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Author(s)	Sim Wong Kooi
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# The Third RITE: Developing a Research Agenda as a Follow-up of the 1990 ICET World Assembly

by  
SIM, WONG KOOI

## RITE Beginnings

With the establishment of the National Institute of Education (NIE) as part of the second university in Singapore on 1 July, 1991, a strong signal regarding the importance of research has been quite apparent. Besides the use of research productivity as the overriding criterion for considering the absorption of staff from the Institute of Education (IE), the Centre for Applied Research in Education (CARE) has also been established with the main function of promoting, provoking and publicising educational research activities at NIE.

Before we go "back to the future," a short trip to the past is necessary. When the NIE was established in 1973 through the amalgamation of the Teachers Training College and the Research Unit of the Ministry of Education and the School of Education of the then University of Singapore, it was clearly charged with not only the "training of teachers in various fields and at all levels" but also with the "promotion of research in education." However, with the passage of time, the latter function was, for a variety of reasons, progressively on the decline. Moreover, its status as a tertiary institution appeared also to have been on a downward trend.

By 1982, there was hardly any research to speak of other than a few sporadic *ad hoc* studies. A concerted effort was therefore made to step up research activities with the view to eventually upgrade the Institute to a university status, since research is a *sine qua non* for academia. Among the earlier initiatives were:

- [a] instituting a staff development programmes whereby promising staff were sponsored for postgraduate studies, together with formal recognition of research and publications for staff recruitment and promotion;
- [b] hosting an international conference on "Research and Teacher Education" in 1983;
- [c] inviting eminent scholars from overseas to conduct workshops for staff on various aspects of research;
- [d] encouraging international conference participation through which cross-national research projects have often resulted;
- [e] revamping the Master of Education programme in 1983 to include coursework which has resulted in a dramatic increase in the number of M.Ed. graduates each year;

- [f] spearheading the formation of an Educational Research Association in 1987; and
- [g] establishing an Educational Research Unit in 1988 to coordinate research within the Institute.

In 1987, an in-house Workshop was conducted in order to review research interests and activities and to develop a research agenda, especially one which focussed on Research In Teacher Education (RITE). [Sim, 1987]. Initially, five groups were formed, each group to simulate the roles of possible stakeholders (Political Leaders, Ministry Officials, Parents/Public, School Principals and Classroom Teachers) in trying to answer each of the following questions in turn:

- What would stakeholders WANT to know about education?
- What would stakeholders NEED to know about education?
- What Assessment of Performance (AP) studies would be useful for stakeholders?
- What Evaluation of Innovation (EI) studies would be useful for stakeholders?

Since the initial exercises were brainstorming sessions, a multitude of answers were produced initially. The groups were then asked to narrow down to the top three priority suggestions, followed by successive attempts at synthesis. The penultimate set of priority areas is shown in *Annex A*. From this set, a conceptual framework was super-imposed with two dimensions, representing the *Type of Data* - Factors Associated with Performance (FAP) versus Effectiveness of Innovative Procedures (EIP) - and *Sourced of Data* - IE-Focussed (IEF) versus School-Focussed (SCF) -, as shown in *Fig.1*.

**Fig. 1: Conceptual Framework for RITE Studies**

	IEF	SCF
F A P	Input-Throughput- Output (ITO) Studies	School/Teacher Effectiveness (STE) Studies
E I P	Theory-Practice Linkages (TPL) Studies	Innovative Teaching and Learning (ITL) Studies

The matrix results in four domains, namely ITO, TPL, STE and ITL, which were used to generate a number of research questions. As a matter of fact, 24 research questions were initially generated and these were subjected to further prioritisation which yielded 12 top questions that formed the basis of eight RITE projects as follows:

**Projects ITO1: IE Selection Criteria**

- How predictive are existing selection criteria of performance in the pre-service programmes and subsequently in school?
- How do additional/alternative selection criteria compare with existing criteria in predicting performance in the pre-service programmes and subsequently in school?

**Project ITO2: IE Programme Effectiveness**

- How effective are the different courses/programmes in terms of end-of-course/programme performance as well as subsequent performance of expected roles in school?
- How should pre-service courses/programmes be modified to cater for the needs and problems (perceived or otherwise) of beginning teachers?

**Project TPL1: Theory-Practicum Linkages**

How extensively are theoretical principles and research findings being used in practicum conferencing and practicum experiences being used in theory courses?

**Project TPL2: Experienced Teachers' Use of Theory**

- How extensively are theoretical principles and research findings being used by experienced teachers in decision-making?
- How effective is cooperating teacher training/orientation in helping them to use theoretical principles and research findings when they supervise student teachers?

**Project STE1: "Expert" versus "Novice" Teachers**

How do "expert" teachers who are effective according to academic as well as non-academic criteria differ from "novice" teachers in various teaching roles?

**Project STE2: School and Teacher Effectiveness**

- How do schools with different characteristics compare in terms of academic as well as non-academic criteria of school effectiveness?
- How do teachers with different characteristics compare in terms of academic as well as non-academic criteria of teaching effectiveness?

**Project ITL1: Effectiveness of Learning Strategies and Metacognitive Skills**

How effective are methods aimed at fostering learning strategies and metacognitive skills in students of varied background characteristics?

**Project ITI2: Jobs Orientation Backup System (JOBS)**

How effective is the use of "non-traditional" approaches, including non-traditional personnel and technologies, in developmental career guidance?

**RITE Perspectives**

It should be apparent that a number of value assumptions underlie the nature of and need for the RITE projects. Three important sets of assumptions are as follows:-

1. It is assumed that some research areas have greater appeal to teacher educators than other areas. It is further assumed that teacher educators would be interested particularly in research which is
  - [a] focussed on the schools or on IE itself and
  - [b] concerned with how the educational system or its sub-systems are performing or how effective are innovations introduced into the system. It is also assumed that the scope of each project is sufficiently broad to allow group as well as individual interests to be sustained in terms of developing sub-projects whereby sub-groups or individuals could play leading roles.
2. It is assumed that educational needs are likely to vary considerably across cultural, organisational, socio-economic and temporal contexts to warrant a conscious recourse to more innovative approaches not only in teaching and learning but also in researching and evaluating such innovations. Furthermore, in view of the multi-faceted nature of educational problems, deliberate attempts to go beyond mere replication of studies conducted elsewhere and to adopt a cross disciplinary perspective are needed. And, since project members from different disciplines are likely to have different perspectives, innovativeness in designing the study is called for.
3. It is assumed that, whether the research is conducted in IE or in the schools, specific plans for using the results for the eventual improvement of teacher education should be incorporated in the project right from the start rather than including an incidental remark concerning implications for improving teacher education listed at the end of a report that ends up merely decorating shelves. Also, it is assumed that

wider applicability of the research findings is desirable, and hence meticulous attention to issues of generalisability need to be made.

There are therefore many RITE perspectives and, for convenience, it is useful to refer to the three main perspectives as:

- [a] The *First RITE*, which stands for Research of Interest to Teacher Educators.
- [b] The *Second RITE*, which stands for Research on Innovations for Teacher Education.
- [c] The *Thrid RITE*, which stands for Research for Improvement of Teacher Education.

The general impression is that if the foregoing criteria are applied rigorously to the eight projects at present, some of them would satisfy those for the First Rite, but only a few would satisfy the Second Rite criteria fully, while practically none could be regarded as satisfying all the Thrid RITE criteria. In order to reinforce these criteria, an in-house workshop was held earlier in 1991 as a follow-up of the 1990 ICET World Assembly, ostensibly to examine a sample of papers and to draw up a set of guidelines for re-examining and possibly re-orienting the existing RITE projects. The precise nature of the papers selected need not concern us, but the 12 papers, which are listed in *Annex B* were intended to provide a cross-section of content and research methodology.

The papers were divided into four sets of three each for scrutiny by eight groups of 3 - 5 persons each. [They were labelled [A1, A2, A3, B1, ..., C1, ..., D1, D2, D3]. Two groups worked on each set of three papers, - e.g. groups 1B and 2B worked on the three papers B1, B2 and B3. Using each of the criteria of "interest," "innovativeness" and relevance to "improvement" in turn, each group selected papers that were MOST and LEAST interesting/innovative/relevant to improvement respectively and attempted to identify specific features that characterised their choices. Finally, they attempted to spell out some of the criteria they would use in judging a research paper as interesting/innovative/relevant to improvement in teacher education.

The papers that were selected as MOST [+] or LEAST [-] interesting/innovative/relevant to improvement in teacher education are shown in *Table 1*.

In some cases, the groups could not decide on any paper to be classified as MOST or LEAST interesting/innovative/relevant to improvement in Teacher Education. The relevant cells were therefore left blank. Another way of viewing the results is in terms of a VENN diagramme, as shown in *Fig. 2*. Overall, it is interesting to note that there is considerable agreement between each of the two groups who were given the same set of three papers. By and large, there is also considerable agreement in the qualitative responses, such as the suggested criteria for interest, innovation and improvement.

In terms of the First RITE [or Interest] criteria, the collective group responses may be classified under four categories:-

**Table 1: Papers selected by Groups According to Interest/Innovation Improvement/Criteria**

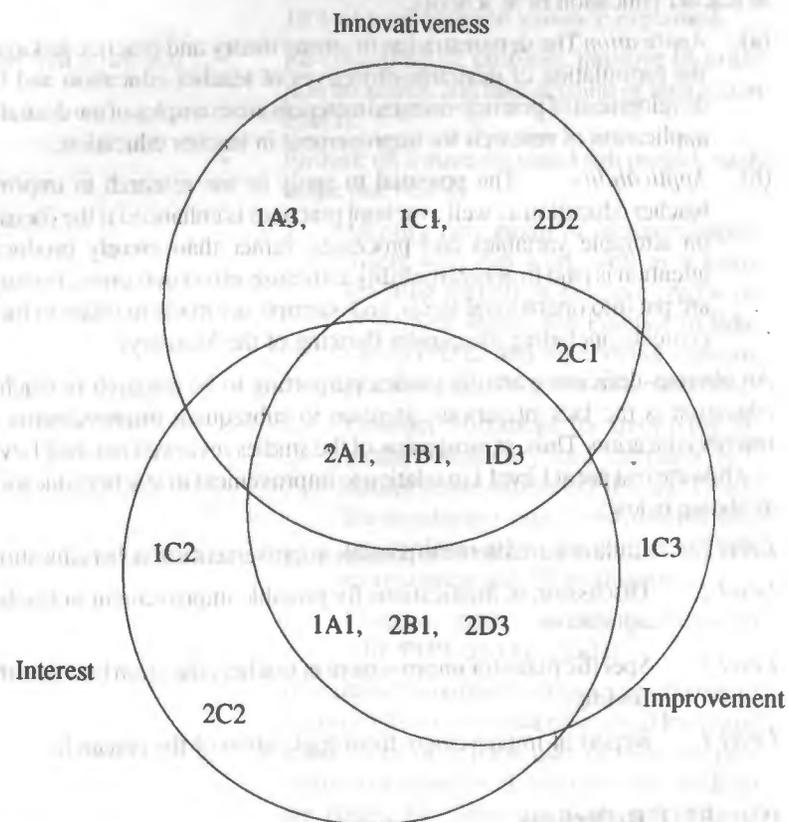
Groups	Interest		Innovation		Improvement	
	+	-	+	-	+	-
1A	A1		A3		A1	
2A	A1	A3	A1	A3	A1/3	A2
1B	B1	B3	B1	B2	B1	B3
2B	B1	B2		B2	B1	B2
1C	C2	C3	C1	C2	C3	
2C	C2	C3	C1		C1	C2
1D	D3	D2	D3	D2	D3	D2
2D	D3	D2	D2	D1	D3	D2

- [a] **Relevance.** Research which provides a basis for prioritising teacher education programmes or further research is related to the knowledge base of teacher education or is meaningful to the local situation or related to local studies would be of interest to teacher educators personally as well as professionally.
- (b) **Rigour.** Interest can apparently be generated also by the rigour in design, by relating to specific contexts, or by incorporating a longitudinal study and in the use of sophisticated or comprehensive data collection and data analysis techniques.
- (c) **Reality.** A research study would presumably be of little interest if its style of presentation, including its title, is not very readable nor comprehensible and the contexts and conditions are not clearly spelt out to allow for possible replication of the study or generalisation of the findings.
- (d) **Range.** Research findings which provide a range of ideas or insights, especially fresh and even unexpected perspectives to old issues would also be of interest to teacher educators.

As for the **Second RITE (or Innovation)** criteria, three main types of innovative features were identified by the groups:

- (a) **Conceptualisation.** Innovative conceptualisation, especially the use of new conceptual frameworks and of creative ways of conceptualising a prevailing problem, is regarded as an important feature of research.

**Fig. 2** Distribution of Papers Identified by Groups as Being **MOST Interesting, MOST Innovative and MOST likely to result in Improvement in Teacher Education.**



- (b) *Methodology* Innovative methodology includes new and unusual ways of data collection and recourse to "triangulation" procedures of cross-validating data, as exemplified by use of a variety of instruments and sources of data, multidisciplinary approaches and a mixture of qualitative and quantitative methods.
- (c) *Outcomes* Innovative outcomes refer to new ways of interpreting and presenting research findings as well as attempts to generate other research questions and to look for implications beyond the study itself.

The **Third RITE** (or improvement) criteria suggested by the groups refer either to actual application or the applicability of the research results, either in teacher education or in schools.

- (a) *Application* The demonstration of strong theory and practice linkages, the formulation of desirable objectives of teacher education and the development of practice-oriented materials are examples of the desirable application of research for improvement in teacher education.
- (b) *Applicability* The potential to apply or use research to improve teacher education as well as school practices is enhanced if the focus is on alterable variables and processes, rather than merely products, attention is paid to generalisability and cause-effect outcomes, findings are put into operational terms, and attempts are made to relate to local contexts, including the current thinking of the Ministry.

An obvious deficiency among studies purporting to be research in teacher education is the lack of serious attention to subsequent improvements in teacher education. Thus, at most a few of the studies reviewed reached Level 2, while the rest are at Level 1 in relation to improvement in teacher education as shown below:

- Level 1:* Little or no reference to possible improvement in teacher education.
- Level 2:* Discussion of implications for possible improvement in teacher education.
- Level 3:* Specific plans for improvement in teacher education based on the findings.
- Level 4:* Report of improvement from application of the research.

### (C) RITE Reflections

The next stage of the workshop involved an evaluation of the existing RITE projects by four groups using the criteria of *interest, innovation and improvement*, including the identification of the main "*perceived problems*" and "*suggested strategies*". Space would not permit a detailed report of the discussions that occurred. However, in order to provide a flavour of kinds of outcomes, very brief summaries for two projects are presented below:

### [a] Project ITOI: IE Selection Criteria

#### *Brief project overview*

Over and above the traditional use of academic criteria, additional instruments such as the 16PF and MTA1, were also explored, with several cohorts of students. Using various theory and practicum grades as criteria, academic background variables still appear to be relatively more predictive of performance; but the proportions of criterion variances explained by the cognitive and affective predictors, whether singly or together, were invariably low.

*Perceived Problems*

- CRITERION measures are not too reliable, valid and usable.

- PREDICTOR variables account for only about 10% of total criterion variance explained.

#### *Suggested Strategies*

- Re-conceptualise problem, improve on criterion measures, and take account of interaction effects.

- Embark on a more focussed sub project, such as the one below:

1. Identify two group of lecturers/supervisors who can work well as a team: teaching part/all of the core course on Principles, Issues and Practice in Education (PIPE) and supervising teaching practice (TP) in one or more subjects.
2. Conduct workshops for improving internal consistency and interrater reliability in assessment of PIPE and TP and for developing a set of instruments with greater face validity for predicting PIPE examination and TP evaluation
3. Correlate grades on new predictor set with PIPE and t.p. grades.

If results are promising, *either* expand scope of study progressively to encompass all lecturers/supervisors of a particular pre-service programme or arrange with schools where students are posted for follow-up evaluation of performance, after workshop with school heads of Department to develop additional criterion measures.

If the result are no better than before, abandon sub-project, or even the total project.

**(b) Project ITL2: Jobs Orientation Backup System (JOBS)****Brief project overview**

**JOBS** is a computer-assisted career guidance package intended to serve as a backup system for career teachers in secondary schools. The main preoccupation has been with the validation of the Career Profile Inventory which focuses on exploration of interests, abilities and work values through a survey of representatives of some 200 occupational groups. To date, about 6,000 responses were received but these represent only 113 occupational groups. At a later stage, **JOBS** would be tested in a number of schools.

**Perceived Problems**

(a) Project seems to be behind schedule and leaving field trial till the end of this year may be unrealistic.

(b) Relationship between **JOBS** and training of teachers in career guidance is unclear.

**Suggested Strategies**

(c) Employ "bootstrap" strategies to develop "guesstimated" career profiles for the remaining occupations, such as by having a specialist panel discuss relevance of categories for these occupations as suggested by research elsewhere.

(d) In the meantime, a special training programme should be developed for teachers in the pilot schools to intergrate **JOBS** in their school career guidance programme. Also, appropriate performance measures should be developed to compare the pilot schools with those whose teachers have received, as well as those whose teachers have not received, training in career guidance.

**(d) RITE Futures**

Under ordinary circumstances, it might have been reasonable to expect each project team to undertake follow-up activities to steer their project towards fulfilling the desirable criteria of *interest, innovation and importance*. However, a lack of enthusiasm is discernible in a number of the **RITE** projects. Two factors are probably responsible for this state of affairs:

(a) Ironically, with the new emphasis on research and publications, there seems to be less interest in research that would contribute to improvements in teacher education in comparison with smaller-scale studies that the *modus operandi* of the projects could be radically changed.

(b) Since most of the **RITE** projects have hitherto not succeeded in catering or even attempted to cater adequately to the needs and interests of

individual team members, e.g. publications tended to have only the leader as the author or the main author, many are skeptical that the *modus operandi* of the projects could be radically changed.

Accordingly, it was felt that while individual project teams are left to consider the future directions that they would take, the initiation of a new project which could exemplify most of the characteristics or criteria would be highly desirable at this stage. The participants of the workshop were finally involved in a simulation exercise to stimulate preliminary thinking on a possible project. The title of the role playing exercise is called MITU, which stands for Meaningful and Innovative Test Utilisation. Again, only a very brief account can be given in this paper.

Three groups of 7 - 8 persons each were supplied with the following "Suggested procedure":

"The **OBJECTIVE** of this exercise is to simulate a group of NIE staff and school teachers who are meeting to plan a collaborative project for using tests and test results in more meaningful and innovative ways. For the purpose of this exercise, 'meaningful' is taken to mean the extent to which test users are able to derive enhanced significance and benefit from special ways of test construction and analysis and representation of test results. **Innovative** is similarly taken to mean unique and novel ways of testing which make it a pleasant and interesting task for testees to take the test and for test users to utilise the test results.

"Each group should select its own Chairperson and Secretary. The other members (Lect1, Lect2, ..., Teach1, Teach2 ...) are expected to contribute ideas **ONLY** when the Chairperson asks a specific question pertaining to the project. If the question is regarded by a member as being too global, e.g., "What suggestions have you for the project?", he or she should just say 'pass' rather than attempt to give specific suggestions. The Chairperson is allowed to ask **FIVE** Questions only, after which the group should collectively develop a 'research plan' for presentation to the entire workshop."

Below are brief descriptions of only two of the roles, merely to illustrate the nature of the role playing situation:

**"MITU Role: Lect 2"**

Your role is that of a lecturer at NIE. You firmly believe that it is more parsimonious and purposeful to use quantitative measures, especially in reducing the complex data pertaining to human behaviour to some meaningful shorthand forms. You feel that the current swing towards qualitative descriptions is a dangerous, subjective trend. You would instead try to make sophisticated measurement techniques more easily understood and more 'user-friendly' by presenting test results in a simplified, pictorial form and avoiding the use of technical jargons or numerical computations in the presentation."

### "MITU Role: Teach 1"

Your role is that of a teacher of English. As you have 'no head for figures,' you dislike analytical marking and, of course, the use of summary statistics, however simple, in presenting the results of class tests. Instead, you prefer to enjoy reading your pupils' essays, unencumbered by having to use a marking scheme. Hence, you have developed a simple form of impressionistic marking, whereby you initially place the essays into 10 possible piles and then put each pile into 10 possible sub-piles. You have also found that it is better merely to underline any part that is syntactically wrong and to place a question mark around the part that is semantically questionable. Pupils who are unable to find out what exactly are their errors or inconsistencies are encouraged to consult you."

Although none of the groups managed to complete the exercise by suggesting a plausible project, some of their ideas were useful in a subsequent formulation of a project entitled "Primary Pupil Profiling Project" started barely a few weeks ago. The reason for mounting this project is that schools are likely to need assistance in conducting school-based assessments, with the impending changes to primary education as from next year. [Yip et al., 1991] Although the assessments are mainly for the purpose of streaming, we feel that, with the recent more innovative application of item response theory, coupled with more sophisticated uses of information technology, the potential of pupil profiling in providing meaningful information to those who need to make important decisions regarding learning, teaching and managing has been greatly enhanced. In particular, the work of Masters et al. (1990) in using rather innovative ways of testing and reporting of test results that would be most meaningful to different users, appears very promising.

With a cross-disciplinary team comprising NIE staff and representatives from schools and the Ministry of Education, the team expects to develop and validate tests in basic literacy and numeracy as well as explore the development of Learning Abilities and Dispositions instruments, including a Bilingual Aptitude and Attitude Test and other cognitive and non-cognitive measures which could be included in the pupil profiling portfolio. Besides attempting to establish norms for key profile components, the project hopes to study various structural relationships and to develop modules to assist teachers to apply remedial strategies based on the analysis of specific weaknesses identified in the pupil profiling instruments.

Hopefully, this project will be able to demonstrate most of the desirable characteristics of a RITE project, as the following:

- (a) In terms of the **First RITE** criteria, the project focusses clearly on an anticipated area of need in schools and hence involves school practitioners as well as Ministry of Education Officers in curriculum planning, research, testing and pastoral care. With the sub-teams on English, Chinese, Mathematics and Learning Abilities and Dispositions

being encouraged to develop plans whereby individual members would have opportunities to take charge of well-defined areas of investigations that could eventuate in research publications, this project is likely to be of interest to NIE staff across different disciplines. The conduct of in-house seminars from time to time on various theoretical underpinnings as well as regular meetings to share experiences should, we hope, be particularly appealing.

- (b) As for the **second RITE** criteria, the project incorporates many of the innovative features of the Basic Skills Testing Programme (Masters et al., 1990), such as the use of interesting stimuli materials in test construction, the efficient use of **The Interactive Test Analysis (TI-TAN)** system, a computer package which includes partial credit analysis, rating scale analysis, and item analysis, and the innovative reporting of test results to teachers, parents and the school as a whole. In addition, the project hopes to include many more new features, such as the use of non-paper-and-pencil test items as well, including various cognitive and non-cognitive measures, and the establishment of pupil norms and identification of pupil weaknesses for use in follow-up remedial action.
- (c) Finally, in respect of the **Third RITE** criteria, the project has been designed with the view to improve teacher education ultimately and includes the development of self-instructional modules on pupil profiling and remedial education for teachers. In the longer term, it is hoped that the project would pave the way to the training of future teachers in the use of item response theory and not just classical test theory as is the current practice.

While the current research agenda of the NIE is still a mixed bag, it is hoped that the **Primary Pupil Profiling Project**, and other similar initiatives would catalyse the emergence of more research of the **RITE-type**. When that happens, the NIE could seriously consider the possibility of conducting research of the **RIPE-type**, where **RIPE** stands for Research for Improvement of Professionalism in Education.

### (E) References

- Masters, Geoffrey et al. (1990) *Profile of Learning: The Basic Skills Testing in NSW, 1989*. Hawthorne: Australian Council for Educational Research.
- Sim, Wong Kooi (1987) Review, Rear-View, Real View and Review of RITE. A Talk to Institute of Education Staff At An In-House Workshop.
- Yip, John Soon Kwong et al. (1991) *Improving Primary School Education*. Report of the Review Committee. Singapore: Ministry of Education.

## Annex A

## Suggested Areas of Research Likely to Yield Information that Might Interest Various Stakeholders

Research Areas Stake holders	RESEARCH IN EDUCATION What would Stakeholders Want .....Need To Know About Education?		RESEARCH IN TEACHER EDUCATION What Ap .....BI Studies Would Be Useful for Stakeholders	
Political Leaders	School Effectiveness in of Optimal Dev't of Each Child  (... max. Dev't of Bright Children	Alternative/ Additional Goals and Roles Of Education in National Deve- lopment Naational Courses Development	Professionalism and Teaching Performance (Effectiveness of IE Programmes/ Courses?)	Innovative Strategies and Policy Concerns
Ministry Officials	Effectiveness of Education and Teacher Education	Charactristics of Effective Principals and Teacher	Relating Characteristics (I) & Programme Activities (T) Optimally to Teacher Effectiveness (O)	Innovative Was of Linking Theory and Practuce
Parents/ Public	Information on Policies and Better Parental Decisions/ Involvements	Parental Roles/ Expectations and Curriculum Improvements	Follow-up Evaluation of IE Programmes/	Innovative and Effective Use of Info. Tech. in Educ. (ITE)
School Principals	School, Teacher and Student Characteristics in "Successful Schools." (Effective Approaches to Sch. Imp't?)	Needs of Principals as Institutional Leaders/ Master	Valid, Reliable Usable Techni- ques for Programme Evaluation	Evaluating Collaborative Innovation in Schools
Classroom Teachers	Effective and Efficient Ways of Facilitating and Managing Learning	Evaluation in Improving/ Individualising Instruction	Support for Teachers in Evaluating Pupil and Sel-Performance	Fostering and Evaluating Creative Teaching and Creative Learning

## ANNEX B

## (G) ICET Papers Used in Workshop

- A1: "The Wealth of Nations and the Generation of Wealth" by Bruce A. Jeans
- A2: "Teachers' Job Attitudes and School's Organisational Attributes: A School Level Analysis" by Cheng Yin-Cheung
- A3: "An Inquiry into 'Expert' Chemistry Teaching at the Pre--University Level in Singapore" by Angela F. L. Wong and Koh Thiam Seng
- B1: "Becoming a Teacher — Brace Yourself" by J.H.C. Vonk
- B2: "Student Teachers' Perception of Teaching" by A. Lourdusamy and Zainal Ghani
- B3: "The Cultures of Two Primary Schools in Singapore" by Richard Lancaster
- C1: "Prospective Student Teachers: Where are They At?" by Loise Laskey and Peter Halinan
- C2: "Teacher Burnout in the United Arab Emirates Public Schools" by Samir Abdel-Aal Mohammed
- C3: "Practical Evaluation of Teacher Education Programmes" by Jerry B. and Mary N. Ayers
- D1: "Perceptions of Chemistry Teacher Trainees and Teacher Educators Concerning a Training Programme for Malaysian Teachers in Chemistry with Particular Reference to Classroom Behaviour" by Siow Heng Loke
- D2: "Evaluating the Impact of a Staff Development Programme on Principals" by Nicholas Difgio et al.
- D3: "Identification and Development of Teachers' Professional Craft Knowledge" by Margaret Batten