STUDENTS' ACCEPTANCE OF COMPUTER-AIDED LEARNING:

AN EMPIRICAL INVESTIGATION USING THE TECHNOLOGY ACCEPTANCE MODEL (TAM)

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ABSTRACT

This quantitative project paper entitled Students' Acceptance of Computer-Aided Learning: An Empirical Investigation Using the Technology Acceptance Model (TAM), aims to determine the effect of perceived ease of use (PE) and perceived usefulness (PU) as the independent variables on students' attitude towards acceptance of the computer-aided learning as the dependent variable (ATT). This study also intends to examine whether any differences on the students' attitude towards acceptance of the computer-aided learning (CAL) exist among the respondents from the urban and rural areas. Respondents for this study comprised 619 Form Four secondary schools students from the adjacent districts of Klang (urban) and Kuala Langat (rural) in Selangor. Three schools in Kuala Langat and four schools in Klang were selected randomly using random selection method of Microsoft Office Excel for the distribution of the questionnaires. Data were analyzed using SPSS version 17. Tests conducted were Pearson correlation, multiple regressions, T-test and One-way ANOVA. The Pearson correlation showed that PE and PU were correlated with ATT. The Pearson correlation result of PE to ATT was 0.75. The Pearson correlation result of PU to ATT was 0.710. Multiple regressions showed that PE and PU had significant effects on ATT. Without the mediator, the PE to ATT β-value was 0.750 for $p < 0.01$. The PU to ATT β-value was 0.504 with the same level of confidence. Perceived ease of use also had a significant effect on perceived usefulness. For the mediation effect, perceived usefulness mediated the relationship between perceived ease of use and students' attitude towards acceptance of the CAL. With the mediation effect, the PE.PU to ATT β-value was 0.372 for $p < 0.01$. This showed that PU was the partial mediator since the β-value was reduced and p-value was still $p < 0.01$. R^2 changed significantly from 0.562 to 0.640 when PU was substituted. This also indicated that PU was the mediator. The finding of the T-test showed that there was a significant difference of students' acceptance of the CAL between the rural and urban areas. Recommendations were suggested for the betterment of the educational system that are new policy enforcement, comprehensive training and skill development for teachers, and monitoring of the development and implementation of the CAL.

ABSTRAK

Kertas projek kuantitatif ini iaitu Penerimaan Pelajar Terhadap Sistem Pembelajaran Berbantukan Komputer: Suatu Kajian Empirikal Menggunakan Teori Model Penerimaan Teknologi, bertujuan mengetahui kesan kesedaran kemudahgunaan (PE) dan kesedaran kebergunaan (PU) sebagai pemboleh ubah bebas kepada sikap pelajar terhadap penerimaan pembelajaran berbantukan komputer (ATT) sebagai pemboleh ubah bersandar. Kajian ini juga bertujuan untuk mengenalpasti adakah terdapat perbezaan sikap terhadap penerimaan pembelajaran berbantukan komputer (PBK) di antara pelajar di kawasan bandar dengan luar bandar. Responden kajian terdiri daripada 619 pelajar Tingkatan Empat di sekolah menengah di dua daerah bersebelahan di Selangor iaitu Klang (bandar) dan Kuala Langat (luar bandar). Sebanyak tiga buah sekolah di Kuala Langat dan empat buah sekolah di Klang telah dipilih dengan menggunakan teknik pemilihan secara rawak "*Microsoft Office Excel"* untuk pengedaran borang soal selidik. Data dianalisis menggunakan SPSS versi 17. Ujian yang digunakan ialah korelasi Pearson, regresi berganda, ujian-T dan ANOVA satu hala. Ujian korelasi Pearson menunjukkan PE dan PU mempunyai korelasi dengan ATT. Keputusan korelasi PE kepada ATT ialah 0.75. Manakala korelasi PU kepada ATT ialah 0.71. Ujian regresi berganda menunjukkan PE dan PU mempunyai kesan yang signifikan kepada ATT. Tanpa pengantaraan, PE kepada ATT mempunyai nilai $\beta = 0.75$ dengan $p < 0.01$. Manakala PU kepada ATT mempunyai nilai $\beta = 0.504$ dengan aras keyakinan yang sama. PE juga mempunyai kesan yang signifikan terhadap PU. Untuk kesan pengantaraan, PU adalah pengantara di antara PE dengan ATT. Dengan adanya pengantaraan, PE.PU kepada ATT mempunyai nilai $\beta = 0.372$ dengan $p < 0.01$. Dapatan kajian menunjukkan PU ialah pengantaraan sebahagian dengan berkurangnya nilai β dengan aras keyakinan yang sama. R^2 juga berubah secara signifikan daripada 0.56 kepada 0.64 apabila PU dimasukkan. Ini juga membuktikan yang PU ialah pengantara. Dapatan ujian-T menunjukkan terdapat perbezaan yang signifikan dalam penerimaan pelajar terhadap PBK di antara bandar dengan luar bandar. Cadangan penambahbaikan dalam sistem pendidikan adalah penguatkuasaan polisi baru, latihan dan pembangunan kemahiran yang komprehensif kepada guru, dan pemantauan terhadap pembangunan dan pelakanaan PBK tersebut.

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List of Abbreviations

ICT - Information and Communication Technology

CAL - Computer-Aided Learning

MOE - Ministry of Education

TAM - Technology Acceptance Model

SAG - School Average Grade

SPM - *Sijil Pelajaran Malaysia*

TRA - Theory of Reasoned Action

TPB - Theory of Planned Behavior

PU - Perceived Usefulness

PE - Perceived Ease of Use

ATT - Acceptance of the Computer-Aided Learning

NGO - Non-governmental Organization

PBC - Perceived Behavioral Control

CB - Control Beliefs

PF - Perceived facilitation

CHILD – Computer Helping Instruction and Learning Development

NECTEC – National Electronics and Computer Technology Center

ANOVA – Analysis of Variance

β - Beta Value

KMO - Kaiser-Meyer-Olkin

MSA - Measure of Sphericity Adequacy

Appendices

CHAPTER 1

INTRODUCTION

1.0 Background of the Study

One of the many challenges facing developing countries today is preparing their societies and governments for globalization and the information and communication revolution. Policy-makers, business executives, NGO activists, academics, and ordinary citizens are increasingly concerned with the need to make their societies competitive in the emergent information economy.

1.1 ICT in Education

Globalization and technological changes, the processes that have accelerated in tandem over the past fifteen years, have created a new global economy. This scenario, in turn, has serious implications on the nature and purpose of educational institutions. As information continues to shrink and access to information continues to grow exponentially, schools cannot remain mere venues for the transmission of a prescribed set of information from teachers to students over a fixed period of time.

Concerns over educational relevance and quality coexist with the imperative of expanding learning opportunities to those made most vulnerable by globalization: low-income groups, girls and women as well as low skilled workers. Global changes also put pressure on all groups to constantly acquire and apply new skills. Information and communication technologies (ICTs)

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Adams, D. A., Nelson, R. R., & Todd, P. A. (1992) *Perceived usefulness, ease of use, and usage of information technology: a replication*. MIS Quarterly, 16(2), 227-247.

Agarwal, R., & Prasad, J. (1999) *Are individual differences germane to the acceptance of new information technologies?* Decision Sciences, 30(2), 361-392.

Agarwal, R., De, P, Sinha, A., & Tanniru, M. (2000) *On the usability of OO representations*. Communications of the ACM, 42(10), 83-89.

Ajzen, I. (1985). *From intentions to action: a theory of planned behavior*. In J. Kuhl, & J. Beckmann (Eds.), Action control: From recognition to behavior. New York: Springer-Verlag.

Ajzen, I. (1991). *The theory of planned behavior*. Organizational Behavior and Human Decision Processes, 50(2), 179-211.

Ajzen, I., & Madden, T. J. (1986). *Prediction of goaldirected behavior: Attitudes, intention, and perceived behavioral control*. Journal of Experimental Social Psychology, 22, 453-474.

Bagozzi, R. P. (2007). *The legacy of the technology acceptance model and a proposal for a paradigm shift*. Journal of the Association for Information Systems, 8(4), 244-254.

Bandura, A. (1982). *Self-efficacy mechanism in human agency*. American Psychologist, 37(2) 122-147.

Baron, R. M. & Kenny, D. A. (1986). *The moderator-mediator variable distinction in social psychological research: conceptual, strategic and statistical considerations,* Journal of personality and social psychology, Vol 51, 6, 1173-1182.

Benamati, J. & Rajkumar, T. M. (2002) *The application development outsourcing decision: an application of the technology acceptation model*. Journal of Computer Information Systems, 42(4), 35-43.

Bertrand, M. & Bouchard, S. (2008). Applying the technology acceptance model to vr with people who are favorable to its use. Journal of Cyber Therapy & Rehabilitation, 1(2).

Chua, Y. P. (2008a). *Kaedah dan statistik penyelidikan: asas statistik penyelidikan buku 1*. (3rd ed.) Kuala Lumpur: McGraw Hill (Malaysia).

Chua, Y. P. (2008b). *Kaedah dan statistik penyelidikan: asas statistik penyelidikan buku 2*. (3rd ed.) Kuala Lumpur: McGraw Hill (Malaysia).

Chua, Y. P. (2008c). *Kaedah dan statistik penyelidikan: asas statistik penyelidikan buku 3*. (3rd ed.) Kuala Lumpur: McGraw Hill (Malaysia).

Chuttur M. Y. (2009). *Overview of the technology acceptance model: origins, developments and future directions*. Indiana University USA. Sprouts: Working Papers on Information Systems, 9(37).

Coaks, S. J., Steed, L., & Dzidic, P. (2006). *SPSS version 13.0 for Windows: without anguish.* Australia: John Wiley and Sons Australia Ltd.

Dasgupta, S., Granger, M. & Mcgarry, N. (2002). *User acceptance of e-collaboration technology: an extension of the technology acceptance model*, Group Decision and Negotiation, 11, 87-100.

Davis F. (1985). *A technology acceptance model for empirically testing new end-user information systems: theory and results*. Unpublished Doctoral dissertation, MIT Sloan School of Management, Cambridge, MA.

Davis, F. D. (1986). *A technology acceptance model for empirically testing new end-user information systems: theory and results.* Unpublished Doctoral dissertation, Massachusetts Institute of Technology.

Davis, F. D. (1989) *Perceived usefulness, perceived ease of use, and user acceptance of information technology*. MIS Quarterly, 13, 319-339.

Davis, F. D. (1993). *"User acceptance of information technology: System Characteristics, user perceptions and behavior impacts."* International Journal of Man-Machine Studies 38(3): 475-487.

Davis, F. D. *"A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results,"* in MIT Sloan School of Management. Cambridge, MA: MIT Sloan School of Management, 1986.

Davis, F. D., & Venkatesh, V. (1996). *A critical assessment of potential measurement biases in the technology acceptance model: Three experiments*. International Journal of Human-Computer Studies, 45(1), 19-45.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). *User acceptance of computer technology: A comparison of two theoretical models*. Management Science, 35(8), 982-1003.

Davis, F. D., Bagozzi, R. P., & Warshaw, P.R. (1992). *Extrinsic and intrinsic motivation to use computers in the workplace*. Journal of Applied Social Psychology, 22, 1111-1132.

Davis, J. (1971). *Elementary survey analysis*. Englewood, New Jersey: Prentice Hall.

Dishaw, M. T. & Strong, D. M. (1999) *Extending the technology acceptance model with task-technology fit constructs*. Information & Management, 36(1), 9-21.

Field, A. (2005). Research methods II: Factor analysis on SPSS. Retrieved from http://www.sussex.ac.uk/Users/andyf/teaching/rm2/factor.pdf

Fishbein, M. & Ajzen, I. (1975), *Belief, attitude, intention and behavior: an introduction to theory and research*. Reading, MA: Addison-Wesley.

Hair, J. (2001). *SPSS survival manual. A step by step guide to data analysis using SPSS*. Open University Press, USA.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black W. C. (1998.) *Multivariate data analysis with readings.* Englewood Cliffs, New Jersey: Prentice Hall.

Hair, J. F., Money, A. H., Samouel, P., & Page, M. (2007). *Research methods for business.* England: John Wiley & Sons.

Hair, J. F., William, C. B., Babin, B. J., Anderson R. E. & Tatham, R. L., (2006). *Multivariate data analysis.* New Jersey: Pearson University Press.

Hair, J.F., Anderson, R.E., Tatham, R.L., & Black, W.C. (2007). *Research methods for business*. West Sussex, England: John Wiley & Sons Ltd.

Hendrickson, A. R., Massey, P. D., & Cronan, T. P. (1993). *On the test-retest reliability of perceived usefulness and perceived ease of use scale*. MIS Quarterly, 17(2), 227-30.

Hu, P.J., Chau, P.Y.K., Sheng, O.R.L., & Tam, K.Y. (1999). *Examining the technology acceptance model using physical acceptance of telemedicine technology*. Journal of Management Information Systems, 16(2), 91-112.

Igbaria, M., Guimaraes, T., & Davis, G. B. (1995) *Testing the determinants of microcomputer usage via a structural equation model.* Journal of Management Information Systems, 11(4), 87-14.

Igbaria, M., Parasuraman, S., & Baroudi, J. J. (1996). *A motivational model of microcomputer usage.* Journal of Management Information Systems, 13(1), 127-143.

Jenkins, M. & Hanson, J. (2003). *E-learning series: A guide for senior managers,* Learning and Teaching Support Network (LSTN) Generic Centre, United Kingdom.

Jabatan Perancangan Bandar dan Desa, (2009). *Profiles of urban areas of Selangor*, RSN, Malaysia.

Johnson, A. M. (2005). The technology acceptance model and the decision to invest in information security. Proceedings of the 2005 Southern Association of Information Systems Conference, North Carolina

Koufaris, M. (2002). *Applying the technology acceptance model and flow theory to online consumer behavior*. Information Systems Research, 13 (2), 205-223.

Lederer, A. L., Maupin, D. J., Sena, M. P., & Zhuang, Y. (2000). *The technology acceptance model and the World Wide Web*. Decision Support Systems, 29(3), 269-282.

Ma, Q & Liu, L. (2004) *The technology acceptance model: a meta-analysis of empirical findings*. Journal of Organizational and End User Computing, 16(1), 59-74.

Malhotra, N. K. (2004). *Marketing research: an applied orientation*. Upper Saddle River, NJ: Prentice Hall, Inc.

Malhotra, Y. & D. F. Galletta (1999). *Extending the technology acceptance model to account for social influence: theoretical bases and empirical validation.* 32nd International Conference on System Science, Hawaii, IEEE.

Maslin, M. (2007). *Technology acceptance model and e-learning*. 12th International Conference on Education, Sultan Hassanal Bolkiah Institute of Education, Universiti of Brunei Darussalam.

Mathieson, K. (1991). *Predicting user intentions: comparing the technology acceptance model with theory of planned behavior*. Information Systems Research, 2(3), 173-191.

Mathieson, K., E. Peacock, et al. (2001). *"Extending technology acceptance model: the influence of perceived user resource."* The DATABASE for advances in Information System 32(3): 86-112.

Meyers, L. S., Gamst, G., & Guarino, A. J. (2006). *Applied multivariate research: design and interpretation.* California: Sage Publication, Inc,

Neuman, W. L. (2003). *Social research theory methods: qualitative and quantitative* (5th ed.). New York: Pearson Education Inc.

Nizam, M.K. (2007). *Hubungan ciri-ciri personaliti dengan menghadapi cabaran perubahan organisas*i. Sintok: Universiti Utara Malaysia.

Nunnally, J. C. (1978). *Psychometric theory*. New York: McGraw Hill.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw Hill.

Pallant, J. (2001). *SPSS survival manual. A step by step guide to data analysis using SPSS.* Open University Press, USA.

Park, N., Lee, K. M. & Cheong, P. H. (2007). *University instructors' acceptance of electronic courseware: an application of the technology acceptance model.* Journal of Computer-Mediated Communication, 13(1), article 9.

Planning Draft of Kuala Langat (2007), Majlis Daerah Kuala Langat, Malaysia.

Robey, D. (1979). *User attitudes and management information system use*. Academy of Management Journal 22(3), 527-538.

Salkind, N. (2006). *Exploring research* (6th ed.). New Jersey: Pearson Prentice Hall.

Schultz, R. L., & Slevin, D. P. (1975). *Implementation and organizational validity: an empirical investigation.* In Implementing Operations Research Management Science, R. L. Schultz and D. P. Slevin (eds.), American Elsevier, New York, NY, pp. 153-182.

Sekaran, U. (2000). *Research methodology for business.* New York: Wiley & Sons, Inc.

Sekaran, U. (2003). *Research methods for business: a skill building approach*. (4th ed) USA: John Wiley & Sons, Inc.

Sekaran, U. & Bougie, R., (2010). *Research methods for business: a skill business approach*. (5th ed.) John Wiley & Sons Ltd.

Subramaniam, G. H. (1994). *A replication of perceived usefulness and perceived ease of use measurement*. Decision Sciences, 25, (5/6), 863-74.

Swanson, E. B. (1982). *Measuring user attitudes in MIS research: a review*. Omega International Journal of Management Science, 10(2), 157-165.

Szajna, B. (1996). Empirical *evaluation of the revised technology acceptance model*. Management Science, 42(1), 85-92.

Tabachnick, B. G. & Fidell, L. S. (2001). *Using multivariate statistics.* Boston: Allyn and Bacon.

Teras Ke-4 Pelan Induk Pembangunan Pendidikan (PIPP) 2006-2010.

Tornatzky, L. G. & Klein, K. J. (1982). Innovation characteristics and innovation adoption-implementation: a meta-analysis of findings. IEEE Transactions on Engineering Management 29(1), 28-45.

Venkatesh, V. & F. D. Davis (2000). *"A theoretical extension of the technology acceptance model: four longitudinal field studies."* Management Science 46(2): 186-204.

Venkatesh, V. (2000). *Determinants of perceived ease of use: integrating control, intrinsic motivation, and emotion into the technology acceptance model*. Information Systems Research, 11(4), 343-365.

Venkatesh, V. and M. G. Morris (2000). *"Why don't men ever stop to ask for directions? gender, social influence, and their role in technology acceptance and usage behavior."* MIS Quarterly 24(1): 115-139.

Venkatesh, V., & Davis, F. D. (1996). *A model of the antecedents of perceived ease of use: development and test.* Decision Sciences, 27(3), 451-481.

Venkatesh, V., Morris, M. G., & Ackerman, P. L. (2000). *A longitudinal field investigation of gender differences in individual technology adoption decision-making processes.* Organizational Behavior and Human Decision Processes, 83(1), 33-60.

Zurinah, R. (2010). *Peluang mengakses pendidikan berkualiti di kalangan pelajar sekolah menengah di kawasan luar bandar : satu kajian kes di daerah Kuala Langat*. Sintok: Universiti Utara Malaysia.