

***Student Reflection to Curriculum Design for Computer Scientist
Comprehensive Examination***

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Abstract

Currently, computer scientists do not need professional certificates for applying their jobs although many organizations have introduced several specific-purpose certificates. The issues of professional certificates in computer science and software engineering have been discussed in several meetings around the world. In Thailand, most professional certificates are granted by authorities in the field. Nowadays, there is still a controversy whether these authorized committees should involve in the curriculum design process or they should act as the third parties in quality assurance process. In designing a current curriculum of Bachelor of Science (BSc) program in Computer Science at Prince of Songkla University (PSU), PSU-BSc-CS-2017, the objectives of outcome-based learning were mainly concerned. Therefore, this new curriculum, PSU-BSc-CS-2017, commencing in 2017, has included the course 344-493: Comprehensive Review and Test for Computer Scientists. The main objectives of this course are (1) to prepare the fourth-year students for job recruitment by self-learning and practice, (2) to assess their knowledge and skills in computing at the end of their BSc program in order to give useful information to stakeholders, and (3) to examine the students' performances in the same manner as an exit examination. Hence, in our preliminary investigation, we started to get some important information from the groups of students who will adopt the course 344-493 called Group-A and who will not adopt the course 344-493 called Group-B. The thirty-nine second-year students were selected as Group-A and the forty-nine fourth-year students were selected as Group-B. These students then were given the questionnaires to express their opinions and suggestions. The results from our preliminary survey show that only 25.6% of students in Group-A know about professional certificates while 36.7 % in Group-B know about this. Thirty-eight percentages of students in Group-A agree with having the course 344-493 in the PSU-BSc-CS curriculum while 69.4 % in Group-B agree with this.

Keywords: Computer scientist, Comprehensive examination, Curriculum design, Exit examination, Student reflection, Undergraduate program.

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Introduction

Nowadays, many universities and institutions are concerned with their educational quality in order to get better results and outcomes for better competition. Graduates' quality is one of key important factors that lead to educational reputation and better competition in terms of student recruitment and enrollment as well as social engagement impacts. These factors seem to be the return of investment for most universities and institutions. Curriculum design becomes a starting point for its implementation during teaching and learning processes, and student assessment processes. Weak curriculum design may lead to weak learning outcomes. This would affect graduates' quality. A program curriculum is strongly related to learning processes and environments as well as learning evaluation and assessments such as student assessment. Thus, not only universities and institutions pay attention to their curriculum design but also most stakeholders are often concerned with this. Outcome-based education (OBE) has gained popularity and successfully implemented for curriculum design, learning and training, assessment as well as other learning activities [Spady, 1994; Tam, 2014; Bergsmann, 2015]. OBE guides clearing learning results at the end of significant learning activities. OBE are often concerned with feedbacks and suggestions from stakeholders and takes this useful information for educational quality improvement. Graduates' competences and expected learning outcomes of a study program can be formed to satisfy its stakeholders' needs. These stakeholders can be considered as significant groups of people such as applicants of the program, students, alumni, employers, funding agencies, teachers and staff. Some quality assurance frameworks also suggest for curriculum design such as ASEAN University Network Quality Assurance (AUN-QA) [ASEAN University Network, 2015]. The 3rd version of the AUN-QA model for program level encompasses the following eleven criteria.

- expected learning outcomes
- program specification
- 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
- output

Although there are several suggestions and guidelines for curriculum design, learning processes, and assessment at higher education levels, this does not always convince the quality of graduates. Therefore, in Thailand, some critical study programs have adopted professional certificates granted by authorities in the fields such as medical programs, nurse programs, and some engineering programs. The national tests and exit examination are also adopted in some programs. Unlike these programs, computer scientists in Thailand do not need professional certificates for applying their jobs although there are some specific purposed certificates [Japan Information-Technology Engineer Examination Center, 2006]. Student and graduate assessment

for computer science (CS) programs at higher education levels vary from university to university although every CS program in Thailand has to compile their programs to the Thailand qualification framework (TQF) for computer disciplines declared in 2009 as the law for higher education standards [Office of the Education Council, 2009]. The TQF is adopted for degree programs in computer including computer science, computer engineering, software engineering, information technology, and business computer or information system. However, evaluation and assessment tasks can be difficult, expensive, and taken time. Therefore, the study reported here is aimed to get understandings and feedbacks about curriculum design from the students who will be our significant stakeholders for the Bachelor's degree of Science (BSc) in computer science at Prince of Songkla University (PSU), Thailand.

Background

The curriculum design for BSc in computer science at PSU has its process as shown in Fig 1. The curriculum design was concerned with OBE in order to meet the following needs.

- the expected learning outcomes of the program
- the graduate competency
- the organizational goals

CS Curriculum Design Process at PSU :

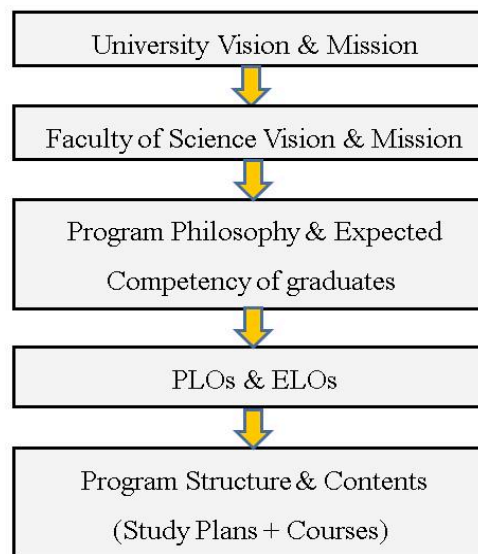


Figure 1: The curriculum design process at PSU

The current curriculum was revised in 2017 (PSU-BSc-CS-2017). It is based on the IEEE/ACM curricula guidelines-2013 [Association for Computing Machinery & IEEE Computer Society, 2013] and the TQF guidelines-2009. The program structure is totally 135 credits, consisting of the following courses.

- General education courses for 30 credits
- Compulsory courses for 75 credits, including basic science courses and core CS courses
- Elective courses for 30 credits

In order to solve some problems of graduate quality, the program committees have decided to add the course 344-493 Review and Test for Computer Scientists to the revised curriculum. This course was designed as the compulsory course in the PSU-BSc-CS-2017 rather than the exit examination. The course description is as follows:

COURSE: 344-493

Review knowledge in core areas (compulsory courses) corresponding to computer science body of knowledge; professional test of knowledge and skills for computer scientist.

Research Methods

The overall research project is planned into four states corresponding to PDCA (Plan-Do-Check-Act) for the curriculum processes as follows:

- P stage : curriculum design
- D stage : curriculum implementation
- C stage : curriculum evaluation
- A stage : curriculum revision

The preliminary investigation reported here is in the P stage. The research questions for the preliminary investigation are as follows:

Q1: Do the CS students at PSU have awareness of professional certification?

Q2: Do the students agree with the exit examination?

Q3: Do the students agree with the newly revised curriculum design in term of having the course 344-493?

Q4: Do the students agree with the learning plans for the course 344-493?

Q5: Do the students agree with the assessment criteria and methods for the course 344-493?

Q6: Do the students agree with having the course 344-493 would enhance education quality assurance?

Q7: Do the students agree with education quality assurance would lead to graduate quality?

Q8: Do the students agree with having the course 344-493 would lead to the students' readiness and confidence for job application and recruitment (employability)?

The populations are current students in the BSc-CS program at PSU. The samples were selected by purposive sampling as the 2nd and 4th-year students in the academic year 2019. The second-year students who will adopt the course 344-495, called Group-A, and the fourth-year students who will not adopt the course 344-493, called Group-B. Questionnaires were used as data collection. Quantitative statistics were applied for data analysis. Group-A consists of 39 students (9 males and 30 females) 30and Group-B consists of 49 students (25 males and 24 females).

Results

The student opinions reflect to the research questions for Group-A and Group-B are shown as Fig 2 and Fig 3 respectively.

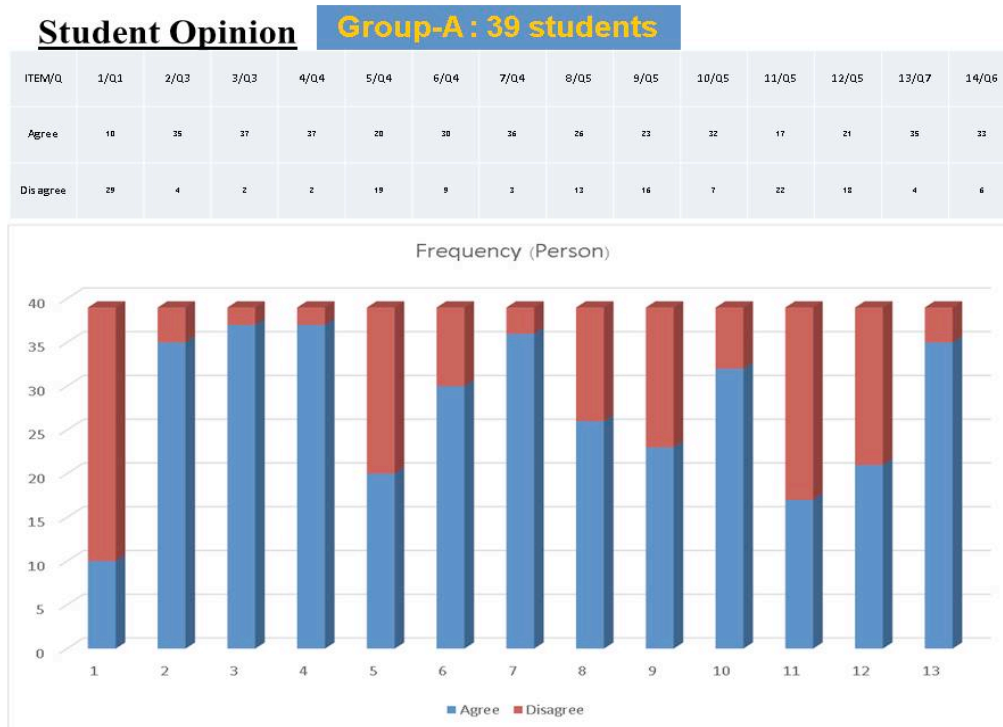


Figure 2: The Group-A students reflect to the research questions

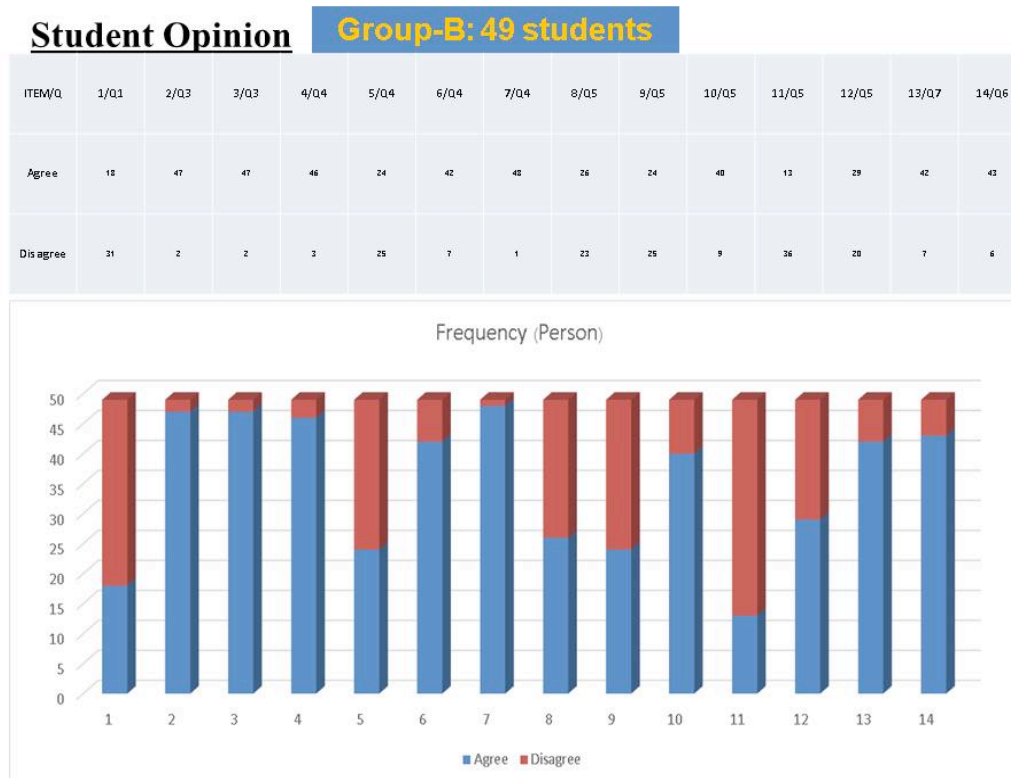


Figure 3: The Group-A students reflect to the research questions

The results from our preliminary investigation corresponding to each research question are as follows:

Answer to Q1

- 25.6 % of students in Group-A know about professional certification.
- 36.7 % of students in Group-B know about this.

Answer to Q2

- 74.4 % of students in Group-A agree with the exit examination.
- 55.5 % of students in Group-B agree with this.

Answer to Q3

- 38.5 % of students in Group-A agree with having the course 344-493.
- 69.4 % of students in Group-B agree with this.

Answer to Q4

- 78.8 % of students in Group-A agree with the learning plans for the course.
- 81.6 % of students in Group-B agree with this.

Answer to Q5

- 61.1 % of students in Group-A agree with the assessment criteria and methods.
- 59.9 % of students in Group-B agree with this.

Answer to Q6

- 84.6 % of students in Group-A agree with the course 344-493 would enhance education quality assurance.
- 87.8 % of students in Group-B agree with this.

Answer to Q7

- 89.7 % of students in Group-A agree with education quality assurance would lead to graduate quality.
- 85.7 % of students in Group-B agree with this.

Answer to Q8

- 84 % of students in Group-A agree with the course would lead to the students' readiness and confidence for job application and recruitment.
- 82 % of students in Group-B agree with this.

Conclusion

The research reported here is the preliminary investigation of student reflection to the curriculum design for the course 344-493 in the BSc program in Computer Science at Prince of Songkla University, Thailand. This course is related to comprehensive examination for undergraduate students in computer science in the similar manner as exit examination in order to improve educational quality in terms of student and graduate quality. This reflection was collected from the 39 second-year students who will adopt the course 344-493 and the 49 fourth-year students who will not adopt the course 344-493 because they adopted the previous version of curriculum. Questionnaires were used as data collection. The study was conducted before the course will be implemented in the year of 2020. The research results would lead to well-prepared implementation of the course and next curriculum revision. These results will be taken to account for the program management. The future works will be related to the major stakeholders of the program and will look through the curriculum implementation, assessment, and revision as the overall research plan.

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References

Spady, W.G. (1994). *Outcome-Based Education: Critical Issues and Answers*, American Association of School Administrators, ISBN: 0-87652-183-9.

Tam, M., (2014). Outcomes-Based Approach to Quality Assessment and Curriculum Improvement in Higher Education, *Quality Assurance in Education*, Vol. 22, No. 2. Pp. 158-168.

Bergsmann, E., Schultes, M.T., Winter, P., Schober, B., and Spiel, C. (2015). *Evaluation and Program Planning*, ELSEVIER, pp. 1-9.

ASEAN University Network. (2015). *Guide to AUN-QA Assessment at Programme Level*, Version 3.0.

Japan Information-Technology Engineer Examination Center. (2006). *Textbook for Fundamental Information Technology Engineers*, NECTEC-Thailand.

Office of the Education Council, Ministry of Education-Thailand. (2009). *Thailand Qualification Framework for Higher Education Standards in Computer*.

Association for Computing Machinery & IEEE Computer Society. (2013). *Curriculum Guidelines for Undergraduate Program in Computer Science*,

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