# UNIVERSITY OF SOUTHERN QUEENSLAND



## Measuring E-Learning Systems Success

A Dissertation submitted by

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# ABSTRACT

The education sector has been radically affected by developments in information technology. In the education arena, substantial funds have been invested in the systematic development of technology infrastructure. E-learning is believed to be the main platform for adopting and using new and more advanced IT in the education sector. However, measuring the success of e-learning systems is one of the key issues facing universities and educational institutions. Although considerable attention has been paid to the information systems success issue, there remain arguments about which factors are the most telling in measuring information system success. The issue of evaluation of the success of information systems generally, and e-learning systems in particular, has become more complicated due to the differing interests and needs of stakeholders. Different groups of stakeholders deal with e-learning systems in different ways - for instance, students, academic staff, ICT staff, management, and software developers. These stakeholders have substantially different objectives and often there are conflicts between their aims. This study proposes an evaluation methodology model to assess e-learning systems success.

The model proposed is one which includes eight constructs: IT infrastructure services; system quality; information quality; service delivery quality; perceived usefulness; user satisfaction; customer value; and organisational value. A range of stakeholders such as students, academic staff, and ICT staff are considered in this model. Three instruments were designed to measure the perceptions of three different stakeholders towards e-learning system success. A quantitative study was conducted at University of Southern Queensland (USQ), with survey responses from 720 students who use the e-learning system, 110 academic staff members, and 22 ICT staff. The results confirm that the study model is valid and reliable to measure the success of e-learning systems from different points of view. Some of the relationships among the constructs in the study model were supported and some were not. The study contributed to the body of knowledge by providing a valid and reliable model to measure the success of e-learning systems. Moreover, this study contributes to the practitioners, recommending universities and educational institutions that develop and support e-learning systems.

# Publications

- **Book Chapters**

Alsabawy, Ahmed Younis, Cater-Steel, Aileen and Soar, Jeffrey (2012) *A model to measure e-learning systems success.* In: Belkhamza, Zakariya and Wafa, Syed Azizi, (eds.) Measuring organisational information systems success: new technologies and practices. Business Science Reference (IGI Global), Hershey, PA, USA, pp. 293-317.

Alsabawy, Ahmed Younis and Cater-Steel, Aileen and Soar, Jeffrey (2013) *E-learning service delivery quality: a determinant of user satisfaction*. In: Kats, Yefim (ed.) Learning Management Systems and Instructional Design: Metrics, Standards, and Applications. (IGI Global), USA.

- **Conference Proceedings - Refereed**

Alsabawy, Ahmed Younis, Cater-Steel, Aileen and Soar, Jeffrey (2011) *Measuring e-learning system success (Research in progress).* In: PACIS 2011: Quality Research in Pacific Asia, 7-11 Jul 2011, Brisbane, Australia.

Alsabawy, Ahmed Younis, Cater-Steel, Aileen and Soar, Jeffrey (2012) *The effect of service delivery quality on customer value of e-learning systems*. In: Conferencia Ibérica de Sistemas y Tecnologías de la Información (CISTI 2012), 20-23 June 2012, Madrid, Spain.

Alsabawy, Ahmed Younis, Cater-Steel, Aileen and Soar, Jeffrey (2012) *IT infrastructure and its role in the success of e-learning systems: measurement and causal models*. In: EUNIS'12 A 360$^{o}$ perceptive on IT/IS in Higher Education, 20, 21 and 22 of June 2012, University of Trás-os-Montes e Alto Douro, Vila Real, Portugal.

Alsabawy, Ahmed Younis, Cater-Steel, Aileen and Soar, Jeffrey (2012) *Identifying the determinants of e-learning service delivery quality*. In: ACIS 2012: 23rd Australasian Conference on Information Systems: Location, Location, Location, 3-5 Dec 2012, Geelong, Australia.

- **Journal Articles: Accepted**

Alsabawy, Ahmed Younis, Cater-Steel, Aileen, and Soar, Jeffrey 'IT Infrastructure Services As a Requirement for E-learning System Success' paper submitted to the 'Computers and Education' Journal 'Accepted'.

**Journal Articles: Under Review**

Alsabawy, Ahmed Younis, Cater-Steel, Aileen, and Soar, Jeffrey 'Factors affecting e-learning service delivery quality: the student perspective' paper submitted to "The Internet and Higher Education' journal 'Under Review'.

Alsabawy, Ahmed Younis, Cater-Steel, Aileen, and Soar, Jeffrey 'The Effect of IT Infrastructure Services and Quality Aspects on Perceived Usefulness of E-Learning Systems' paper submitted to 'Computers in Human Behaviour' journal 'Under Review'.

Alsabawy, Ahmed Younis, Cater-Steel, Aileen, and Soar, Jeffrey 'Issues in Evaluating the Success of E-Learning Systems' paper submitted to 'Systems' journal 'Under Review'.

- **Report**

Alsabawy, Ahmed Younis, and Cater-Steel, Aileen "Measuring E-Learning System Success", Report to the Senior Management of University of Southern Queensland.

The researcher compiled a report with the results and recommendations of the thesis for the Faculty Deans at USQ, Deputy Vice-Chancellor (Academic Services) and Chief Information Officer, Executive Director of Australian Digital Futures Institute, and Executive Director, ICT Services. The results and recommendations of this report were adopted by the "Integrated StudyDesk" team which is updating the USQ StudyDesk to improve students' experience, and also to improve some inefficiencies for academic staff.

# CERTIFICATION OF DISSERTATION

I certify that the ideas, results, analyses and conclusions reported in this dissertation

are entirely my own effort, except where otherwise acknowledged. I also certify that

the work is original and has not been previously submitted for any other award,

except where otherwise acknowledged.


Candidate signature

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  Ahmed Younis AL-Sabawy                                     Date



ENDORSEMENT

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# ACKNOWLEDGEMENT

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| | |
|---|---|
| AGFI | Adjusted Goodness-of-Fit Index |
| AHP | Analytic hierarchy process |
| AST | Adaptive Structuration Theory |
| **AVA\*** | **Availability** |
| AVE | Average variance extracted |
| BELS | Blended E-Learning Systems |
| C.R. | Critical Ratio |
| CAS | Computerized Accounting System |
| CEO | Chief executive officer |
| CFA | Confirmatory Factor Analysis |
| CFI | Comparative Fit Index |
| $\chi^2$ | Chi-square |
| CIO | Chief information officer |
| CIS | Customer Information Satisfaction |
| **CONT\*** | **Contact** |
| CPQ | Consumer Products Questionnaire |
| CSE | Computer Self-Efficacy |
| CSF | Critical Success Factors |
| **CUSV\*** | **Customer value** |
| DDLM | Demand-Driven Learning Model |
| DP | Data Processing |
| DSS | Decision Support Systems |
| EASE | Electronic Assignment Submission Environment |
| ECM | Expectation-Confirmation Model |
| EDMS | Electronic document management system |
| EDT | Expectancy Disconfirmation Theory |
| **EFFI\*** | **Efficiency** |
| eLSE | e-Learning Systematic Evaluation |
| ERP | Enterprise resource planning |
| e-SELFQUAL | Online self-service quality |
| e-SQ | electronic Service Quality |
| ESS | Enterprise System Success |
| eTailQ | eTail Quality |
| ETM | Educational Technology Model |
| eTransQual | Electronic transaction quality |
| **FULF\*** | **Fulfilment** |
| GFI | Chi-Square, Goodness-of-Fit Index |
| GoF | Goodness-of-Fit |
| $H^2$ | Cross-validated communality |
| HELAM | Hexagonal E-learning Assessment Model |
| ICE | Integrated Content Environment |
| ICT | Information and communication technology |
| IIT | Image Interactivity Technology |
| **IQ\*** | **Information Quality** |
| IS | Information system |
| ISSDOs | Information System Service Delivery Organisations |
| IT | Information technology |
| **ITIS** | **Information technology infrastructure services** |
| KMS | Knowledge Management System |
| LMSs | Learning management systems |
| ML | Maximum likelihood |
| MOOC | Massive Open Online Course |
| NFI | Normed Fit Index |
| NNFI | Non-normed Fit Index |
| OER | Open Education Resource (OER) |
| OLS | Online Learning System |

| | |
|---|---|
| OMIS | Organisational memory information system |
| **ORGV\*** | **Organisational value** |
| PCLOSE | P of Close Fit |
| PeSQ | Perceived e-service quality |
| PGFI | Parsimony Goodness of Fit Index |
| PIQ | Perceived Information Quality |
| PIRQ | Perceived Internet Retailing Quality |
| PLS | Partial Least Squares |
| PLS-SEM | Partial Least Squares Structural Equation Modeling |
| PNFI | Parsimony Normed Fit Index |
| PRATAM | The Perceived Resources and Technology Acceptance Model |
| **PRIV\*** | **Privacy** |
| PSP/IQ | Product and Service Performance Model for Information Quality |
| PWQ | Perceived web quality |
| $Q^2$ | predictive relevance |
| QES | Quality of Electronic Service |
| QMS | Quality Management System |
| QUIS | Questionnaire for User Interface Satisfaction |
| R&D | Research and development |
| $R^2$ | Coefficient of determination |
| **RESP\*** | **Responsiveness** |
| RFID | Radio Frequency Identification |
| RMR | Root Mean-square Residual |
| RMSEA | Root Mean Square Error of Approximation |
| **S.R.W. \*** | **Standardized Regression Weight** |
| **SATF\*** | **User satisfaction** |
| SCT | Social Cognitive Theory |
| SDQ | Service delivery quality |
| SEM | Structural Equation Modelling |
| SMC | Squared Multiple Correlation |
| SOLE | Soft Library Evolution |
| **SQ\*** | **System Quality** |
| SQM | Software Quality Metrics |
| SQMAT | Software Quality Measurement and Assurance Technology |
| SRMR | Standardise Root Mean-square Residual |
| TAM | Technology Acceptance Model |
| TLI | Tucker-Lewis Index |
| TPB | Theory of Planned Behaviour |
| TQM | Total Quality Management |
| TRA | Theory of Reasoned Action |
| TRA | Theory of Reasoned Action |
| TTF | Task-Technology Fit |
| UDA | User Development computer Applications |
| UIS | User information satisfaction |
| **USEF\*** | **Perceived usefulness** |
| UTAUT | Unified Theory of Acceptance and Use of Technology |
| VET | Vocational Education and Training |
| VLE | Virtual Learning Environments |
| WBL | Web-Based Learning |
| WEBCT | Web Course Tools |
| WebCT CCMS | WebCT course content management system |
| WebQual | Web site quality |
| WWW | World Wide Web |
| ZOT | Zone of Tolerance |
| $(\chi^2/df)$ | Normed Chi-square |

**\*This abbreviations created by the researchers to use in the statistical analysis**