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The Impact of E-learning Service Quality on the Student Grades

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ABSTRACT: Utilizing the E-learning facilities is a common thing in the learning process carried out from basic education to higher education. By utilizing the e-learning facilities, it is hoped that the learning process that cannot be carried out face-to-face can be replaced. Although not the whole advantage of face-to-face learning can be replaced, at least the learning process can continue. The purpose of this study is to find out whether the quality of e-learning services affects the achievement of students' grades. From the literature, it was obtained that 5 factors affect the electronic service quality which is tangibility, reliability, responsiveness, assurance, and empathy. The used research method was the quantitative research method. Respondents obtained in this study were 174 students with the largest proportion being students who were in semester 7. The measurement of used instruments was valid with a KMO value greater than 0.5 and reliable with the Cronbach's alpha value of more than 0.6. From the calculation results, it can be concluded that five factors measuring the quality of electronic services can be used to measure the quality of electronic learning services and the most influential factor is the assurance factor. The results of the correlation between the electronic service quality factors and the achievement of students' grades as long as they use the E-learning facilities to study were found to be insignificant.

KEY WORDS: Electronic Service Quality, Electronic Learning, student grade, learning process.

I. INTRODUCTION

When the pandemic hit the world, everything is almost stop including the learning process. The learning process is moved from the physical into the electronic and accessed by the internet. The use of electronic forms for the learning process give a significant effect. The changing and the use of electronic learning become popular during the pandemic situation. From elementary until higher education, electronic learning (E-learning) becomes a way of delivering the learning process [1].

E-learning itself is a form of utilizing information and communication technology for the learning process. More specifically, e-learning is an online learning model that utilize network technologies to design, deliver, select, manage, and extend learning [2].There are also those who provide other meanings such as the use of Internet technology to provide information a variety of solutions that increase knowledge and performance [3]. Broadly speaking, e-learning is defined as the use of internet technology to provide, deliver or expand learning that aims to improve learning knowledge and performance as well as the management of the learning. As learning media, e-learning has a broad scope as one of several digital technologies that evolve rapidly including giving a strong impact on the education world. The digital technology which can be used to deliver distance learning are audio visual technology, digital broadcasting network, social media, etc. [4]

Before the Covid-19 pandemic outbreak, the trend of using e-learning had emerged. One of them is called MOOC (Massive Open Online Courses) [1]. The rise of MOOC has opened the opportunity for those which for some reason do not have the opportunity to continue learning in school or higher education [5]. One could take a course or two according to their passions. With this method, higher education could monetize their intellectual capability [1].

The changing of the learning process into digital form through e-learning has its own obstacles. One of the biggest barrier is the technology infrastructure, mainly telecommunication technology. The technological infrastructure barriers

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are definitely more experienced by the rural areas because of the unique geographical conditions. Besides the technological infrastructure, the supporting infrastructure also plays an important role in delivering electronic content such as the electronic service quality. Imagine if ones access the e-learning has a bad connection from the side of telecommunication technology but also experience a bad electronic service quality. The learning process is definitely could not be delivered in proper ways. The students could not understand at all the topic or even the course. The electronic service quality can be measured by using electronic service quality framework [6]. The electronic service quality framework consist of five factors which are tangibility, reliability, responsiveness, assurance, and empathy.

Although e-learning has a good quality service but does not give a sufficient impact on its users, it can be said that e-learning has not yet achieved its goals. So further research is needed to see the effect of the quality of e-learning on the performance of users. The performance of the user in this context is the grade obtained by the student. This is the basis why this research needs to be done.

II. LITERATURE REVIEW

The learning process in educational institutions is usually carried out in a classroom where the teacher will be in front of the class while the students will sit in front of the teacher. The teacher will explain the subject matter and the student will listen and take notes. A picture like this is a picture of a teacher-centered learning process. Such characteristics make students become passive learners.
As the world is changing with advanced demands, the students are required to become active learners. The concept of learning has to change so that they can become strong learners. The presence of e-learning makes teachers have a wider choice in giving their teaching. Likewise, students can freely manage their time and how they learn by accessing the course material in e-learning and being more responsible in their learning process [7].

The presence of e-learning cannot immediately replace a well-formed meeting pattern in the classroom. There are several things that cannot be replaced and by the empirical especially the effectiveness of using e-learning still not proven enough. Even the effectiveness of e-learning is not proven enough to make a good impact, the combination action between utilizing the e-learning with the classroom activity gives a better chance [7].
learning can be assumed as a virtual environment that is used to deliver the learning process. This virtual environment is utilizing internet technology which is now a basic need in this century. The presence of a virtual environment for the learning process has been utilized by many universities or schools to deliver their learning process. This condition is the perfect solution for a pandemic situation like now.

Utilizing e-learning in the learning process presents its own challenges. These challenges must be answered by students, teachers, and education providers. As an example, the dental student of Indonesia University has proven that they still can learn during the pandemic situation by utilizing the e-learning platform provided by the university [8]. The learning process is different compared with students from other fields such as economics field. The research of [8] has proven even the challenges are different, they can adapt and evolve using e-learning so their course still continues even in the pandemic situation. They even feel that the e-learning facility makes them productive and their attention is improved compared to learning in the classroom.

Besides the challenges and the impact of e-learning, the management of utilizing technology knowledge affects the success of e-learning. The support of management, student awareness improvement, and understanding of information technology from teachers, students, and education provider is a must. Those are significant factors founded by [9] on the success of e-learning implementations.

From the previous research, it is found that e-learning is the popular platform for delivering the learning process. This gives knowledge that e-learning is proven to be a good tool for distance learning. Another important part that should not be forgotten is the content of e-learning. The e-learning content should not reduce the important aspect of learning for the 21st centuries such as critical thinking, problem-solving, creative thinking, communication, and collaboration. It can be concluded that the communication and collaboration between students and teachers, the learning material (video, news, quiz, test, etc.), and how to deliver the teaching material (using what kind of platform) is important too. As the infrastructure of learning is ready, the preparedness of teachers and students also important [10].

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The conclusion that can be drawn from the previous research that has been described is that the e-learning platform is a suitable platform. Besides being suitable, this platform is a platform that is widely used by education actors and providers. Another thing that is no less important than the platform is the content/learning materials that are included so that the learning process can take place. Although not in the form of class or face-to-face meetings, at least things such as collaboration between students and teachers, materials, science synthesis, and knowledge transfer, multimedia-based materials, and supporting information must be available. So that the form of class/face-to-face meetings can be replaced more or less.

From the existing literature, it has been identified that the e-learning platform is a suitable platform for distance learning during a pandemic. The material contained in the e-learning platform must also be more varied so that the learning process can take place properly. Of course, it is also necessary to think about whether these two things have been researched and give good results, then when the platform and the content of the platform are good enough, do these two things have an impact on the performance/grades of students? This question is the basis of this research.

III. METHODOLOGY

The research methodology that used was quantitative research. The steps of the research methodology can be seen in Fig1.

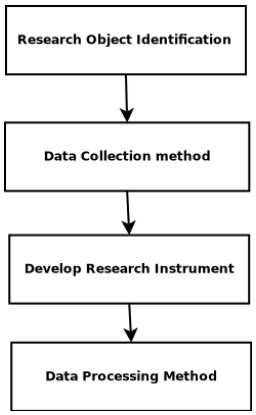

Fig 1. Stages of the Research Method

The research object was the students of Information Technology Faculty of a private university in Indonesia that already used e-learning facilities at least in one semester or six months. The students must be active and registered in the active semester. The data was gathered by questionnaire based on the Likert scale. The student grade from two courses in the active semester was taken as the second source of data. The questionnaire was developed based on the previous research that related to the research and delivered to the active and registered students. The gathered data is then processed using a software environment for statistical computing and graphics which name is R (r-project.org). The validity and reliability test was conducted including descriptive analysis and correlation to answer the research question.

IV. RESULT AND DISCUSSION

A. **Descriptive Statistics of the Respondent**

The respondent for this research is 174 students which answered the questionnaires. The respondent can be describe based on the department in the faculty (Fig2.).

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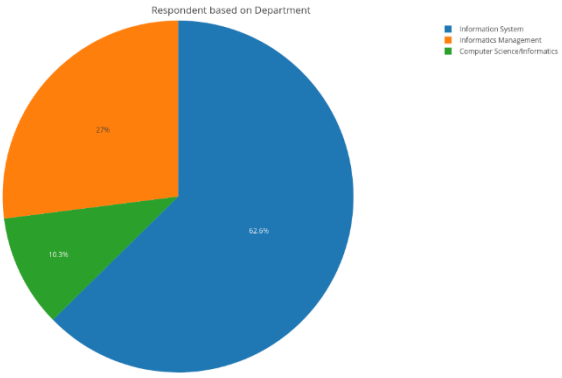

Fig 2. Respondent Based on Department

From Fig2 can be drawn that 62.6% of the respondent is from Information System Department which is 109 students from 174 respondents. Then followed by Informatics Management Department which is 27% or 47 students from 174 respondents, and the last portion is the Computer Science/Informatics Department which is 10.3% or 18 students from 174 respondents.

The gender of the students that reply the questionnaire can be seen in Fig3. The Fig3 is shown that male is the big part of respondents which is 59.2% or 103 students from 174 respondents. The female is in the second part which is 40.8% or 71 students from 174 respondents.

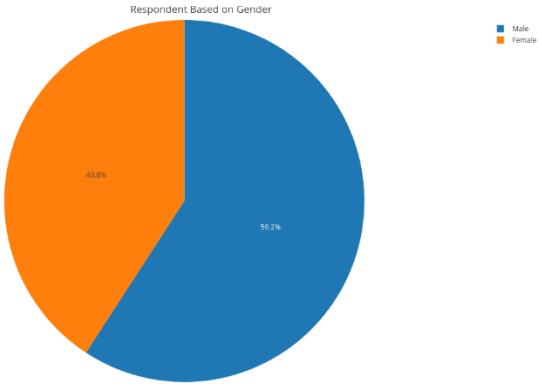

Fig 3. Respondent based on Gender

From 174 respondent which return the questionnaire, most of the respondent was in semester 7 that near of the end of their study. Fig 4 shown the semester proportion of the respondent.

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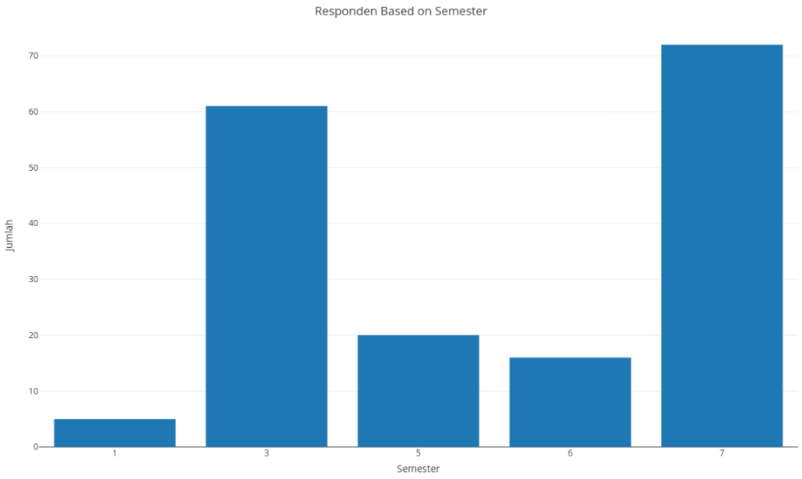

Fig 4. Respondent Based on Semester.

B. **Data Analysis**

In the data analysis part, the report is divided into several part which is the reliability test, the validity test, factor analysis and the last part is the correlations.

1) Reliability Test

To achieve the research objectives, the study has employed several data analyses. The first data analysis that has been done is the reliability test of the instrument. The reliability test is a way to know how consistent the result of the instrument is when used to collect the data. It means the instrument will give the same reliability when used twice or more in another research. One of the ways to conduct a reliability test was using the alpha() function in R and reading the Cronbach's Alpha calculation result. The alpha() function was in the psych library which needed to called it first.
From the first factor of electronic service quality, the tangibility factor, the reliability of the instrument was 0.59 which is less than the standard value, 0.6 for passing the reliability test (Fig 5).

```
Reliability analysis
Call: alpha(x = x1[, 1:4])

  raw_alpha std.alpha G6(smc) average_r S/N   ase mean   sd median_r
      0.59       0.6    0.55      0.28 1.5 0.051  3.9 0.74     0.27

 lower alpha upper     95% confidence boundaries
0.49 0.59 0.69

 Reliability if an item is dropped:
    raw_alpha std.alpha G6(smc) average_r  S/N alpha se  var.r med.r
X11      0.63      0.63    0.54      0.36 1.72    0.049 0.0044  0.36
X12      0.46      0.47    0.39      0.23 0.89    0.072 0.0140  0.16
X13      0.53      0.54    0.46      0.28 1.16    0.063 0.0187  0.24
X14      0.47      0.47    0.38      0.23 0.90    0.070 0.0052  0.24

 Item statistics
     n raw.r std.r r.cor r.drop mean  sd
X11 174  0.61  0.58  0.31   0.25  3.7 1.2
X12 174  0.72  0.73  0.60   0.46  4.0 1.0
X13 174  0.67  0.67  0.49   0.37  4.0 1.1
X14 174  0.71  0.72  0.60   0.45  4.0 1.0

Non missing response frequency for each item
       1    2    3    4    5 miss
X11 0.07 0.10 0.16 0.36 0.31    0
X12 0.03 0.04 0.24 0.32 0.37    0
X13 0.04 0.05 0.18 0.32 0.41    0
X14 0.02 0.06 0.24 0.28 0.40    0
```

Fig 5. Reliability test with alpha() function for tangibility factor.

The second factor is reliability, where this factor is trying to measure how far the e-learning services can fulfill what they promise and guarantee to the users that the e-learning will give as they promise. The reliability test result gives

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0.76 for the reliability factor which is greater than 0.6. The alpha() function gives a bunch of calculation results, but only the raw_alpha column that needed to be read. The column was shown the Cronbach's Alpha value for the reliability test.
The responsiveness is the third factor of electronic service quality, the reliability test for this factor gives the value of 0.74 which is greater than the standard value of 0.6. The fourth factor is the assurance and the reliability test gives 0.73 which is greater than the standard value, 0.6. The fifth factor was empathy and the reliability test give value of 0.78 which is greater than the standard value.

2) Validity Test
The validity test is tried to measure what it is supposed to measure. The result of the validity test will inform that on what degree to which evidence and theory support the interpretations. In the R language, the validity test is performed by using KMO() function from the psych library. The default value for pass from the validity test is 0.5. This means, if validity test of some factor resulted greater than 0.5, the factor is pass and can proceed the factor analysis test.

```
Kaiser-Meyer-Olkin factor adequacy
Call: KMO(r = x1[, 1:4])
Overall MSA =  0.67
MSA for each item =
 X11  X12  X13  X14
0.74 0.65 0.71 0.64
```

Fig 6. Validity test with KMO() function for tangibility factor.

The first factor, the tangibility factor, is tested using KMO() function and gives a result of 0.67. The second factor, the reliability, gives 0.7 which is greater than the standard value. The validity test for the third factor gives 0.75 so can be seen that the value is greater than the standard value. The validity test for the fourth and fifth factor gives value of 0.59 and 0.75.

3) Factor Analysis
Factor analysis is a technique used to find factors that can explain the relationship or correlation between the various independent indicators that are observed. In the R language, to use the factor analysis test, it should call the GPArotation library besides the psych library. The implementation of factor analysis in R can be seen in Fig 7.

```
Call:
factanal(x = x1[, 1:4], factors = 1, rotation = "varimax")

Uniquenesses:
  X11   X12   X13   X14
0.907 0.597 0.743 0.540

Loadings:
    Factor1
X11 0.304
X12 0.635
X13 0.507
X14 0.678

               Factor1
SS loadings      1.213
Proportion Var   0.303

Test of the hypothesis that 1 factor is sufficient.
The chi square statistic is 1.77 on 2 degrees of freedom.
The p-value is 0.412
```

Fig 7. The Factor Analysis Result from Tangibility Factor.

From Fig 7, it can be seen that from 4 instruments related to the tangibility factor, only one instrument that a value greater than 0.5. The fourth instrument value is 0.678. The conclusion for this condition is the fourth instrument has a significant correlation with the tangibility factor. For the second factor, all the four instruments give a significant correlation which the strongest one is 0.898. The third factor, all the four instruments gives a significant correlation which the strongest one is 0.761. The fourth factor, only two instruments gives significant correlations with the value of 0.951 and 0.927, the other two factors give less than 0.5. The last factor, the empathy factor, only one instrument doesn't have significant correlation the empathy factor. It is gives 0.447 value which below the standard (see Fig 8.)

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```
Call:
factanal(x = x5[, 1:4], factors = 1, rotation = "varimax")

Uniquenesses:
  X51   X52   X53   X54
0.773 0.559 0.421 0.315

Loadings:
    Factor1
X51 0.477
X52 0.664
X53 0.761
X54 0.828

               Factor1
SS loadings      1.932
Proportion Var   0.483

Test of the hypothesis that 1 factor is sufficient.
The chi square statistic is 3.98 on 2 degrees of freedom.
The p-value is 0.136
```

Fig 8. The Factor Analysis Result from Empathy Factor.

To answer the research questions, the results of the calculations using the R language for the five factors from electronic service quality can be seen in Fig 9. The Fig 9 gives the results that the five factors of electronic service quality have a fairly good influence on electronic learning services used by students of the Faculty of Information Technology. The value of those five factors are greater than the standard value with the biggest value is 0.760 or the fourth factor.

```
Call:
factanal(x = xgabungan, factors = 1, rotation = "varimax")

Uniquenesses:
   x1    x2    x3    x4    x5
0.539 0.451 0.459 0.423 0.616

Loadings:
   Factor1
x1 0.679
x2 0.741
x3 0.735
x4 0.760
x5 0.620

               Factor1
SS loadings      2.512
Proportion Var   0.502

Test of the hypothesis that 1 factor is sufficient.
The chi square statistic is 20.43 on 5 degrees of freedom.
The p-value is 0.00104
```

Fig 9. The final Factor Analysis Result.

4) Correlation Test

The correlation test can be seen as a relationship, but if look it further, it does not simple like that. From the statistic world, correlation is a dependency that causes whether or not there is an effect on 2 variables. If the first variable has decreasing trend, the decreasing trend will affect the second variable. The second variable can be decreasing or the opposite. To calculate the correlation, it needed the r table value that will inform which value is critical. Because the number of respondent is 174 and by calculating *n - 2*, it should be 172 and the critical value from the r table is 0.1488. The correlation calculation in the R language can be done by using cor.test() function which gives a detail information like in Fig 10.

```
Pearson's product-moment correlation
data:  x1$rata and x1$nilai
t = 0.26044, df = 172, p-value = 0.7948
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 -0.1292976  0.1681274
sample estimates:
       cor
0.01985418
```

Fig 10. The Correlation test for Tangibility and Grades.

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From Fig 10, it can be said that the p-value is 0.7948 and the significant level value is 0.01985418. It concluded that there is no significant correlation between the tangibility and the student grades, because it is lower than 0.1488. The second factor, the reliability, gives the p-value of 0.1806 and the significant level is 0.1019679. The second factor does not have significant correlation with the student grades because it is lower than 0.1488. The third factor, the responsiveness, gives the p-value of 0.1457 and the significant level is 0.1107581. The third factor does not have significant correlation with the student grades because it is lower than 0.1488. The fourth factor, the assurance, gives the p-value of 0.3979 and the significant level is 0.06448423. The fourth factor does not have significant correlation with the student grades because it is lower than 0.1488. The fifth factor, the empathy, gives the p-value of 0.4696 and the significant level is 0.05517778. The fifth factor also does not have significant correlation with the student grades because it is lower than 0.1488.

VI. CONCLUSION AND FUTURE WORK

The overall result of this study can be explained as (1) The instrument that used in the measurement is reliable and it is found that the instrument for measuring the tangibility is almost reliable; (2) The validity test gives 0.59 value for the instrument that used for measure the assurance factor. It is greater than 0.5, but it can be said that the validity is valid but is not strong enough; (3) The factor analysis result is good and only four instruments give less value than the standard value to pass the factor analysis test; (4) The biggest influence of the electronic service quality comes from assurance factor, this means that this factor is the most factor students believe it will fulfill the promise; (5) The correlation test gives a fact that the quality of e-learning is not significantly affect the student performance to get a good grades.

The future work for this study that can be given is (1) the development of the instrument should be carefully check whether it is strongly related with the factor or not; (2) the future research which can be done is by adding intermediate factor between the e-learning service quality and the impact of the student grades.

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