SMART PACE

A Project submitted to the Graduate School in partial fulfilment of the requirements for the degree

Master of Science (Information Technology),

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ABSTRAK

Teknologi Maklumat sedang berkembang dengan kadar yang begitu pesat sekali. Perubahan teknologi pada dasarnya dirujuk sebagai revolusi maklumat Revolusi ini telah banyak membuat perubahan kepada kehidupan kita sekarang. Tetapi, pada masa yang sama juga dapat memperbaiki kualiti kehidupan kita dalam menghadapi kelebihan persaingan di era baru teknologi maklumat. Pusat Pendidikan Profesional dan Lanjutan (PACE) di Universiti Utara Malaysia yang mempunyai peranan utama menyediakan program pendidikan jarak jauh serta latihan kursus korporat telah menerima cabaran teknologi ini untuk memperbaiki kesemua kemudahan-kemudahan dan perkhidmatan-perkhidmatan mereka yang ada.

Untuk mencapai matlamat utama dalam member&an pembelajaran yang berkesan serta latihan yang cekap, satu cetakan biru untuk mengkomputerkan keseluruhan pusat ini yang dipanggil sebagai SMART PACE telah dicadangkan dalam laporan ini. Cetakan bit-u ini mengandungi maklumat terperinci bagaimana PACE dapat meneruskan pembangunan pengotomatan sistem pejabatnya dengan menggunakan konsep e-Pengurusan serta konsep e-Pembelajaran bagi programprogram jarak jauhnya. Laporan ini juga membincangkan dengan terperinci keperluan perkakasan dan perisian serta cadangan rangkaian komputer yang baru untuk menghasilkan projek SMART PACE dengan jayanya.

ABSTRACT

Information technologies are expanding at an extremely rapid rate. The fundamental technological change now is referred to as the information revolution. The revolution has done a lots of changes to the way we lives today, but at the same time is improving our life quality for facing the competitive advantage in new Information Age. Centre for Professional and Continuing Education (PACE) in Universiti Utara Malaysia (UUM) whose main role is to provide a distance learning program and corporate training, has accepted the technologies challenge in improving the facilities and services provide by them.

In achieving their main goal for giving an effective learning and efficient training, a blueprint for entire centre computerization has been proposed in this project report called a SMART PACE. The blueprint contains in details of how PACE may proceed for developing an automation system in the office by using the e-Management concept, and e-learning concept for their distance learning programs. This paper discusses in detail the hardware and software requirements with the proposed computer networking in order to develop a successful project.

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CHAPTER ONE

INTRODUCTION

1.0 BACKGROUND

PACE centre is an acronym for Professional and Continuing Education Centre in Universiti Utara Malaysia (UUM) and was formed on 1st. April 1999 to fulfil the university ambition to be the World Status University. The main role of PACE is to offer an education to non-traditional group such as distance learning program and franchising or twinning program with other private institution or corporate training.

There are three units under PACE administration; Distance Learning Unit (DLU), Franchise and Twining Unit (FTU) and Corporate Learning Unit (CLU).

DLU is responsible in planning and offering programs for the schools in UUM, training program for the academic staff, and appropriate programs that is aim to cater for the current need of the market. Distance Learning Unit's future plan is to make an improvement for distance learning methodology and to be more effective in using new collaborative technology.

FTU main objective is to coordinate the program offered jointly with private institutions under the franchise and twinning modes. This unit's future plans include working closely with reputable public and private agencies and to offer more professional and in-house programs and courses.

The contents of the thesis is for internal user only

REFERENCES

- Alexander, S. (1995) Teaching and Learning on the World Wide Web. Paper presented at AusWeb95, online paper available at http://www.scu.edu.au/sponsored/ausweb95/papers/education2/alexander [2000, September 23].
- Bates, A. W.(1995) Technology, Open Learning And Distance Education. London: Routledge.
- Becker, G.S. (1999). Economic Viewpoint: How The Web Is Revolutionizing Learning. Business Week Vol. 3661, pp 40.
- Borgman, C.L. (2000). The Premise and the Promise of Global Information Infrastructure. Available online at http://firstmonday.org/issues/issue5_8/borgman/index.html [2000, September 29]
- Business Wire (1998). Top Online Learning Institutions Form Strategic Alliance With Learning Portal Hungry Minds.com.
- Capron, H.L. (1996). Computers: Tools for an Information Age. Fourth Edition. The Benjamin/ Cummings Publishing Co., Inc.
- Chute, A. G., Sayers, P.K. and Gardner, R.P. (1996). Networked Learning Environment, *Center for Excellence in Distance Learning* Web site. Available online at http://www.lucent.com/cedl/networked-learning.html. [2000, August 15]
- Creed, A. (1999). Malaysia's Mahathir Upbeat On Electronic Government. *Newsbytes* News Network.
- Cross, J. (2000). The eLearning FAQ. Available online at http://www.internettime.com/forum/faq.htm [2000, September 20]
- Dell Computer Corporation (2000, July 28). PowerEdge Server and PowerVault Storage Planning Guide. Available online at http://www.dell.com/spg.zip [2000, September 20].
- Dewayne, M. (1998). Transforming higher education. *Educational Review*, Sept/Oct 98, Vol. 33 (5), pp 48.
- Diotalevi, R.N. (1999). Copyright Dot Com: The Digital Millennium in Copyright. JALN Volume 3 (2) November 1999, pp 20-40.
- Eastmond, D. V. (1995) Alone But Together: Adult Distance Study Through Computer Conferencing. *Cresskill*, NJ: Hampton Press.

- Emory, C.W. and Cooper, D.R (1991). Business Research Methods, Richard D. Irwin, Inc., United States of America.
- Fiber-to-the-Desk: The Ultimate Structured Cabling System (1999) *Anixter: Technical Library*. Available online at http://www.anixter.com/techlib/whiteppr/cabling/ d0504p02.htm [2000, September 20]
- Filipczak, B. (1995). Putting the Learning into Distance Learning. Training 32, no. 10: 111-118 (ERIC Document Reproduction Service No. EJ 511 253).
- Guided Learning: Using the TopClass[™] server as an effective Web-based Training System (1997). A WBT Systems White Paper.
- Government Business Process Reengineering (BPR): Readiness Assessment.

 Available online at http://www.itpolicy.gsa.gov/mkm/bpr/gbpr/gbpra.htm
 [1999, June 3]
- Herman, J. (1999). Are You Ready for E-Management? *Business Communication Review*, Dec 1999, pp 20-21.
- Hyatt, S. (1992). Developing and Managing a Multi-Modal Distance Learning Program in the Two-Year College. Paper presented at the Annual International Conference of the National Institute for Staff and Organizational Development on Teaching Excellence and Conference of Administrators, Austin, Texas, (ERIC Document Reproduction Service No. ED 349 068)
- Hwang, R. and Chao, M.S (1997). A New On-line Paradigm for Developing Courses, Teaching, and Learning: A Project in the Asynchronous Learning Environment at National Chung Cheng University. Paper presented at AusWeb97, online paper available at http://ausweb.scu.edu.au/proceedings/chao/index.html [2000, September 19].
- IBM UPS Systems. Office Office Professional AVR UPS 120V. Available online at http://www.reliableups.com/catalog/family.cfm?line=Office%20Professional%20AVR%20UPS [2000, September 22]
- Indstry Group 91 (1999). U.S. Commerce Secretary Daley Shreds Paper To Deliver Digital Department Commerce To Be Paperless By 2002. *Regulatory Intelligence Data*.
- Jones, D. (1999). Solving some problems with University Education: Part II. Paper presented at AusWeb99, online paper available at http://ausweb.scu.edu.au/aw99/papers/jones/paper.html [2000, September 23].
- Kerka, S. (1996). Distance Learning, the Internet, and the World Wide Web. *ERIC Digest* (Selected) in Full Text. (ERIC Document Reproduction Service No. ED 395 214).
- Kettinger, W.J., James, T.T.C, and Guha, S. (1996). Information architectural design in business process reengineering. Journal of Information Technology, Vol. 11, pp 27–37.

- Kirch, J. (1999). Microsoft Windows NT Server 4.0 versus UNIX. Available online at http://www.unix-vs-nt.org/kirch/ [2000, September 22]
- Kraemer, K.L., Gurbaxani, V., King, J.L., McFarlan, Raman, K.S. and Yap, C.S. (1990). Theoretical Perspectives on the role of institutions in the International diffusion of Information technology. ICIT'90 Conference proceeding.
- Kulik J.A, Kulik C.C & Cohen P.A. (1980) 'Effectiveness of computer based college teaching: a meta-analysis of findings' in *Review of Educational Research*, Vol. 50, pp 525-544.
- Long, L. (1989). Management Information System. Prentice Hall Inc. United States of America.
- Lotus Development Corporation (1999). Domino Workflow White Paper: Automating Real-World Business Processes. Lotus White Paper.
- Lotus Development Corporation (2000). IBM and Lotus Introduce Complete, Flexible e-learning Technology for Enterprises: Lotus LearningSpace 4.0 Provides Platform for Virtual Learning.
- Marjuni, H. (2000). E-government for efficiency. *New Straits Times*-Management Times.
- McGinn, D., (2000). College Online, Newsweek (Atlantic Edition), Vol. 135 (17), pp 58.
- O'Leary, T.J. and O'Leary, L.I (1999). Computing Essentials: Annual Edition: 1998-1999. Irwin McGraw-Hill.
- Paradine, R.J. (1997). Bell Laboratories Demonstrate Achievement of NEXT Channel Performance Requirements for the GigaSPEED Cabling System. Anixter: Technical Library. Available online at http://www.anixter.com/techlib/whiteppr/cabling/ d0503p05.htm [2000, September 20]
- Parrott, S. (1995). Future Learning: Distance Education in Community College. *ERIC Digest* (Selected) in Full Text. (ERIC Document Reproduction Service No. ED 385 311).
- Performance Up ~50% with New Intel Pentium III Xeon Processor (2000). Hewlett Packard Company, HP NetServer LH 6000 & LT 6000r. Available online at http://www.hp.com/pb_cascade.pdf [2000, September 20]
- Rahardja, A. (1999). Designing Interactivity: Who Are The Users And What Are The Techniques. Paper presented at AusWeb99, online paper available at http://ausweb.scu.edu.au/aw99/papers/rahardja/paper.html [2000, September 23].
- Rais, A. K. M., (1998). Addressing challenges pertaining to services in e-govt implementation, Steps to ensure success of e-govt implementation at agency level. *Computimes*, New Straits Times, pp. 34-37.

- Reid, I.C. (1999). Online strategy in Higher Education. Paper presented at AusWeb99. online paper available at http://ausweb.scu.edu.au/aw99/papers/reid/paper.html [2000, September 23].
- Romiszowski, A. (1993). Telecommunication and Distance Education. *ERIC Digest* (Selected) in Full Text. (ERIC Document Reproduction Service No. ED 358 841).
- Schamber, L. (1988). Delivery Systems for Distance Education. *ERIC Digest* (Selected) in Full Text. (ERIC Document Reproduction Service No. ED 304 111).
- Seifert, R. (1995). Technical Report: Issues in LAN Switching and Migration from Shared LAN Environment. *Networks and Communications Consulting*.
- Senn, J.A. (1990). *Information System in Management*. 4th. Edition .Thomson International Publishing. United States of America.
- Slay, J. (1997). The Use of the Internet in Creating an Effective Learning Environment. Paper presented at AusWeb97, online paper available at http://ausweb.scu.edu.au/proceedings/slay/index.html [2000, September 19].
- Stallings, W. (1990). Local & Metropolitan Area Networks, Prentice Hall International, Inc.
- Terry, L. (2000). On the job training. UPSIDE magazine. Available online at http://www.upside.com/texis/mvm/news/news?id=38e15e500 [2000, September 21]
- The easy server your business can depend on (2000, July). Hewlett Packard Company, HP NetServer E800. Available online at http://www.hp.com/ds_e800.pdf [2000, September 20]
- Vargo, J. (1997). Evaluating the effectiveness of Internet delivered coursework. Paper presented at AusWeb97, online paper available at http://ausweb.scu.edu.au/proceedings/vargo/index.html [2000, September 19].
- Waldo, B.H. (1998). Information technology: strategies for success. *Nursing Economics* Vol. 16 (3), pp 33.
- Walsh, J. and Reese, B. (1995), Distance learning's growing reach. (several examples). *T.H.E Journal (Technological Horizons In Education)*, Vol. 22 (5), pp 58.
- Waters, J.O. (1999). Network Operating System Comparison. Available online at http://www.arches.uga.ed/~jowaters/5640/noscomp.html [2000, September 22]
- Webb, G. (1997) A Theoretical Framework for Internet-Based Training at Sydney Institute of Technology. Paper presented at AusWeb97, online paper available at http://ausweb.scu.edu.au/proceedings/webb/paper.html [2000, September 19].

- Whisnant, W.T, Sullivan, J.C. and Slayton, S.L. The "Old" New Resources for Education Student Age. *Journal of Technology Education*. Available online at http://scholar.lib.vt.edu/ejournals/CATALYST /v22N3/whisnant.html [July 2, 2000]
- Willis, B. (1995). Distance Education at a Glance. Engineering Outreach at the University of Idaho. Available online at http://www.uidaho.edu/ distglan.html [2000, September 1].
- Wulf, K. (1996): Training via the Internet: Where Are We? *Training And Development 50*, no. 5, pp. 50-55.
- Zikmund, W.G. (1993). Business Research Methods, 4th ed., New York: Dryden Press.