Improvement of Education Quality Using Quality Control Circle Methods Based on Fulfillment of ISO 21001:2018 Requirements

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Abstract

Changes in learning media/methods during the covid-19 pandemic, from face-to-face to online, make lecturers and students have to adapt to the learning process. Many complaints were received in the early days of online lectures related to implementing the teaching-learning process and knowledge transfer. Student's complaints through questionnaires were often due to lecturers who cannot deliver material optimally through online media or learning systems. As a result, the student satisfaction results in the first semester of 2020/2021 were decreased. Therefore, this research aims to improve the performance of lecturers to improve the organization's overall performance. This research was conducted in Z Study Program, X Faculty, Y University, using the Quality control circle (QCC) to improve the study program's performance. The international standard of the education organization management, ISO 21001:2018, is a reference in determining the clause that will be used as an outline in this research. The research was carried out by implementing some clause and gaps analysis of internal quality assurance. By integrating ISO 21001:2018 into the QCC method, there is an increase in lecturer performance of the Z study program as a whole, from 3.22 to 3.41. It shows that the improvement is effective in improving student satisfaction.

Keywords
ISO 21001:2018, quality control circle, educational organizations, management system

1. Introduction

According to Triyanto and Prasojo (2013), quality refers to products or services that meet predetermined quality standards and satisfy customers. Meanwhile, according to Prihatmaji (2017), quality is something that meets and exceeds customer needs. Based on this opinion, it can be said that quality is a product and/or service that meets predetermined quality standards that can meet and exceed customer needs and expectations. Quality is at the top of the agenda for most academics and a key element that cannot be ignored for any institution's success (Irhamna and Nurcahyo, 2018, Sharma and Kamath, 2004). Especially higher education must continue to improve quality to produce output that can meet the standards that have been set. Universities are required to produce graduates who can meet the world of work and business and compete with other graduates nationally and internationally (Triyanto and Prasojo, 2013). Quality of education can be enhanced only when the people involved in framing education policies develop new attitudes and encourage group involvement in problem solving activities as conscious efforts to ensure quality in the system. The Quality control circle (QCC) generally recommend solutions to be beneficial for quality improvement and productivity problems (Sharma and Kamath, 2004).

Quality circles (QC) were initially a movement that evolved from Edwards Deming trained Japanese workers to use statistical analysis to measure product quality in the 1950s and share their knowledge to improve product quality (Land, 1983). A QC is a small group of employees who meet regularly to identify, analyze, and solve a company's problems and is viewed as a powerful tool for quality improvement (Middleman, 1983; Zhang, Liao and Liu, 2020). The QC in educational institutes are much complex than those in manufacturing areas measured by the student

capabilities, knowledge, and values (Khond, 2012). The various advantages of establishing a QCC in an organization are helping workers have a favorable view of their role for the organization, increasing productivity by increasing product quality, and reducing rejected products (Rafaai, 2018). The quality circle process could not achieve a high degree of success without effective participative management from various levels (Anyaocha, 1984;Khond, 2012).
Research on the application of Quality Control Circle (QCC) has been widely carried out in the manufacturing industry, including research on QCC to improve the quality of production or reduce rejects in the metal casting process (Wicaksono and Syahrullah, 2020). Another study on QCC was conducted to improve the quality of the production process and reduce defects in electronics manufacturing companies in Banyumas (Nashida and Syahrullah, 2021). Implementing QCC that involves all team members consisting of various departments can spur organizations to achieve quality improvement targets (Elsye and Novera, 2019). QCC can increase employee awareness of the importance of maintaining and improving the quality of products and services of an organization, specifically the department where the employee is assigned. In manufacturing companies, QCC implementation is usually done by involving employees from various departments to fix specific problems. However, research on QCC is not only carried out in the manufacturing industry. The application of QCC is also beneficial for hospitals in improving service quality in the patient care department (Zhang, Liao and Liu, 2020). In educational organizations, research on QCC was conducted on the benefits of QCC training for students at that institution (Shariff, 2014). So that the research was not undertaken to improve the quality of service in the educational organization but to show the importance of knowledge about QCC to students in improving the quality of human resources. QCC research in the field of education can improve the quality of learning methods in the medical field in an educational institution (Fang, Xiaoxia and Guiyan, 2021).
Before 2018, universities' internal quality assurance system (SPMI) implemented the ISO 9001 standard as the quality management system. According to (Antaresti, 2017) the purpose of ISO 9001 is to ensure that the organization has provided goods or services by the standards and requirements set. ISO 9001 is commonly used in schools, higher education, and companies. There are several key differences between the ISO 21001:2018 and ISO 9001 standards used by the education sector which is acknowledges that the customers of education, unlike those in regular companies. Educational organizations should adopt ISO 21001 for their management system than ISO 9001 because of an educational institution's complexity, focusing on developing competence in students and increasing the level of satisfaction of interested parties (ISO, 2018;Wibisono, 2018). The new university accreditation instrument currently requires educational institutions always to improve the quality of educational services. Therefore, we need a way to improve the quality of educational services by considering the ISO standard for the management of educational organizations that refers to ISO 21001:2018 and using quality improvement methods proven to improve the quality of services and products in organizations, such as QCC.

1.1 Objectives
This research aims to improve the performance of lecturers that can affect the improvement of the organization's overall performance. selected improvement objects based on the analysis of the implementation of the management system based on the requirements of ISO 21001:2018.

2 Methods
The research was conducted using QCC Steps developed by analyzing the fulfillment of ISO 21001:2018 requirements in educational organizations that were used as objects in this study (Zhang, Liao and Liu, 2020). The steps of the research are conducted through the following explanations.

2.1 Determine the subject
The subject determination stage is done by analyzing the quality assurance system of universities with ISO 21001:2018 requirements that shown in table 1. From the results of this analysis will be obtained discrepancies or problems faced by educational organizations. at this stage the theme is determined based on the fulfillment of the management system standard of the educational organization ISO 21001:2018 at Faculty X, University Y. Compliance with ISO requirements is obtained by observing and discussing with faculty leaders, study programs, quality assurance and sections in faculty.

Table 1. Analysis of ISO 21001:2018 Standards Fulfillment (ISO, 2018b)

Clause	Requirement
1	Scope
2	Normative references
3	Terms and definitions
4	Context of the organization

Clause	Requirement
5	Leadership
6	Planning
7	Support
8	Operation
9	Performance evaluation
10	Improvement

2.2 Planning an Action
The action is chosen based on the conditions of the study program in the organizational unit in Y University. Selection based on the consideration of accreditation results from national accreditation (BAN-PT) to the existing study program at Faculty X University Y.

2.3 Analyze a project
Based on the subject and actions that have been set in the previous stage, a project analysis of one of the courses is conducted. Improvement will be focused on the selected course by disseminating questionnaires to students in the study program. The results of this questionnaire will then be used as the basis in determining the target at a later stage.

2.4 Define a goal
Goals are set based on the results of project analysis at the previous stage. The target will be increased based on the achievements that have been measured at the analyst stage.

2.5 Generate a solution
Furthermore, based on the goals set, the team will come up with several possible solutions to improve the expected performance.

2.6 Identify solutions that are sure to be done
After producing several solutions at the previous stage, the team will select the most suitable solution and become a priority to achieve the desired goal.

2.7 Implementation
Further solutions that have been determined by the team, will be implemented in the next period.

2.8 Evaluation of results and impacts
At this stage, a survey will be conducted to students and evaluated the results. The evaluation result is expected to reach the expected target.

2.9 Standardization
If based on the evaluation, there is an improvement in performance achievement compared to the previous period, then the selected solution will be standardized implementation.

2.10 Review and filter
At this stage, plans will be implemented at a later stage to improve the organization's sustainable performance.

3. Results and Discussion
3.1 Determine the subject
Field observations and discussions were carried out with the head of Faculty X at Y University, consisting of Dean, Vice Dean, Head of Department, Head of Field, and Head of Quality Assurance. observation and discussion based on the requirements in the main clause and sub-clause respectively. examination is also carried out by showing evidence of each existing clause and sub-clause. the results of the observations and discussions are shown in the table 1.

Table 2. Analysis of ISO 21001:2018 Standards Fulfillment

No.	Clause	Clause content	Total Value	Maximum Score	Percentage Fulfillment
1	Clause 4 (4.1,4.2,4.3, and 4.4)	Context of the organization	18	20	90%
2	Clause 5 (5.1,5.2, and 5.3)	Leadership	25	30	84%
3	Clause 6 (6.1,6.2, and 6.3)	Planning	10	15	66%
4	Clause 7 (7.1,7.2,7.3, 7.4, and 7.5)	Support	74	105	70%

No.	Clause	Clause content	Total Value	Maximum Score	Percentage Fulfillment
5	Clause 8 (8.1,8.2,8.3, 8.4, 8.5, 8.6, and 8.7)	Operation	115	160	72%
6	Clause 9 (9.1,9.2, and 9.3)	Performance Evaluation	45	55	81%
7	Clause 10 (10.1,10.2, and 10.3)	Improvement	8	20	40%
Percentage readiness			73%		

The table 1 shows that at Faculty X of Y University, there is still less in improving the performance of the organization to achieve continuous performance improvement. So that the chosen theme relates to improving the performance of Education in Faculty X, University Y.

3.2 Planning an Action

Based on the accreditation of study programs, study program Z is the study program with the minimal level accreditation (level C). So that the improvement of education performance will be focused on the study program Z, Faculty X at the University of Y.

3.3 Analyze a project

By using the performance questionnaire of study programs in Faculty X, University Y, student satisfaction measurement to the performance of education study program measured in the odd semester 2020/2021 (Period I = Before Midterm Exam, and Period II = After Midterm Exam). The survey was conducted by disseminating questionnaires consisting of 21 questions (The designed questionnaire is shown in the table 2) to all active students using a satisfaction scale of 1 to 4. With the following information: score 1= less, score 2= enough, score 3= good, and score 4= very good.

Table 3. Questions in the lecturer's performance questionnaire

Question Number 1-11	Question Number 12-21
Lecturers have readiness to give lectures and/or practice/practicum (1)	Test assignment materials, and exams according to course materials and in harmony with rps content (12)
Lecturers provide textbooks, teaching materials, hand outs or the like (2)	Teaching materials are easy to understand (13)
Lecturers teach materials with effective methods by setting concrete examples (3)	Teaching materials containing the results of the research of the lecturer concerned (14)
Lecturers are very communicative and able to create a pleasant atmosphere (4)	Lecturers provide a message of moral and ethical values other than about the subject matter (15)
Lecturers show respect for students and encourage/motivate students (5)	Lecturers have regularity and order of organizing lectures, such as the length of time of lectures on schedule, not late entry, etc. (16)
Lecturer gives objective assessment (6)	Lecturers have an attitude of authority as lecturers (17)
Lecturer always returns test results/assignments with notes/comments (7)	This lecturer has attitudes and behaviors that can be used as examples by students, such as a firm, patient, timely attitude, etc. (18)
Lecturers make time to discuss lecture materials outside the classroom (8)	Lecturers have the ability to control themselves in various situations and conditions (19)
Lecturers are skilled in using modern technological means in giving lectures (9)	Lecturers have the ability to openly accept other people's criticisms, suggestions, and opinions (20)
Course materials are in accordance with the latest science and technology developments(10)	Course materials delivered at each meeting in accordance with RPS (21)
RPS content is very clear and helps you understand the course (11)	

The results of the table 4, show that the average level of student satisfaction between the scales 1 to 4, is = (3.25 + 3.18) = 3.22. So that the average value of student satisfaction will be used as the basis for improving the performance of education in the Z study program.

Table 4. Student Satisfaction Level to the performance of Study Program Z

information	Period 1	Period 2
Recapitulation of Student Satisfaction Level to The Performance of Lecturers of Study Program Z	3,25	3,18

3.4 Define a goal

Based on QCC team discussion with the head of department, further set performance target is 3.3 in even semester period 2020/2021.

3.5 Generate a solution

Furthermore, to achieve the goals that have been set, the results of this survey are then broken down in more detail to each lecturer. Lecturers are asked to plan improvement ideas based on the results of the measurement of the lecturer's performance. Lecturers are asked to focus on improving the lowest level of satisfaction of each lecturer. Improvement ideas are planned in a form that contains a commitment to make improvements. Because based on the results of the analysis at an early stage, Faculty X at Y University still needs to make improvements or performance improvements that can be monitored and evaluated.

The study program and quality assurance team designed a form that can monitor and evaluate the corrective actions of the 2 lecturers with the lowest performance in the Z study program and submit the results of questionnaires along with the designed improvement form. Based on the results of the survey analysis that has been conducted based on the performance of each lecturer, obtained the following results on table 5.

Table 5. Student Satisfaction Level to the performance of Study Program Z

Lecturer Name	Average Performance	Lecturer Name	Average Performance
Lecturer 1	3,50	Lecturer 8	3,03
Lecturer 2	3,50	Lecturer 9	3,14
Lecturer 3	2,28	Lecturer 10	3,42
Lecturer 4	3,46	Lecturer 11	3,41
Lecturer 5	3,12	Lecturer 12	3,23
Lecturer 6	3,17	Lecturer 13	3,41
Lecturer 7	3,61	Lecturer 14	3,46

The table 4 is obtained based on the results of the assessment on average from 21 question items used to measure student satisfaction with the performance of lecturers Z. From the table above obtained the results that the lowest performing lecturers are Lecturer 3 and Lecturer 8.

3.6 Identify solutions that are sure to be done

Lecturers of study program Z then receive the results of questionnaires based on student assessment and set improvement solutions based on the results of the questionnaire in the form of improvement forms that have been approved by each. Obtained several solutions of improvement done by each lecturer in the table 6.

Table 6. Improvement Activity Plans

PIC	Improvement Ideas	
	Short-Term	Long-Term
Lect. 3	Trying to change the method of delivering content to be more synchronous. The material is provided with illustrations or videos that support the material to be delivered. Make assignments more interactive, use more case studies, interactive group discussions.	Explore more methods of giving material that follow the current trend. Provide more adequate supporting facilities and infrastructure according to the ability of the lecturer concerned (eg tablets). Collaborate with the support team in the preparation of teaching materials and course assignments. Publish research conducted so that it can be used in teaching materials. Conduct collaborative research for fields that are

PIC	Improvement Ideas	
	Short-Term	Long-Term
	Trying to provide feedback as soon as possible to students regarding assignments and exams.	not the main focus of the lecturer's research which are then published so that they can be used as teaching materials. Schedule better to check assignments and exams so you can provide feedback as soon as possible.
Lect. 8	Supervise directly by activating the webcam / camera at the time of the exam Explain from the beginning related to group assignments like this from the beginning of the lecture	Making SOPs / reliable methods in carrying out exams with online / online methods

3.7 Implementation

Implementation is carried out based on solutions that have been fixed in the teaching period of the even semester 2020/2021.

3.8 Evaluation of results and impacts

After implementation in the period 3, even semester 2020/2021 Before Midterm exam, conducted again student satisfaction survey. The results of this measurement are then compared to the achievements in Periods 1 and 2 shown in the Figure 1 and 2.

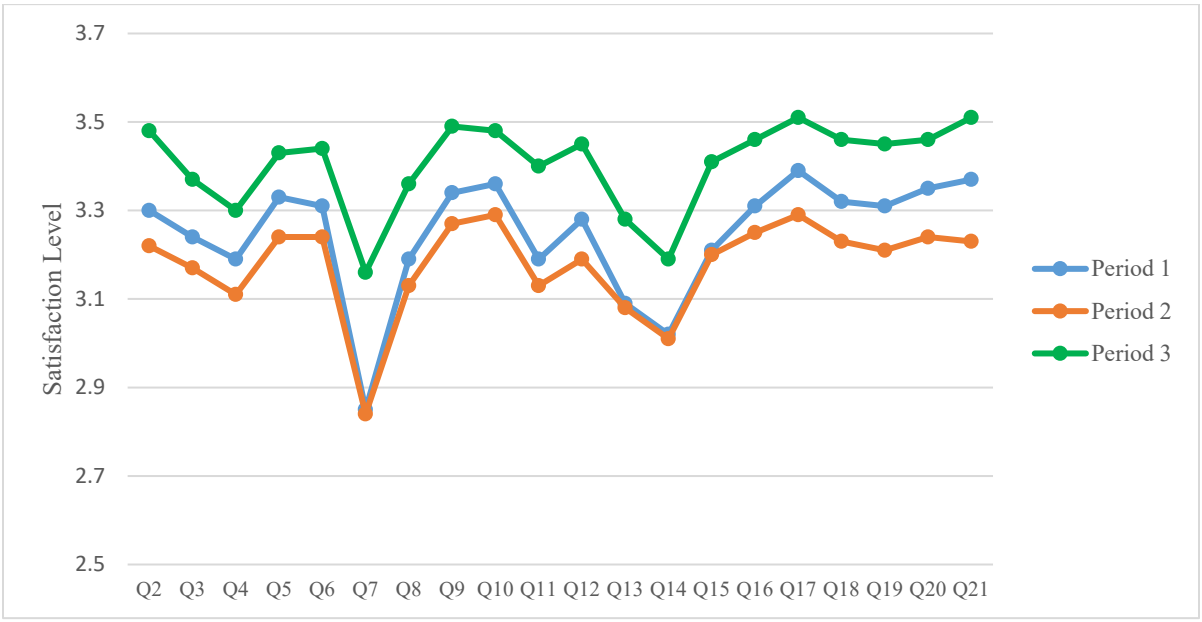

Figure 1. Student Satisfaction Survey Results

The evaluation results showed that by setting an improvement plan based on the results of the Z study program performance questionnaire, there was an increase in the level of student satisfaction to the overall performance of the Z study program, from 3.18 in period II (after Midterm Exam) in the 2020/2021 semester lectures to 3.41 in period I (before Midterm Exam) in the even semester 2020/2021 lectures. This achievement has also been in accordance with the target set together with the head of the department of study program Z.

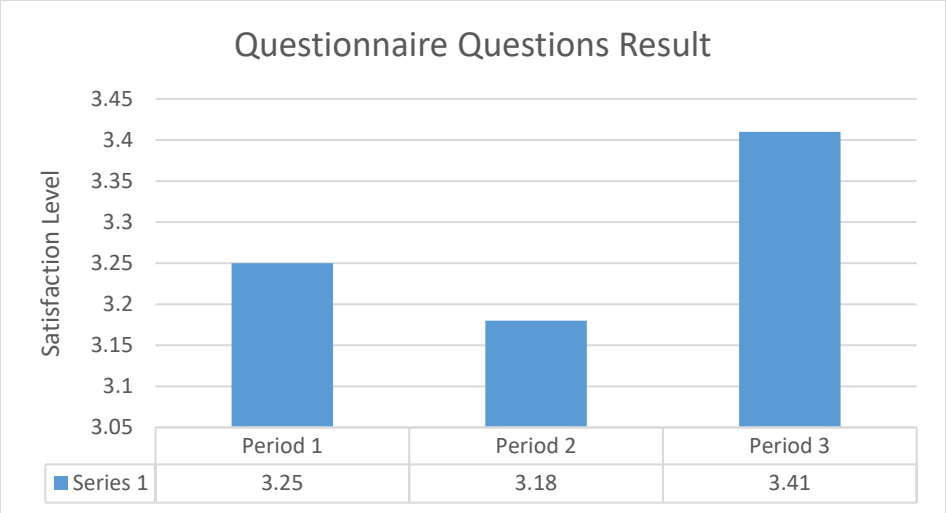

Figure 2. Student Satisfaction Survey Results

3.9 Standardization

The improvement plan form (Figure 3) that has been designed and used to monitor and evaluate the corrective action is set as a document of study program Z because it is proven that the use of the form can improve the performance of the Z study program.

Improvement Action Plan Form

Academic Year : ..... Dept. : XXX Dept

Improvement Action

Problem Source :
☐ AMAI / AIMA Audit ☑ Student Satisfaction Survey ☐ .....
☐ Monev Activity of Faculty ☐ Monev Activity of Dept

Problem Description :

Root Cause :

Short-Term Improvement Action (Next Semester) :

Long-Term Improvement Action :

Figure 3. Improvement Action Plan Form Standarization

3.10 Review and filter

The results of the questionnaire survey in the third period of the even semester 2020/2021 did show a significant increase in all questionnaire items asked to students of the Z study program.

4. Conclusion

Because of the three survey periods that have been conducted, obtained these 2 items have the lowest satisfaction level compared to others. Based on the results of research that has been done, the Z study program needs to create a project to improve the performance of the study program with a focus on solving problems that have the lowest performance, such as: returning test results / tasks with notes and comments, and teaching materials containing the results of lecturers' research. In addition, this method of improvement and improvement of performance needs to be also applied to other courses at Y University.

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