UNIVERSITI PUTRA MALAYSIA

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

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

By

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

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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

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Pengerusi: **Professor Dr. Kamariah Abu Bakar**

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Kementerian Pendidikan Malaysia bercadang untuk menjadikan lebih kurang 10,000 buah sekolah rendah dan menengah kepada sekolah bestari yang menekan 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 tugasan (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 tugasan 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 penggangu 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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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.

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