



UNIVERSITI PUTRA MALAYSIA

**DEVELOPMENT AND VALIDATION OF INFORMATION
TECHNOLOGY (IT) BASED INSTRUMENT TO MEASURE
TEACHERS' IT PREPAREDNESS**

WONG SU LUAN

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IT PREPAREDNESS**

By

WONG SU LUAN

**Thesis Submitted in Fulfilment of the Requirement for the
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Chairperson: Professor Dr. Kamariah Abu Bakar

Faculty: Educational Studies

The Malaysian Ministry of Education plans to turn approximately 10,000 primary and secondary schools into Smart Schools which emphasise the use of Information Technology (IT) by the year 2010. This means that all teachers must be fully prepared to teach in Smart Schools nation-wide. The pressure on teachers has, therefore, become urgent. For this reason, there is a growing educational interest in the assessment of teachers' IT preparedness.

This study attempts to develop and validate an instrument to measure teachers' IT preparedness. IT preparedness is measured in three domains: the teachers' actual IT skills, their knowledge about IT and their attitudes toward IT. Initially, three tables of content specification were constructed for each domain. These tables comprised two dimensions. Actual IT skills were measured in terms of content (word processing, electronic spreadsheet, electronic database, electronic presentation and



the Internet) and task categories (basic operation, manipulation and design); knowledge about IT was measured in terms of content categories (system hardware, system software and the Internet) and Bloom's taxonomy (knowledge, comprehension and application); attitudes were measured in terms of content categories (the Internet, specific software applications, software applications in general, computer and IT in general) and four sub-domains (usefulness, confidence, anxiety and aversion).

A panel of six expert judges verified the content and task level of each item. Their concurrence supported the claim of content validity. Face validity was established when the participants claimed that the instrument seemed to measure their actual IT skills, knowledge and attitudes. Phases one and two of the study were used to analyse and revise the item pool. Items that met the difficulty, discriminant criteria (between 30% and 90%, above .30 respectively) and distractor analysis were administered in phases three and four. Factor analysis was accomplished with an option of four factors. The reliability of scores from each of the three domains (skills, knowledge and attitudes) was above .70. Two main and six minor hypotheses were tested to support construct validity. The items also showed convergent and divergent validity. Based on the results all tests carried out, the instrument was proven to be good. It also exhibited its ability to relate to relevant extraneous variables (gender and prior computer experience). The researcher is confident that sound psychometric test construction principles have been followed throughout this study.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

**PEMBINAAN DAN PENGESAHAN SATU INSTRUMEN BERASASKAN
TEKNOLOGI MAKLUMAT BAGI MENGUKUR KESEDIAAN GURU-
GURU TERHADAP TEKNOLOGI MAKLUMAT.**

Oleh

WONG SU LUAN

January 2002

Pengerusi: Professor Dr. Kamariah Abu Bakar

Fakulti: Pengajian Pendidikan

Kementerian Pendidikan Malaysia bercadang untuk menjadikan lebih kurang 10,000 buah sekolah rendah dan menengah kepada sekolah bestari yang menekankan penggunaan teknologi maklumat pada 2010. Ini bermakna semua guru perlu bersedia sepenuhnya untuk mengajar di sekolah bestari di seluruh negara. Penyediaan guru ke arah memenuhi matlamat ini menjadi satu tekanan kepada guru-guru. Ini juga mencetuskan minat bidang pendidikan untuk mengukur kesediaan guru terhadap teknologi maklumat.

Kajian ini bertujuan untuk membina dan mengesahkan satu instrumen untuk mengukur kesediaan guru terhadap teknologi maklumat. Kesediaan terhadap teknologi maklumat dalam kajian ini adalah diukur dalam tiga domain iaitu kemahiran teknologi maklumat guru, pengetahuan teknologi maklumat dan sikap mereka terhadap teknologi maklumat. Pada mulanya, jadual spesifikasi isi dibina untuk setiap domain. Setiap jadual

ini mengandungi dua dimensi. Kemahiran teknologi maklumat diukur dari segi kategori isi (pemproses perkataan, helaian hamparan elektronik, pangkalan data elektronik, persembahan elektronik dan Internet) dan kategori tugas (operasi asas, manipulasi dan rekabentuk), pengetahuan teknologi maklumat diukur dari segi kategori isi (sistem perkakasan, sistem perisian dan Internet) dan sikap diukur dari segi empat sub domain (kebergunaan, keyakinan, kerisauan dan ketidak sukaan) dan kategori isi (Internet, aplikasi perisian secara khusus, aplikasi perisian secara umum, komputer dan teknologi maklumat secara umum).

Enam orang pakar dirujuk bagi tujuan pengesahan isi dan penentuan tahap tugas untuk setiap item. Persetujuan di antara mereka menyokong kesahan isi instrumen. Kesahan muka diperolehi apabila peserta-peserta mendapati bahawa instrumen tersebut mengukur kemahiran teknologi maklumat, pengetahuan dan sikap mereka. Fasa satu dan dua kajian digunakan untuk menganalisa dan menyemak item-item. Item-item yang menepati tahap kriteria kesukaran dan tahap diskriminasi (masing-masing di antara 30% dan 90%, .30 ke atas) dan analisa pengganggu digunakan di fasa tiga dan empat. Faktor analisa dilaksanakan dengan menghadkan kepada empat faktor. Kebolehpercayaan skor bagi setiap satu dari tiga domain (kemahiran, pengetahuan dan sikap) adalah melebihi .70. Dua hipotesis utama dan enam hipotesis minor diuji untuk menyokong kesahan gagasan. Item-item juga menunjukkan kesahan bertumpu dan kesahan bercapah.

Berdasarkan keputusan dari kesemua ujian, instrumen ini telah dibuktikan sebagai instrumen yang baik. Ia juga telah menunjukkan keupayaan untuk berkait dengan pembolehubah luaran (jantina dan kemahiran awal komputer). Pengkaji beryakinan bahawa prinsip-prinsip psikometrik pembangunan instrumen telah diikuti sepanjang kajian ini.

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I certify that an Examination Committee met on 12th January 2002 to conduct the final examination of Wong Su Luan on her Doctor of Philosophy thesis entitled "Development and Validation of an Information Technology (IT) Based Instrument to Measure Teachers' IT Preparedness" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

Zakaria Kasa, Ph.D.
Associate Professor
Faculty of Educational Studies
Universiti Putra Malaysia.
(Chairman)

Kamariah Abu Bakar, Ph.D.
Professor
Faculty of Educational Studies
Universiti Putra Malaysia.
(Member)

Ramlah Hamzah, Ph.D.
Associate Professor
Faculty of Education Studies
Universiti Putra Malaysia.
(Member)

Rohani Ahmad Tarmizi, Ph.D.
Faculty of Education Studies
Universiti Putra Malaysia.
(Member)

Dato' Jamaludin Mohaiadin, Ph.D.
Associate Professor,
Centre for Instructional Technology and Multimedia
Universiti Sains Malaysia
(Independent Examiner)



AINI IDERIS, Ph.D.
Professor/Dean of Graduate School
Universiti Putra Malaysia

Date: 7 FEB 2002

This thesis submitted to the Senate of Universiti Putra Malaysia has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy.

AINI IDERIS, Ph.D
Professor
Dean of Graduate School
Universiti Putra Malaysia

Date:

DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.



Wong Su Luan

Date: *31 January 2002*

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