

The Effects of Implementing Quality Management System on Undergraduate Engineering Programmes – The Case of Technological University (Hmawbi)

Abstract

The implementation of a quality management system (QMS) has become a must for all technological universities in Myanmar because they need to follow the standards and guidelines of the Engineering Education Accreditation Committee (EEAC) under the Myanmar Engineering Council (M.EngC) for programme accreditation. In this paper, 1) the current practices of National Education Policies and Quality Assurance (QA), 2) the major components of QMS of Technological University (Hmawbi) (TUHMB), 3) the university policy in Teaching and Learning, Research and Development, Administration and Leadership, 4) effects of QMS on undergraduate engineering programmes were discussed. A comparison was made before and after implementing QMS. The main aim of this paper was to evaluate how and to what extent the QMS implementation can have positive effects on the undergraduate engineering programmes using the case of TUHMB. The study involved multi-stakeholders: department heads, academic and administrative staff in all levels, and student representatives. Descriptive research methodology was utilized in this research. A questionnaire was prepared to gather the required data and informal interview with the heads was conducted to deeply analyse the impact of QMS. The findings have shown that TUHMB applied quality management to a great extent in most of its academic processes and QMS implementation had a strong positive effect on the undergraduate engineering programmes especially in the teaching and learning process, research and development, course evaluation, curriculum review, student services and support, provision of facilities and infrastructure.

Key words: quality management system, undergraduate engineering programmes, quality assurance practices, effects of quality management system

1. Introduction

The higher education system in Myanmar is exposed to constant change and transformation especially with the country's new government. Universities and their respective programmes should become more diversified because the higher education sector is quickly expanding and focusing more and more on quality education. With this context, the quality of universities and their programmes are put under scrutiny more than ever. To address this concern, most universities have established their quality management system (QMS), put up their Quality Assurance Unit (QAU), and top management assign well trained personnel as quality management representatives. Moreover, they arranged a series of training on quality matters for all staff and conducted internal audit according to the guidelines and standards of quality procedures implemented in line with the requirements of external quality assurance (EQA). The main responsibilities of QMS/QAU are: 1) to monitor the internal quality processes that a university has developed; and 2) to ensure the achievement of the established goals, objectives and standards through continuous monitoring of quality processes.

1.1 Technological University (Hmawbi) and its programmes

Technological University (Hmawbi) or TUHMB, which is now under the Department of Higher Education (DHE), Ministry of Education (MoE) was upgraded from being a Government Technological College (GTC) on 20 January 2007. It was originally under the Ministry of Science and Technology until early 2015 when all universities including art and science universities, technological universities and computer universities throughout the country underwent reform and all of them were put under the Ministry of Education. TUHMB is composed of seven engineering departments and six supporting academic departments. At present, it offers seven Engineering programmes for bachelor and master's degrees: Civil Engineering, Electronics Engineering, Electrical Power Engineering, Mechanical Engineering, Mechatronic Engineering, Computer Engineering and Information Technology and Architecture.

1.2 The current practices of National Education Policies and Quality Assurance

Myanmar's education system was previously based on 11 years of basic education but has recently added two levels to its basic education system

(kindergarten and year 12). The transition into the new system is ongoing and will be fully implemented in 2022. There are over 100 universities around the country and the registration of universities is legislated under the National Education Law 2014 (amended in 2015).

The National Education Policy Commission (NEPC) has legislated responsibilities for setting national education objectives and policies, for founding a national curriculum committee responsible for kindergarten to year 12, and the national quality assurance committee responsible for the accreditation processes (institutional level) related to the national qualifications framework (NQF). NEPC will evaluate the higher education system and develop policies and regulations to assist the National Accreditation and Quality Assurance Committee (NAQAC) in developing criteria and standards for quality assurance. The Commission will also set policies for opening and closing universities and schools, and will report to the parliament every six months.

As TUHMB prepares engineers and architects for the nation, it needs to be recognized by the Engineering Education Accreditation Committee (EEAC) under the Myanmar Engineering Council (MEngC). Therefore, TUHMB needs to follow the standards and guidelines of NAQAC for institutional level and those of EEAC for programme level accreditation. MEngC has stipulated that EEAC was established to guarantee the quality of engineering education and programmes offered by technological universities under the MoE. It was further mandated that the teaching-learning environment of all study programmes and their management need to be in line with the guidelines and standards of EEAC for programme accreditation in order to be recognized regionally or globally. It should be noted that the criteria and guidelines for programme accreditation of EEAC are referred to the Federation of Engineering Institutions of Asia and Pacific (FEIAP). There are altogether seven criteria in the EEAC manual and QMS is one of them. It must be implemented and continually maintained to be assessed for accreditation.

To keep up with all these developments, TUHMB has implemented its Quality Management System (QMS) since 2015. In line with this, internal auditors who underwent sufficient training to carry out this task have regularly assessed monitoring and management of the teaching and learning processes. The aims of implementing quality management system are: 1) to involve stakeholders in quality initiatives, 2) to conduct continuous internal assessment of all programmes including

the supporting subjects, and 3) to ensure the improvement of the teaching and learning environment of undergraduate engineering programmes. In order to meet the stated aims, work plans had to be designed and documentation processes were implemented in late 2014.

Initially, there were many challenges for top management as well as for all staff involved to initiate the QMS processes in the university although it has already set up its QMS office. Some staff felt that they had work overload when they had to do their QA tasks and some were not interested in it at all. The most challenging aspect was the transfer system which happens every two years as mandated by the MoE. With this system, administrators and faculty members get to be transferred from one university to another. This results obviously to a constant turnover of personnel that challenges stability and continuity of programs and projects.

TUHMB decided that getting the ISO certification would be its key driver to implement QMS systematically and sustainably. ISO 9001-2008 standards, now upgraded to ISO 9001:2015, was considered to be one of the tools that could bring about a radical change in the institutional performance. Although getting the ISO certification is not mandatory for programme assessment in the accreditation process, implementing QMS is recognized as a key factor in setting the groundwork for accreditation.

1.3 Milestones and limitations after implementing QMS

Although TUHMB has experienced many challenges in the implementation of QMS, it has its successes, too, in the area of teaching and learning processes to some extent. In May 2016, three staff members of the QMS Office initiated a survey that included all staff serving in the university at that time. The total population that took part in the survey was 238 teaching staff from all departments and 53 from administrative offices and student affairs. The survey had two objectives: to reflect the staff's actual understanding level of QMS processes and their participation in doing QMS processes, and to evaluate the extent by which the quality of teaching and learning process was covered by the implementation of QMS.

With these objectives in mind, a set of questionnaires was prepared and then administered to gather data, results were then reported to the rector and presented in the management review meeting in July 2016. Based on the survey results, TUHMB has practised quality management processes in most of its academic

processes because over 75 percent of respondents followed the quality procedures of the university and took part in doing QMS processes in their respective departments. In addition, the results also yielded data that were categorized into milestones covering processes that were completely implemented and limitations to include those that were left to be implemented in the next phase. According to the results, the completed milestones within nearly two years are as follows:

- The Policy Statement, Vision and Mission of the university were documented.
- Quality Objectives were set and analysed yearly.
- The quality manual, quality procedures and work flow for all processes were written and documented.
- Documentation processes were carried out in all levels.
- Duties, responsibilities and authorities were defined for all levels of staff
- Internal audit was conducted in all departments according to planned schedule.
- Trainings for teaching and administrative staff were conducted.
- Data on student satisfaction with teachers and the teaching and learning environment were collected, analysed and documented.
- Management review meeting was held at regular intervals and strategies for quality improvement were discussed.

The aforementioned were regarded as success factors but there were also limitations to be addressed. The following were said to be limitations according to the internal survey:

- The vision and mission statements were documented but the top management failed to review them.
- Outcome-based education (OBE) was initiated to be implemented at the end of 2016 but we managed only to hold training on writing learning outcomes based on Bloom's taxonomy.
- The student satisfaction score was often questioned by teachers due to the subjective tendency of students in evaluating the learning process and teachers' performance. Often the student evaluation was based on just the style and performance of the teachers and not on their quality of teaching and learning methods.

- The needs of teachers for their continual professional development (CPD) were explored yearly and trainings were conducted to address their needs. However, the effectiveness of these trainings was not evaluated for further development.

Among these, the most important task that TUHMB could not do at that time was for OBE to be practiced at all levels. Although TUHMB implemented QMS and practised it at all levels, it still needed to do improvement in the teaching and learning environment.

1.4 Quality Enhancement and Strengthening Quality Management System

TUHMB got a chance to participate in the ASEAN-QA TrainIQA Program Phase III (2016-2018), and based on the knowledge from this training, the performance of QMS was systematically carried out within the institution and the practices and processes were reformed to align with the university's needs.

Based on the survey results and knowledge from the training module titled "Designing Effective Quality Management Systems in Higher Education Institutions", all members of our QMS team initiated group discussion and gap analysis with all senate members and discussed how to enhance the existing quality of the university. Then, the Deming cycle of PDCA was used for continuous quality improvement at all levels.

TUHMB was committed to providing quality teaching and learning environment to all students. Therefore, in order to meet its commitment, a series of training was designed and implemented them with local QA experts especially in the field of teaching and learning processes. The timeline of training plan between 2017 and 2018 was prepared for quality enhancement (plan stage). Implementing outcome-based education (OBE) was considered one of the key factors for quality enhancement. Therefore, a series of trainings for implementing OBE and quality enhancement was conducted within the planned timeline schedule (do stage). And then, all departments were assessed to determine if the trainings were effective in the departmental implementation of quality teaching and learning process and management process (check stage), and we made sure that QMS teams and all responsible persons discussed and modified the processes according to the assessment findings (act stage).

1.5 Objectives and Scope of the research

Objectives of the research paper are as follows:

1. To identify areas of improvement by implementing QMS
2. To compare the performance of QA-related activities before and after QMS implementation
3. To analyse potential impact of enhancing QA on the undergraduate engineering programmes of the university.

With these objectives in mind, this paper aims to describe the QMS and its IQA processes highlighting the good practices. As it can be said that quality assurance is the responsibility of every staff in a university, it also aims to investigate the level of involvement of staff within the university. Finally, the effects on the undergraduate engineering programmes of implementing QMS were identified and analysed. However, graduate employability was not discussed in this study because of the time limitation and insufficient data from the alumni and their supervisors in the workplace.

Although analyses such as student satisfaction with teaching and learning, drop-out rate, and pass-rate among others, were regularly carried out once a year since 2015, the effects of implementing QMS on the undergraduate engineering programmes have never been examined before. Therefore, the focus of the paper is how and to what extent does the implementation of QMS impacts on the undergraduate engineering programmes, especially on teaching and learning process, curriculum and syllabus, course development, student services and support and stakeholder involvement using the case of TUHMB. Also, the pass rates of undergraduate engineering students before and after implementing QMS were compared in order to highlight one of the success factors of QMS.

2. The Concept of Quality and Quality Management System

The word “quality” came from the Latin word *qualis*, meaning, “what kind of”. With a wide variety of meanings and connotations attached to it, quality is a difficult term to define, having thus been referred to as a “slippery concept” (Pfeffer and Coote, 1991). The change in meaning of educational quality takes place according to the stakeholders and their perspectives. It has been defined with different perspectives and orientations, according to the person, the measures applied and the context within which it is considered. From the perspective of funding agencies,

quality is measured by the performance of the investment; for the students, quality is related to the likelihood of getting an advantage and developing their skills for future employment; and for the academic and administrative staff, quality implies that they can do their work with recognition and appreciation. With a wider variety of meanings and connotations attached to it, it can be concluded that quality in the context of higher education is complex to define. The different terms such as strategic quality management, total quality management, and total quality leadership are actually examples showing the different emphasis placed on particular aspects of what is generally called quality management (Sangeeta and Banwe, 2004). The quality management system contains the organization structure, competence division and responsibility, procedures, processes and resources.

The adoption of a QMS has to be a strategic decision of a university/organization, thus its design and implementation is not mandatory but a voluntary process supported by the university's own strategic policies and plans. In order to get the benefits, the university has to take into account that the design and implementation of QMS is usually influenced by its own strategy, size, geographical region and the structure it operates.

When it comes to design and implement QMS in higher education institutions, the following needs to be considered:

Defining organizational mission, values, and priorities: The starting point for quality management system is to set the clear goals of the institutions and the path to meet those goals. This includes setting priorities and timelines for progress and mapping out the critical processes. It is critical for the institutions to be honest about its priorities. Frequently they fall into the trap of saying what sounds good, but has no commitment to that value with actual management attention or resources (Goldberg & Cole, 2002).

Mapping the processes: Most QMS practices are process-based systems. This requires understanding how operational activities fit together to achieve the desired or planned outcomes. It can be started by mapping out the major, overarching processes (for example teaching-learning, assessment, and design) with their inputs, activities, and outputs. Once major processes are defined, it needs to map the primary sub-processes that comprise the overarching organizational processes. Creating a useful, formal description of how the institution

works is a firm requirement for QMS. Critical processes should be documented in the quality manual, in procedures, or other QM documentation (Detert & Jenni, 2000).

Defining roles and responsibilities in the QMS: Clearly defining roles and responsibilities for the staff that is performing quality management procedures is a crucial part of implementing the quality system and it is necessary to make them transparent. When processes are defined, as well as the desired outcomes, all staff members in the institution have to take responsibility for ensuring the desired results actually happen. Top managements are given the responsibility for their processes. They create objectives that align with the institutional goals, policies and priorities, and put in the place the needed resources like staff, equipment, and budget.

The institution needs to make sure that staff members have the needed skills, education, or training necessary to properly execute their roles. Where there are gaps, they take steps to close them with continuing education and training. A commitment to ongoing training is critical to organizations that want to improve.

Regularly reviewing quality and improving the system: After the institution has an overall direction, defined processes, and responsible process owners, the next step is to analyse how QMS is working and also analyze whether the process objectives are being achieved or not and whether the institution is reaching, or at least moving toward its goal (Detert & Jenni, 2000). If not, the top management and the QMS team need to consider what needs to change to get the targeted outcomes. In this process, a reflective evaluation is required, and then concrete steps are taken to improve. If objectives are always easily reached, or seem unreachable, then a review of the objectives is needed for continual quality improvement (CQI).

3. Methodology

3.1. Material and Methods

In this case, the combined method was used: completion of questionnaires to determine the key factors that should be the priority in order to determine the area affected by implementing quality management system and informal interview with respective heads. The perceptions of teaching and administrative staff as well as the involvement of students in QA processes were investigated by means of completing questionnaires.

3.2 Research Population

This paper was based on data collected from stakeholders including department heads, teachers, and student representatives who were enrolled in university when the study was conducted. The questionnaires were distributed to 218 teaching staff, 61 administrative staff and 140 student representatives (20 from each department). Their views were captured in the questionnaires prepared by the QMS team to gather perceptions on the function of QMS, their involvement and area improvement by implementing QMS. The response rate was at 83 percent which was sufficient to draw reasonable conclusions.

In order to study the effectiveness of QMS in a more-in-depth way, descriptive analysis was also used. Seven heads from engineering departments, six from academic departments, and three from administrative departments were informally interviewed with questions focusing on their roles and responsibilities in QA, teaching and learning, management and effectiveness of QMS. Then the heads were asked to present areas of undergraduate programmes that were improved by means of QMS implementation and IQA processes, and the areas that need to be developed for continual quality improvement.

4. Data Analysis, Findings and Discussion

The collected data were analyzed and interpreted in line with the aims of the study. There were two types of question in this survey: the first one was generally concerning all the staff's involvement in performing the QA related activities, effects on their professional development, and areas for improvement. The second was analysis of the effect of setting up QMS on the undergraduate engineering programmes, especially teaching and learning, curriculum development and revision, and course evaluation.

All the respondents were asked to indicate the extent to which Quality Management is applied in TUHMB. According to the response, 100 percent of respondents said that the Quality Management System based on the ISO 9001:2015 standards was meant to certify the processes and the system of an organization and not the product or service itself. TUHMB has certified by the ISO 9001:2015 certification body and applied quality management to a great extent in most of its academic process. 82.1 percent of respondents said that they followed the standards and guidelines of Engineering Education Accreditation Committee (EEAC) under the

Myanmar Engineering Council (MEngC) and the experts from EEAC have assessed altogether (6) programmes. These programmes were provisionally accredited and recognized by Myanmar Engineering Council in 2018.

In terms of AUN-QA standards and guidelines, a few respondents said that they were given the training on “PDCA Approach to SAR Development at Programme Level” in November 2015 with the help of AUN-QA and EU Experts under the project of ASEAN-QA SQUARED Real Life Workshop. This training workshop was based on the AUN-QA Model and intended for the participants to interpret the AUN-QA criteria for programme level. But most of the trained heads and teaching staff were transferred to other universities so the participants, only 39.3%, who took part in this survey, have knowledge on AUN-QA guidelines and standards.

4.1 Stakeholders’ involvement in Quality Assurance

This survey includes various stakeholders because their involvement in QA should be considered as an impact factor after implementing QMS. According to the survey questionnaire, they are asked to what extent they had taken part in formulating quality policy, procedure manual, and objectives of the university.

According to the results, it can be said that academic staff (over 90 percent) and administrative staff (100 percent) involved in doing QA-related processes as they knew that their university’s policy statement, manual and quality objectives were documented and they followed and made practice to fulfil the targeted objectives set by the university. Quality policy and manual were designed in accordance with the requirements of ISO 9001:2015 certification. The manual included university’s vision, mission, policy, objectives, and strategies for quality enhancement and it made sure that it could be accessible to all staff at all levels. The percentage of academic staff was slightly lower than that of administrative staff in practice of QA because the transfer system has been applied for teaching staff in Myanmar education system.

In collaboration with heads of academic and administrative departments, quality policy statement and manual were designed and developed by QMS, with the discussion of all senate members. Therefore, they were said to be involved in developing quality policy statement whereas students were not taken part in the development of quality policy statement and manual. Over 80 percent of student representatives answered that vision, mission, quality policy and objectives were described in university information handbook, departmental pamphlets, notice

boards, posters and university website although they were not involved in the development. However, only 17.8 percent of students knew that quality manual was documented and majority of students answered that they did not know and some answered the manual did not exist in their university because they did not take part in developing it and they have not seen it before.

4.2 QA Related Processes

Initially, the survey questionnaires investigated the extent to which academic and administrative staff involved in carrying out the QA related processes applied in TUHMB. The specific QA related processes are described and both types of staff had to choose the ones that they got involved.

It can be found that, according to the responses, the majority of frequency that the responses of academic staff were designing organizational structure, evaluating the students' satisfaction, specifying roles and responsibilities of staff at all levels, initiating the OBE, and developing policy, procedures, and documentation process, all of which were over 90 percent. Although most of the teaching staff developed course learning outcomes (CLOs) and designed teaching and learning strategies that were aligned with the CLOs, some of them needed the awareness of how to develop assessment criteria, about half of the respondents (58.9 percent) had experience how to develop them. The very limited frequency (38.7 percent) that encountered in academic staff was developing process approach to management because most of the respondents were lecturers, assistant lecturers and demonstrators and they have not had any experiences of management.

Unlike the academic staff, all staff members from administrative department had participated in designing organizational structure, developing policy, procedures, and documentation process and specifying roles and responsibilities of staff at all levels because most of them have served in the university for several years and there is no transfer system for them. They did not identify the initiating the OBE and developing assessment criteria as they were not in the field of teaching but head of the administrative department said they have already developed assessment criteria for new staff recruitment and staff promotion.

4.3 Effects on professional development for the staff

The survey questionnaires were prepared for the staff with the aim of analyzing the potential impact of strengthening QA on the academic and administrative staff for their continual professional development (CPD). Managing training on CPD is essential in education so as to keep abreast with the latest information and technology. Before implementing the QMS in university, the top management and respective heads of the department did not design and develop the training plan and implement the trainings necessary for the staff members. Although some training has been conducted throughout all the academic years, they did not need to plan themselves and most of them were directly arranged from ministry. In recent years, the education system in Myanmar was changing and most of the universities were trying to shift the teaching learning paradigm, from teacher-centered to student-centered. Implementing professional development training is considered as the most important factor for quality education. That's why, after implementing the QMS, top management encouraged heads of the department to design and develop the training plan in order to be aligned with the needs of staff. Then, needs analysis was carried out to get the actual needs of the staff and trainings were implemented with the help of local or external experts; evaluation on trainings was systematically carried out and documented the plans and results for further investigation. According to the results, it can be found that the impact of QMS on continual professional development for the academic staff (85.1 percent) was rather higher than administrative ones (67 percent), compared to before and after establishing the QMS.

To get the actual data for the management of CPD, altogether 50 staff members (12 professors and heads, 7 associate professors and 28 senior lecturers from academic department and 3 senior staff from administrative department) who have served in TUHMB since 2015 were selected and asked to answer the questionnaire.

According to the findings, only just over 20 percent of academic staff agreed that CPD trainings had not been conducted and heads did not design and develop training for the staff before establishing the QMS. In contrast, the rest of the academic and administrative staff did not accept it. They said trainings were always conducted year after year with the guidance of top management but no documentation processes have been done before. Majority of respondents accepted

that implementing and strengthening the QMS made all processes smooth, easily accessible and also more effective.

4.4 Effects on Teaching and Learning Process of Undergraduate Students

Teaching and Learning is the most important process in every institution. After implementing the QMS, it is needed to investigate the extent to which the effectiveness of teaching and learning environment. What the lecturers urgently need to do is shifting the paradigm, from teacher-centered to learner-centered. Most of the students do not accept the traditional classroom management. After strengthening the QMS, outcome-based education has been initiated and a series of training concerning writing learning outcomes, teaching learning strategies and assessment methods and constrictive alignment has been provided. In order to deeply understand the effective level of teaching and learning process, 173 academic staff and 118 students provided responses.

Based on the responses of academic staff and students, developing and documenting learning outcomes at programme and course levels were carried out and 100 percent of academic staff and students have familiar with them. Designing lesson plans was responsible for each and every teaching staff and most students (86.4 percent) knew that teachers taught them accordingly. Designing assessment plan especially rubric was the most difficult issue for teachers because they were not familiar with the rubric system. In terms of learning environment, only 56.6 percent of teachers and 54.2 percent of students responded that students have a chance to learn in a relaxed and supportive learning environment. The rest of them did not respond and accept because of the insufficient facilities such as classroom, sports, library, lab equipment and safety, and time management.

4.5 Effects on Course Evaluation

After setting up the QMS in 2015, evaluating the course was necessary to conduct for the purpose of acquiring the quality education. As soon as final examination and all the processes of checking and correcting the students' papers were over, teachers from each department had to do the analysis of pass rate of each course. And then, strengths and weaknesses of the course were discussed with various stakeholders in order to meet the needs of students and various employers. Changes and amendments were recorded and reported to the senate.

When 173 academic staff were asked how often course evaluation was conducted, they mentioned that they have to do every year especially before starting the new academic year whether the results meet the targeted outcomes.

According to the findings of the survey questionnaire, 98 percent of academic staff and 87 percent of students mentioned that conducting course evaluation regularly and finding the solutions of the needs of courses were useful in the curriculum review processes. 98 percent of teachers said that various stakeholders such as teachers, students, alumni, representatives from related government ministries, industries, and companies were invited as their expectations for graduates are most important factor to be considered in the curriculum review processes. Almost 100 percent of teachers and students said that they had great effects in their teaching and learning processes by doing course evaluation regularly.

4.6 Effects on Curriculum Development and Curriculum Review

Although curriculum development is one of the tools of quality management system, it has a little effect on developing curriculum in the case of TUHMB. Based on the results of the survey, data was analysed accordingly. 100 percent of academic staff and students were aware that all the technological universities in Myanmar apply the same curriculum and syllabus designed and developed by the Board of Study (BoS) and approved by the Ministry of Education. These teams are organized with respective heads, professors and senior lecturers from all technological universities. The number of BoS members will vary according to the popularity of the programme. Moreover, stakeholders such as representatives from industries, related government ministries, technical experts, alumni, students also participate in the BoS. The purpose of organizing BoS is to discuss and analyse the strengths and weaknesses of the programme and courses based on the consideration of the inputs of various stakeholders and market needs. Although the same curriculum and syllabus are applied in all technological universities, minor changes can be made in curriculum review meeting held in respective universities to meet the requirements of the students and local areas. These changes need to be approved by the university senate.

In terms of curriculum review meeting (CRM), it has usually been conducted yearly since 2015 involving all stakeholders and the results from discussion are used as inputs in BoS meeting.

Concerning CRM, 84.4 percent of academic staff and 75.4 percent of students said CRM is carried out yearly and it was useful for updating the course. 87.3 percent of teaching staff and 83.1 percent of students said they participated in CRM and changes and amendments were reported to the university senate and communicated with all stakeholders.

4.7 Effects on student pass rate before and after implementing QMS

Outcome-Based education has been practiced in recent year and class size has been reduced, maximum 40 students per class, after implementing the QMS to meet the student satisfaction on teaching and learning and to improve the pass rate. When evaluating the undergraduate engineering student pass rate before and after implementing the QMS from the period of 2013-2014 academic year to 2017-2018 academic year, it can be seen that implementing QMS can affect on student pass rate to some extent. The following table shows the total students and the number of pass students from the period of 2014 to 2018 and comparison of the improvement of undergraduate pass rate before and after setting up the QMS can be seen in figure 1.

Table 1: the total students and the number of pass students from 2014 to 2018

Academic Year	Total undergraduate students	Number of Pass students	Pass %
2013-2014	6317	4713	74.6
2014-2015	5559	4653	83.7
2015-2016	5213	4812	92.3
2016-2017	3912	3603	92.1
2017-2018	4192	3903	93.1

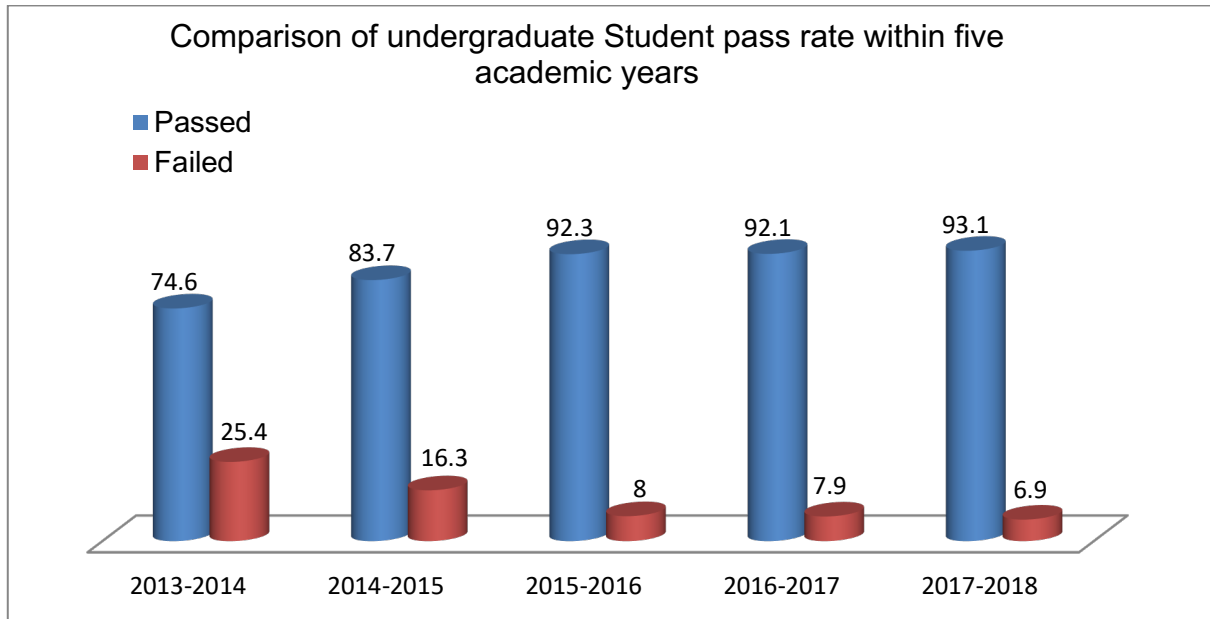


Figure 1: Comparison of undergraduate student pass rate between 2014 and 2018

4.8 Effects on the student satisfaction for teaching and learning process

Student satisfaction toward teaching and learning process and teachers' performance in the classroom is being considered as one of the QMS mechanisms so after setting up QMS in 2015, survey on student satisfaction was conducted every year. In doing so, most of the teachers seemed to be more respect to their teaching work than before because everything they performed such as punctuality, teaching style, behavior, communication, etc., were being assessed by their students and also results were evaluated by the top management. The following figure shows the improvement of student satisfaction on teaching and learning process between 2015 and 2019.

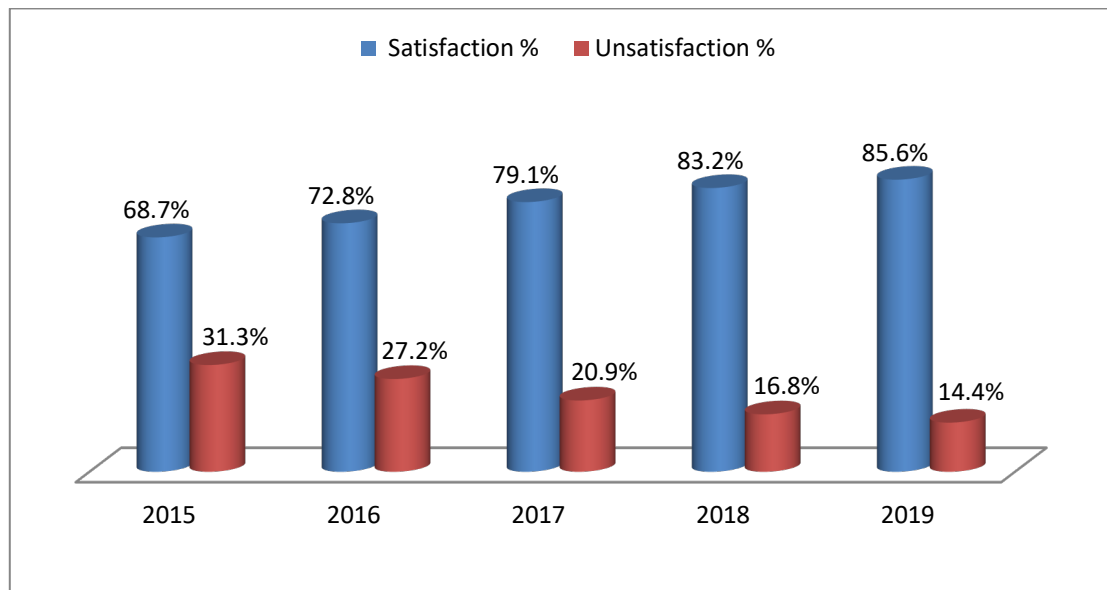


Figure 2: Comparison of student satisfaction toward teaching and learning process

It can be seen that student satisfaction level on teaching and learning process was gradually increasing year after year after implementing QMS. It meant that most of the teachers followed the policies and procedures and participated in doing QA related activities.

5. Recommendations for Further Research

Areas of this research that were identified generally include a study on designing the quality management practices used in TUHMB and the effects of QMS on undergraduate engineering programme such as teaching and learning process, course evaluation, curriculum development, student pass rate and student satisfaction on teachers' performance and teaching and learning processes. Moreover, overall effects of QMS on professional development for the staff and stakeholder involvement were analysed and discussed. Although multi-stakeholder approach was adopted in order to meet the objectives of the study, alumni were not included in this survey because of time limitation and university itself hasn't designed and implemented graduate tracer study and their employability. Therefore, it is recommended that further research should be done to determine the possibilities of employment for the graduate students and the level of student satisfaction on university performance by implementing the quality management system. Moreover, study on challenges faced in implementing the quality management practices in

universities should be done as further research in order for higher education institutions (HEIs) to lead to quality education.

6. Conclusions

TUHMB has implemented its quality management system since 2015 and strengthened its performance since 2017. QMS has defined the continual improvement as happened through the use of quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management reviews. Quality management system of TUHMB is derived from ISO 9001:2015, which is actually in line with the International Organization for Standardization. Based on the survey conducted internally, it has practised quality management system to a satisfactory level in most of its academic process.

The study also set out to compare the stakeholders' opinion and appreciation of QMS processes and identify the effects on undergraduate engineering programmes by implementing QMS. Different stakeholder perspectives helped give a clear picture in perceptions within the university context. With these aims in mind, the study firstly investigated the involvement of different stakeholders. Academic and administrative staff reported that they actively involved in setting quality policy, manual, work instruction and the preparation of ISO certification processes and provisional accreditation processes under the standards and guidelines of EEAC. Students also involved in these processes as interviewees so they have also taken part in the quality assurance implemented within the university.

In terms of the findings of the study, answered by the academic staff, administrative staff and students, the effectiveness of implementing QMS on undergraduate engineering programmes were investigated. Academic staff said that QMS covers continual professional development for the staff, teaching and learning process, course evaluation, curriculum development and review and student service and support. However, curriculum development and student support have still weakness because of the country education system. Apart from these two areas, the effectiveness of the QMS is visible and highly appreciated. From the students' point of view, they participated on a regular basis in QMS processes as respondents in student satisfaction surveys, job fair and job recruitment activities held in the university campus, interviewees in accreditation process, and participants in workshop, seminar, and exhibitions.

Overall, it can be concluded that stakeholders' involvement of implementing Quality Policy, Manual and Objectives was relatively high as multi-stakeholders involved in the QMS processes. The effects of implementing QMS on professional development of staff and teaching learning process applying OBE framework were the most visible and success factors according to the findings of the study. In addition, implementing QMS can greatly affect on student pass rate and student satisfaction level on teaching and learning process.

7. References

- Cheng, Y.C. & Tam, W.M. (1997). "*Multi-models of quality in education*", *Quality Assurance in Education*, Vol. 5 No.1, pp.22-31.
- Dale, B.G. (1999). "*Managing Quality*", 3rd ed., Blackwell Publishers Ltd, Oxford.
- Detert, J.R. & Jenni, R. (2000). "*An instrument for measuring quality practice in education*", *Quality Management Journal*, Vol. 7 No.3, pp.20-37.
- Goldberg, J.S. & Cole, B.R. (2002). "*Quality management in education: Building excellence and equity in student performance*", *Quality Management Journal*, Vol. 9 No.4, pp.8-22.
- Hewitt, F. & Clayton, M. (1999). "Quality and complexity - lessons from English higher education", *International Journal of Quality & Reliability Management*, Vol 16 No.9, pp.838-58.
- Niedermeier, F. (2017). "*Designing Effective Quality Management Systems in Higher Education Institutions*" Training on Internal Quality Assurance Series (Module 1).
- Owlia, M.S. (1996). "*A framework for the dimensions of quality in higher education*", *Quality Assurance in Education*, Vol. 4 No.2, pp. 12-20.
- Pistor, P. & Stammen, K.H. (2017). "*Tool and Procedures for Quality Assurance in Higher Education Institutions*", Training on Internal Quality Assurance Series (Module 2).
- Pfeffer, N. & Coote, A. (1991). "*Is Quality Good For You?*" A Critical review of Quality Assurance in the Welfare Services, Institute of Public Policy Research, London.
- Roberts, Harry V. & Bernard, F. (1993). "*Quality Is Personal: A Foundation for Total Quality Management*".

Sahney, S. & Banwe, D.K. (2004). "*Conceptualizing total quality management in higher education*" The TQM Magazine, Volume 16 Number 2 pp. 145-159 Emerald Group Publishing Limited ISSN 0954-478X.

Welsh, J., & Dey, S. (2002). "Quality measurement and quality assurance in higher education".

Author Profile



Thwe Thwe Oo is an associate professor from the Department of English. She teaches English at both undergraduate and postgraduate level. She has also been appointed as a quality management representative and a trainer in QMS Office since 2016 and she has participated in national and international QA related activities, training and workshops. She obtained her B.A (Hons:) specializing in English major from Mandalay University in 1996 and M.A (English for Specific Purposes – ESP) from Yangon Technological University in 2003.