# THE ANALYSIS OF FACTORS AFFECTING THE QUALITY OF E-LEARNING AND STUDENT LEARNING OUTCOMES

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**Abstract:** This research aims at examining the effect of factors affecting the quality of e-learning and student learning outcomes of Universitas Terbuka. The study population included the students of Non Education at Universitas Terbuka from which we drew 96 respondents. Our sampling involved non probability method, i.e., purposive sampling, based on whom we thought would be appropriate for the study. We dealt with primary data that included respondents' answers through questionnaires and interviews.

The questionnaires were analyzed by means of correlation and multiple regression analysis, where we summarized a given data set using descriptive statistics. We also addressed the selection of variables using test reliability and test validity. Classical assumption test, including multicollinearity test, was run to look at whether the variables were related. Once multicollinearity test was completed, we settled on hypothesis testing to arrive at an inferential analysis about the given population that determined if a particular claim was statistically significant.

F-test showed that the variable of ease of use, information quality, material quality and media quality simultaneously had positive and significant effect on the quality of e-learning and student learning outcomes. T-test showed that media quality and material quality had positive and significant partial effect on the quality of e-learning. Ease of use and information quality, however, were not found to have significant partial effect on the quality of e-learning.

Similar to the partial relationship between media quality, material quality and the quality of e-learning, the partial effect of the quality of e-learning on student learning outcomes was positive and significant.

**Keywords:** ease of use, information quality, material quality, media quality, quality of E-learning and learning outcomes

## 1. INTRODUCTION

Distance learning at Universitas Terbuka (UT), as opposed to the conventional face-to-face learning, calls for a self-study mode that navigates the students to complete their studies at their own pace and time. Distance learning serves as an educational option that enables students to fully harness their potential and facilities in order to meets their individual needs, interests and styles of learning.

Given its distant nature, UT captures the essence of education that takes place when the teacher is not physically present. As technology turns not only an archive of information, but also an actual medium of communication and collaboration, the physical barrier of teachers and students during instruction is overcome, more often than not, and these kinds of educational interactions are increasingly possible within this new technological platform. This technological platform is the staple component since it shapes the culture of learning environment in ways that enable students to construct knowledge both individually and in collaboration with teachers and peers.

Handayani [1] taps into the factors that affect the use of information system in her research and believes that quality information results from a well-designed information system. It is for this reason that information system is designed to hone in on the needs of individuals to sustain operational activities across all levels within an organization.

The development of information and communication technology plays a central role and provides strategic directions in the ever-growing educational landscape. Evidence over the past years has clearly indicated that access to information and communication technology has been framed through new concepts and efforts in terms of technology use in learning process that favors student-centered opportunities. Everyday technological advances and their global use make it more plausible for more technology to be introduced in educational practices and to be a vital component for the success of self-regulated students in distance learning setting.

The level of student achievement is, within a broad framework, influenced by several factors, which may take internal and external forms [2]. Internal factors strongly correlate with the physical health and psychological well-being (e.g., mental preparedness, maturity, intelligence, interest, talent and motivation)—all of which manifest in their school-related behaviors. External factors are most strongly driven by the environment of family, school and society. Internal factors result in negative or positive reactions to myriad stimuli in the external environment.

Information quality serves to be one of the external factors that drives excellence in learning outcomes in relation to the use of learning media by teachers. Information quality essentially measures the quality of output the information system generates [3]. Quality information is relevant for its purposes concerning the needs of students. When the quality of information is enhanced in terms of accuracy, relevancy, completeness, timeliness and attractiveness, better teaching practices and learning outcomes will be fully realized. Information quality can capture the optimal use of information technology to nurture learning activities in a way that students actively engage to pursue higher learning productivity and gain better outcomes.

Technology-based learning that leverages on the use of computer and the Internet, commonly known as e-learning, has been widely used and comes with effectiveness that has ranged broadly. Hamdani [4] fits e-learning into an educational system or concept that makes use of the systematic application of technology in addressing practical tasks in learning. The integration of e-learning into distance learning platform allows for anywhere-anytime flexibility that overcomes time and place barriers.

However in reality, the application of E-learning, though its importance in distance education is very well-recognized, falls short of expectation at Universitas Terbuka where it is not fully developed in providing online information retrieval services. There is also inequitable access to UT website for students to extend their range of learning. In such circumstances, students jeopardize their grade when it comes to dealing with final examination (Ujian Akhir Semester-UAS). Students who earn poor grades are not properly exposed to the e-learning services. This unfortunate circumstance aggravates when extending e-learning opportunities to students in rural and remote areas where access to information and communication is limited remains a challenge. Another predicament students encounter on a daily basis emerges when they struggle to understand the initiation materials delivered by tutors. These materials have yet to mandate supplementary facilities such as Open Educational Resources (OER), a free learning-material service that enhances access to knowledge and personalized learning experience.

We have set out a wide array of literature that weighs in on e-learning practices and what builds a technological momentum that successfully integrates e-learning within distance learning framework, which includes ease of use, information quality, material quality and media quality. We sought to look at the effect of these variables on the quality of e-learning. We then proceeded to observe the effect of these variables, including the quality of e-learning, on student learning outcomes.

## 2. LITERATURE REVIEW

Deni Darmawan [5] contends that information contains a number of meaningful output gained from data processing procedures to ensure the integrity and utility of the data for subsequent use according to users' needs. As for the conception of quality, it refers to a dynamic state within an organization associated with products, services, human resources, processes and environments calls for meeting and exceeding expectations [6].

E-learning method capitalizes on the appropriate utilization of the Internet to enable knowledge transfer and delivery. E-learning presents contemporary education with a new spectrum of practices that involve the use of computer or electronic devices, as the "e" stands for electronic. As the name implies, e-learning can deal with a great variety of electronic resources. Through e-learning, distance students manage to capture and analyze more data in an unprecedented manner [4].

Zaenal Arifin [7] claims that learning achievement is observable and measurable, and defining it is critical to measure what students have achieved individually and collaboratively upon the completion of a course or a program. Learning achievement serves not only the indicator of individual success in a given course or a program, but also the quality of the educational institution.

When it comes to learning media, Hujair AH Sanaky [8] believes students can engage in a more meaningful learning experience by means of learning media as it serves to convey learning messages. Gangne' & Brings in Azhar Arsyad [9] claim that "Learning media constitutes a physical tool to deliver media-rich educational contents, including books, tape recorders, cassettes, video cameras, video recorders, films, photos, images, graphics, televisions and computers."

With regard to the usefulness of learning media and the perceived ease of use, Jogianto [3] proposes that ease of use accounts for user perception on the extent to which he/ she believes that using a particular technology will be effortless. Higher perceived ease of use will lead to higher perceived usefulness and ultimately greater intensity of the use of learning media. The definition implies that the construct of perceived ease of use is indispensable part of decision making process.

## 3. RESEARCH METHOD

We dealt with e-learning students at 5 locations of UPBJJ-UT as the population of the study. We reached out our samples using purposive sampling method that served the purpose of the study. We provided a primary source of data on which the study was based. These data were quantitative in nature, i.e., numerical data amenable to statistical manipulation [10] obtained from respondents' answers through direct questionnaires. These data were observed and collected firsthand, as opposed to the fabricated secondary data. Once the data were converted into numerical form, we subjected them to statistical analysis.

The primary data in this study were questionnaires by distributing 105 questionnaires to respondents which included Non Basic Education students who were in five locations including Ambon, Denpasar, Surabaya, Manado and Samarinda with three to eight semester semesters. The number of questionnaires returned was 101, questionnaires that can be processed and analyzed were 96 questionnaires

We employed a variety of data testing techniques, i.e., correlation analysis and regression analysis in SPSS. The results of the analysis summed up in descriptive statistics as we proceeded to data quality test and classical assumption test prior to hypothesis test and discussion.

## 4. RESULT AND DISCUSSION

### 4.1 Result of Data Analysis

Data should be sufficiently accurate for the intended objectives of the study and measure what is supposed to be measured. We, hence, settled on test reliability and test validity to serve the imperative for maintaining the standards of data quality.

### 4.1.1 Result of Test Reliability and Test Validity

Test reliability measures the degree to which the instrument of a study is consistent. To measure whether our instrument was internally consistent, we ran Cronbach's alpha (α) using the reliability command in SPSS, where alpha > 0,70 denotes acceptable reliability (Widoyoko, 2014). As we shall see below, each of our items gained > 0,70, making them internally consistent and, thus, reliable.

**Table 1**
**Result of Test Reliability**

| No | Variable | Cronbach's Alpha | Description |
|---|---|---|---|
| 1 | Ease of Use | 0,883 | Reliable |
| 2 | Information Quality | 0,821 | Reliable |
| 3 | Material Quality | 0,847 | Reliable |
| 4 | Media Quality | 0,865 | Reliable |
| 5 | E-learning Quality | 0,868 | Reliable |
| 6 | Learning Outcomes | 0,890 | Reliable |

Source: Processed primary data

Test validity by means of Pearson's correlation method shown in Table 1 shows that the correlation coefficient of each item with the total score of the variable is significant at 0,01 (two-tailed).

**Table 2**
**Result of Validity Test**

| Variable | Item | Pearson's Correlation | Description |
|---|---|---|---|
| Ease of Use | K1 | 0,819 | Valid |
| | K2 | 0,786 | Valid |
| | K3 | 0,,808 | Valid |
| | K4 | 0,876 | Valid |
| | K5 | 0,840 | Valid |
| Information Quality | KI1 | 0,626 | Valid |
| | KI2 | 0,695 | Valid |
| | KI3 | 0,678 | Valid |
| | KI4 | 0,683 | Valid |
| | KI5 | 0,751 | Valid |
| | KI6 | 0,762 | Valid |
| | KI7 | 0,679 | Valid |
| Material Quality | KM1 | 0,787 | Valid |
| | KM2 | 0,780 | Valid |
| | KM3 | 0,825 | Valid |
| | KM4 | 0,770 | Valid |
| | KM5 | 0,786 | Valid |
| Media Quality | KMD1 | 0,869 | Valid |
| | KMD2 | 0,807 | Valid |
| | KMD3 | 0,845 | Valid |
| | KMD4 | 0,857 | Valid |
| E-learning Quality | KE1 | 0,787 | Valid |
| | KE2 | 0,796 | Valid |
| | KE3 | 0,779 | Valid |
| | KE4 | 0,735 | Valid |
| | KE5 | 0,785 | Valid |
| | KE6 | 0,675 | Valid |
| | KE7 | 0,703 | Valid |
| Learning Outcomes | PB1 | 0,760 | Valid |
| | PB2 | 0,810 | Valid |
| | PB3 | 0,837 | Valid |
| | PB4 | 0,811 | Valid |
| | PB5 | 0,803 | Valid |
| | PB6 | 0,803 | Valid |

Source: Processed primary data

Table 2 indicates that $r_{cal}$ of the six variables is greater than $r_{table}$ 0,200. The item-item questionnaire is, therefore, significantly correlated with the total score, making each item of the construct valid.

We ran hypothesis test in multiple regression to allow us to carry out inferences about population parameters using data from the sample. We adopted path analysis to test mediation or indirect effect of e-learning quality (KE), which was both a predictor and an outcome in the same analysis; e-learning quality caused mediation in the independent variables (ease of use [K], information quality [KI], material quality [KM] and media quality [KMD]) and in the dependent variable (learning outcome [PB]). Path equation was calculated using two regression equations that showed the hypothesized relationships.

Equation 1……………. $\textbf{KE} = \textbf{b}_1\ \textbf{K} + \textbf{b}_2\ \textbf{KI} + \textbf{b}_3\ \textbf{KM} + \textbf{b}_4\ \textbf{KMD} + \textbf{e}_1$

Equation 2……………. $\textbf{PB} = \textbf{b}_1\ \textbf{K} + \textbf{b}_2\ \textbf{KI} + \textbf{b}_3\ \textbf{KM} + \textbf{b}_4\ \textbf{KMD} + \textbf{b}_5\ \textbf{KE} + \textbf{e}_2$

## 4.1.2 Hypothesis Test
**Model 1. The Analysis of Ease of Use, Information Quality, Material Quality and Media Quality on the Quality of E-Learning**

Table 3 shows the regression results of the effect of ease of use, information quality, material quality and media quality on the quality of e-learning.

**Table 3. Regression Analysis Model 1**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | .848 | 1.633 | | .519 | .605 |
| | K | .136 | .091 | .102 | 1.485 | .141 |
| | KI | .043 | .093 | .039 | .465 | .643 |
| | KM | .550 | .113 | .412 | 4.887 | .000 |
| | KMD | .706 | .137 | .425 | 5.145 | .000 |
| $R^2$ : 0.782 $F_{Cal}$ : 81.868 Sig : 0.000 | | | | | | |

Source: Processed Primary Data

$F_{Cal}$ in ANOVA is 81.868 with a significance of F test showing p-value of 0,000 (< 0.05). This leads ease of use, information quality, material quality and media quality, simultaneously, to be statistically significant in the quality of e-learning. $R^2$ of 0,782 implies that 78.2% of the variation in the quality of e-learning could be explained by the four independent variables. The remaining 0,218 or 21.8% accounts for other factors not included in the model.

In terms of partial test, both media quality and material quality gained significance of 0.000 (<0.05), with the former standing at 5.145 and the latter at 4.887. Both had positive and significant partial effect on the quality of e-learning.

However, the t-statistics of information quality and ease of use are not similar to the prior two variables. Information quality gained significance of 0.643 (>0.05) with $T_{Cal}$ of 0.645, indicating positive but insignificant effect on the quality of e-learning. As for ease of use, the significance level is less than 0.05, i.e., 0.141, with $T_{Cal}$ of 1.485, also indicating positive but insignificant effect on the quality of e-learning.

Based on Table 3, we can sum up the equation of regression model 1:

$KE = b_1 K + b_2 KI + b_3 KM + b4 KMD + e_1$
$Y_1 = 0.102 + 0.039X1 + 0.412X2 + 0.425X3 + 0.466$

**Model 2. The Analysis of Ease of Use, Information Quality, Material Quality, Media Quality, and E-Learning Quality on Learning Outcomes**

Table 4 provides the regression results of the effect of ease of use, information quality, material quality, media quality and e-learning quality on learning outcomes.

**Table 4. Results of T Test on Learning Outcomes**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | .467 | 1.757 | | .266 | .791 |
| | K | -.124 | .099 | -.099 | -1.248 | .215 |
| | KI | .150 | .100 | .144 | 1.507 | .135 |
| | KM | .129 | .136 | .103 | .946 | .347 |
| | KMD | .227 | .168 | .146 | 1.355 | .179 |
| | KE | .550 | .113 | .587 | 4.887 | .000 |
| $R^2$ : 0.717 $F_{Cal}$ : 45.601 Sig : 0.000 | | | | | | |

Source: Processed primary data

$F_{Cal}$ in ANOVA is 45.601 with a significance of F test showing p-value of 0,000 (< 0.05). This leads the simultaneous effect of ease of use, information quality, material quality and media quality including the quality of e-learning to be statistically significant on learning outcomes. The resulting $r^2$ of 0.717 implies that 71.7% of the variation in the learning outcomes could be explained by the aforementioned five independent variables. The remaining 0,283 or 28.3% accounts for other factors not included in the model.

When it comes to partial T test, the quality of e-learning gained significance of 0.000 (<0.05) with $T_{Cal}$ of 4.887, indicating positive and significant effect on learning outcomes. The other independent variables showed insignificant relationship with learning outcomes, with media quality standing at a significance level of 0.179 (>0.05), material quality at 0.347 (>0.05), information quality at 0.135 (>0.05), ease of use at 0.141 (>0.05). However, ease of use, though insignificant, showed positive effect on learning outcome with $T_{Cal}$ of 1.485.

The equation of regression model 2 is:

$PB = b_1 K + b_2 KI + b_3 KM + b_4 KMD + b_5 KE + e_2$

$PB = -0.099 X1 + 0.144 X2 + 0.103 X3 + 0.146 X4 + 0.587 Y1 + 0.531$

## 4.1.3 Discussion

### 4.1.3.1 The Effect of Ease of Use, Information Quality, Material Quality and Media Quality on the Quality of E-Learning

We have looked at the possible statistically significant differences on the dependent variables as a result of the effects of the independent variables. F test, as previously shown, informs that the simultaneous effect of the independent variables was significant on the quality of e-learning with a probability value of 0,000 < 0,05. This finding provides us the representation and understanding of the simultaneous relationship between the multiple independent variables and the quality of e-learning.

When it comes to the partial test, we have come to understand that material quality and media quality, individually, had significant effect on the quality of e-learning at 5%. Sustaining and improving the quality of learning materials and learning media are pivotal to the quality of e-learning. In the scenario of distance learning, studying remotely calls for more than just reading texts and writing essays or assignments. Virtual, interactive platforms and online collaborations through electronic devices create a more effective way in which the contents and learning methods are integrated. Hence, distance students can nowadays choose from many media to support learning. Ideally, the media chosen in a particular learning condition depends on the learning goals of a course and how well a typical media supports the learning goals.

Ease of use and information quality did not affect the quality of E-learning so significantly. Though E-learning has expanded rapidly and has the potential to extend the educational opportunities

further, the current design and implementation at Universitas Terbuka have met substantial challenges in terms of insufficiency of facilities and poor participation among particularly least-prepared students. Ease of use and information quality were not heavily highlighted in the study, consequently.

**4.1.3.2 The Effect of Ease of Use, Information Quality, Material Quality, Media Quality and the Quality of E-Learning on Learning Outcomes**

In model 2, we treated the quality of e-learning no longer as an outcome variable but a predictor variable or independent variable that was predicted to affect the learning outcomes. Similar to model 1, the probability value in model 2 was 0,000 < 0,05, indicating significant simultaneous effect of ease of use, information quality, material quality, media quality, including the quality of e-learning on learning outcomes.

The partial effect of e-learning quality was also found to be statistically significant in learning outcomes at 5%. Our finding is consistent with Lili Darliah's [11]. We believe e-learning delves into various aspects of the relationship between students' approaches to learning and their learning outcomes. This means that the focus of e-learning methods is on how to strengthen the capacities of students to act progressively through the appropriate acquisition of relevant knowledge and useful skills to increase the likelihood of better learning outcomes.

On the other hand, ease of use, information quality, material quality and media quality were found not significant with respect to the improvement of learning outcomes at Universitas Terbuka. There were a number of students, particularly least-prepared students, who had yet to fully utilize learning in online setting and consistently underperformed, ultimately impeding their success through college and enhancing the likelihood of dropping out.

## 5. Conclusion

Based on result with the existing F test can be influenced by variables, information quality, material quality, media quality together positively and significantly to the quality of E-learning and student learning achievement. Partial T test in model 1 resulted in positive and significant effect of media quality and material quality on the quality of e-learning, while ease of use and information quality did not fit neatly into this statistical pattern. Partial T test in model 2 highlights the positive and significant effect of the quality of e-learning on learning outcomes, providing evidence that students who took on e-learning more effectively gained better learning outcomes.

## 5.1 Implication

In this chapter, we provide potential implications of our findings for policy and practice with respect to distance learning implementation.

1. Our finding calls for decision-making and implementation process of the improvement in distance learning using e-learning, including the level of involvement of diverse stakeholders of Universitas Terbuka at different stages of the process, the challenges they encounter and the final outcomes of these decisions.
2. Our finding also contributes as credible and relevant evidence sources to the wide strand of literature in Open and Distance Education landscape, most notably in the use of information technology in learning setting.

## 5.2 Suggestion

Though we failed to support all of the hypothesized relationships in the present study, we suggest tackling implementation challenges and planning corrective and precautionary measures against non conformance concerning the development of information technology at Universitas Terbuka.

We also suggest future studies to set out further exploration of other relevant variables as they link to the technical factors that sustain the implementation of distance e-learning. It is also essential to draw primarily on larger samples of UPBJJ-UT for more representative and comprehensive findings along with instrument development that taps into more complex and dynamic conditions and environments.

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