

Analysis of Quality and Quantity of Civil Engineering Students in Pandemic Period (Case Study Civil Engineering)

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Abstract:- The purpose of this study was to determine the quality and quantity of Civil Engineering students at UNG during the pandemic. This research is a descriptive study with a survey approach in data collection. The data analysis was done in a descriptive quantitative. Based on the results of research 1) Quality and quantity according to concentration, which is corrected in this pandemic period is the concentration of structure, namely for quality occurs in the odd semester by 25% and quantity occurs in the even semester by 50%. 2) Overall it can be concluded that the quality of UNG Engineering students majoring in Civil Engineering in the odd semester during the pandemic has decreased slightly. If the overall Quality percentage is 100% and divided for the five concentrations, each of 20%, then the total quality is 90% ($100-0.5 \times 20\%$). Meanwhile,

Keywords:- Quality, Quantity, Pandemic.

I. INTRODUCTION

The Covid-19 pandemic changes the order of life. These changes can be said to change drastically or change 180o or the opposite. The conditions that occurred during this pandemic were better known as new normal. The conditions that have changed include the learning patterns that were face-to-face directly into a learning system online without being face-to-face. This online learning uses the internet network. Internet is an information center that can be accessed without being restricted anywhere and anytime. The internet is known as an information center without barriers because it can connect one information site to another in a short time. From these circumstances, individuals in using the internet are expected to be able to balance or control themselves in using the internet.

This online learning system depends on the learning position between the teacher and student, where the internet conditions of an area are very decisive.

Maccording to the Director General of Post and Information Administration of the Ministry of Communication and Informatics that the condition of our internet is constrained by several factors.

First of all is the geographical constraint of Indonesia which is very broad and consists of islands. This condition becomes a challenge because of the difficulty of building network and data facilities in disadvantaged, frontier, and outermost (3T) areas.

The second challenge is dependence on mobile broadband. Indonesian people, can access data and internet services anywhere and anytime. Meanwhile, there are still blankspots in many 3T and non 3T areas in Indonesia. In total there are around 12,548 blankspot areas in Indonesia.

Then there is the constraint on people's limited purchasing power to access the internet. This is because fiber optic network internet services are relatively expensive, while cellular operators usually sell internet with a limited quota system. In addition, there are challenges in providing large internet coverage due to the large number of users in Indonesia. Therefore, telecommunications operators must provide large internet capacity to support large demand for internet access.

The last obstacle is the problem of internet network management regulation. The existing rules and regulations do not fully support the use of the internet and its network.

Besides internet constraints, another obstacle is the availability of a teaching system application that is controlled by an educator / lecturer as well as an assessment system application. This relates to a person's ability to master and use the available applications.

Based on the situation and conditions, it is appropriate to know the quality and quantity of undergraduate (1) civil engineering majors in receiving the online lecture system and blended learning. This blended learning course is a combination of face-to-face lectures (offline is the same as outside the network) and online lectures (online).

II. THEORETICAL REVIEW

2.1 Definition of Analysis

According to the Big Indonesian Dictionary, analysis is a basic description of the various parts of the section itself as well as the relationship between the sections to obtain a more precise understanding. Meanwhile, quality is anything that is able to fulfill customer wants and needs.

2.2 Definition of Quality

Quality or quality is the level of good or bad level or degree of something. This term is widely used in business, engineering, and manufacturing in relation to techniques and concepts to improve the quality of products or services produced, such as Six Sigma, TQM, Kaizen, etc.

The quality according to the big Indonesian dictionary is 1) the level of good or bad something; grade; 2) degree or level (intelligence, proficiency, etc.); 3) quality; 4) good.

Quality is one of the important indicators for the quality of education / company to exist in the midst of intense competition in the industry. Quality is defined as the totality of the characteristics of a product that supports its ability to satisfy specified or defined needs. In defining product quality, there are five main experts in total quality management who have different opinions, but they mean the same thing. Below is the definition of quality from five TQM experts (Nasution, 2001: 15-16): 1. According to Juran (1993: 32) Quality is the suitability of product use (fitness for use) to meet customer needs and satisfaction. The suitability of use is based on the following five main characteristics: a. Technology, namely strength or endurance. b. Psychological, namely the image of taste or status. c. Time, namely reliability. d. Contractual, namely the existence of a guarantee. e. Ethics, namely courtesy, friendly and honest. The suitability of the use of a product is if the product has a long durability of use, improves the image or status of the consumer who uses it, is not easily damaged, there is quality assurance and is ethical when used. Especially for services required service to customers who are friendly, polite and honest so that they can please or satisfy customers. 2. According to Crosby (1979: 58) Quality is conformance to requirement, which is in accordance with what is required or standardized. A product has quality if it conforms to predetermined quality standards. Quality standards include raw materials, production processes and finished products. 3. According to Deming (1982: 176) Quality is conformity with market needs. If Juran defines quality as fitness for use and Crosby as conformance to requirements, then Deming defines quality as conformity with market or consumer needs. Companies must really be able to understand what consumers need for a product to be produced. 4. According to Feigenbaum (1986: 7) Quality is full customer satisfaction (full customer satisfaction). A product is said to be of quality if it can provide full satisfaction to consumers, that is, in accordance with what consumers expect for a product. then Deming defines quality as conformity with market or consumer needs. Companies must really be able to understand what consumers need for a product to be produced. 4. According

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2.3 Definition of Quantity

The quantity according to the big Indonesian dictionary is the number (objects and so on); and the amount of something quantity is any group of homogeneous objects in a set, any quantity is the set if it can be counted, or dimensions that can be measured.

Quantity expresses the external, formal relations of objects, their parts, their properties, their connections, quantities, dimensions, sets, elements (units), individuals, classes, the degree of manifestation of this or that property. Quantity expresses the external, formal relations of objects, their parts, their properties, their connections, quantities, dimensions, sets, elements (units), individuals, classes, the degree of manifestation of this or that property.

Knowledge of the quantitative aspects of a system is a step towards deepening our knowledge of this system. Before a person can calculate, for example, he must know what he is calculating. Science derives from general qualitative estimates and descriptions of phenomena to precise mathematical laws of quantity.

The basis of quantitative thinking is the discrete purpose of things and processes. Quantity is expressed as a number, which has two main meanings: a measure of the generality of elements when put together; division (real or perceived) of an object, its properties and relationships, into homogeneous elements that are relatively independent of their quality.

Apart from discreteness, which serves as the real premise for the concepts of quantity and number, it is important to understand the objective basis of mathematics in order to realize that separate things, their properties and relationships, are put together in sets.

Measure. For centuries it has been said, "everything has a measure." Sensible people have a sense of size in all things: behavior, clothing, eating, taste, and so on. Losing a sense of size, proportionate, is a bad sign and retaliates by placing the perpetrator in comic and sometimes tragic situations.

III. METHODOLOGY

This research is a descriptive study with a survey approach in data collection. The data analysis was done in descriptive quantitative. Where the data obtained is tabulated so that the description of the students' abilities and mastery of the course material can be seen clearly. The population in this study were students in the civil engineering department of the Faculty of Engineering, UNG Gorontalo, with a research time of 2 semesters, namely odd and even in the 2019-2020 academic year. The sample data collected were 2015-2016 to 2019-2020. This collected data for 5 (five) academic years, namely 4 (four) academic years before the pandemic and 1 (one) school year during the pandemic.

The data were analyzed based on the classification of the scientific fields of Structure, Management, Transportation, and Water and Geotech, where the data in the odd and even semesters were analyzed for the academic year before the pandemic and would be compared with the pandemic conditions.

The data collected is in the form of data on the results of lecturers' assessments of students in the 5th (five) field of structural science concentration in the last semester both theory and practicum respectively.

Research instruments for theoretical subjects with indicators are structured assignments, quizzes, independent assignments, midterm exams and final semester exams. The indicators for the assessment of the practicum are the exposure of the practicum implementation, the method of implementation, and the training skills / skills and reporting procedures.

IV. RESULTS AND DISCUSSION

The results of this study include even and odd semesters with the research year being the 2015-2016 school year to 2019-2020. As for the length of the research for a year (2 semesters). For the 2015-2016 school year to 2018-2019 for 4 years, the conditions before the temporary

pandemic occurred for the last year or the 2019-2020 academic year where the Covid 19 pandemic took place. Lectures during the Covid 19 pandemic were held online to break the chain of transmission of the Corona virus. During this pandemic, UNG in particular made it compulsory to work from home (WFH). The implementation of this lecture is held with various kinds of obstacles, starting from supporting facilities in the form of the internet and teaching system applications as well as assessment tools and research systems.

The results of the assessment were obtained and grouped according to the concentrations contained in the civil department of the State University of Gorontalo, namely 5 (five) concentrations in the subjects of Structure, Management, Transportation, Water and Geotech. As for the number of participants (J), graduating (L) and not graduating (TL) students with quality grades of -B to A are the best scores (NT) as an illustration of the quality of students in receiving lectures.

The value of the structure course as presented in Table 4.1 is represented by the Statics 1 course. This course is deliberately taken considering that because one of the courses is a scourge for students in order to complete lectures. In addition, this course serves as a foundation for various concentrations in the field of civil science, in addition to the structure itself, for example, Steel structure courses, Concrete, Wood, Earthquake and advanced courses such as Structure Analysis 1 and Structure 2.

Table 4.1 presents the quality that in the even semester (2019-2020) during this pandemic, for the structure concentration course, the student's condition has shown symptoms of returning to normal conditions. This is shown by the passing percentage of 50% and the achievement of the best score of 100%. Table 4.1 shows that the graduation rate before the pandemic, namely the 2015-2016 to 2018-2019 school year ranges from 40% -80% while the best scores range from 60% -100%, where the range of the percentage of graduation and the best score during the pandemic is in that range.

Table 4.1 Group Values for the Structure Subject (Statics 1)

Structure						
Smstr Even	L	TL	J	NT	% L	% NT
2015-2016	26	7	33	15	78.79%	57.69%
2016-2017	16	21	37	14	43.24%	87.50%
2017-2018	19	24	43	19	44.19%	100.00%
2018-2019	6	9	15	6	40.00%	100.00%
2019-2020	6	6	12	6	50.00%	100.00%
Odd Smstr						
2015-2016	16	16	32	14	50.00%	87.50%
2016-2017	25	11	36	13	69.44%	52.00%
2017-2018	34	3	37	18	91.89%	52.94%
2018-2019	15	3	18	15	83.33%	100.00%
2019-2020	8	23	31	2	25.81%	25.00%

Table 4.1 also presents that in the odd semester there was a decline in the quality of students, both in terms of graduation percentage of 26% and the best score of 25%. This is far from the range of the percentage of passing rates (50-92)% and the best scores (52-100)%. This may occur due to the shock of changing habits or due to unfamiliar internet network conditions or unfamiliar control of media and applications.

The quantity aspect is viewed in terms of the number of participants as presented in Table 4.1 and Figure 4.1. This table shows that the quantity in the odd semester of participants is quite normal but the final quality achieved is

below the normal level. Meanwhile, for the even semester, the opposite situation occurred, namely in terms of quantity it decreased but in terms of quality it returned to its normal position. The possibility is that the quantity of these students will return to its normal position in the third semester during the pandemic, namely the odd semester 2020-2021.

Figure 4.1 shows that in the even semester of the beginning of the pandemic, there was a decrease in the quantity of students, namely 12%, while the attendance rate of students in the conditions before the pandemic ranged (15-43)% of the average number of participants.

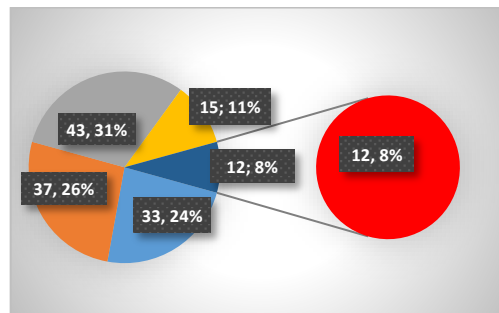


Figure 4.1 Student Quantity of Even Semester

So it can be concluded that for the subject matter, the quality of the structure concentration in the pandemic period remains normal while in terms of quantity there is a decrease. For the conditions in the even semester of the pandemic period, the opposite situation occurred, namely in quantity there was a decrease and in quality it returned to its normal position

The management concentration course is represented by the land surveying course. The consideration was that the implementation of this course was followed by the practice of using tools such as water pass / tilting levels and theodolites and total stations. The course is 80% online, and 20% face-to-face. So it can be concluded that the learning system is a blended learning (mixed system) by implementing a fairly strict health protocol, namely limiting the number of students, maintaining distance and using

masks and carried out outside the room. This management group course is as presented in Table 4.2

Table 4.2 shows that the quality and quantity of students for management concentration in the even semester during the pandemic period remained at normal conditions. In terms of quality, the passing percentage of 87% is within the normal range (64-89)% likewise with the best value 100% the same as in normal conditions ranging (75-100)%.

Table 4.2 also shows that the quality and quantity of students for management concentration in the odd semester during the pandemic period are still in normal conditions as well. In terms of quality, the percentage of passing 78% is in the normal range (60-100)% as well as the best score is 100% the same as in normal conditions (87-100)%.

Table 4.2 Group Values for Management courses (Land Measurement Science)

Management						
Smstr Even	L	TL	J	NT	% L	% NT
2015-2016	20	11	31	1	64.52%	5.00%
2016-2017	20	13	33	15	60.61%	75.00%
2017-2018	20	4	24	20	83.33%	100.00%
2018-2019	17	2	19	17	89.47%	100.00%
2019-2020	19	3	22	19	86.36%	100.00%
Odd Smstr						
2015-2016	18	0	18	18	100.00%	100.00%
2016-2017	31	5	36	27	86.11%	87.10%
2017-2018	6	4	10	6	60.00%	100.00%
2018-2019	5	0	5	5	100.00%	100.00%
2019-2020	11	3	14	11	78.57%	100.00%

So it can be concluded that in the even semester and odd semester in the pandemic period, the quality and quantity for the concentration of management courses remains normal as in the pre-pandemic period. This is possible because the application of e learning and blended learning has been implemented frequently.

The selection of pavement courses as representatives of the transportation group course with the consideration that the implementation of this course is followed by the practice of using tools such as water pass / tilting levels and theodolites as well as total stations as management concentrations. This course is also followed by a road pavement practicum in the laboratory. The course is 80%

online, and 20% face-to-face. So it can be concluded that the learning system is a blended learning (mixed system) with a fairly strict health protocol, namely limiting the number of students, maintaining distance and using masks and being carried out outside the room. This transportation group course is as presented in Table 4.3.

Table 4.3 shows that the quality and quantity of students for the transportation concentration represented by the pavement course, in the even semester during the pandemic period, remained in normal conditions. In terms of quality, the percentage of passing even reaches 100% within the normal range (44-93)% as well as the best score 100% the same as in normal conditions (86-100)%.

Transportation						
Smstr Even	L	TL	J	NT	% L	% NT
2015-2016	22	5	27	19	81.48%	86.36%
2016-2017	25	7	32	23	78.13%	92.00%
2017-2018	6	5	11	6	54.55%	100.00%
2018-2019	26	2	28	26	92.86%	100.00%
2019-2020	34	0	34	34	100.00%	100.00%
Odd Smstr						
2015-2016	4	0	4	4	100.00%	100.00%
2016-2017	1	1	2	0	50.00%	0.00%
2017-2018	19	2	21	18	90.48%	94.74%
2018-2019	24	1	25	24	96.00%	100.00%
2019-2020	22	2	24	22	91.67%	100.00%

Table 4.3 Group Values for the Transportation (Pavement) course.

Table 4.3 also shows that the quality and quantity of students for the concentration of transportation in the odd semester during the pandemic period are still in normal conditions as well. In terms of quality, the percentage of passing 91.67% is in the normal range of 50-100)% as well as the best value of 100% the same as in normal conditions (94-100)%.

The conclusion is that the quality and quantity of students in receiving lectures the same as the concentration of management during the pandemic, it was not disturbed at all because the e learning system had been implemented long before the pandemic occurred.

The concentration of the Water Group is represented by the hydrology and hydraulics course. These two courses were followed by Field Hydro and Laboratory Hydro practicum. The application of lectures in this concentration has also been used *learning blended*. The portion of blended learning is the same as management and transportation and the structure is 80% online, 20% face-to-face.

During the pandemic, the quality and quantity of students for the concentration in the fluidity course is the same as normal conditions or as before the pandemic as presented in Table 4.4. The quality and quantity of students for the liquidity concentration in the even semester during the pandemic period remained at normal conditions. In terms of quality, the passing percentage of 87% is within the normal range (64-89)% as well as the best value of 71.43% which is the same as in normal conditions (40-90)%.

Table 4.4 also shows that the quality and quantity of students for management concentration in odd semesters during the pandemic are still at normal conditions as well. In terms of quality, the percentage of passing 57% is in the normal range (50-92.86)% as well as the best score is 100% the same as in normal conditions 2015-2016 and 2016-2017 ranges (84-100)%, even better than the 2017 school year - 2018 and the academic year 2018-2019 ranged from (9-11.43)%.

Table 4.4 Group Values for Aquatic courses (Hydrology & Hydraulics)

Hydrology						
Smstr Even	L	TL	J	NT	% L	% NT
2015-2016	24	9	33	21	72.73%	87.50%
2016-2017	26	14	40	18	65.00%	69.23%
2017-2018	29	3	32	15	90.63%	51.72%
2018-2019	8	12	20	8	40.00%	100.00%
2019-2020	20	8	28	19	71.43%	95.00%
Odd Smstr						
2015-2016	26	2	28	22	92.86%	84.62%
2016-2017	1	1	2	1	50.00%	100.00%
2017-2018	35	6	41	4	85.37%	11.43%
2018-2019	11	8	19	1	57.89%	9.09%
2019-2020	8	6	14	8	57.14%	100.00%

The conclusion is that at the Water Concentration there are almost no obstacles or obstacles in the implementation of the lecture, so that the quality and quantity are maintained.

The last concentration is the concentration of Soil or Engineering Geology (Geotech), which is represented by the Foundation Engineering course. The choice of this course is because it is required to do a soil mechanics practicum. The application of lectures in this concentration has also used blended learning. The portion of blended learning is the same as Structure, Management and Transportation and Water, 80% online 20% face-to-face.

The quality and quantity of Civil Engineering students for Geotechnical Concentration as presented in Table 4.5. The quality and quantity of students for the Geotech concentration are the same as the previous 3 concentrations (Management, Transportation, Water) in the even semester during the pandemic period, they are still in normal conditions. In terms of quality, the passing percentage of 81.82% is in the normal range (66-88.24)% as well as the best score of 92.59% which is the same as in normal conditions (62.5-100)%.

Table 4.5 Group Values for Geotech (Foundation Engineering) courses

Soil						
Smstr Even	L	TL	J	NT	% L	% NT
2015-2016	19	5	24	19	79.17%	100.00%
2016-2017	30	4	34	21	88.24%	70.00%
2017-2018	8	4	12	5	66.67%	62.50%
2018-2019	14	6	20	9	70.00%	64.29%
2019-2020	27	6	33	25	81.82%	92.59%
Odd Smstr						
2015-2016	36	1	37	24	97.30%	66.67%
2016-2017	10	12	22	4	45.45%	40.00%
2017-2018	4	0	4	4	100.00%	100.00%
2018-2019	8	17	25	6	32.00%	75.00%
2019-2020	27	1	28	23	96.43%	85.19%

Table 4.5 also shows that the quality and quantity of students for the Geotechnology Concentration in odd semesters during the pandemic are still at normal conditions as well. In terms of quality, the percentage of passing 96.43% is in the normal range (60-100)% as well as the best score of 85.19% which is the same as in normal conditions (40-100)%.

Geotechnical concentration courses are also close equal to 3 concentrations, namely (Management, Transportation and Water) that the quality and quantity of students during this pandemic period remains the same as in normal conditions.

Overall, the conclusion is that UNG Engineering students majoring in Civil Engineering have a slightly decreased quality in the odd semester during the pandemic. Of 5 (five) the concentration that is slightly disturbed / decreased in value is the Concentration Structure. The value is in the range of 50%. If the overall Quality percentage is 100% and divided for the five concentrations, each of 20%, then the total quality is 90% (100-0.5x20%). Meanwhile, the value of Quantity decreased slightly in the even semester during the pandemic, which was 12% (see Figure 4.1) also from the concentration of the structure, so that the total value of Quantity was around 97% (100-0.12x20%).

V. CONCLUSION

Based on the changes and analysis and looking at the research objectives, it can be concluded as follows:

1. Quality and quantity according to concentration, which is corrected in this pandemic period is Concentration Structure, namely for quality occurring in odd semesters by 25% and quantity occurring in even semesters by 50%.
2. Overall it was concluded that the quality of UNG Engineering students majoring in Civil Engineering in the odd semester during the pandemic period decreased slightly. Of the 5 (five) concentrations that are slightly disturbed / decreased, the value is Structure Concentration. The value is in the range of 50%. If the overall Quality percentage is 100% and divided for the five concentrations, each of 20%, then the total quality is 90% ($100 - 0.5 \times 20\%$). Meanwhile, the value of Quantity decreased slightly in the even semester during the pandemic, which was 12% (see Figure 4.1) also from the concentration of the structure, so that the total value of Quantity was around 97% ($100 - 0.12 \times 20\%$).

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