An in-depth study of an elementary school in rural Thailand working with key informants and interviews of villagers is the focus. An analysis of villagers' views on educational quality is contrasted with national education standards in the country. This study also sheds some light on how a marginal group of people views the quality of their school in order to share grounded information from a country where education reform is now gaining paramount public concern.

The Quality of Schooling

What is quality? Downey, Frase, and Peters (1994) claim quality is meeting, exceeding, and satisfying a community's needs and expectations with the recognition that these needs and desires will change over time. This definition of quality is influenced by Deming's (1986) view of quality as meeting and exceeding the customers' needs and expectations and then continuing to improve. In addition, the American Society for Quality Control (Johnson & Winchell, 1990) defines quality as the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs. These definitions of quality originate from a managerial perspective. However, Seigel (1994) suggests that some educators may object to the term customer and may prefer to come up with their own terminology. Generic names such as recipient, beneficiary, and client as well as references to specific education stakeholders such as student, parent, teacher, employer, and so on, can serve just as well.

To determine school quality is quite a challenge for evaluators. Since quality is abstract and difficult to measure, the tendency therefore is to rely on easily measurable outcomes such as competitive examinations and standardized tests (Hopkins, 1987). Using examinations as a major outcome measure, however, limits the range of educational aims because they are only a part of the quality of education. Examinations usually measure only cognitive achievement, they do not assess other personal qualities such as skills, attitude, character, and ethics. Ironically, the over-emphasis on outcome measures like examinations may have the effect of reducing the quality of

education because in order to increase examination results more emphasis is placed on instrumental forms of teaching.

This paper attempts to define the quality of education based on parental perspectives. Relating to the quality of education in general, most of the quality arguments are from professional or research-based knowledge. According to the decentralisation movement and putting people at the margin first, this paper argues that every level of management should respond to villagers' perspectives. This study focuses on the needs and views of the parents since the current movement is more toward parental involvement in the education process. For instance, family background variables affect both educational qualities and outcome (Card & Krueger, 1990). Moreover, the studies of individual families show that what the family does is more important to student success than family income or education. International comparisons show high academic success of students from Asian countries, which may be attributed to the priority their families give to education (Stevenson, 1993). Parents are often victims of economic circumstances that prevent a more active role in education. All parents want to see their children succeed in school. Some parents have to contend with their own negative memories of school. In terms of decentralisation, education management should welcome the involvement of parents in the classroom on problem-solving teams and as equal partners in the educational process. Therefore, the study aims to examine how the villagers perceive the quality of their childrens' schools. It is a reflection from parents in a local area as an example to the Ministry of Education in Thailand for future educational development. Moreover, the study provides grassroots' perspectives on how they view school quality to encourage educators, evaluators, and administrators to realize the significance of parental concerns.

RESEARCH STRATEGY

The village chosen as the study site was purposely selected based on accessibility, convenience, size, and voluntary school staff. The voluntary school staff was considered as an important aspect. Additionally, I was seeking a small school that served about 300 to 400 households and where I could easily commute from town to the village. Firstly, the educational office authorities gave me a few schools. I then selected a school according to the criteria mentioned above. I quickly gained villagers' and teachers' trust because the principal was familiar with my research assistant, and my status as a student was very welcome to villagers. The study site is located in Tak province in the north of Thailand. This city is about 200 miles from Bangkok.

The elementary school site was located in a district of Tak province about 25 miles west of the district seat. The target school of this study has six teachers including the principal and 60 students from pre-kindergarten up to level six. The school serves about 400 households in the surrounding area. There is a temple near the school, which was there before the school was established. In the early period of this school, it was located at the same place as the temple, which is now on the west side of the school's current location on a mountain. The school was relocated to facilitate access by students and parents.

Parents were the key informants for this study. At first, I asked the school to recommend parents who were involved in school activities. Two of the key informants were on the school board committee. To invite more parents to participate in the study, I asked the principal to recommend some other people. However, the principal was worried that the parents might not be at home while I was conducting the research. Some parents had to work in the fields so that accessibility was somewhat difficult. Practically, the principal or a teacher asked students whether their parents stayed at home on that day. Then, he would ask a student whose parents stayed home to take the researchers to his or her home.

I received the consent of the villagers with whom I met as well as permission to tape the conversation. At the beginning, a teacher from this target school brought my assistant and me into the site but it seemed people were reluctant to provide information. Later, we asked the principal to let the students take us to meet their parents instead.

This study used a qualitative approach. Villagers were interviewed in Thai. The study took place at a province in Thailand during summer 1999. I had two research assistants: one was a female educational supervisor in the target province. She conducted interviews with me in the field since she was considered as a local staff member. I asked her to join the research process because I also had interviews with female participants. The other assistant was a male researcher working in a curriculum development area. He helped me in transcribing the tapes to text files. In-depth interviews were conducted with six parents. Three of them had their children in fifth and sixth grades, whereas the other three families had children who completed sixth grade at this school. Two participants in the study were male.

With respect to data analysis, I examined "recurring regularities" in the field notes, observation notes, and transcripts to grasp the meaning of parents' perspectives to illustrate their understanding of the quality from the villagers' perspectives. I looked for informative incidents from parents' opinions. I then grouped and categorized the information according to their recurring themes. This methodology is a classification system for the data (Patton, 1987). During the field studies, my assistant and I found it necessary to simplify the questions or encourage participants to use their own dialect. In addition, we worded questions and clarified some terms to make them as explicit as possible, and allowed the parents to talk to their friends or cousins if they asked for advice or naturally engaged with others in the interviews (Phillips, 1965).

Profile of Interviewed Parents

Five different families were interviewed. All of the participants had graduated in elementary levels and had lived in the village more than two years. These participants had concrete relationships with a target school either being a school committee member or sending their children to the school. The number of female participants was more than the number of male participants due to the majority of men in the village commonly worked overseas. A profile of the six participants is presented in Table 1.

Table 1: Participants' characteristics

Pseudonyms	**Phu Yai Pan**	**Inn**	**Kamsor**	**Jamreang**	**Sawath**	**Sanga**
Gender	Male	Male	Female	Female	Female	Female
Education level	Elementary	Elementary	Elementary	Elementary	Elementary	Elementary
Relationship with the school	A parent and on school board	A parent and on school board	A parent	A parent	A parent	A parent
Child's status related to school	Graduated	Graduated	Fifth & sixth grade	Sixth grade	Sixth grade	Graduated
Occupation	Farmer	Farmer and Freelance carpenter	Homemaker	Homemaker	Homemaker	Farmer

Phu yai Pan is a 52 years old man who has an elementary level of education (fourth grade). "Phu yai" is a Thai word meaning a head of the village. Although Phu yai Pan has retired from the position, the villagers still called him by this title. Phu yai Pan was the head of the village and also on the school board before he left the village to work in Iran as a family driver for 2 years to earn some money to send back home. He added that in this village most young men around 25 to 45 year old were interested in working overseas to support their families and parents. Most of those who went abroad were successful in getting jobs as semi-skilled laborers. Nowadays, Phu yai Pan

grows rice annually. He would take turns with his cousin to utilize the land inherited from his ancestors. The amount produced would depend on the weather each year. Some years he would get less and in other years he would be lucky, so he would get more. He also has 50 cows that he grazes along the mountainside seasonally.

Inn is 54 years old and Phu yai Pan's elder brother. Inn completed education at fourth grade. Inn also is on the school board. During the time the study was conducted, Inn was working with one of the federal government projects. This project aimed at funding the village and it allows villagers to make their own decisions on how to utilize the funds in the most efficient way to benefit the village. He was working on building a water tank in the temple area since it was considered as the most public place and the most efficient location to distribute the water to the households during the dry season. Inn is good at carpentry work as we observed from his work, although he did not hold any diploma from formal institutions. Inn's children had finished their elementary schooling. He said that he was quite happy that his children could get jobs in town.

Kamsor has two children in the target school. Most housewives in the village were committed to taking care of their children, as she was. Her husband works overseas. She is the only parent raising her children. Kamsor finished fourth grade and so did her husband. According to Phu yai Pan, about 50 per cent of males around 25-45 have been working overseas. If he includes the number of those working in the city, the number would be more than 50 per cent. Kamsor's husband is working in Taiwan and he sends her a monthly allowance. Before getting this job, her family had to pay 4,000 dollars. It has been 10 months since her husband left for Taiwan when we visited her house. She said she paid all the debts including the 15 per cent interest. Kamsor's family has moved from another village on the other side of the nearby mountain because the family considered the future education opportunities for their children and they wanted to live closer to the city.

Jamreang has two children: one is studying in a secondary school in the city near this village, and the other is studying in the target elementary school at sixth grade. Jamreang finished fourth grade in school since the compulsory education at that time was only the fourth grade. Her husband is working in Dubai. This family paid about 2,000 US dollars to get the job. She said her husband sends her money about 200 - 300 US dollars a month. If her husband sends her money late, she borrows from her cousin in the same household. Jamreang's family also moved from the other side of the mountain two years ago.

Sawath is working as a labourer in the village doing such jobs as growing rice, household chores or any other kinds of labour. Sawath has two children: the elder one studies at a secondary school in the urban area where her son's friend from the village also studies; the younger one is a female student at sixth grade at the target elementary school. Sawath's family moved to this village at about the same time as Jamreang's family. Her husband is working at Brunei Darusalum and sends about 250 –300 US dollars back home each month.

The last family that we interviewed about the quality of school is Sanga's family. This family is the only family in the sample that does not work overseas. This is because Sanga's parents have a lot of land in this area and the family has been in this village longer than any other family except Phu yai Pan's and Inn's. Sanga's husband grows rice and he owns cows. He takes care of the cows and has the cows fenced in the lower level of the house. Sanga's child has finished education from this school and worked at a factory in another city in the northern part of Thailand.

RESEARCH RESULTS

What is the quality of their elementary school from the parents' perception?

After listening to the parents' ideas, I tried to learn how the parents define the quality of their elementary school from their perspectives. I mainly asked them about how they perceived the quality of the school and what was the evidence to support their thoughts. In other words, I studied the experience of the parents to shed some light on increasing local participation for the provision of education. This would help us to examine effectively the current educational system. From analyzing field notes, observation notes, and transcripts, five distinct aspects emerging from the study were:

1. post schooling successes,
2. immediate schooling successes,
3. teachers' dedication,
4. students' discipline, and
5. the relationship between the school and community.

For each theme, at least two parents mentioned each of these dimensions of quality.

Post schooling successes

Phu yai Pan stated that he was quite satisfied with school performance. According to him, he was satisfied that his son graduated from this school and got a job. Phu yai Pan sent his son to continue studying in the city since there was no secondary school in the village. Inn also stated that he was satisfied when the children got jobs outside the village. He expected that his children would be able to work at a stable job and they could have decent jobs. He also hoped his children would be able to work in other jobs besides farming because it would make them happier. Inn said most parents would expect the same thing since the parents saw their current situation as a problem and the only way they could become better off was through higher education. In the conversation with Phu yai Pan, he mentioned that the village did not have job opportunities for students that villagers were looking for.

Immediate schooling success

Phu yai Pan, Inn and Sanga, whose children graduate from this elementary school, responded to the question of whether they were satisfied with the school by saying that they were satisfied in some levels. However, Kamsor, whose child was attending the school, said there were parents who complained about the quality of schooling. She explained that their children could not read fluently and the children did not have homework when they finished school each day. Kamsor added that last year she did not see any English homework at all. Her concern was that her child would not be capable enough to continue at secondary level and that her child would be embarrassed and frustrated when her friends could study faster. Regarding the assessment system, Sawath stated that she did not understand the grading system although her child told her that a '4' was better than a '3'. The school also had letters explaining the student assessment system. She still was not quite clear why the school had the system. Jamreang also said her child got a '4' but still could not read fluently but when Jamreang was in school if she could get good scores, she had to be able to read very well. Kamsor also had a similar situation in that she observed her child when he was watching television to see how fast her son could read from advertisements or sometimes from reading newspapers. Kamsor did not want to criticise openly the outcomes for her children because she realized that the teachers should get some respect from the villagers and that as a parent she should behave as a good model for her children by showing gratitude toward

teachers. Sawath also mentioned that some parents took their children from this school to the other schools because of its low performance but she did not want to do that because her child was in the last year at this school.

Teachers' dedication

Some parents mentioned that teachers were the main persons who were a part of their children's education. Jamreang indicated that she would like to see teachers' dedication in teaching more than now. She believed her child studied only one subject a day. Jamreang said, in this school, the students' performance was lower than the previous school. She could tell from her observation when her child was doing homework or reading newspapers at home. She felt the school at the village where her family previously stayed encouraged her child to read more than this. She could also see her child's enthusiasm when her child was doing homework. Jamreang would like teachers to visit her house occasionally to encourage her children to study more because her children more readily obeyed their teachers. Sawath also hoped that the teachers in this elementary school would pay more attention to teaching since she felt her child was getting worse by having a lower level of achievement, and had less enthusiasm in working on his homework.

Students' discipline

The parents felt that helping their children at home was an obligation. Students were expected to do household chores such as washing, cooking, and cleaning. Parents were quite satisfied with their children's responsibility. However, with regard to students' discipline, some parents complained that their children did not behave as well as they expected. Sanga felt that the teachers were quite generous because teachers were too friendly with the children. She expected the teachers would teach her child more discipline in the sense that her son would be more obedient, concentrate on his homework, and pay respect to his elders. Sawath understood that their peers might influence the children's behaviour when they were at school, and that teachers should take responsibility of this issue.

Relationship between school and community

During the conversation with Phu yai Pan and Inn, both of them constantly talked about school activities with the villagers. I therefore raised questions about school activities such as school maintenance, annual fund raising and how the school cooperated with the villagers. Phu yai Pan said that the school activities were good opportunities for the villagers to participate in school management. Phu yai Pan was a school board committee member before he went to work in Iran. The annual fund raising event called "Jedi Khaw Peauk" was very common for the people in this village. Phu yai Pan explained that it was the time that all villagers would get together and donate their rice or money for school, and the school committee would manage this donation based on committee agreements. He added that the money from this event was used to build school fences and playground facilities for children.

Jamreang said that each family was expected to give a donation. Some parents would donate money while others would donate rice. She donated 20kg of rice whereas the others who would donate money normally would give less than 100baht (US $3) which is a lot from the villagers' point of view. Regarding the school activities, Inn mentioned that the villagers tended to agree with the teachers' ideas and were happy when the teachers asked for cooperation. Kamsor said that the way of doing annual fund raising was different between the current principal and the old one, because the previous principal would report how the money was spent. She thought that it was a very good idea. She said she did not want to know exact details but somehow she saw that the

different working styles of the principals might influence the school management. All the parents responded to the question of whether they agree with the school idea to improve the building or facilities in school. They always agree with the teachers' suggestions. Therefore, they would rather wait to hear what the school would ask for and tell the villagers to do. One parent stated that the teacher loved their school so it was good if they wanted to improve their school.

One parent mentioned school environment and instructional media. During the conversation with Inn, he also believed that a good quality school would provide the instructional media and be clean.

From these comments, it is clear that generally the parents were very much involved with the school and kept in touch with the school via their children. Moreover, the distance of this school was not too far for parents to come to school by taking too much time for traveling. Parents who still have their children in school looked at the quality related with students' performance by using their own observations and comparisons with their own experience and also with a similar school in the nearby area. Parents also questioned the teacher's attention toward teaching in the school although they may not state it explicitly. Some parents who had their children at this school tended to look at the school in terms of infrastructure, and teacher-parent relationships. In addition, parents also indirectly questioned the curriculum. For instance, one parent stated that she could not help her child to understand the mathematics since it was different from her time. She interpreted the situation that her child would only believe what the teacher taught in class and be disciplined by the teachers.

How do parents' perspectives reflect the national educational standard?

The national education council conducted a number of studies and invited many educational organisations to get involved in the process of identifying the education standards (NEC, 2000). These standards are grouped into three categories: students, educational activities, and input. It is clear that the national standards partially cover the need for parents in general. It is also equally clear that the parents have their focus on what they expect from sending their children to an elementary school for six years of education. Regarding student characteristics, interestingly and naturally, the parents' observations and involvement with their children activities at home frame their conclusions about their children's achievement. Although the school presented report books, the parents were not able to fully comprehend the evaluation information. With respect to the educational activity standards, the parents viewed quality in terms of educational activity standards in many aspects: teaching methods, assessment processes, local participation, and public relations. The national standards include the education administration structure, training, a coherent curriculum on student and local needs, and student-centered strategies. It is worth keeping in mind that it is essential to ensure that teachers are being effectively used as teachers and that they are not devoting too much of their time to clerical and administrative tasks (Bennett, 1975). In terms of input standards, it is valuable to hear that parents consider themselves as being role models for their children when they directly or indirectly interact with teachers. However, it was unfortunate to learn that some parents did feel left out of the school administrative system. This study shows that decision making in environmental development originally came from the teachers and the principal. This helps explain why the parents did not feel a part of the school.

One important aspect in the provision of education stood out from the study. That is, although the government has conceptually and collectively constructed national standards to ensure that the schools reach these requirements, the needs of local stakeholders cannot afford to be overlooked. In doing so, greater effectiveness and more involvement from schools are clearly seen from the parental points of view. The Ministry of Education has to keep in mind that parents have indeed

high expectations on their schools. If the school is to demonstrate how well it performs, its local stakeholders' voices must be considered first.

What is the local notion of schools' quality?

The quality of schooling from the villagers' perspectives is that certain levels of their children's achievement required concrete evidence as facilitated by the teachers' full attention in teaching the children and by some level of community involvement based upon the school's needs and community agreement. Obviously, policy makers, educational staff, teachers and administrators need effective communication to establish an underlying understanding of educational goals to the local people. Not only do the local people need to be educated about the current education movement, but also policy makers and educators must learn the needs of the people. Parent meetings or public hearings are suggested to provide opportunities for parents and communities to develop a wider and deeper vision of the current education and to listen to the needs of community members. In short, the needs of people are quite straightforward and applicable to their own community conditions, whereas national level standards are rather general and need to be adjusted to fit the concerns of people. Listening to the voices of those in the margin will definitely enable us to collaboratively build a society in which every one has a chance to win together.

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Learning in Schools: A Modelling Approach

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This article claims that constructivism is both incomplete and inadequate for the effective learning and teaching of mathematics and science at the upper secondary school level. The article briefly reviews the reforms that have occurred over the past 50 years on mathematics and science education from the perspectives provided by advances in knowledge on the physical and biological sciences, in developmental and cognitive psychology, in educational research and in the emerging field of neuroscience. It is argued that the finding from these many different fields of research must be brought together to advance learning through a modelling approach which requires that both individual and corporate knowledge must be tested not only for coherence, but also for adequacy against evidence obtained from the real world in which human beings are living and undertaking their inquiries.

Constructivism, social constructivism, cognitive development, hypothetico-deductive thinking, Piagetian theory, hypotheses testing, modelling, neuroscience, formal operational thinking, upper secondary schooling, learning in schools

INTRODUCTION

In the present-day world of schools, universities and lifelong learning institutions, the ideas of 'constructivism' pervade discussions on curriculum development, the learning experiences provided, and the procedures used for assessment of student achievement. If constructivist theories of knowing were limited to the simple principle that existing knowledge is used in the processes of building new knowledge not only by individuals but also by social groups and communities of scholars, there would be little cause for concern. However, Phillips (2000) has shown that constructivism in education extends well beyond this simple principle to take a wide variety of forms that confound those concerned with educational issues and that have serious implications for how learning occurs in schools and universities. Constructivist approaches also often distort what is acceptable as knowledge in a world where what is accepted as knowledge is growing at an extremely rapid pace. Furthermore, the constructivist approach is accepted by many as the only approach to learning at all levels and stages of learning in schools and universities as well as in everyday life. In addition, constructivism has tended to dominate teaching at levels of education where other approaches may be necessary or desirable.

It is the purpose of this article to examine the issues associated with the rise of constructivism and to argue that, at least in the fields of mathematics and science, the basic principles of constructivism are incomplete and inadequate for both learning and teaching in these fields. Moreover, the very many extensions of constructivism that have been advanced have a limited place in education in learning mathematics and science as well as in the establishment of the bodies of knowledge that are endorsed by scholars. A modelling approach both to learning and to the accumulation of knowledge is argued to be necessary, in so far as any models that are constructed must be tested for their coherence and adequacy, with recognition that certainty and the so-called 'truth' of knowledge can never be fully established.

In this article, the reforms that have occurred over the past 50 years and are currently occurring in science and mathematics education are briefly reviewed and set in the perspectives generated by advances in knowledge in the physical and biological sciences, in developmental and cognitive psychology, in education and in the emerging field of neuroscience. It is argued that the findings from these many different fields of research must be brought together to advance learning through a so-called 'modelling approach'. This approach requires that both individual and corporate knowledge must be tested not only for coherence, but also against evidence obtained from the real world in which human beings are living and undertaking their inquiries.

A CONCERN FOR PROCESS IN EDUCATION

The first half of the twentieth century was the scene for the establishment of research activities in psychology and education, the emergence of the disciplines of sociology and statistics, and remarkable growth of knowledge in the fields of the sciences, mathematics and technology. These developments were accompanied by a rapid expansion of secondary education in the countries of the developed world, together with the growth of universities and institutes of technology, as well as the establishment of highly specialised research institutes. By the mid-1950s, it came to be recognised that the curriculum of schools and universities had changed little over the preceding decades and reform was urgently needed to take into account the growth in knowledge that had occurred.

Projects were established during the 1950s in the United States and the United Kingdom to reform the teaching of mathematics and the sciences in order to incorporate the new knowledge that had emerged during the previous half-century. By 1959, major programs had been launched by leading mathematicians, biologists, chemists and physicists into curriculum development for schools and universities. Concurrently, educators and psychologists were examining anew, the approaches to teaching and the structure of the curriculum in the light of the knowledge gained from their research. It was clear that an overall reappraisal of the teaching and learning of mathematics and science was urgently needed. As a consequence, a conference was held in September 1959 at Woods Hole on Cape Cod in the United States that was attended by leading scholars who were already engaged in major curriculum reform projects, as well as psychologists and teachers from some of the leading schools in the country. The discussions at the conference were summarised by Bruner (1960) in the volume *The Process of Education* that had very wide circulation throughout the Western world. Key ideas that were discussed involved the importance of structure in the curriculum, readiness for learning, intuitive and analytic thinking, and motivation and active learning. Consideration was given to the ideas of Piaget on children's thinking and the three stages of intellectual development of the child. As one conclusion, the proposition was advanced:

> that any subject can be taught to any child in some honest form - then it should follow that a curriculum ought to be built around the great issues, principles, and values that a society deems worthy. (Bruner, 1960, p.52)

For probably the first time, educators and psychologists had the confidence, derived from research, to assert that there were principles on which the curriculum of schools and universities could be based. Whitehead, an Anglo-American philosopher, had argued several decades earlier for three stages of mental growth; he also argued against an educational process of "uniform steady advance undifferentiated by change of type or alteration of pace" (Whitehead, 1949, p. 27). He called these stages "the stage of romance, the stage of precision, and the stage of generalisation" (ibid, p. 28).

Shortly after the Woods Hole Conference, two books were published that drew widespread attention in North America and the English-speaking world to the work of Piaget in Switzerland,

and that challenged the current ideas of “fixed intelligence” and “predetermined development”. Hunt (1961) wrote on *Intelligence and Experience,* elaborating on Piaget's research from the perspective of information processing and summarising the emerging evidence from brain research and neuro-psychology. In addition, Flavell (1963) wrote on *The Developmental Psychology of Jean Piaget,* providing greater detail on Piaget's research, together with an excellent evaluation of the theories that Piaget had advanced. Flavell summarised some of Piaget's ideas in the following terms:

> the subject cognises only what is immediately apparent and obvious in things, i.e. just a few surface characteristics (phenomenism); on the other hand, he is unable to assess the contributions of his own perspective to the way things appear; he cannot turn his intellectual instruments back upon himself so as to make his own cognitions an object of critical inspection (egocentrism). It is the work of development to correct this initial egocentrism-phenomenism in two ways. Phenomenism gives way to a progressive **construction** [Flavell's emphasis]: the subject penetrates more deeply and more extensively into the object of his cognition. And egocentrism is replaced by **reflection** [Flavell's emphasis]; the subject rethinks and restructures aspects of an object of thought "constructed" earlier, critically reanalyses his initial assumptions about these aspects, and in general, submits his earlier cognitions to a searching *prise de conscience.* (Flavell 1963, p. 256)

The use of these processes of construction and reflection in learning and teaching is referred to as 'constructivism'; and it is the operations of both construction and reflection that are central to constructivism. Piaget extends these operations that recur in the minds of individuals, to apply to the evolutionary processes at work throughout the history of mathematics and physics. It is these ideas that have been extended and reformulated not only to give rise to psychological constructivism but also to other forms of constructivism (see Phillips, 2000).

It should be noted that the work of development in the key processes of construction and reflection corrects the initial egocentrism-phenomenism, and would appear to involve only the transition from the first to the second stages of cognitive development advanced by Piaget, namely the pre-operational stage to the concrete operational stage. However, Piaget's research shows that cognitive development undergoes a further transition during adolescence from the concrete operational stage to the formal operational stage, which involves the use of hypothetico-deductive thought processes. It is this further stage of development which goes beyond the two operations of construction and reflection that renders constructivism to be both incomplete and inadequate. Criticism of constructivism has also come from the field of neuropsychology. Before turning to consider findings from the area of neuropsychology, it is necessary to discuss another approach to constructivism that is referred to as 'social constructivism'.

SOCIAL MEDIATION AND COGNITIVE GROWTH

Vygotsky (1981), a psychologist who lived and worked in Russia, and who died in 1934 at the age of 38 years, argued that the social context in which learning took place had a marked effect on learning outcomes. Initially, his evidence of the effects of social mediation on learning was observed in testing programs in which students, assessed under formal objective testing conditions, performed very differently from assessment in an interview situation where the psychologist or test administrator interacted with the student through discussion or with apparatus. The mediating influence of a sympathetic adult assisted the student to succeed on conventional test items that the student was otherwise unable to do. Vygotsky extended these

ideas to learning situations where the student's learning was facilitated by social interaction with adults or peers:

> Any function in the child's cultural development appears twice, or on two planes. First it appears on the social plane, and then on the psychological plane. First, it appears between people as an interpersonal category, and then with the child as an intra-psychological category. This is equally true with regard to voluntary attention, logical memory, the formation of concepts, and the development of volition. (Vygotsky, 1981, p. 163)

Vygotsky contended that instruction would only be effective if the instruction proceeded ahead of the associated cognitive development, was in a zone of proximal development (ZPD), and was close to and below the level of the learning required. Vygotsky's ideas have given rise to ideas variously referred to as 'social constructivism' and 'social constructionism'. Other forms of social constructivism have developed from Berger and Luckman's (1969) ideas on the social construction of reality.

BRAIN RESEARCH

Hunt (1961) recognised that an understanding of the processes of cognition and learning must be consistent with evidence drawn from neuro-psychology. During the 1950s and early 1960s, brain research was an emerging field of inquiry where significant advances were being made. Bransford, Brown and Cocking (1999) in *How People Learn* have recently reviewed the field of brain research from an educational perspective. It is evident that neural activity in the brain is central to the processes of learning. However, they argue that only a limited number of research findings are ready for implementation in educational practice. The connections set up in the brain and their functional organisation benefit significantly from experience. Cognitive development is not merely an unfolding process that is biologically driven, but is an active process that derives from experience. It is a function of education to advance this process by providing appropriate experiences.

Sweller (1999) has recently presented more detail on the cognitive architecture of working memory, long-term memory, schemas, automation and cognitive load theory, and the effects of split attention and redundancy of information. He questions strongly the efficacy of so-called 'constructivist based' learning procedures and argues that evidence for the effectiveness of these learning procedures is almost totally missing with a lack of systematic and controlled experimentation.

Recent studies in the field of connectionism that involve neural network accounts of brain functioning provide the best currently available theories of how the brain works. A recently published volume on *Issues in Educational Research* (Keeves and Lakomski, (1999) examines these ideas and relates them to the processes involved in learning and teaching from a coherentist perspective.

SITUATED ACTION AND SOCIAL COGNITION

Lakomski (1999) has examined the approaches to cognition of situated action and symbol processing and finds them both to provide an inadequate framework for the explanation of human action and thought in education and everyday life. Lakomski (1999) has discussed the idea of 'situated action' drawing on the writings of Lave (see Rogoff and Lave, 1984). The four key principles of situated action accepted by Lakomski are:

a) action is embedded in the concrete setting in which it takes place;

b) an individual does not automatically transfer knowledge from one context to a different context;

c) training through abstraction is rarely successful without extensive practice; and

d) instruction is affected by the complex social environment in which it occurs, but skills can be taught independently of the social context. (Lakomski, 1999, pp. 287-289)

Situated action is based on the idea of an interactive system that includes people, other materials and other systems. Learning occurs through individuals interacting in a concrete way with material and with other people within a contained system. However, in order to understand the way in which cognitive processing takes place, it is necessary to take into consideration the functioning of the brain. It would seem profitable to reject the historical dualism of brain and mind, and to consider the brain and the mind as a duality or even as one, since the strength of an information processing approach resides in directing attention to the individual and how the individual acquires knowledge.

In its simplest form, the symbol processing hypothesis advanced by Newell and Simon (1972), holds that rational thought and the knowledge generated involve the manipulation of linguistic and quasi-linguistic symbols in the head or the brain-mind duality. Thus, the emphasis in this approach is on the processing of cognitive structures and their symbolic representations by the brain. Simon's (1990) ideas have been derived from studies of eye movements, reaction times, and thinking aloud protocols as well as probes in the brain. Simon states:

> a system will be capable of intelligent behavior if and only if it is a physical symbol system …. [it] is a system capable of inputting, outputting, storing, and modifying symbol structures and of carrying out some of these actions in response to the symbols themselves. "Symbols" are any kinds of patterns on which these operations can be performed, where some of the patterns denote actions (that is, serve as commands or instructions). … Information processing psychology claims that intelligence is achievable by physical symbol systems and only such systems. From that claim follow two empirically testable hypotheses:
>
> 1 that computers can be programmed to think; and
>
> 2 that the human brain is (at least) a physical symbol system.
>
> (Simon, 1990, p. 3, quoted by Lakomski, 1999, pp.284-5)

It is important to recognise that symbols are not simply words or arithmetic and algebraic symbols, but may be diagrams, icons, mental pictures, and patterns formed by the senses of sight, sound, touch, smell and taste. Simon (1990) contends that the physical symbol system hypothesis has been examined extensively during recent decades, and while there are many unresolved issues, it must be considered to be well established.

The weakness of assuming a physical symbol system and symbol processing as the key process of human thought, is that the system is considered programmable and can be formulated in terms of rules. However, there would seem to be many cognitive phenomena that cannot be adequately explained by this approach, since these phenomena do not appear to involve chains of reasoning or the crunching of symbols, as is carried out in a computer. The ability to formulate rules for the operation of a system cannot be taken to imply that the system actually operates according to such prescribed rules.

It is evident that the situated action approach and social cognition that relate to aspects of constructivism do not provide a complete view of how learning takes place. Likewise, the symbol processing hypothesis fails to take into consideration many cognitive phenomena. Under these circumstances it would seem necessary to seek a new approach that takes into account all stages of Piagetian development, relating them to changes in brain structure and suggesting how the brain might operate under this new approach.

TOWARDS A NEW APPROACH

The first task involved in the development of a new approach is to reconsider the stages of cognitive development advanced by Piaget.

The research conducted by Piaget, and reviewed by Hunt (1961) and Flavell (1963), has been examined, explored and extended in a large body of educational and psychological research, but would appear to continue to be challenged and rejected by some research workers in North America on a wide variety of grounds. Nevertheless, to those who have taught mathematics and science in schools across the years of secondary schooling, Piaget's stages of development would appear to be highly consistent with their experience. Furthermore, for research workers who have employed scales to measure Piagetian levels of reasoning, and the corresponding levels of cognitive complexity such as the Solo Taxonomy (Biggs and Collis, 1982) and the *Arlin Test of Formal Reasoning* (Arlin, 1984) (for example, Alagumalai, 1999; Scholten et al. 2002), the use of these scales provides very rewarding explanatory evidence for such phenomena as problem solving and higher order thinking. Resnick (1987) has listed the characteristics of higher order thinking after consultation with educators, psychologists, philosophers and computer scientists, but appears to reject that they are consistent with and can be accounted for by Piaget's ideas of formal operational thinking.

Shayer and Adey (1981) have examined the evidence available from Piagetian research in the early 1980s and argued strongly for the use of Piagetian ideas of cognitive development in curriculum planning and construction. More recently, Adey and Shayer (1994) have again reviewed the evidence and argued for cognitive intervention programs, particularly in the teaching of science and mathematics in ways that are consistent with Piagetian theory and stages of development. It could well be that the poor results consistently reported from cross national achievement testing programs in the United States at the middle and upper secondary school levels conducted by the International Association for the Evaluation of Educational Achievement (IEA) (see for example, Keeves, 1995) and the Programme for International Student Assessment (PISA) (Lokan et al. 2001), can be attributed to the ways in which the science and mathematics curricula are organised and taught in the schools of the United States. Not only do the science and mathematics curricula continue to reject Bruner's (1960) advocacy for a "spiral curriculum" with a coherent structure, but they would also seem to reject the emphasis Bruner placed on cognitive stages of development that recognised the pre-operational, concrete operational and formal operational stages proposed by Piaget. It is the formal operational stage that is of particular relevance in this article, because it is during the years of secondary schooling that both science and mathematics are introduced into the school curriculum in a formal way.

Flavell (1963, pp.204-206) has stated:

> The most important general property of formal-operational thought, the one from which Piaget derives all others …. concerns the **real** versus the **possible**…. Several other characteristics of formal thought are implied by this new orientation.

1) A cognitive strategy which tries to determine reality within the context of possibility is fundamentally **hypothetical-deductive** in character.
2) Formal thought is above all **propositional thinking** …[Flavell's emphases]
3) This property of formal operational thought is closely affiliated with the newly developed orientation towards the possible and hypothetical.

Neither the ideas of 'propositional thinking' and 'hypothetico-deductive thinking' nor the ideas associated with 'symbol processing' simply do not receive consideration in discussions of constructivism. As indicated above constructivism is concerned with situated action and concrete operational thinking and does not relate to the formal operational thinking that occurs in the learning of science and mathematics at the middle and upper secondary school and university levels. As a consequence, the experiences that are necessary preparation for formal operational thinking do not appear to be considered in a school curriculum that is grounded in constructivism.

The ideas advanced by Flavell that have led to 'constructivism' and by Vygotski (1981) that have spawned 'social constructivism', as well as by Lakomski (1999) concerning 'situated action' are not necessarily erroneous, but are incomplete and inadequate when referred to the stage of formal operational thinking, and the type of thinking that is needed not only in learning science and mathematics, but also some of the social sciences at the upper secondary and university levels.

COGNITIVE DEVELOPMENT AND BRAIN GROWTH

If all stages of cognitive development are to be taken into consideration in the development of curricula, it is necessary that the nature and the phasing of the stages are consistent with current knowledge about the development of the human brain.

Shayer and Adey (1981, p.135) have reviewed the research of Epstein (1974, 1977), a brain physiologist, and other investigations that show that in both mammals and humans, there are, in general, critical periods of brain growth. In humans, spurts in brain growth occur around 11 and 15 years of age, with a quiescent stage occurring around 13 years of age. Shayer and Adey (1981, p.135) state:

> In girls the earlier spurt is more marked, in boys the later. These two brain growth phases correspond to the periods of maximum rate of development of concrete and formal operational thinking … it was found that no evidence of formal thinking capacity could be found in children under the age of 10, no matter how clever they were.

Since the new brain growth that occurs is mainly the production of dendrite structures at the ends of nerve cells, without being assigned to any specific functions, it is only through experience and instruction that the reasoning transformations advanced by Piaget are produced; their development having been limited prior to the changes in brain growth (Epstein, 2001). Adey and Shayer (1994, pp.140-143) present further evidence to support Epstein's (1986) claims and call for intervention in schools to facilitate cognitive growth prior to and during these stages of brain development. However, it is important to recognise that these changes do not necessarily occur at highly specific ages and substantial variations are likely to be observed in practice, partly as a consequence of advanced or delayed development, and partly as a result of the learning experiences provided. Consequently, schools clearly need to take these developments into consideration in the planning of curricula by allowing in appropriate ways for individual differences between students.

TOWARDS A MODELLING APPROACH

The key characteristic of cognitive functioning at the stage of formal operational thinking involves propositional thought that is hypothetical in nature. Operational thinking involves the formulation of a proposition and the testing of that proposition in ways that provide support for the adequacy of the proposition or its rejection. Rarely are the situations under consideration so simple that a single hypothesis is involved. In general, situations are sufficiently complex for alternative propositions and hypotheses or multiple hypotheses that are interrelated, to be required. The interrelationships between hypotheses require some structuring of the hypotheses and in this way a so-called 'model' is formulated for testing.

Kaplan (1997, p. 117) has argued that the term 'model' is useful:

> only when the symbolic system it refers to is significant as a structure - a system that allows for exact deductions and explicit correspondences. The value of the model lies in part in its abstractness, so that it can be given many interpretations, which thereby reveal unexpected similarities. The value lies also in the deductive fertility of the model, so that unexpected consequences can be predicted and then tested by observation and experiment.

Keeves (1997, pp. 386-7) argues that a model should satisfy several requirements:

a) a model should lead to a prediction of consequences that can be verified by observation;

b) a model should not only contain associative relationships, but also structural relationships that have a causal direction;

c) a model should reveal something of a causal mechanism, leading to explanation, as well as in some cases to prediction; and

d) in so far as a model contributes to explanation, it should give rise to new concepts and new relationships and thus to further inquiry.

Keeves (1997, pp. 388-390) has identified several different types of models: (a) analogue models, (b) semantic models, (c) schematic models, (d) mathematical models, and (e) causal models. However, some models may suffer from oversimplification and inappropriate signification in which significance is attached to inappropriate aspects of a model rather than reveal the structural aspect of importance.

In the framing of hypotheses, Quine and Ullian's five virtues would seem to apply:

a) conservatism - the hypothesis conflicts with as few previous beliefs as possible;
b) modesty - the events assumed are of the more usual and familiar kind;
c) simplicity - the simplest hypothesis is the most likely;
d) generality - the wider the range of applications of the hypothesis the better; and
e) refutability - the hypothesis can be refuted by the occurrence of unexpected events.

(Quine and Ullian, 1978, pp. 68-79)

The model or hypothesis serves to explain the past and predict the future. The testing of models should be carried out using the procedures of formal, mathematical, or symbolic logic. In addition, the testing of models must be done by controlled observation, experimentation, or the systematic collecting of evidence from the real world. In many situations statistical procedures for model testing are required with data expressed in a quantitative form. These procedures for a modelling approach were first advanced by Sir Ronald Fisher, but have recently been reformulated by

Lindsey (1995) to overcome the shortcomings and limitations of other statistical approaches, to be used with maximum likelihood procedures for the testing of models and the estimation of their parameters.

The advantages of working with the mathematical formulation of a model lie in the ease with which data can be employed to test the model, and the facility with which mathematical logic and mathematical algorithms can transform data and organise data for testing in appropriate ways. The maximum likelihood approach is now the basis of modern statistics, and is used for testing the adequacy of a model. Under this approach, the research worker develops a model, collects data with an assumed underlying generating distribution in order to test the model, and makes a decision to reject the model, or to accept that the model provides an adequate representation of the data collected from the real world. Choices can also be made between two or more models, but a model can never be verified, merely being accepted as an adequate representation of the observed phenomenon or situation in the real world.

In their simpler forms, these modelling processes might well be described as involving the processes of construction, and the term 'constructionism' employed. Nevertheless, the term 'constructionism' has already been used in association with social constructivism and in this context it has a very different meaning (see Nightingale and Cromby, 1999). Since commonly a simple construction with the characteristics of a model is not being built through social constructionism, the term 'constructionism' is best avoided and an alternative word sought. Consequently, the term 'modelling' has been adopted.

TOWARDS A NEW APPROACH TO COGNITIVE PROCESSING IN SCHOOLS

In this article the origins of the term 'constructivism' are discussed. In its simple form the term refers to cognitive processes that are involved in the incorporation of new knowledge in the brains and minds of individuals. In general, the sources of the knowledge are concrete experiences, as would be appropriate at the stage of concrete operational thinking. Furthermore, the social contexts in which the learning experiences occur are likely to have effects on the learning outcomes. As a consequence, some of the ideas associated with constructivism and social constructivism would appear to provide a meaningful account of the cognitive processes involved.

At around the age of 15 years, under circumstances where an individual student has had appropriate experiences in working with symbols of particular types, the student is prepared for thinking with formal operational processes that involve hypothetico- deductive operations. This is also the stage in learning when logical proof of relationships is meaningful and when formal problem solving tasks can be provided for solution.

During the stage of concrete operational thinking, learning through situated action would appear to be involved. Both the use of concrete operational thinking and learning through situated action continue in particular situations at times throughout life. However, added to these processes during the stage of formal operational thinking are both the capacity to engage in formal operational thought and to use symbol processing procedures in which the individual has been trained. Nevertheless, it is evident from university teaching that some students have not reached the stage of formal operational thinking even though they have sometimes attained the age of 20 years or more, and may never be capable of formal thought. Moreover, many people frequently revert to the use of concrete operational thought under particular circumstances, even though they are well capable of formal thinking.

Thus, the choice is not between a symbol processing approach or a situated action approach to learning, but rather the search for a further approach that encompasses both of these approaches,

each to be used in appropriate situations. To base learning experiences on one approach to the exclusion of the other during the years of schooling is to deny students the capacity to use one type of procedure in situations that demand its use. The development of a curriculum solely with the principles of constructivism in mind, or to base a curriculum only on the principles of social constructivism is to deny students the capacity to advance to formal operational thought. Likewise, to develop a curriculum based solely on formal operational thinking with a concentration on symbol processing procedures for students who have not been adequately prepared is to provide very frustrating learning experiences for those students who cannot cope with formal operational tasks.

These issues do not appear to be adequately acknowledged in educational circles in many Western countries, including Australia and the United States. Shayer and Adey (1981) in Britain would appear to be aware of the issues and have argued for 20 years and more for the development of appropriate curricula. A recent article by Penner (2001), titled 'Cognition, Computers, and Synthetic Science: Building Knowledge and Meaning through Modeling', laid excellent foundations for a shift towards what he recognises to be a modelling approach. This modelling approach is probably not new. However, Penner fails to recognise that a model must be tested for adequacy, not only in the accumulation of knowledge by scientists, but also by individual students in their learning of science and mathematics in schools and universities. The emphasis on practical work in English and American schools from the beginnings of the twentieth century, under Armstrong's (1903) advocacy, has ensured that the testing of models in the learning of science has not been ignored during the past century. However, it is unfortunate that while Penner considers practical work in the traditional teaching of science, he does not see clearly the role of testing of models in a modelling approach.

> Science education needs to move beyond the demonstrations and so-called experiments that are characteristic of school science. This requires that researchers and educators consider ways of engaging students that involve them in seeking to understand and explain natural phenomena. (Penner, 2001, p. 1)

Clearly, there is need to develop the modelling approach that Penner strongly endorses and to consider where it fits in the debate on the nature of the cognitive processing involved in the testing of ideas. Nevertheless, Penner rightly recognises the power of computers and synthetic science in the teaching of both science and mathematics. It is exciting to learn of the development of a computer based mathematics course that has adopted a modelling approach and is designed for use at the upper secondary school level in Australia. This work that is being carried out at the I. N. Baker Mathematics Centre in Adelaide has the potential to transform the teaching of mathematics in secondary schools through the adoption of a modelling approach.

TOWARDS A NEW APPROACH TO COGNITIVE SCIENCE

The partial rejection of both the situated action approach and the physical symbol processing hypothesis approach considered above demands a new theoretical approach to cognitive science. A connectionist theory and recent work on artificial neural networks (ANNs) has been presented by Evers (2000) with a taxonomy of the main models being employed together with a fairly detailed account of the workings of one particular type of model in an educational situation (Yuen, 2000). It is of interest that a first account of this work seen by this author in an educational setting should come from the University of Hong Kong in the Asia-Pacific Region. Are the new frontiers of educational research being established in the Asia-Pacific Region?

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