The Development of Patterns Software for Educational Management on Cloud Computing in Supply Chain for ASEAN University Network Quality Assurance

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***Abstract*— The research topic the development of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance. The objectives of research to develop and to assess patterns software for educational management on cloud computing in supply chain for asean university network quality assurance. The research tool was questionnaire the development of patterns for The development of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance comprises nine main components, namely sub-components, Suppliers, University (Manufacturer),Enterprise data canter (private cloud), Finish product, consumers, Information exchange, Internet access. The statistics used in this research are arithmetic mean and standard deviation. Patterns of assessment system using Back-Box technique. The overall findings reveal that development of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance, shows the overall rating mean of 3.57 which means that patterns software for educational management on cloud computing in supply chain for asean university network quality assurance at the high level and can be appropriately applied in actual work settings.**

***Keywords*—** *development of patterns software, educational management on cloud computing,* ASEAN university network quality assurance

1. Introduction

Quality in higher education have significant about academic quality. In view of the varied needs and expectations of stakeholders, quality in higher education can be said to be a multi-dimensional concept. The world declaration on higher education for the twenty first Century: Vision and action [11] article 1 1 , Qualitative evaluation considers quality in higher education as "a multi-dimensional concept, which should embrace all its functions, and activities; teaching and academic programmers, research and scholarship, staffing, students, buildings, facilities, equipment, services to the community and the academic environment. Internal self-evaluation and external review, conducted openly by independent specialists, if possible with international expertise, are vital for enhancing quality." To develop, implement, sustain and improve the level of quality in higher education, an institution needs to install a quality assurance system. The regional report of asean and the pacific [1],[12] defines quality assurance in higher education as "systematic management and assessment procedures to monitor performance of higher education institutions" So, The awareness of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance will be choice as a method . To accomplish work procedures, actions and affairs within the organization. It starts from planning, providing accurate data at the time of need, practicing and maintenance, distribution by giving priority to information exchange, data analysis and sharing in order to achieve productivity through the development. The nature of supply chain and cloud computing technologies will be derived to play a role in changing work processes to be more computerized in order to style occupied custom of technology not only carrying supply chain and cloud computing technologies in specific supply chain activities. There are certain activities which are most commonly focused on in supply chain .The activities consisted of four activities forecasting and planning, Logistic,service and raw management and sourcing and procurement. supply chain ,service and spare parts management as well as sourcing and procurement. Many of these activities have been greatly improved by supply chain managers with the use of cloud computing. to increase efficiency and efficient

higher education .It is very important at the progress level. The asean quality qssurance Network is an association of southeast asian nations university network that is a collaboration of higher education institutes between member countries consisting of the National Association of East Asia, south chiang mai or asean with the aim of establishing to promote educational cooperation which is an essential mechanism for creating a foundation for society and regional unity. From the status declared directly above; consequently, the researchers are interested in emerging development of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance . [4] The researcher had an idea to develop the patterns software for educational management on cloud computing in supply chain for asean university network quality assurance for application to increase values of enterprises and educational institutions and increase satisfaction of consumers.

2. Related research

Toka, Darginis. &Aivazidou,Eirini (2013) said that computing in supply chain is technology that could contribute to this optimization by providing infrastructure, platform, and software solutions for the whole supply chain network via Internet. The utilization of cloud-based services in supply chain management leads to operational benefits, while at the same time potential risks and limitations should be taken into account by all supply chain stakeholders. The overview of cloud in supply chain that it can be visible to all supply chain partners, from the manufacturer to the customer especially real-time visibility throughout their customer network.

Cloud technology makes a lot of sense for supply chain managers. Computing in the cloud makes it possible to closely track a product throughout its life cycle ,include it enables you to make quick decisions and communicate effectively.

3 Research methodology

3.1 Population

The Population groups were 5 experts in supply chain management, 5 experts in cloud computing technologies and 5 experts on network quality assurance. The research sample totaling 15 experts for evaluation patterns software for educational management on cloud computing in supply chain for asean university network quality assurance

Independent variable. The independent variable is development of

patterns software for educational management on cloud computing in supply chain for asean university network quality assurance.

Dependent variable. The dependent variable is the evaluation result of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance

3.2 Research Tool

A questionnaire for assess development of

patterns software for educational management on cloud computing in supply chain for asean university network quality assurance.

The research methodology comprised into seven following, as follows:

3.2.1 Studies and research literature both within and outside the country concerning patterns software for educational management on cloud computing in supply chain for asean university network quality assurance.

3.2.2 Drafting of patterns software for educational management on cloud computing in supply chain for asean university network quality .

3.3.3 Design and construction patterns software for educational management on cloud computing in supply chain for asean university network quality .

3.2.4 Identification of experts for evaluation of patterns software for educational management on cloud computing in supply chain for asean university network quality. The researcher determined that they must be experts on supply chain management and in cloud computing technologies. All of them must have educational qualification at the doctoral degree level, and must have more than five years of work experience.

3.2.5 Create questionnaire for assess the suitability of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance. The experts assess the appropriateness of components model ,as follows:

1. Main components
2. Suppliers
3. University (Manufacturer)
4. Enterprise data canter (private cloud)
5. Finish product
6. consumers
7. Information exchange
8. Internet access
9. Enterprise data canter (private cloud)

3.2.6 Data collection and create questionnaire for assess the suitability of the patterns and sent the experts 5 experts in supply chain management, 5 experts in cloud computing technologies and 5 experts on network quality assurance..

3.2.7 Data analysis and evaluation result for patterns software for educational management on cloud computing in supply chain for asean university network quality assurance. The statistics

used in data analysis were mean, standard deviation, as follows:

1. Create questionnaire for assess the suitability of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance using form was a 5-scale rating , as follows:

The rating of 5 means most appropriate.
The rating of 4 means highly appropriate.
The rating of 3 means moderately appropriate.
The rating of 2 means lowly appropriate.
The rating of 1 means least appropriate.

2. The defining the criteria for the interpretation of the average , as follows: [2]

The rating means ranging from 4.51 – 5.00 means appropriate at the highest level.
The rating means ranging from 3.51 – 4.50 means appropriate at the high level.
The rating means ranging from 2.51 – 3.50 means appropriate at the moderate level.
The rating means ranging from 1.51 – 2.50 means appropriate at the low level.
The rating means ranging from 0.00 – 1.50 means appropriate at the lowest level.

4 Results

4.1 Results of research are presented in figure 1 for the whole development of patterns Software for educational management on Cloud Computing in supply chain for asean university network quality assurance in Tables 1 , as shown below:

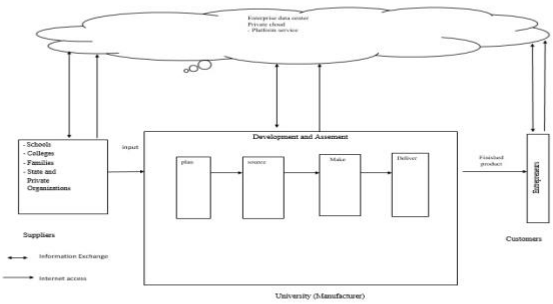

Figure 1: The development of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance

Table 1: Stakeholders each process is related to the following activities:

Stakeholders	Activities in supply chain	Needs for data
1. **Suppliers** 1. School 2. College 3. Family 4. State and private organizations	- Sending graduated students - giving funding and scholarships	-quick responses. - Real time Visibility
2. **University (Manufacturer)** 1 plan -Expected Learning Outcomes - Programme Specification	- The expected learning outcomes have been clearly formulated and aligned with the vision and mission of the university -The expected learning outcomes cover both subject specific and generic (i.e. transferable) learning outcome. -The expected learning outcomes clearly reflect the requirements of the stakeholders. -The information in the programme specification is comprehensive and up-to-date -The information in the course specification is comprehensive and up-to-date -The programme and course specification	-perform basic analytics and more accurate statistical demand forecasts - Real time Visibility -Execute more accurate - Real time Visibility

Table 1: (Continued)

Stakeholders	Activities in supply chain	Needs for data
2. **University (Manufacturer)** 2 Source - Programme Structure and Content	made available to the stakeholders. -The curriculum is designed based on constructive alignment with the expected learning outcome -The contribution made by each course to achieve the expected learning outcomes is clear.	-Execute more accurate - Real time Visibility
3 Make - Teaching and Learning Approach	-The curriculum is logically structured, sequenced, integrated and up-to-date .	-Able to provide real-time visibility of an activity and shipments and improve supply chain tracking
- Student Assessment	-The educational philosophy is well articulated and communicated to all stakeholders. -Teaching and learning activities are constructively aligned to the achievement of the expected learning outcomes. -Teaching and learning activities	- Real time Visibility -Able to provide real-time visibility of an activity and shipments and improve supply chain tracking - Real time Visibility

Table 1: (Continued)

Stakeholders	Activities in supply chain	Needs for data
2. **University (Manufacturer)** 3 Make - Student Assessment	enhance life-long learning. - The student assessment is constructively aligned to the achievement of the expected learning outcomes. -The student assessments including timelines, methods, regulations, weight distribution, rubrics and grading are explicit and communicated to students.	-Able to provide real-time visibility of an activity and shipments and improve supply chain tracking - Real time Visibility
- Academic Staff Quality	-Methods including assessment rubrics and marking schemes are used to ensure validity, reliability and fairness of student assessment. -Feedback of student assessment is timely and helps to improve learning. -Students have ready access to appeal procedure. -Academic staff planning (considering succession, promotion, re-deployment,	-Able to provide real-time visibility of an activity and shipments and improve supply chain tracking - Real time Visibility

Table 1: (Continued)

Stakeholders	Activities in supply chain	Needs for data
2. **University (Manufacturer)**		
3 Make - Academic Staff Quality - Support Staff Quality	termination, and retirement) is carried out to fulfil the needs for education, research and service - Staff-to-student ratio and workload are measured and monitored to improve the quality of education, research and service.- Recruitment and selection criteria including ethics and academic freedom for appointment, deployment and promotion are determined and communicated. - Competences of academic staff are identified and evaluated. - Training and developmental needs of academic staff are identified and activities are implemented to fulfil them. - Performance management including rewards and recognition is implemented to motivate and support education, research and service. - The types and quantity of research activities	-Able to provide real-time visibility of an activity and shipments and improve supply chain tra - Real time Visibility cking

Table 1: (Continued)

Stakeholders	Activities in supply chain	Needs for data
2. **University (Manufacturer)** 3 Make - Support Staff Quality	by academic staff are established, monitored and benchmarked for improvement -Support staff planning (at the library, laboratory, IT facility and student services) is carried out to fulfil the needs for education, research and service. - Recruitment and selection criteria for appointment, deployment and promotion are determined and communicated. - Competences of support staff are identified and evaluated. -Training and developmental needs of support staff are identified and activities are implemented to fulfil them. -Performance management including rewards and recognition is implemented to motivate and support education, research and service.	-Able to provide real-time visibility of an activity and shipments and improve supply chain tracking - Real time Visibility

Table 1: (Continued)

Stakeholders	Activities in supply chain	Needs for data
2. **University (Manufacturer)**3 Make -Student Quality and Support - Facilities and Infrastructure	-The student intake policy and admission criteria are defined, communicated, published, and up-to date. - The methods and criteria for the selection of students are determined and evaluated.- There is an adequate monitoring system for student progress, academic performance, and workload. -Academic advice, co-curricular activities, student competition, and other student support services are available to improve learning and employability. - The physical, social and psychological environment is conducive for education and research as well as personal well-being. -The teaching and learning facilities and equipment (lecture halls, classrooms, project rooms,	-Able to provide real-time visibility of an activity and shipments and improve supply chain tracking - Real time Visibility

Table 1: (Continued)

Stakeholders	Activities in supply chain	Needs for data
2. **University (Manufacturer)** 3 Make - Facilities and Infrastructure - Quality Enhancement	etc.) are adequate and updated to support education and research. - The library and its resources are adequate and updated to support education and research. - The library and its resources are adequate and updated to support education and research. - The laboratories and equipment are adequate and updated to support education and research. -The IT facilities including e-learning infrastructure are adequate and updated to support education and research. -The standards for environment, health and safety; and access for people with special needs are defined and implemented. -Stakeholders' needs and feedback serve as input to curriculum design and development. - The curriculum	-Able to provide real-time visibility of an activity and shipments and improve supply chain tracking - Real time Visibility

Table 1: (Continued)

Stakeholders	Activities in supply chain	Needs for data
2. **University (Manufacturer)** 3 Make - Quality Enhancement	design and development process is established and subjected to evaluation and enhancement. - The teaching and learning processes and student assessment are continuously reviewed and evaluated to ensure their relevance and alignment. -Research output is used to enhance teaching and learning. -Quality of support services and facilities (at the library, laboratory, IT facility and student services) is subjected to evaluation and enhancement. -The stakeholder's feedback mechanisms are systematic and subjected to evaluation and enhancement.	-Able to provide real-time visibility of an activity and shipments and improve supply chain tracking - Real time Visibility
4. Deliver Output	-The pass rates and dropout rates are established, monitored and benchmarked for improvement. -The average time to graduate is established, monitored and	-Real-time visibility

Table 1: (Continued)

Stakeholders	Activities in supply chain	Needs for data
2. **University (Manufacturer)** 4. Deliver Output	benchmarked for Improvement .- Employ ability of graduates is established, monitored and benchmarked for improvement. - The types and quantity of research activities by students are established, monitored and benchmarked for improvement. - The satisfaction levels of stakeholders are established, monitored and benchmarked for improvement .	-Real-time visibility
3 Consumers Entrepreneurs	Employing graduated students with desirable characteristics including good virtues and morality, good knowledge and intellectual skills, good human relationship skills, good responsibility, good numerical analysis skill, good	

Table 1: (Continued)

Stakeholders	Activities in supply chain	Needs for data
3 Consumers Entrepreneurs	communication skill, and good information technology usage skills, etc.	- Questionnaires to assess the employer's satisfaction with the employed graduated student on various aspects of desirable characteristics.

4.2 Principles of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance

4.2.1 Suppliers

Suppliers of the student (High school/college) , Supplies of the family (Parents, Siblings) , relatives, etc. government and private organizations (Scholarship).The suppliers mean the organizations that supply raw materials to the manufacturer. Raw materials in this case are students who graduated from high schools or students who receive special quotas for admission. They can apply for admission via internet, perform basic analytics and consequently execute more accurate statistical demand forecasts .

4.2.2 University (Manufacturer)

Manufacturer mean the university is regarded as a service provider university that produces graduated students. It performs the duty to transform raw materials, or entering students, into the finished products of qualified graduated students. The university will perform its duty of student Implementation and evaluation based upon quality assurance in education asean university network quality assurance of each activity, namely, expected learning outcomes, program structure and content, teaching and learning approach, student assessment, academic staff quality, support staff quality, student quality and support , facilities and infrastructure , quality enhancement and output . The final outcomes of the Manufacturer, ie. Graduates with desirable quality outcomes are transmitted information to a cloud application. As a result, All activity route can be visible to all supply chain partners, from the manufacturer to the customer.

4.2.3 Platform as Service

Platform as Service is a software to run on or for the user to build on cloud by using lifecycle of cloud computing namely Define the purpose, Define the hardware, Define the storage, Define the network, Define the security, Define the management process and tools, Testing the process and analytics.

4.2.5 Information exchange

Information exchange mean exchanging information or sharing information with each other.

4.2.6. Internet access

Internet access is the process of connecting to the internet using personal computers, laptops or mobile devices by users or enterprises. Internet access is subject to data signalling rates and users could be connected at different internet speeds.

4.2.7 Finished products

The Finished products mean graduated students from university.

4.2.8 Consumers

Graduate student identifies the society as the end consumer in this integrated supply chain. As universities are part of the society, the final outcomes of this supply chain, including graduates with desirable quality outcomes are delivered to the society as the end-of-process supply chain They include the society in general and entrepreneurs who receive and/or employ the students who graduated from the university. Finally, the end product of qualified graduated students will provide added value to the supply chain. [2],[3],[4],[5],[6],[7],[8],[9].

5. The evaluation the development of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance as shown table 2 below

Table 2: Appropriate level of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance

No.	List of Evaluated Items	$\overline{X}$	S.D.	Appropriate Level
1	Main components	3.57	0.66	High

Table 2: (Continued)

No.	List of Evaluated Items	$\overline{X}$	S.D.	Appropriate Level
2	Suppliers	3.58	0.62	High
3	University (Manufacturer)	3.58	0.54	High
4	Enterprise data canter (private cloud)	3.60	0.50	High
5	Finish product	3.53	0.63	High
6	consumers	3.53	0.91	High
7	Information exchange	3.60	0.73	High
8	Internet access	3.60	0.48	High
	Total	3.57	0.63	High

The development of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance evaluation assessed by experts can be concluded as shown in Table 2 Evaluation of patterns by experts was evaluated at highly a appropriateness ($\overline{X}$ = 3.57, S.D. = 0.63) which means that patterns software for educational management on cloud computing in supply chain for asean university network quality that can be applied in actual work settings.

4.2 Conclusion and Discussion

4.2.1 Conclusion

The development of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance comprises eight main components, namely sub-components, Suppliers, University (Manufacturer),Enterprise data canter **(** private cloud**)** ,Finish product, consumers, Information exchange, Internet access. The model using Back-Box technique. The overall evaluation result for the development of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance shows the overall rating mean of 3.57 with standard deviation of 0.63 which means that patterns software for educational management on cloud computing in supply chain for asean university network quality assurance at the high level and can be appropriately applied in actual work settings.

4.2.2 Discussion

The development of patterns software for educational management on cloud computing in supply chain for asean university network quality assurance was evaluated by a group of experts at a high level. As Chansamut & Piriyasurawong (2014) and (2019) indicated that supply chain and information system about educational need to consider elements namely Suppliers, University (Manufacturer), consumers, and customer that are related between different organizations with a clear goal of reducing the operational process of the model [2],[3] Moreover, with the study of Kaewngam, Chatwattans and Piriyasurawong [5] it reveals that supply chain and digital quality assurance for asean university network quality assurance has studied elements as well.

6 Recommendations

The development of patterns software for educational management on cloud computing in supply chain for ASEAN university network quality assurance comprises eight main components, namely sub-components, Suppliers, University (Manufacturer),Enterprise data canter **(** private cloud**)** ,Finish product, consumers, Information exchange, Internet access is highly appropriate ,but it has not been actually implemented in higher education . Therefore, if possible it should be implemented in some vocational college. The feedback information from

the implementation could be used to further improve patterns.

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