Evaluation of the Effectiveness of AUN-QA-based Course Learning Outcomes: A Case Study in a Management Information System Course at Mahidol University

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Abstract

Outcome-based education (OBE) is an educational philosophy and model focusing on the expected learning outcomes. Unlike subject-based education principles, emphasising the transfer of the instructor's knowledge, expertise, and experience to the learners, in relation to the body of knowledge established for that particular discipline, the OBE curriculum is centered on formulating what students should be capable of doing once completing a particular course. The design of the course structure, teaching and learning activities, and assessments are created to establish these outcomes. This paper presents a case study of the application of the effectiveness of the ASEAN University Network quality assurance (AUN-QA)-based course learning outcomes to the Management Information System course at Mahidol University from the perspective of the student. There were three objectives addressed by means of multiple research methods. The first objective centered on a qualitative design was to research the identification of the course learning outcomes, the second objective was to implement it in the course and the third objective was the creation of a quantitative research methodology using an online questionnaire as a data collection technique. The subjects for the second and third studies were the registered international students for the MIS course in the 2018/2019 Academic Year. The findings of the studies were that firstly there were nine course learning outcomes formulated that students needed to achieve for the MIS course.

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Secondly, the course learning outcomes were implemented and resulted in the system analysis and design of prototypes of eight diverse information systems. Finally, the evaluation of the effectiveness of the AUN-QA-based course learning outcomes revealed that the overall mean score was at a highest level ($\bar{x}$=4.46, SD=0.55).

Keywords: Course Learning Outcomes, Outcome-based Education**,** AUN-QA

Introduction

Nowadays, outcome-based education (OBE), an educational theory by Spady (1994) and model, has gained much more attention and popularity, and has become one of today's educational development practices. It focuses on the learning outcomes (subject-specific and generic) that the learners are expected to achieve once completing a programme or course. Unlike subject-based education (other researchers use the term 'input-based education' or 'traditional education'), that place an emphasis on delivering the instructor's body of knowledge in that particular discipline and on assessing the student performance in order to see if the students complete and pass all the established topics required, the OBE curriculum first decides on the expected learning outcomes. The curriculum designer then backward designs from the learning outcomes with regard to what to teach and how to assess the student performance in order to see if the students attain these set of proposed outcomes.

UNESCO (2003) (cited in ASEAN University Network (AUN), 2015) defines quality assurance in higher education as systematic procedures of management and assessment in order to monitor performance of higher education institutions. ASEAN University Network (AUN) (2019) was established in November 1995 to accelerate the solidarity and development of a regional identity through the promotion of human resource development, and one of its missions is to realise the importance of quality in higher education and the need to have quality assurance system development. AUN Quality Assurance (AUN-QA) models were developed as a sequence of such collaboration so as to promote and raise academic standards and enhance education, research and service amongst member universities (AUN, 2015). These models are centred on OBE and can be classified and serve strategic (AUN-QA model for instructional level), systemic (AUN-QA model for Internal Quality Assurance (IQA) System), and tactical (AUN-QA model for programme level) levels (AUN, 2015). The AUN-QA model for programme level emphasises quality of educational activities in three distinctive dimensions, namely input, process, and output.

The Master of Education in Educational Management (International Programme), M.Ed. (Educational Management), Department of Education, Faculty of Social Sciences and Humanities, Mahidol University was established in 1996. The programme has accepted students from ASEAN countries and other parts of the world. It is an international programme under this name, whereas others are Thai programme and prefer the term educational administration, except of M.Ed. (Educational Administration and Leadership) of Assumption University that is also an international programme. Due to the highly competitive education business and declining birth rates resulting in fewer people attending schools, colleges, and universities, the M.Ed. programme at Mahidol University has strived for excellence and to keep pace with the fast changes in economic, societal, and cultural situations, as well as the emergence of new technology in the 21st century. In doing so, one of the programme's strategies is to switch from subject-based to outcome-based education, and prepare itself for AUN quality assurance in order to be accredited internationally and become more renowned amongst overseas students.

Research Objectives

The present research has the following objectives:

1. To formulate the AUN-based course learning outcomes using a Management Information System (MIS) course at Mahidol University as a case study.
2. To implement the course learning outcomes.
3. To evaluate the effectiveness of the course learning outcomes implementation from students' perspectives.

Research Methodology

The present research is about formulating, implementing and evaluating the course learning outcomes of the course in Master of Education Programme in Educational Management (International Programme). This research adopted the multiple methods of research design and can be divided into three parts.

Part 1: To address the first research objective, the study was centered on a qualitative design to determine the programme learning outcomes (PLOs) and formulate the course learning outcomes (CLOs) for the Management Information System (MIS) course used as a case study. The AUN-based MIS course learning outcomes (MIS CLOs) were formulated based on the three phases of a curriculum development, namely the pre-assessment, assessment, and post-assessment phases (Chansaengsee et al., 2018: 155). The pre-assessment phase

identified stakeholders; the assessment stage was centered on two main activities, the needs assessment (i.e. eliciting the requirements of the identified stakeholders of the M.Ed. programme) and the analysis of data and content elicited; and finally the post-assessment step of developing the curriculum. This research placed an emphasis on the post-assessment phase, the deliverables, which were incorporation of the PLOs to the MIS course learning outcomes (MIS CLOs), the MIS course's teaching and learning methods, and the MIS course's assessment methods.

Part 2: To address the second objective, the study implemented the CLOs of the MIS course. The contents of the CLOs concerned information systems concepts, types of IS, IS in organisations, MIS, as well as system analysis and design phases of the information system development life cycle (SDLC). The research tool used in this phase of study was the MIS course syllabus and the assignment worksheets. The subjects used for this study were the eight international students with non-IT background from Bhutan, China, Japan and Myanmar registering for the MIS course in the 2018/2019 Academic Year. They were assigned five assignments –pre-assignment, assignment 1, 2, 3, and 4, each of which possessed its own task description, duration, submission date and time, assessment guidelines and rubrics. The summative assessment (scale 0 to 100) was used to objectively measure the student performance.

Part 3: To address the third objective, the research applied a quantitative research methodology. The CLOs were evaluated by means of empirical evaluation to find out the effectiveness of its implementation from student's perspectives. In this study, the term effectiveness was used to refer to the student agreement and disagreement to the deployment of the MIS CLOs. Steps taken were as follows:

1.1 Study and research on the evaluation of course learning outcomes.

1.2 The subjects used for this study were also the eight international students registering for the MIS course in the 2018/2019 Academic Year.

1.3 Creation of a questionnaire, consisting of twenty-eight closed questions and four open-ended questions, all of which concerned learning outcomes, teaching and learning activities, and assessments. For the closed questions, the responses were coded as 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree) on a Likert scale.

1.4 Validation of the questionnaire by three Educational Management experts to achieve an Index of Item-Objective Congruence (IOC) of between 0.67-1.0 (IOC > 0.5).

1.5 Creation of an online version of the questionnaire.

1.6 Email of the access link to the online questionnaire to students.

1.7 Analysis of the statistical results for the closed questions and content analysis for open-ended questions, using mean score and standard deviation

Research Results

The research results can be divided into 3 parts in accordance with the research objectives, as follows:

1) The design of the AUN-based course learning outcomes (CLOs) using a Management Information System (MIS) Course at Mahidol University as a case study.

Prior to the design of CLOs, the establishment of the PLOs of the Master of Education (Educational Management) (international programme) were undertaken. PLOs represent characteristics and abilities that students are expected to possess after graduating from the programme, and are formulated by taking into account the vision and mission of the institutions, in this case, the Faculty of Social Sciences and Humanities of Mahidol University, as well as reflecting the needs of active stakeholders, involving Thailand Qualification Framework (TQF), alumni and employers recruiting the graduates from the M.Ed. (Educational Management) programme.

PLOs were then clearly formulated and categorised into specific and generic outcomes, together with lifelong learning outcomes. The former describes the outcome obtained from the knowledge and skills of the subject discipline, which in this case is educational management, whereas the latter refers to soft skills such as communications, information and communication technology, problem-solving, critical and analytical thinking, and team-building. Additionally, the lifelong learning outcomes describe the learning outcomes helpful throughout a person’s life. Table 1 illustrates the mapping between PLOs, specific, generic and lifelong learning outcomes.

Table 1 Mapping between PLOs, TQF, Specific, Generic and Lifelong Learning Outcomes

PLO	Outcome Statements	TQF	Specific LO	Generic LO	Lifelong LO
1.	Adhere to morality and ethics in the standardised educational management profession	✓ Morality and Ethics		✓ (Attribute: organisation)	
2.	Be able to apply the knowledge involving standardised educational management that corresponds to the 21st century learning skills	✓ Knowledge	✓ (Knowledge: applying)		
3.	Be able to create and evaluate research studies regarding educational management (educational innovation) by applying research skills in educational management as a basis for analysis and synthesis.	✓ Intellectual development	✓ (Knowledge: creating; attribute: internalizing values)		
4.	Be able to apply and demonstrate leadership skills in managing and solving educational problems	✓ Interpersonal skills		✓ (Knowledge: applying; skills: valuing; attributes: adaptation)	
5	Be able to apply concepts and principles of information technology to create, retrieve, and process knowledge concerning educational management, and present the research findings efficiently	✓ Analytical Thinking and ICT skills	✓ (Knowledge: creating; skills: mechanism)		

PLO	Outcome Statements	TQF	Specific LO	Generic LO	Lifelong LO
6	Show advanced communication skills using foreign languages in constructing research studies and presentation, as well as being able to create a network of cooperation and cultural exchange at international level	✓ Communications and Lifelong learning skills			✓ (Skills: origination)

As shown in Table 2, the specific and generic learning outcomes were designed based on Bloom's Taxonomy of Educational Objectives to enable the learners to achieve the M.Ed. (Educational Management) programme's PLOs. Each of the outcomes could be classified as Knowledge in one of the Cognitive domain categories (C) (namely, remember, understand, apply, analyse, evaluate, and create); Skills in the Psycho-motor domain categories (P) (specifically,perception, set, guided response, mechanism, complex overt response, adaptation, and origination); and Attitudes in the Affective domain categories (A) (particularly, receiving phenomena, responding to phenomena, valuing, organisation, and internalising value).

Following the PLOs formulation, CLOs are intended learning outcomes stating what students are supposed to attain from a particular course unit in the programme (Biggs and Tang, 2011). In other words, they are desirable learning outcomes of a course planned for the students. Traditional course management relies on what lecturers have to teach. On the other hand, outcome-based educational management is centred on determining what students should be able to perform, then design what kind of knowledge, topics, teaching activities and assessments to be included in order for the students to achieve the created learning outcomes. All courses in the M.Ed. (Educational Management) programme clearly designed the CLOs in alignment with PLOs, each of which has its own description, teaching and activities (TL), and assessment (A), or TLAs. Using a Management Information System (MIS) course as a case study, the design of MIS CLOs resulted in nine CLOs, as shown in Table 3.

Table 3 Constructive Alignment of the PLOs, the MIS CLOs, and the MIS TLAs

Programme Learning Outcomes (PLOs)	Course Learning Outcomes (CLOs)	Bloom's Taxonomy			Teaching and Learning Activities (TL)	Assessments (A)
		C	P	A		
PLO5: Be able to apply the concepts and principles of information technology to create, retrieve, and process the knowledge concerning educational management, and present the research findings efficiently	CLO1: Describe the terminology and the association between information systems (IS) and information technology (IT), and its use in the field of information systems	Re			- Lecture - In-class discussion - Exercises	- Exercises - Case Studies
	CLO2: Explain and differentiate between the different types of ISs	Un			- Lecture - In-class discussion - Case study	
	CLO3: Explain the roles of people and the strategic value of ISs in the organisation	Un				
	CLO4: Describe the components and functions of MIS and decision support systems (DSS), and their uses	Re			- Lecture - In-class discussion - Exercises	

Programme Learning Outcomes (PLOs)	Course Learning Outcomes (CLOs)	Bloom's Taxonomy			Teaching and Learning Activities (TL)	Assessments (A)
		C	P	A		
	CLO5: Compare and contrast the different processes of developing MIS;	U n			- Lectures - In-class discussion - Project-based learning:	Project initiation and problem definition statement, using a rich picture (Pre-Assignment)
	CLO6: Demonstrate the analysis and design of MIS in an education setting;	An		Va	- Lecture - In-class discussion - Project-based learning: analysis and design practice - Student presentation on the analysis and design of the prototype - Learning and sharing	System analysis and design (Assignment 1)
	CLO7: Plan and conduct an assessment of how ISs support the activities of managers and users in organisations;	Cr		Va	- Lecture - In-class discussion - Project-based learning: evaluation - Student presentation on the evaluation plan - Learning and sharing	An evaluation plan (Assignment 2)
	CLO8: Develop a design prototype of chosen MIS in education		Ori		- Lecture on the - Case studies - Project-based	Design prototype development (Assignment 3)

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Programme Learning Outcomes (PLOs)	Course Learning Outcomes (CLOs)	Bloom's Taxonomy			Teaching and Learning Activities (TL)	Assessments (A)
		C	P	A		
					learning: prototype development - Student presentation on the design prototype creation - Learning and sharing	
	CLO9: Integrate all the concepts discussed in class and write an academic paper reflecting the results of the design prototype development	Cr	Ori	Org	- Research-based learning: academic writing in IS development - Learning and sharing	A research paper reflecting the results of the design prototype development (Assignment 4)

As can be seen in Table 3, there were nine CLOs altogether formulated in alignment with PLO5. Each CLO had its own description, teaching and learning activities and assessments. Furthermore, each of CLOs was designed based on three domains of Bloom's Taxonomy, as previously described, ranging from lower to higher levels. For instance, CLO6 stated that *students would be able to demonstrate the analysis and design of MIS in an education setting*. It was designed to cover the Analyse level of Cognitive domain (C) and Valuing of Affective domain (A). Its teaching and learning activities were dependent on lectures on the analysis and design of management information systems in a business setting, IS infrastructure and applications for digital age; in-class discussion; project-based learning; analysis and design practice; student presentation (communication) on the analysis and design of the prototype and collaborative learning and sharing. Moreover, the students were assessed based on the submission of Assignment 1 concerning system analysis and design of the chosen management information system.

Similarly, CLO8 specified that *the students would be capable of developing a design prototype of a chosen MIS in education*. This is in the Origination of Psychomotor domain (P). Its teaching and learning activities heavily relied on lecture and case studies of the prototype development, project-based learning, student presentation, and learning and sharing; and its assessment relied on Assignment 3 task of developing a design prototype of the intended MIS.

2) The implementation of the MIS course learning outcomes (MIS CLOs)

The CLOs were adopted in all teaching and learning activities, as well as assignments of the MIS course, as previously mentioned, and resulted in a vast array of distinctive MIS design prototype development. A list of the design prototypes involved a preschool MIS, a teacher-parent information exchange system, a government platform for controlling media and news for citizens, a teacher-student-parent information system, an independent recruitment and management system in higher vocational college, a class management system for schools, a staff monitoring information system, an event mobile application for international students. Due to page restrictions, the event mobile application for international students by a Japanese student, was especially chosen as an example to demonstrate the implementation of the MIS CLOs. Her problem statements are that students have too many events essential for their studies from too many different resources, and have to register for each of the events separately. Therefore, the students are looking for a one-stop service allowing them to search and book for ongoing and future events, and view and edit the events that have already been reserved. In addition, regarding teachers, staff and student council, they generally do not know the student's timetable and what students are attending which events. They are also not informed about all the ongoing and future events, and are unable to create a new event they would like the students to attend.

From the problem statements, the system analysis of the application (CLO6 achievement) was conducted. It shows that there are three main entities, namely students, administrator, and event creator entity consisting of teachers, staff and student council. The student entity can view, reserve and cancel an event, and is also reminded about the reserved event, including date, time, a number of participants. Administrator can check, edit, and maintain information, especially granting user access and retrieving lost passwords. Event creators (including teachers, staff, student council), can view all the events, create a new event in different communicative channels at one time, check and modify the already created events, and view the statistical results of all the events.

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The design prototype of the application (CLO8 attainment) to offer the functionality for the aforementioned entities is exhibited as examples in Figure 1-5.

Figure 1 Home Page (Students)

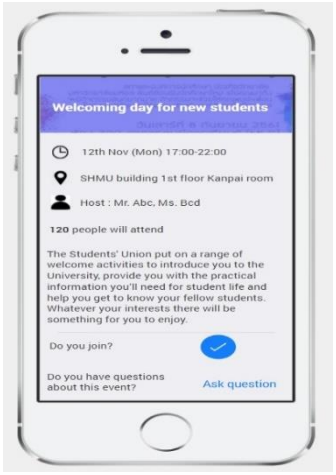

Figure 2 Event Info Page

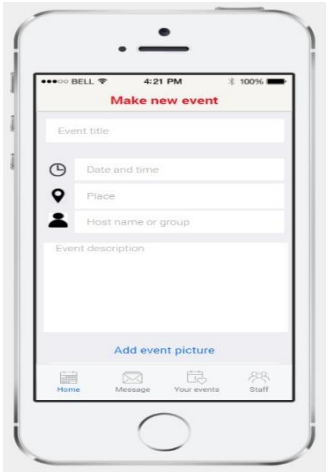

Figure 3 Staff Creating Event Page

Figure 4 Participants' Events Info Page

Figure 5 Administrator Editing Event Pages

The submissions of all course assignments showed that the students attained the MIS CLOs. The students had no prior knowledge regarding the IS development, meaning that this course was their first time gaining the experience in this area of studies, particularly the system analysis and design activities. However, all students could manage and complete the assignments perfectly under the lecturer's supervision, sharing and discussing knowledge amongst them, and research-based studies. In addition, the summative evaluation of student performance revealed that over sixty percent of the students obtained grades of A (over 80 marks). This affirmed the accomplishment of student performance and meeting the set of established CLOs.

3) The evaluation of the effectiveness of the implementation of course learning outcomes from student's perspectives

In addition to the objective evaluation based on the students' summative assessment, the students were also required to perform a subjective evaluation of the effectiveness of the CLOs implementation, the results are shown in Table 4. Overall, the mean score was at a highest level of agreement (Best, 1977) ($\bar{x}$=4.46, SD=0.55), meaning that the subjects agreed very highly with the evaluation criteria. When considering each aspect, it was found that most questions attained the highest level of mean scores (Best, 1977). The item receiving the highest mean score was Q6: *"The lecturer delivered his lectures based on the course learning outcomes (CLOs) established."* ($\bar{x}$=4.88, SD=0.35). Similarly, Q1: *"I believe learning outcomes are important to learning."*, Q5: *"The design of teaching and learning activities, together with assessments, are coincided with the course learning outcomes (CLOs)."*, and Q8: *"I feel the MIS course is useful."* all attained the second highest mean core ($\bar{x}$=4.75, SD=0.46). On the other hand, Q10: *"I am confident that I have achieved all of the course learning outcomes (CLOs)"* had the lowest mean score ($\bar{x}$=4.13, SD=0.64), meaning that this question received the least student agreement towards the evaluation criteria. However, it was still in the high category.

Table 4 The Evaluation Results

Evaluation Criteria/Questions	$\bar{x}$	SD	Meaning
Q1: I believe learning outcomes are important to learning.	**4.75**	**0.46**	**Highest**
Q2: I realise the programme learning outcomes (PLOs) are appropriate. **(PLOs are established in accordance with programme stakeholders' needs, e.g. alumni, employees, and Faculty of Social Sciences and Mahidol University Missions and Visions)**	**4.40**	**0.49**	**Highest**
PLO1: Adhere to morality and ethics in the standardised educational management profession	4.50	0.53	Highest
PLO2: Be able to apply the knowledge involving standardised educational management that corresponds to the 21st century learning skills.	4.38	0.52	Highest
PLO3: Be able to create and evaluate research studies regarding educational management (educational innovation) by applying research skills in educational management as a basis for analysis and synthesis.	4.63	0.52	Highest

Evaluation Criteria/Questions	$\bar{x}$	SD	Meaning
PLO4: Be able to apply and demonstrate the leadership skills in managing and solving educational problems.	4.25	0.46	Highest
PLO5: Be able to apply the concepts and principles of information technology to create, retrieve, and process the knowledge concerning educational management, and present the research findings efficiently.	4.38	0.52	Highest
PLO6: Show advanced communication skills using foreign languages in construct research and presentation, as well as being able to create a network of cooperation and cultural exchange at the international level.	4.25	0.46	Highest
Q3: I think the MIS course learning outcomes (MIS CLOs) are appropriately designed and meaningful.	**4.40**	**0.49**	**Highest**
CLO1: describe the terminology and the association between information systems and information technology, and its use in the field of information systems	4.38	0.52	Highest
CLO2: explain and differentiate the different types of information systems	4.38	0.52	Highest
CLO3: explain the roles of people and the strategic value of information systems in the organization	4.38	0.52	Highest
CLO4: describe the components and functions of management information systems (MIS) and decision support systems (DSS), and their uses	4.38	0.52	Highest
CLO5: compare and contrast the different processes of developing management information systems	4.50	0.53	Highest
CLO6: demonstrate the analysis and design of management information systems in a business setting	4.25	0.46	Highest
CLO7: plan and conduct an assessment of how information systems support the activities of managers and users in organisations	4.25	0.46	Highest
CLO8: develop a design prototype of chosen management information system in education	4.50	0.53	Highest
CLO9: integrate all the concepts discussed in class and write an academic paper reflecting the results of the design prototype development	4.63	0.52	Highest
Q4: The MIS course learning outcomes (MIS CLOs) realised	**4.50**	**0.53**	**Highest**

Evaluation Criteria/Questions	$\bar{x}$	SD	Meaning
the Educational Management programme learning outcome (PLOs).			
Q5: The design of teaching and learning activities, together with assessments, accomplished the course learning outcomes (CLOs).	4.75	0.46	Highest
Q6: The lecturer delivered his lectures based on the course learning outcomes (CLOs) created.	4.88	0.35	Highest
Q7: I think the MIS course learning outcomes (CLOs) met my expectations.	4.38	0.52	Highest
Q8: I feel the MIS course is useful.	4.75	0.46	Highest
Q9: I have learned something new in the MIS course.	4.63	0.74	Highest
Q10: I am confident that I have achieved all of the course learning outcomes (CLOs).	4.13	0.64	High
Q11: I can apply the concepts of analysis, design and evaluation to my information system development.	4.25	0.46	Highest
Q12: I agree the outcome-based course design has helped to develop my knowledge and skills.	4.50	0.53	Highest
Q13: I am satisfied with the design of course learning outcomes (CLOs).	4.50	0.53	Highest
Q14: I am satisfied with the course assessment.	4.25	1.16	Highest
Q15: I am confident I have achieved some of the course learning outcomes (CLOs)?	4.50	0.53	Highest

Note: 1.00-1.80 = lowest, 1.81-2.60 = low, 2.61-3.40 = moderate, 3.41-4.20 = high, 4.21-5.00 highest (Best, 1977)

With regard to the open-ended questions, it revealed the following:

The majority of students were confident that they had achieved some of the CLOs ($\bar{x}$=4.50, SD=0.53), and that the CLO8: *"being able to develop a design prototype of chosen MIS in education"* had the highest responses.

Additionally, most students replied that they had felt the CLO9 stating that *"being able to integrate all the concepts discussed in class and write an academic paper reflecting the results of the design prototype development"* was the most important, followed by the CLO7 stating *"plan and conduct an assessment of how ISs support the activities of managers and users in organisations"* and CLO8 describing *"develop a design prototype of chosen MIS in education"*.

Furthermore, from the responses recorded with regard to additional comments, the students agreed that the MIS course was useful, it was then suggested if the course could be a required course, instead of elective, so that everyone could benefit from it in different perspectives from other educational management courses. In addition, all students were interested in digital education and learning, particularly, educational technology, e-Learning, the use of ICT in education, multimedia technology development, and developing small educational application themselves. Lastly, few students gave additional comments relating to their new knowledge discovery about IS and educational technology, and the appreciation they expressed towards the MIS course. On the whole, student's perceptions revealed a high to highest level of agreement in all items in the questionnaire, and they believed they had achieved most of the CLOs.

Discussion and Conclusions

From the studies there are some issues that can be discussed and conclusions drawn.

The formulation of AUN-based CLOs, using a Management Information System course at Mahidol University as a case study, resulted in nine CLOs that were derived from the PLOs. Although there are other courses in the Ed.M. programme accountable for the PLO5, stating that *"students will be able to apply concepts and principles of information technology to create, retrieve, and process knowledge concerning educational management, and present the research findings efficiently"*, this course is merely a core information technology course. However, as it was an elective course, the students commented that every student should have the opportunity to attend and gain benefits from the system development approach and the concept of information and communication (ICT) in education. This can be achieved by means of converting it to a required course so that every student could register. Therefore, in the next round of curriculum enhancement, there could be a brand new course entitled 'information and communication technology in education', similar to the M.Ed. (Educational Administration and Leadership programme of Assumption University (Assumption University, 2019).

The implementation of the CLOs led to the development of eight dissimilar information system prototypes. The students experienced for the first time, the life cycle of information system development (SDLC), particularly the system analysis and design activities. A number of MIS courses for non-IT background students at postgraduate level are generally delivered within the teacher-centered paradigm by means of teaching theories, principles and concepts. In contrast, this course was centered on both theoretical and practical delivery.

Kyndt et al. (2014 cited in Kumpas-Lenk et al., 2018) reported that the students dislike a course design where it was presented based on provision of topics to be memorised. The way this MIS course was designed emphasised OBE, which according to Brooks et al. (2014), it was stated that the majority of students discovered learning outcomes worthwhile and used them to support their every day's studies in a number of ways. This is because learning outcomes enable students to concentrate on their learning, allowing them to understand what they need to accomplish; hence assisting them to complete the course assignments and examinations effectively. In addition, the MIS course allowed the students to have the opportunity to identify their own actual problem(s) of interest and conduct a small IS design project as a solution to their identified problem(s). Correspondingly, Lixun (2011) stated that knowing what exactly the students would be able to do after finishing a course, in relation to defined learning outcomes, allowed for more student-centered learning. Moreover, Kumpas-Lenk et al. (2018) noted that learning outcomes could possibly be used as a tool in guiding the process of transforming the teacher-centered to student-centered learning.

The evaluation of the effectiveness of the CLOs implementation from students' perspectives revealed that the overall mean score of effectiveness of the AUN-QA-based CLOs was at the highest level of agreement. The students believed that learning outcomes were important to learning ($\bar{x}$=4.75, SD=0.46). This is similar to the work by Kumpas-Lenk et al. (2018) noting that from students' perspective the design of learning outcomes mattered, and that all in all the CLOs had a positive impact on student's agreement, satisfaction and achievement of their studies. In summary, the student's perception towards the MIS course had an affirmative review, and the students were confident and believed that the AUN-QA-based MIS course was useful and effective. Future work is to enhance the MIS teaching and learning activities and assessments to keep pace with the students' comments and the fast changing trends of IT and educational management strategies. Furthermore, the intention is to incorporate the concepts found in this study to every course in the M.Ed. (Educational Management) programme, and to conduct a future study in a larger scale, including a course with a larger number of students.

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