DEVELOPMENT OF SCHOOL BASED ASSESSMENT MANAGEMENT SYSTEM FOR ICT SUBJECT (SBAMS4ICT)

MOHD FAZUDLI BIN SAAD

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By

Mohd Fazudli bin Saad

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ABSTRAK

Subjek *Information and Communication Technology* (ICT) telah diperkenalkan oleh Bahagian Pembangunan Kurikulum (BPK) pada 2006. Subjek ini ditawarkan sebagai subjek elektif kepada calon yang akan menduduki peperiksaan Sijil Pelajaran Malaysia (SPM). Lembaga Peperiksaan Malaysia (LPM) merekabentuk instrumen pentaksiran berdasarkan sukatan pelajaran yang dihasilkan oleh BPK. Pembangunan instrumen pentaksiran ini adalah berdasarkan jadual piawaian spesifikasi bagi menjamin kualiti dan standard, begitu juga kesahan dan kebolehpercayaan bagi skor ujian yang diberikan. Walaubagaimanapun, pengurusan rekod pentaksiran oleh pentaksir di peringkat sekolah adalah masih menggunapakai kaedah manual. Pentaksir perlu mangisi data yang sama dalam borang-borang yang berlainan. Rekod-rekod tersebut perlu diletakkan di dalam 'fail cincin' (portfolio pelajar), dan ditempatkan dilokasi yang berkunci dan selamat. Apabila diperlukan, guru (pentaksir), pentadbir sekolah atau pelajar (calon) perlu mendapatkan portfolio tersebut terlebih dahulu sebelum sebarang rujukan boleh dilakukan. Pendekatan ini sememangnya meningkatkan bebanan kerja pentaksir, kemungkinan kesilapan dalam merekod data, memakan masa, rekod yang tidak dikemaskini, serta beberapa kelemahan lain lagi. Atas dasar ini, projek ini dicadangkan dan prototaip bagi Sistem Pengurusan Pentaksiran Berasaskan Sekolah Bagi Subjek *ICT* telah dibangunkan. Keperluan sistem telah dikenalpasti dan pembangunan prototaip menggunapakai Metodologi Pembangunan Sistem Agile. Fungsi prototaip telah diuji dengan menggunakan kaedah skrip ujian. Penilaian sistem dilaksanakan dengan menggunakan instrumen PUEU bagi mendapatkan tanggapan pengguna bagi aspek kepentingan sistem dan aspek mudah untuk digunakan. Sistem ini membolehkan pentaksir menguruskan rekod pentaksiran dengan lebih mudah berbanding pendekatan secara manual. Pentadbir sekolah mampu memantau prestasi pelaksanaan pentaksiran. Manakala pelajar pula akan dimaklumkan status terkini prestasi pentaksiran mereka melalui email yang telah didaftarkan.

ABSTRACT

Information and Communication Technology (ICT) has been introduced by Curriculum Development Division (CDD) as a subject in 2006. This subject is offered as an elective subject to candidates who are taking the Sijil Pelajaran Malaysia (SPM) examination. The Malaysia Examinations Syndicate (MSE) designed the assessment instruments based on the syllabus released by the CDD. The development of these assessment instruments is based on the standard table of specification to maintain the quality and standard, as well as the validity and the reliability of these test scores. Anyhow, the management of the assessment records by assessor on ground is still on manual effort. Assessor need fill in same data into different forms. Records need to be bind in a ring file (student's portfolio), and placed in the locked and secured place. Whenever needed, teacher (assessor), school admin or students (candidates) need to get the portfolio first and then do a reference. Increase assessors' workload, tendency to writing error, time consuming, not updated records, a few to mention the weakness of this approach. For that regard this project is proposed and the prototype of School Based Assessment Management System for ICT Subject has been developed. The requirements needed have been identified and the prototype development has employed Agile System Development Methodology. The functionalities of the prototype have been tested by using a Test Script method. System evaluation has utilized Perceived Usefulness and Perceived Ease-of-Use instruments. The system prototype has enable assessors to manage assessment records easily compared to manual approach. School admins would have capability to monitor the assessment progress. Students will have a copy of their progress notified through email.

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CHAPTER 1

INTRODUCTION

1.1 Background

In line with the implementation of the teaching and learning of Science and Technology subjects in English, the Curriculum Development Division (CDD) introduced Information and Communication Technology (ICT) as a subject in 2006. This subject is offered as an elective subject to candidates who are taking the Sijil Pelajaran Malaysia (SPM) examination.

The introduction of ICT as an elective subject in Malaysian secondary schools provides a valuable training ground for students (Curiculum Development Division, 2006). The curriculum helps students relate their ICT learning experiences to a progressive technology-based daily life and provides a platform for producing a technologically capable work force. This subject is offered to all Form 4 and Form 5 students. It aims to provide them with the knowledge, skills and values from several

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REFERENCES

adappt. (2011). *Agile Thinking*. Retrieved 03 01, 2012, from Agile Thinking: http://www.adappt.co.uk/agile-thinking

Bahagian Pendidikan Guru. (2012a). *Kementerian Pelajaran Malaysia*. Retrieved 02 28, 2012, from Standard Guru Malaysia: http://apps1.moe.gov.my/sgm/index.cfm

Bahagian Pendidikan Guru. (2012b). *e-SPLG: Sistem Pengurusan Latihan Guru*. Retrieved 02 28, 2012, from Kementerian Pelajaran Malaysia: http://apps.moe.gov.my/splg/index.cfm

Christian, D., Wyatt, B., & Tim, P. (2011). *Build Your Own ASP.NET 4 Website Using C# & VB, 4th Ed.* VIC Australia: SitePoint Pty. Ltd.

Curiculum Development Division. (2006). *Sukatan Pelajaran Kurikulum Bersepadu Sekolah Menengah: Information and Communication Technology.* Kementerian Pelajaran Malaysia.

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly, 13*, 319-340.

Denis, A., Wixom, B. H., & Tergarden, D. (2007). *Systems Analysis and Design With UML Version 2.0: An Object Oriented Approach.* River Street, Hoboken: John Wiley and Sons, Inc.

Dinakar, K. (2009). Agile development: overcoming a short-term focus in implementing best practices. *Proceedings of the 24th ACM SIGPLAN conference companion on Object oriented programming systems languages and applications* (pp. 579--588). New York, NY, USA: ACM.

Gal, A. a. (2001, 07/08). Toward web-based application management system. *IEEE Transactions on Knowledge and Data Engineering, 13(4)*, pp. 683-702.

Galitz, W. O. (2007). *The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Technique, 3rd Ed.* Indianapolis, Indiana: Wiley pulblishing, Inc.

Geerders, P. (2004, 12 30). *Management Information Systems*. Retrieved 02 25, 2012, from Management Information Systems: http://knowledge.cta.int/en/Dossiers/S-T-Issues-in-Perspective/MIS-for-environmental-monitoring/Articles/Management-Information-Systems

Imaar, S. (2010). *Beginning ASP.NET 4 in C# and VB.* Indianapolis, Indiana: Wiley Publishing, Inc.

Kendall, K. E., & Kendall, J. E. (2011). *System Analysis and Design (8th).* New Jersey: Prentice Hall.

Malaysia Examination Syndicate. (2007). *Sijil Pelajaran Malaysia Information and Communication Technology (3765/2): Coursework Assessment Manual For ICT.* Kementerian Pelajaran Malaysia.

Matthew, M. (2010). *Beginning ASP.NET 4 in VB 2010.* New York: Apress.

Matthew, M., Dan, M., & Adam, F. (2010). *Pro ASP.NET 4 in VB 2010, 3rd Ed.* New York: Apress.

Mishra, A., & Mishra, D. (2011). A curriculum for agile software development methodologies. *SIGSOFT Softw. Eng. Notes(36),* 1-2.

Norshuhada, & Shahrizan. (2010). *Design Research in Software Development: Constructing and Linking Research Questions, Objectives, Methods and Outcomes.* Sintok: Universiti Utara Malaysia.

OCC. (1995, 05). *Comptroller of the currency Administrator of National Banks.* Retrieved 02 27, 2012, from Office of the Comptroller of the Currency: http://www.occ.gov/publications/publications-by-type/comptrollers-handbook/mis.pdf

Online Communities. (2011, 08 16). *Teachers losing sleep over online exam system*. Retrieved 02 28, 2012, from community.com.my: http://www.community.com.my/2011/08/16/teachers-losing-sleep-over-online-exam-system/

Oz, E. (2009). *Management Information Systems, Sixth Edition.* Boston, Massachusetts: Course Technology.

Pekka, A., Outi, S., Jussi, R., & Juhani, W. (2002). *Agile Software Development Methods.* Otamedia Oy,Espoo: VTT Publications 478.

Salbiah, I. (n.d). *ICT and School Linkages.* Retrieved 04 29, 2012, from Scribd.com: http://www.scribd.com/doc/11003700/MALAYSIA-ICT-and-School-Linkages

Shelly, G. B., & Rosenblatt, H. J. (2012). *System Analysis and Design (9th).* Massachussetts: Course Technology.

UNESCO. (2009). *GUIDE TO MEASURING INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT) IN EDUCATION.* UNESCO Institute for Statistics.

Viera, R., Borbinha, J., & et al. (2011). A reference architecture for records management 10.11452037556.2037615. *Proceedings of the 12th Annual International Digital Goverment Research Conference: Digital Government Innovation in Challenging Times* (pp. 339-340). College Park, Maryland: ACM.

Wikipedia. (2010, 11 11). *Test script*. Retrieved 04 29, 2012, from Test script - Wikipedia, the free encyclopedia: http://en.wikipedia.org/wiki/Test_script

Wikipedia. (2012, 02 15). *Record Management*. Retrieved 02 28, 2012, from Record Management - Wikipedia, the free encyclopedia: http://en.wikipedia.org/wiki/Records_management

Yasar, A.-U.-H. (2007). Enhancing experience prototyping by the help of mixed-fidelity prototypes. *Proceedings of the 4th international conference on mobile technology, applications, and systems and the 1st international symposium on Computer human interaction in mobile technology* (pp. 468--473). New York, NY, USA: ACM.

Zhang, P., Carey, J., Te'eni, D., & Tremaine, M. (2005). Integrating Human–Computer Interaction Development into the Systems Development Life Cycle: A Methodology. *Communications of the Association for Information Systems, Vol. 15*, 512–543.