Rubric for Assessing ICT Vision, Plan, Policies and Standards in Malaysian Higher Education

Shamsul Anuar Mokhtar, Rose Alinda Alias, Azizah Abdul Rahman
Faculty of Computer Science and Information System
Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor
Tel : 016-2175330, Fax : 07-5532210,
shamsulanuar@hotmail.com   alinda@utm.my   azizah@fsksm.utm.my

ABSTRACT

The paper proposes a rubric for assessing the ICT vision, plan, policies and standards in Malaysian higher education institutions. Based on a selection of twelve survey questionnaires and rubrics that are used to assess ICT implementation, the paper identifies sixteen performance indicators. ICT vision is assessed based on who drives the vision, its focus and the level of awareness and understanding by the campus community. The indicators for ICT plan include the scope of plan, participation in plan development, level of detail, funding for plan and multi-year planning. ICT policies and standards cover the scope, characteristic, participation in the development, level of development and implementation, awareness and understanding by the campus community and how they are reviewed. The paper then uses these indicators to describe the characteristics of three case higher education institutions representing low, moderate and high level of ICT implementation.

KEYWORDS
Assessment, Vision, Plan, Policy, Standard, Rubric.

1. Introduction

Academic computing encompasses the utilisation of staff, infrastructure (hardware and software) and services (technology, information content and human resources) which enable and support the management and delivery of academic programmes in teaching, learning and research. Six main areas of academic computing include 1) teaching and learning using ICT, 2) researching using ICT, 3) ICT vision, plan, policies and standards, 4) ICT infrastructure, 5) information services, and 6) ICT institutional support.

The purpose of the paper is to propose a rubric for assessing ICT vision, plan, policies and standards. It focuses on one area of academic computing, and constitutes one step in a series of steps for proposing a framework for assessing academic computing in Malaysian higher education.

2. Rubrics as an Assessment Tool

According to Pickett (1998), rubrics are sets of categories that define and describe the important components of the areas being assessed. Each category contains a gradation of levels of implementation with a score assigned to each level and a clear description of what criteria need to be met to attain the score at each level. As an assessment tool, rubrics are effective in evaluating institutional performance in areas which are complex and vague. Rubrics can be created in a variety of forms and levels of complexity, however, they all contain common features which focus on measuring a stated objective (performance or quality), use a range to rate performance and contain specific performance characteristics arranged in levels indicating the degree to which a standard has been met

To identify the performance indicators for the rubric, twelve existing survey questionnaires and rubrics used to assess ICT implementation are analysed. The research then proceeds with a case study on three higher education institutions representing low, moderate and high level of implementation. The findings of the case study are used to form the initial rubric.

3. Existing Assessment Instruments

The paper refers to existing assessment instruments consisting of three survey questionnaires and nine rubrics to identify performance indicators for ICT vision, plan, policies and standards. The instruments are:

a. Campus Computing Project (Asian Campus Computing Survey, 2003)
b. ICT and E-learning in Further Education Survey (Becta, 2004)
c. International Survey-Online Learning: Strategies, Infrastructure & Initiatives (Observatory on Borderless Higher Education, 2004)
d. Technology Planning Analysis Rubric (Sibley and Kimball, 1998)
e. Implementation of Technology: A Developer's Guide to the Assessment of Progress (WestEd, 1998)
f. Information and Communication Technology in Higher Education (IFIP, 2000)
g. Technology Plan Rubric (Kansas State Department of Education, 2001)
h. Draft District Technology Plan Rubric: A Self Assessment Tool (Monterey County Office of Education, 2001)
i. Rhode Island State Technology Plan Rubric (Rhode Island Dept. of Elem. and Sec. Edu., 2002)
j. 2003-04 Freedom to Learn School Readiness Rubric (Michigan Virtual University, 2003)
k. Rubric for Essential Technology Conditions (Nebraska Department of Education, n.d)
l. Utah Technology Awareness Project Rubrics (Utah Technology Awareness Project, n.d)

4. Performance Indicators

**Define indicators
And check the numbering on that section**

3.1 ICT vision

According to IFIP (2000, p.14), vision refers to "the aspirations and goals of both individuals within an institution and the institutional system as a unified whole". According to Becta (2004), the vision should clearly articulate how ICT will contribute to learning and to the management of learning. This will provide a basis for decision-making with regard to ICT implementation in higher education institutions. The performance indicators are:

a. Who drives the vision (IFIP, 2000).
b. The focus of the vision (Sibley and Kimball, 1998; IFIP, 2000; Monterey County Office of Education, 2001; Becta, 2004).
c. Awareness and understanding of the vision (IFIP, 2000).

3.2 ICT plan

Plan refers to the detailed steps of how the vision is carried out (IFIP, 2000). According to Dury and Marks (1990), a strategic ICT plan is a key ingredient to the success of ICT implementation in higher education institutions. The performance indicators are:

a. The scope of plan (Sibley and Kimball, 1998; IFIP, 2000; Monterey County Office of Education, 2001; Rhode Island Department of Elementary and Secondary Education, 2002).
b. Who participates in the development of plan (Sibley and Kimball, 1998; WestEd, 1998; Kansas State Department of Education, 2001; Rhode Island Department of Elementary and Secondary Education, 2002).
c. The level of detail in professional development plan (WestEd, 1998; Kansas State Department of Education, 2001; Monterey County Office of Education, 2001; Rhode Island Department of Elementary and Secondary Education, 2002; Nebraska Department of Education, n.d; Utah Technology Awareness Project, n.d).
d. The level of detail in plan for using ICT in teaching and learning (Sibley and Kimball, 1998; Kansas State Department of Education, 2001; Monterey County Office of Education, 2001; Rhode Island Department of Elementary and Secondary Education, 2002; Michigan Virtual University, 2003).
e. The level of detail in plan for using ICT in research (Sibley and Kimball, 1998).
f. Funding for implementation of plan (Sibley and Kimball, 1998; WestEd, 1998; IFIP, 2000; Monterey County Office of Education, 2001; Rhode Island Department of Elementary and Secondary Education, 2002; Nebraska Department of Education, n.d; Utah Technology Awareness Project, n.d).
g. Multi-year planning (Sibley and Kimball, 1998; WestEd, 1998; Rhode Island Department of Elementary and Secondary Education, 2002).

3.3 ICT policies and standards

ICT policies and standards encompass infrastructure, teaching and learning, professional development, acceptable use and intellectual properties. They need to be developed to help institutions manage facilities and resources (IFIP, 2000), provide protection and incentives to users (WestEd, 1998), and guide the campus community on how ICT can be used effectively for learning and the management of learning (Ministry of Higher Education, 2005). The performance indicators are:

a. The scope of policies and standards (Sibley and Kimball, 1998; Rhode Island Department of Elementary and Secondary Education, 2002).
b. The nature of the policies, either restrictive, permissive or inclusive (IFIP, 2000).
c. The level of policy development and implementation (WestEd, 1998; Utah Technology Awareness Project, n.d).
d. Who participates in the development of policies (IFIP, 2000; Rhode Island Department of Elementary and Secondary Education, 2002).
e. The awareness and understanding of policies and standards by the campus community (WestEd, 1998; Monterey County Office of Education, 2001; Utah Technology Awareness Project, n.d).
f. Review of policies and standards (Utah Technology Awareness Project, n.d).

5. Methodology: The Case Study - delete

The majority of the rubrics from the literature adopt either a 3-point or 4-point scale for the rubric columns. As for the labelling of the rubric columns, there is no set standard used in the rubrics. Therefore, this study adopts a 3-point scale to differentiate the levels of ICT implementation. For simplicity, the three categories of ICT implementation are labelled as low, moderate and high to represent the lower, middle and upper tier of the rubric scale.

To identify the detail rubric description for each level, a case study was conducted on three higher education institutions. These institutions are initially selected to represent the low, moderate and high level of ICT implementation based on the ICT information provided by the institutional websites and how they are utilised to disseminate information. In general, the website for low level institution provides limited static information and is

largely focused on the programmes on offer. The website for moderate level institution provides a fair amount of static and dynamic information. The website for high level institution provides a large amount of static and dynamic information and incorporates online applications.

In all three institutions, personal interviews were conducted involving the academic and ICT management. They were asked about ICT infrastructure, planning, organisation, integration in teaching and learning and other issues confronting the institution.

6. Findings from the Case Study - delete

Using the performance indicators identified in the previous section, the findings from the case study are described based on low, moderate and high levels of ICT implementation in the respective institutions.

5.1 ICT vision

Low: ICT vision is just beginning to develop and is largely driven by a small group of enthusiastic lecturers. Their goals and objectives are related to the learning of ICT skills and the uses of technology based on their own knowledge and expertise and the resources available. The role of ICT specialists is limited to providing technical support to the users in the form of routine maintenance of infrastructure and outlining the specification of equipment to be purchased. The position of ICT specialists in relation to the vision is of a follower with the enthusiastic lecturers taking the lead. As for the rest of the campus community, they are generally unaware of the ICT initiatives in the institution.

Moderate: As ICT develops, both ICT specialists and lecturers play significant roles in driving the vision. ICT specialists are from the ICT unit headed by a manager. Their goals and objectives are related to the development of infrastructure based on their own view of what are needed in the institution as well as the request and feedback by the lecturers. The lecturers play an equally significant role in driving the vision emphasising on the improvement of learning and the management of learning. Professional development for lecturers and staff is evident at this stage of ICT development. However, this vision is not shared by all lecturers and does not encompass the whole learning community in the

institution. However, efforts are underway to built greater campus community awareness and understanding of ICT initiatives.

High: The top management provides leadership in driving the vision. The significant role of ICT to the learning outcome is integrated in the institution vision statement. Focus is given to the development of a learning environment based on ICT and to integrate technology across the curriculum. Emphasis is also given to researching, developing and promoting new application of ICT in academic environment. The institution also visualises itself as network centred, providing a physical place to learn as well as web based learning spaces, accessible anytime, anywhere by students and lecturers. In support of the vision, the institution introduces policies that encourage and enforce the use of ICT among the campus community. With the institution providing leadership, the vision is shared by the all administrators, lecturers, staff and students. They have good awareness of ICT in various aspects of higher education and are well informed of the present and planned ICT initiatives.

5.2 ICT plan

Low: ICT planning is largely limited to the acquisition of basic hardware and software. The plan is developed by ICT specialists based on routine needs of infrastructure maintenance and purchasing requests from a small group of lecturers. Plan for professional development regarding the use of ICT for the lecturers and staff is not evident. ICT training is mostly confined to lecturers teaching ICT courses and technical support staff based on individual request. There isn't any plan for integrating technology in the curriculum, aside from the ICT elements required for programme accreditation. No educational research is mentioned as part of the ICT plan. Funding for implementing the ICT plan is limited and budgeted on a year-to-year basis.

Moderate: ICT planning encompasses the development of infrastructure, the use of ICT in teaching and learning and professional development. Both ICT specialists and subject specialists (lecturers) contribute to the development of ICT plan. The plan on infrastructure includes the purchasing and deployment of equipment to fulfil current and future needs of the institution. The plan for using ICT in teaching and learning describes the need for technology-rich environment, but how students and lecturers use technology to enhance learning is not explained fully. As for professional development, a plan is articulated for all lecturers and staff and is based on a current survey of ICT skills. The plan provides competencies on a variety of software application, peripherals and platforms. The use of ICT for research is mentioned in the plan, but only in the broadest sense. A fair amount of funding is provided for implementing the ICT plan and it is supported by annual and special programme budget. The plan covers more than one year, but is short term in nature, with limited reference to on-going planning and support.

High: ICT plan comprehensively encompasses various aspects of infrastructure, the use of ICT in teaching, learning and research, professional development and technical support. The plan is developed with participation from the top management, lecturers, staff and students. They are actively involved in giving input, implementing and evaluating components of the ICT plan. The plan on infrastructure includes the purchasing and deployment of equipment to fulfil current and future needs of the institution. The plan for using ICT in teaching and learning describes the need for technology-rich environment and explain in detail how students and lecturers use technology to enhance learning. As for professional development, a plan is articulated for all lecturers and staff and is based on a current survey of ICT skills. The plan provides ICT competencies as well as specific uses of technology in the educational environment. In addition, a plan for support is in place as lecturers and staff acquire new skills. The use of ICT for research is specifically described in the plan, with specific timelines and targets. A significant amount of funding is provided for implementing the ICT plan and it is supported by annual and special programme budget. The plan is multi-year and with references to multi-year funding, planning and support.

5.3 ICT policies and standards

Low: There are very few ICT policies and standards. There is also no immediate plan to develop additional policies and standards. Existing ICT policies are confined to the purchasing of equipments and access for learners. However, some policies are restrictive in nature. For instance, there is a policy that limits learner access to computers to only scheduled class hours to protect the computers from vandalism and misuse. The policies are developed by administrators of the institution with very little input from the ICT

specialists and lecturers. In addition, there isn't any proper review process of policies and standards. With only a few ICT policies and standards in place, there is a lack of awareness from the general campus community.

Moderate: ICT policies and standards encompass the acquisition and maintenance of ICT infrastructure, information literacy and learner access. In addition, the policies and standards cover aspects of acceptable use and ethics. There is also a plan to develop additional policies and standards on the use of ICT to improve teaching and learning. The policies are generally permissive in nature, where the main purpose is to allow the campus community to utilise the campus ICT facilities and resources for educational reasons. The policies are developed by administrators of the institution with significant input from the ICT specialists and lecturers. In terms of implementation, many of the policies and standards are in place, but are inconsistently implemented. The policies and standards are also reviewed from time to time based on the requests and recommendations of ICT specialists and lecturers. The awareness of the policies and standards are generally fair, and efforts are underway to built greater understanding particularly among staff and lecturers.

High: ICT policies and standards encompass infrastructure, learner access, information literacy and the use of ICT to improve teaching, learning and research. In addition, the policies and standards cover aspects of acceptable use, ethics, copyright, intellectual property and incentives for using ICT. The policies are generally inclusive in nature, where the main purpose is to get the whole campus community to fully utilise the campus ICT facilities and resources for educational reasons, either by encouragement or enforcement. The policies are developed with significant input from the ICT specialists, lecturers and students. In terms of implementation, many of the policies and standards are in place and consistently implemented. The policies and standards are also reviewed regularly based on the recommendations and feedback from ICT specialists, lecturers and students. There is generally good awareness and understanding of the policies and standards among the campus community.

7. Summary and Conclusion

The findings of the case study is summarised by the rubric in Table 1. In general, the institution with low level of ICT implementation does not have any ICT vision, limited in their plan, policies and standards, and its campus community lack awareness of ICT initiatives. Institution with moderate level of ICT implementation has good vision, plan, policies and standards. Institution with high level of ICT implementation has excellent vision, plan policies and standards. The high level differs from the moderate level in the better scope and depth of the components, the role of leadership and the involvement of the whole campus community in ICT implementation.

The rubric proposed by this paper is not in any way an absolute description for all higher education institutions in Malaysia. However, it gives a good description of typical institutions regarding their implementation of ICT. This rubric can be used as a basis to form questionnaire for surveying higher education institutions in Malaysia. With data from a large number institutions, statistical analysis such as factor analysis and Cronbach's alpha can be used to reduce the number of performance indicators to only the ones that have high factor loadings (discriminating factor) and to achieve construct reliability.

Table 1: Rubric for assessing ICT vision, plan, policies and standards

ICT Vision	Levels of Implementation		
	Low	Moderate	High
a. Who drives the vision	Driven by enthusiastic lecturers.	Driven by ICT specialists and lecturers.	Driven by the top management by providing leadership.
b. Focus of the vision	Focus on the learning of ICT skills and the uses of technology.	Focus on the infrastructure and improvement of learning and the management of learning.	Focus on ICT based learning environment based on ICT and technology integration.
c. Awareness and understanding of the vision by the campus community	Generally unaware of any ICT vision.	Efforts are underway to built greater awareness and understanding	Good awareness and are well informed.
ICT Plan	Levels of Implementation		
	Low	Moderate	High
a. The scope of plan	Limited to the acquisition of basic hardware and software.	Encompasses infrastructure, the use of ICT in teaching and learning and professional development.	Encompasses infrastructure, the use of ICT in teaching, learning and research, professional development and support.
b. Who participates in the development of plan	Developed by ICT specialists.	ICT specialists and lecturers contribute to the development of the plan.	Developed with participation from the top management, lecturers, staff and students.
c. The level of detail in professional development plan	None, except training for lecturers teaching ICT courses and technical staff based on individual request.	Provides ICT competencies based on a survey of ICT skills for all lecturers and staff.	Provides ICT competencies and specific uses of technology in the education based on needs assessment for all lecturers and staff.
d. The level of detail in plan for using ICT in teaching and learning	None, aside from the ICT elements required for programme accreditation.	Describes the need for technology-rich environment, but how students and lecturers use technology to enhance learning is not explained fully.	Describes the need for technology-rich environment and explain in detail how students and lecturers use technology to enhance learning.
e. The level of detail in plan for using ICT in research	None.	Mentions the use of ICT for research, but only in the broadest sense.	Describes the use of ICT for research in detail.
f. Funding for implementation of plan	Limited amount.	Fair amount.	Significant amount.
g. Multi-year planning	Year-to-year basis.	Covers more than one year, but is short term in nature.	The plan is multi-year and with references to multi-year funding, planning and support.
ICT Policies and Standards	Levels of Implementation		
	Low	Moderate	High
a. The scope of policies and standards	Confined to the purchasing of equipments and access for learners.	Encompasses infrastructure, learner access, information literacy, acceptable use and ethics.	Encompass infrastructure, learner access, information literacy, teaching and learning, acceptable use, ethics, copyright, intellectual property and incentives.
b. The characteristic of the policies	Restrictive.	Permissive.	Inclusive.
c. The level of policy development and implementation	Very few are in place.	Many are in place, but are inconsistently implemented.	Many are in place and consistently implemented.
d. Who participates in the development of policies	Developed with very little input from the ICT specialists and lecturers.	Developed with significant input from the ICT specialists and lecturers.	Developed with significant input from the ICT specialists, lecturers and students.
e. The awareness and understanding of policies and standards by the campus community	Lack awareness.	Fair awareness and efforts are underway to built greater understanding particularly among staff and lecturers.	Good awareness and understanding among the campus community.
f. Review of policies and standards	None.	Reviewed from time to time based on requests and recommendations of ICT specialists and lecturers.	Reviewed regularly based on the recommendations and feedback from ICT specialists, lecturers and students.

References

Becta (2004). *ICT and e-learning in Further Education: embedded technology, evolving practice: A report to the Learning and Skills Council.* Coventry: Becta.

Dury, C. G. and Marks, R. B. (1990). Computing Across the Curriculum: Infusing Technology into the Classroom at a Small, Liberal Arts College. *ACM SIGUCCS.* 18: 103-110.

IFIP (2000). *Information and Communication Technology in Higher Education.*

Kansas State Department of Education (2001). *Technology Plan Rubric* [online]. Available from: http://www.taken.org/ techplanrubric 2001.htm [Accessed 9 February 2006].

Michigan Virtual University (2003). *2003-04 Freedom to Learn School Readiness Rubric* [online]. Available from: http://school. discovery.com/schrockguide/pdf/schooltec hrubric.pdf [Accessed 9 February 2006].

Ministry of Higher Education (2005). *Code of Practice Quality Assurance in Public Universities in Malaysia.* 3rd Edition.

Monterey County Office of Education (2001). *Draft District Technology Plan Rubric: A Self Assessment Tool* [online]. Available from:http://www.wested.org/techplan/pdfs/ techplanrubric.pdf [Accessed 9 Feb 2006].

Nebraska Department of Education (n.d). *Rubric for Essential Technology Conditions* [online]. Available from:http:// www.nde.state.ne.us/TECHCEN/document s/NERETC.pdf [Accessed 9 Feb 2006].

Observatory on Borderless Higher Education (2004). *2nd International Survey 2004 - Online Learning: Strategies, Infrastructure & Initiatives* [online]. Available from: http://www.obhe.ac.uk [Accessed 9 August 2004].

Pickett, N. (1998). *Creating Rubrics* [online]. Available from: http://teacher.esuhsd.org/rubrics/ [Accessed 9 February 2006].

Rhode Island Department.of Elementary and Secondary Education (2002). *Rhode Island State Technology Plan Rubric* [online]. Available from: http://www.ridoe.net/ tech_in_schools/ IT_Plan_Review_Rubric. PDF [Accessed 9 February 2006].

Sibley, P.H.R. and Kimball, C. (1998). *Technology Planning Analysis Rubric* [online]. Available from: http://www.uni. edu/zeitz/tc/assignments/edmin/TPAR2.5.p df [Accessed 9 February 2006].

Utah Technology Awareness Project (n.d). *Utah Technology Awareness Project Rubrics* [online]. Available from: http://www.uen.org/cg-bin/websql/ utahlink/UTAPdomains.hts [Accessed 9 February 2006].

WestEd (1998). *Implementation of Technology: A Developer's Guide to the Assessment of Progress* [online]. Available from: https://www.howard.edu/ assessment/open/Tools/Implementation%2 0of%20Technology--Assess%20Rubric.pdf [Accessed 9 February 2006].