

DEVELOPMENT AND ASSESSMENT OF e-CQI SYSTEM

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Abstract: Continuous quality improvement (CQI) is the main agenda in an organization. It is seen as a strategy management organization with the objective to improve work processes and provide better quality services to customers. In the education system in Malaysia, the Malaysian Qualifications Agency (MQA) is a body that provides quality assurance in higher education. The aspect of continuous quality improvement is shown in documents named COPIA which issued by the agency and became a requirement for obtaining the accreditation of study programme. In order to improve efficiency in reporting continuous improvement e-CQI system was developed. This system was developed to solve the problem of reporting activities, improvements in teaching and curriculum courses. Agile model has been used to implement development e-CQI system. It has been chooses in the development of the system because it was an able to speed up the development of the system and increase customer satisfaction. Evaluation of the system e-CQI in terms of usability is carried out to determine the functionality of the systems involved is able to meet the needs of the user. The sample for this study consists of 40 lecturers in the field of information technology and electrical engineering. An instrument for this study is a set of questionnaire. Data analysis is done by using Statistical Package for Social Sciences (SPSS) version 23.0. The findings show that e-CQI system that has been developed meets the needs of lecturers.

Index Terms: Evaluation, improvement, system.

1. INTRODUCTION

Continuous quality improvement (CQI) is a culture of ongoing improvement involving all parties in an organization. It aims to reduce wastage in the system and processes and ensure the use of minimum financial level [1].

The Malaysian qualifications Agency (MQA) is an agency under the Ministry of Higher Education was established on 1 November 2007, as a body that gives quality assurance in higher education. The main function of the MQA is to ensure that the Malaysian Qualifications Framework (MQF) is complied with. MQF acts as a quality assurance for higher education that works like giving guidelines to develop standards and credit, provide for programme accreditation criteria and standards, and facilitate the recognition and articulation qualifications and also to maintain eligibility for Malaysia Qualification Registration (MQR). There are actually two guidelines provided by the agency to ensure quality standards, namely the Code of Practice for Programme Accreditation (COPPA) and the Code of Practice for Institutional Audit (COPIA).

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The aspects of continuous quality improvement are shown under the field to nine in the document COPIA. Each

higher education institution has a respective committee to maintain quality assurance for all study programme. Higher education institutions are required to document all necessary information along with appropriate evidence for the audit process that will be carried out in a given period of time. e-CQI system was developed facilitate lecturer recorded all the implementation of improvements that have been made either in terms of teaching and learning or curricula. Information in the form of reports can be generated through e-CQI system to be used as evidence when it is needed.

In the development of e-CQI system, Agile development model was used. This model contains the phases of planning, analysis, design, development and testing. Each phase has continuity with each other to produce a complete system. Usability e-CQI system also has been tested to see if it very effective in discharging its functions as a component of continuous quality improvement.

2. PROBLEM STATEMENT

There are eight problems that will be encountered when implementing a CQI or processes, namely the acceptance and application of forces and individuals, innovation for the better, pointing to human resources management achievements, more flexible and external factors or internal [2]. Even on the academic system (teaching and inquiry) is not documented CQI effort, properly [3]. The use of electronic documents is quicker and easier. Any changes that are implemented in electronic documents can be stored automatically. Search for required documents are easier

and faster and it safer for storage [4].

In Kuala Terengganu Polytechnic (PKT), most of the CQI implemented by the lecturer is not recorded. This will make it difficult in the procurement documents as evidence when required by a particular party. Therefore with the development of the e-CQI system, it will facilitate work process in the preparation of reports related to the CQI has been implemented.

2.1 Objective of the Study

- i) Develop e-CQI system for the needs of lecturers.
- ii) Evaluating the usability of e-CQI system in Kuala Terengganu Polytechnic.

2.2 The Importance of Research

The results from this study will hopefully provide positive impact to the improvement of the production quality of work. In line with the mainstream of national development in line with the progress of information and communication technology, then a lecturer can get benefit from the use of information technology as a medium for strengthening the work process. This study shall be in force by Kuala Terengganu Polytechnic and stakeholders in implementing the ongoing systematic improvement.

2.3 The Scope of the Study

This study was conducted in Kuala Terengganu Polytechnic (PKT). The subject of research is the lecturers teach courses of information technology and electrical engineering.

2.4 Limitations of the Study

The study was only conducted in Kuala Terengganu only Polytechnic. Sample limited to only consist of the lecturer at the Polytechnic Kuala Terengganu. Researchers wanted to evaluate in advance the usability of e-CQI system that has been developed before it can be used in other institutions.

3. STUDY OF LITERATURE

According to Pryor TA [5], Computer-based Clinical Decision Support Systems (CDSS) that has been developed to provide decision support with the aim of improving

patient outcomes. CDSS is a software application which designed to aid in clinical decision-making about each patient. Detailed information about individual patient are input into a computer program that sorts and matches them using specific algorithms in a knowledge base, resulting in the generation of patient-specific assessments or recommendations for clinicians. CDSSs are proven to prevent adverse occurrences in health outcomes and improve compliance with treatment suggested; they will become more widely accepted and utilized as a quality improvement tool.

The study run by H. E. Resnick, B.B. Manard [6], about the use of information systems that facilitate data collection and tracking for patient care can also sustain care quality improvement. In the past decades, application of Electronic Health Records (EHRs) has streamlined data processing and management in many health care settings with benefits of increasing access to more complete, accurate and up-to-date data and reducing redundancy of data. The implementation of EHRs has potential to improve quality of care, efficiency of operation and integration of several services.

According to Levinson & Renick [7], 'Lean' is the best process of continuous improvement that received international recognition when Womack, Jones and Roos published a book on the Toyota production system. Many hospitals were borrowing the principles of 'Lean' for inspection tasks and focus on reducing waste to improve delivery of health care. Lean helps operate the changes to create a workflow and processes that work in a long time.

S.d. Horn and D.S.P. Hopkins (eds.) [8], has developed a quality improvement approach, called the increase in clinical practice that basically combines computer-based protocol, local research and improvement quality (CQI). Protocol developed to address selected health problems (for example, difficulty acute respiratory syndrome) based on the relevant review and analysis data from the system records retrospectively the patient electronically.

According to Connelly and D.P. S.T. Bennett [9], a knowledge-based system has been developed for clinical use, called the clinical decision support system (CDSS). It is able to improve the quality of work and quality improvement system is effective in the clinical field. This system based on expert system using knowledge base contains the rules and results of the algorithm that combines knowledge and judgment about the health

problems faced by mankind. Use of this computer based systems capable of describing disease faced and which need to be taken.

4. METHODOLOGY

According to Johari and Ahmad Irzam [10], the methodology is a method of the development of a system. The study is divided into two phases, namely system development phase and evaluation phase.

4.1 e-CQI Systems Development phase

Design process is a system of procedures for developing consistent systems and can be trusted. Agile models are used in the development of e-CQI system. They are used as phase in the development of ready to accept changes to the needs of users who are not final, short construction period, simple design, lack of documentation and fast making changes. Agile models are easier to use than traditional methods because the instructions less when the analysis, design and implementation of software requirements [11]. Agile model contained several interrelated phases for wake a system which is complete as stated below.

4.2 Phase Planning

At this phase, the period of time for handling project set so it's can run smoothly. Gantt charts are built to ensure all actions for this project was able to be developed with the time given to all of the activities described. Planning in the development of e-CQI system has be done with detailed system developed for completion within the specified period and to meet the needs of the user.

4.3 Phase Analysis

Phase analysis involves the process of identifying the problem, scope, objectives, problem solving and the methodology that will be used. Once when all the analysis is done, all the help and information under review. Requirements specification of the system can be done easily when objectives are stated explicitly. The use of methodologies is used based on the period of time given in order for the development of the system can be developed within the time set and requirements specification can be flexible to fixed.

4.4 Design Phase

The need system specification design, specification system requirement will be used in their form of user needs. 'Visual Paradigm' software is used for all output design that has been developed. Design development needs to keep earning traits to assess project administrators profile in cost and Agile system builders can see achievements in controlling arrangements with regards to cost. So the main function of stressed is to make an assessment of the profile and generating reports rather than the assessment.

4.5 Development Phase

At this phase, development of the system will be based on design specifications and system requirements specification system. This development will be web-based and will use the PHP programming language. Production of the interface and functionality of the system is built based on the design phase have been implemented. Complete system prototype will be tested to ensure that there are no errors of logic in terms of functionality of the system.

4.6 Testing Phase

This phase aims to test the critical functions in the system. This will be involvement of critical functions in line with the objectives of the project. A failure occurred in function critical impact on the project. Failure to achieve the objectives of the project, coordination should be carried out or revisit the phase analysis or development depending on the type of failure that occurs for in-depth study of making improvements.

5. ASSESSMENT PHASE OF THE USABILITY SYSTEM e-CQI

5.1 Sample

The sample consisted of 40 lecturers who teach various courses at Kuala Terengganu Polytechnic.

5.2 Instrument Examination

The study of the instrument was a questionnaire which used to assess usability the system awakened. Each item in questionnaire is assessed based on Likert scale five marks with a score of 1, 2, 3, 4, and 5

5.3 Data Analysis

The findings will be analyzed by using Statistical Package for Social Science (SPSS) ver. 23.0. This study uses descriptive statistics to see percent, mean, and standard deviation for analyzing aspects under review

5.4 Study Findings

Table 1: Mean and standard deviation Analysis Usability of e-CQI System

No	Item	Mean	SD	Interpretation Of The Mean
1.	The system is easy to learn.	3.76	0.90	High
2.	This use of this system is very easy.	3.79	0.90	High
3.	This system provides all the functionality that I need.	3.71	0.86	High
4.	All the function in this system integrated properly.	3.72	0.98	High
5.	I can accomplish the task with effective when using this system.	3.65	0.90	Medium
6.	If there are errors, the system can provide help in resolving offences involved quickly.	3.72	0.91	High
7.	The information provided was happy obtained when needed.	3.88	0.90	High
8.	Information compiled by regularly to facilitate understanding.	3.68	0.96	High
9.	The information provided is very clear.	3.68	0.95	High

10.	The information provided is very useful for me in completing the assignment.	3.75	0.97	High
11.	The interface of the system is very user friendly.	3.77	0.90	High
12.	I love using this system interface.	3.81	0.95	High
13.	I found this system is not complicated and difficult.	3.68	0.93	High
14.	I feel confident when using this system.	3.67	0.95	High
15.	On the whole I am satisfied with this system.	3.70	0.89	High
	Overall mean	3.73	0.86	High

* N = 40

Based on table 1 shows the items used to assess usability e-CQI system. Generally e-CQI system developed easy to learn (mean 3.76 and standard deviation 0.90). The system is very easy to use (mean 3.76 and standard deviation 0.90) and this system provides all the functionality that the lecturers need (mean 3.76 and standard deviation 0.90). Lecturers found that function in this system is well integrated (mean 3.76 and standard deviation 0.90) and be able to complete tasks effectively (mean 3.76 and standard deviation 0.90). The findings show if there are errors, the system is able to provide assistance in resolving offences involved quickly (mean 3.76 and standard deviation 0.90). The information provided was happy obtained (3.76 mean and standard deviation 0.90) and arranged in a systematic manner (mean 3.76 and standard deviation 0.90). Lecturer found the information provided very clear (mean 3.76 and standard deviation 0.90) and are very useful in completing the assignment (mean 3.76 and standard deviation 0.90). The results show the interface of the system is very user friendly (mean 3.76 and standard deviation 0.90) and lecturers love to uses system interface (mean 3.76 and standard deviation 0.90). The lecturers aware that this system is not complicated and difficult (mean 3.76 and standard deviation 0.90) and feel confident when using this system (mean 3.76 and standard deviation 0.90). As a whole the lecturers are satisfied with e-CQI system (mean 3.76 and

standard deviation 0.90). Overall findings indicate the system has good usability (mean 3.76 and standard deviation 0.90).

6. CONCLUSION

Continuous quality improvement is important for improving work processes available. Any system of higher education it became important in particular in obtaining element accreditation programme. As a result of observations made is available, continuous quality improvement is the heart of our efforts to improve the quality of programmes from time to time. Implementation of process improvement is also identified as the main agenda to ensure continuous improvement in teaching and learning activities in a programme of education [12].

The lecturers before implement CQI in the process of teaching cannot provide good reporting of audit accreditation programme yet with the development of the e-CQI system it facilitates the lecturers prepare CQI reporting very well. e-CQI system is a web-based system where it can be accessed at anytime and anywhere. Agile model was used in the development of the system involved. Study was carried out in terms of usability of the system involved. Findings the study found e-CQI system is very effective in implementing CQI in the process of recording of teaching and curriculum improvement. Therefore, the future functionality of the systems concerned are required to be added is not only used by lecturers but also officials from academic support units in all higher education institutions.

7. REFERENCES

- [1] Bhuiyan, N., & Baghel, A. (2005). An overview of continuous improvement: from the past to the present. *Management Decision*, 43(5), 761-771.
- [2] Roffe, I. M. (1998). Conceptual problems of continuous quality improvement and innovation in higher education. *Quality Assurance in Education*, 6(2), 74-82.
- [3] Temponi, C. (2005). Continuous improvement framework: implications for academia. *Quality Assurance in Education*, 13(1), 17-36.
- [4] James H. Pence, How to Do Everything with HTML, McGraw-Hill Osborne Media; (May 22, 2001).
- [5] Pryor TA. Development of Decision Support Systems. *Journal of Clinical Monitoring and Computing*. 1990; 7:137-146.
- [6] H. E. Resnick, B.B. Manard, et al. Use of electronic information systems in nursing facilities: United States. *Journal of the American Medical Informatics Association* 16(2) (2004) 179.
- [7] Levinson WA, Rerick RA. Lean enterprise: A synergistic approach to minimizing waste. ASQ Quality Press, 2002, xiii-xiv, 38.
- [8] S.D. Horn and D.S.P. Hopkins (eds.), *Clinical Practice Improvement: A New Technology for Developing Cost-Effective Quality Health Care* (New York, NY: Faulkner & Gray, 1994.
- [9] D.P. Connelly and S.T. Bennett. "Expert System and the Clinical Laboratory Improvement", *Clinics in Laboratory Medicine*, vol. 11, No. 1, March 1991, pp. 36-138.
- [10] Johari dan Ahmad Irzam. (2010). *Pembangunan Sistem Pengurusan Makmal Tempahan Dan Inventori*. *Universiti Teknologi Malaysia*. pp. 1-6. (Unpublished PhD Dissertation)
- [11] Aksit, M., Mezini, M., & Unland, R (Eds.). (2002). 'Do We Need 'Agile' Software Development Tools?' Springer-Verlag Berlin Heidelberg, pp. 412-430.
- [12] Norbahiah Misran, Siti Salasiah Mokri, Hafizah Husain and Wan Mimi Diyana Wan Zaki. (2011). Continual quality improvement process for undergraduate programs. *Procedia Social and Behavioral Sciences*, 18, 565-574.