

# Does Student Satisfaction Mediate the Correlation between E-Learning Service Quality, Academic Engagement and Academic Achievement?

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## Does Student Satisfaction Mediate the Correlation between E-Learning Service Quality, Academic Engagement and Academic Achievement?

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**Abstract:** This research aimed at analyzing the influence of e-learning service quality and academic engagement on academic achievement through student satisfaction as an intervening variable. Only students who had ever used e-learning service could be the research sample and 222 students were sampled using purposive sampling. The data were collected by distributing questionnaires to the research samples. The data were analyzed using path analysis technique. The result indicated that e-learning service quality, academic engagement, and student satisfaction had an influence on accounting students' academic achievement. From this research finding, it was suggested that university lecturers keep on developing teaching and learning strategies which can improve students' academic engagement since it has been proven that academic engagement has a dominant influence on students' academic achievement.

**Keywords:** E-learning Service Quality, Academic Engagement, Student satisfaction, Academic Achievement

### INTRODUCTION

The technology disruption era 21st century presents the biggest chance possible for inter-country cooperations which lead to tight competition in every aspect of our life. The high competition has made both companies and institutions alike set specific terms and conditions in recruiting their employee candidates. One of the terms and conditions they set is the high academic achievement any future employee has ever achieved during their study. Academic achievement, frequently measured by GPA (Grade Point Average) score, is defined as the result of performance which indicates to what extent an individual has achieved the specific goal on which the activities within teaching environment, especially in higher education institutions, are focused (Steinmayr et al, 2014). An individual with a high academic achievement is deemed to have good ability academically and this will have a good effect on their development at work. Additionally, high academic achievement is also important when one wishes to continue their study to a higher level (Steinmayr et al, 2014).

In addition to such importance for an individual, academic achievement is equally important to measure a nation's wealth and prosperity, for example for PISA (Programme for International Student Assessment) ranking held by OECD (Organisation for Economic Co-operation and Development) once every three years (Steinmayr et al, 2014). PISA constitutes worldwide rank assessment organized to test students' academic ability in three fields, namely reading, mathematics, and science. However, the latest data released by OECD on December 3, 2019 in Paris, placed Indonesia at 72th position out of 77 countries, way lower than its neighboring countries such as Malaysia and Brunei Darussalam which were ranked 48th and 50th respectively. This PISA ranking could be interpreted that Indonesian students' academic achievement was relatively low than other countries in the world.

A country's high or low academic achievement was significantly influenced by many factors, including e-learning service quality (Kasmin & Hii, 2017). E-learning service quality is the thorough evaluation of the strength and quality of e-learning service experienced by students (Santos & Santos, 2003). Students receiving good e-learning service quality would think that their need to the university is prioritized and fulfilled. This creates students' perception that the university actually gives their full support to students in their attempt to be high academic achievers. However, an unexpected result comes from the adoption of e-learning into teaching and learning environment on academic achievement, in which contradiction emerges between them. Some studies showed positive relationship between e-learning and academic success, for example, e-learning increased academic performance (López-Pérez et al., 2011; Roffe, 2002) and reflective and critical thinking (Saadé et al., 2012), e-learning had a positive impact in reducing school dropout rate (López-Pérez et al., 2011), and e-learning improve student satisfaction with their learning experience (Lyons & Evans, 2013). On the other hand, some studies also revealed the negative relationship between satisfaction with learning courses and academic achievement (Levy, 2007) and the negative relationship between technology use and academic achievement (Hunley et al, 2005). Such contradiction was due to the level of e-learning service quality, engagement, and other characteristics such as attitude, motivation, and self-confidence in using e-learning technology which were varied among students.

Academic achievement is also influenced by academic engagement (Assunção et al., 2020; Kim et al., 2019; Lin & Huang, 2018; Miralles-armenteros et al., 2019; Navarro et al., 2018; Sinval et al., 2018). Academic engagement is defined by Fredricks et al., (2004) as the students' psychological and behavioral attempts in learning which include mastery of skills and knowledge in academic activities. Students with high academic engagement will think that they are accepted and appreciated in their learning activities and this, in turn, can trigger serious attempts to get a high academic achievement.

The last factor which influences academic achievement is student satisfaction (Pham et al., 2018). Student satisfaction is a short-time attitude in the form of a student's happy or disappointed feeling as a result of evaluating their educational experience in the university which takes the form of comparison between their expectation and the performance/results they receive (Shahsavari & Sudzina, 2017). Students with high satisfaction level in the university will devote everything they have to try their best in their learning activities, resulting in an improved academic achievement.

This research tried to place student satisfaction as an intervening variable, because indirectly student satisfaction can strengthen the relationship between e-learning service quality and academic engagement on academic achievement (Al-Fraihat et al., 2020; Zhao et al., 2019 ; Al-rahmi et al., 2018; Eom & Ashill, 2018; Mtebe & Raphael, 2018; Pham et al., 2018, 2019; Shahsavari & Sudzina, 2017; Tossy, 2017). It is therefore important to conduct a study on various factors which influence students' academic achievement, considering that academic achievement, in addition to its importance for individual achievement assessment, is highly essential to appraise a country's prosperity. For this reason, this research focused on discovering how e-learning service quality and academic engagement influenced student satisfaction and its impact on academic achievement in accounting students.

## LITERATURE REVIEW AND HYPOTHESES

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### Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) is a theory which studies the behavior of an individual's acceptance in accepting an information system (F D Davis, 1985). A good technology system should meet two main requirements, namely usefulness and ease of use. Individuals are more likely to accept an information/technology system when the technology can make their jobs easier and is easy to use without having to read a lengthy and complicated manual. This TAM theory itself was suggested for the first time by Davis (1985). TAM is the application and development of Theory of Reasoned Action (TRA) specifically made for modelling the acceptance of use of information system. Therefore, TAM becomes a model construct developed to analyze and understand the factors which influence the acceptance of information technology use. In its development, TAM has undergone some changes, namely TAM2 (Venkatesh & Davis, 2000) and UTUT (Dillon, 2006). In general, TAM has 2 goals, namely: (1) to explain the determinant factors of acceptance of information-based

technology in general, and (2) to explain the information technology final user's behavior. Acceptance Model (TAM) is a theory that studies an individual's acceptance behavior in receiving an information system (F D Davis, 1985).

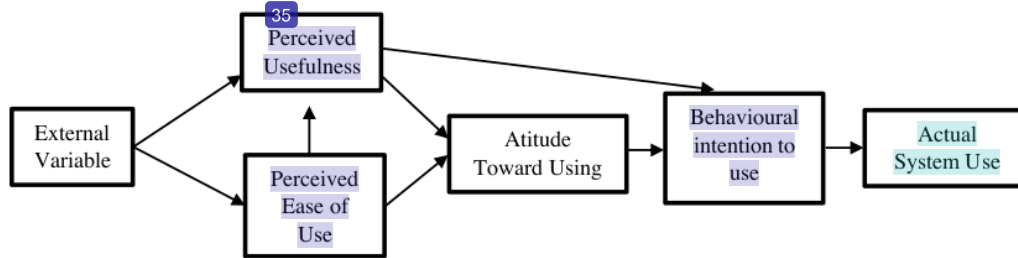


Figure 1. Technology Acceptance Model (TAM)  
(Source: Fred D. Davis et al., 1989)

External variables are the ones of external nature in considering to use technology, such as subjective norm, computer self-efficacy, and facilitating conditions (Scherer et al., 2019). These variables then influence an individual's cognitive responses consisting of 2 elements, namely perceived usefulness and perceived ease of use. Perceived usefulness refers to the perception of whether using the technology benefit their life or not and perceived ease of use describes the ease of using the technology without having to carefully read the technical manual. In practice, perceived ease of use might influence perceived usefulness, the reason being an easy-to-use technology will make an individual thinks that the technology will benefit their life. Furthermore, the two cognitive responses significantly influence people's affect response in the form of attitude toward using which can be either positive or negative attitude. Positive attitude directs an individual to decide to use a technology and the negative attitude was the opposite. Moreover, from a person's affect response, behavioural response emerges in the form of actual system use, i.e. the realization of actual technology use. Thus, it can be concluded that an easy-to-use technology with some usefulness for life will direct the users to decide to use the technology in a long run.

### E-learning Service Quality

Beqiri et al., (2009) defines e-learning as the use of modern information and communication technology (ICT) and computer which are connected to the internet to provide teaching and learning contents. E-learning is an innovative approach in delivering educational services in the form of electronic information which can enhance knowledge, skills, and other outputs of students (Fazlollahabbar & Muhammadzadeh, 2012). Meanwhile, Lewis and Booms (1983) defines service quality as a measurement of how good a service is given based on customer's expectation. Service quality is the result of evaluation process, where customers compare their expectation and the services they receive (Loring, 2007). Thus, e-learning service quality can be defined as a thorough evaluation of the strengths and quality of e-learning service thought by students (Santos & Santos, 2003). E-learning service quality is the measurement of how good was the provided e-learning service based on students' expectation. The higher the quality of e-learning service provided to students, the higher the fulfillment of student needs, and in turn it could be said that students were satisfied with the e-learning service.

In this research, the term e-learning referred to the use of any kind of teaching and learning media used by lecturers when they gave assignments or delivered lectures with no classroom face-to-face meeting, for example using edmodo, google class, google form questions, blogspot, wordpress, etc. The use of e-learning for accounting students had not been completely thoroughly integrated only some lecturers had applied the blended learning model in their classes. Thus, the e-learning in this research was independent from the e-learning model managed by the university.

The dimension of e-learning service quality as developed by Pham et al., (2019) consisted of 3 dimensions, namely e-learning system quality, e-learning instructor and course material quality, and

e-learning administrative and support service quality. These dimensions were adopted from some other researchers such as: (1) Han & Baek (2004) which included 4 aspects, i.e. tangibles, reliability, responsiveness, and empathy; (2) Yang et al., (2004) which consisted of 2 aspects, namely ease of use and accuracy; and (3) DeLone & McLean (2003) which comprised of 2 aspects, namely content and timeliness.

### Academic Engagement

Various definitions on engagement have been proposed by experts, including Skinner et al., (2009) who define engagement as the quality of student's participation in school activities, values, and goals. Student engagement is students' commitment to study and participate in educational environment to achieve their desired results (Christenson, 2008). School engagement is student's involvement in both academic and non-academic activities which could be observed through their behavior, emotion, and cognitive aspects, be it at school in general and in the classroom (Fredricks et al., 2004). Furthermore, Henrie et al., (2015) suggest that academic engagement is the commitment or attempt to get involved in the context of academic learning at schools.

From the various definitions of engagement above, it can be understood that academic engagement is students' active participation in academic activities to achieve the expected outcomes. A high academic engagement represents students' effort seriousness to achieve a satisfying final result. The dimensions of academic engagement are adopted from Brown et al., (2017) which consist of 4 dimensions, namely: (1) skills: students' engagement through practical skills; (2) emotional: students' emotional engagement with classroom materials; (3) participation/interaction: students' engagement through their participation in classroom and interaction with lecturers and other students; and (4) performance: students' engagement through performance level in classroom.

### Student Satisfaction

Satisfaction is defined by Bolton & Drew (1991) as an evaluation of a certain service. Satisfaction can be measured as a thorough feeling or satisfaction of transaction elements (Fornell, 1992). In the context of higher education, students are deemed as main customers (Sultan & Wong, 2013), hence student satisfaction can be defined as a short-term attitude in the form of happy or disappointed feeling as a result of their experience with the educational services they receive (Elliott, K.M. & Healy, 2001). Student satisfaction is the happy or disappointed feeling within students emerging after comparing the services they receive and what they expect. The higher the quality of service received by students, the more likely for them to be satisfied with the university.

S. J. Lee et al., (2011) develop 5 indicators to measure student satisfaction, namely (1) goal achievement: an evaluation of the learning activities done against the initially set learning goals; (2) interest in learning subjects: the desire to learn the learning objects seriously; (3) level of interest: liking/disliking classroom teaching model; (4) level of convenience: being convenient/inconvenient in attending classes; and (5) level of willingness to recommend: how enthusiastic they are to recommend other students regarding the classroom teaching model they have attended.

### Academic achievement

Tian & Sun (2018) define academic achievement as the level of development achieved by students through learning within a certain period of time under teachers' guidance and based on their previous experiences in such aspects: knowledge, skills, attitude, and values. Furthermore, Steinmayr et al (2014) suggests that academic achievement is the result of performance which indicates to what extent an individual has achieved the specific goals on which the activities in the teaching environment are focused, particularly at schools, academies, and universities. Most school systems define academic achievement as the achievement of cognitive goals in various courses such as having critical thinking or having knowledge and understanding in intellectual fields such as sciences, history, and so on. From these various definitions, it can be concluded that academic achievement is the accumulation of final scores of each course obtained by students at each end of semesters or end of study time.

The indicators of academic achievement reached by a student can be seen from their GPA (Grade Point Average). As stated by Moore & Shulock (2009), GPA is one of the best predictors of higher educational institution's success in academic activities since it indicates students' performance

during their study in the university. GPA consists of final score accumulation for each course, and the final score is obtained from attendance, assignment, final examination, and mid-term examination scores. Thus, it can be concluded that GPA is actually the right indicator to reflect students' academic achievement in their classes.

### Direct Influence of E-learning Service Quality on Student Satisfaction

E-learning service quality is a thorough evaluation of the strengths and quality of learning service experienced by students (Santos & Santos, 2003). The term service quality includes e-learning system quality, e-learning instructor and course materials quality, and e-learning administrative and support service quality. E-learning service quality serves as one of the factors which may influence student satisfaction (Mtebe & Raphael, 2018; Zhao et al., 2019). As suggested by Dehghan et al., (2014), student satisfaction occurs when they successfully achieve their goals. In particular, students will be satisfied when their educational service experience is greater than their expectation, and vice versa students will not be satisfied when their educational service is worse than their expectation (Abdel-Jaber, 2017). Hence, a good e-learning service quality level can significantly increase student satisfaction.

The correlation between e-learning service quality and student satisfaction has been widely studied by previous researchers. One of them was conducted by Al-Fraihat et al., (2020) which indicated that there was a positive correlation between e-learning service quality and perception of satisfaction. Pham et al., (2019) findings indicated that the attributes in e-learning service quality such as course design, interaction between student and instructors, interaction between student and student, technology-related, and support and administrative service collectively influenced student satisfaction.

It can be inferred that the better the e-learning service quality the more likely for student satisfaction to increase significantly. This is because high e-learning service quality can make students comfortable in learning courses and thus it can lead to student satisfaction. From this elucidation, it can be concluded that e-learning service quality has a direct influence on student satisfaction, therefore the following hypothesis can be drawn:

H<sub>1</sub> : There is a direct influence of e-learning service quality on student satisfaction

### Direct Influence of Academic Engagement on Student Satisfaction

Academic engagement is the time and effort spent by students to participate in teaching and learning activities both in or outside the classroom (Kuh, 2003). The theoretical framework of student engagement was first developed by Alexander Astin (1984) who explained that students changed and developed as a result of their participation in teaching and learning activities. Students with a high participation had better intellectual and social integration with the university than students with low engagement (Loya, 2014). In particular, participation is generally associated with positive outcomes in students, such as better academic achievement and increased student satisfaction. This is supported by Webber et al., (2013) who suggest that higher level of participation with lecturers, campus employees, and other students collectively give a contribution not only to students' higher GPA scores, but also to their satisfaction with all academic experiences.

The association between academic engagement and student satisfaction has been massively studied previous researchers. One of them was conducted by Assunção et al., (2020) to 3.992 students from Europe, North and South America, Africa, and Asia. Their research result indicated that academic engagement had a positive influence on student satisfaction. Furthermore, research by Navarro et al., (2018) to 1435 engineering students in 11 universities in Latin America found that academic engagement had a positive and significant influence on student satisfaction. This was also supported by Cheong & Ong (2016) who stated that "in particular, engagement is generally associated with positive result in students such as better academic achievement, retention, and satisfaction with the institution". From this, it can be seen that academic engagement has a positive influence on student satisfaction (Webber et al., 2013)

Based on the explanation of theory and previous studies above, it could be said that the higher the academic engagement of students, the more likely for students to feel more satisfied. This is because high academic engagement makes students think that they are welcome, supported and

involved in campus activities, hence it nourishes their sense of belonging to the university and in turn this leads to high student satisfaction. From the explanation, it could be concluded that academic engagement has a direct influence on student satisfaction, therefore the following hypothesis can be proposed:

H<sub>2</sub> : There is a direct influence of academic engagement on student satisfaction

#### Direct influence of student satisfaction on academic achievement

The research conducted by Tossy (2017) at Tanzania University found the fact that student satisfaction on e-learning system had a positive association with student achievement. Students with high satisfaction level with the university's services were more likely to have high achievement. As suggested by Martínez-Argüelles & Batalla-Busquet (2016), the provision of good university service quality could increase student satisfaction and eventually this led to student loyalty. Loyal students had extremely high commitment to contribute to the development of university in general and their education program in particular (Pham et al., 2018). Students' specific contribution to the university could be in the form of increased student achievement during their study.

Based on the explanation above, it could be said that the higher the student satisfaction, the more likely for students to obtain higher academic achievement. Students with high satisfaction with the university will be loyal to the university. This loyal attitude of the students will lead to improved academic achievement. From this explanation, it could be concluded that student satisfaction has a direct influence on academic achievement, thus the following hypothesis could be drawn:

H<sub>3</sub> : There is a direct influence of student satisfaction on academic achievement

#### Indirect influence of e-learning service quality on academic achievement through student satisfaction as an intervening variable

In the current e-learning environment, students are deemed as customers and student satisfaction is always one of university's most important goals (J. W. Lee, 2010). To obtain student satisfaction, universities should first understand quality attributes of e-learning services experienced by students, and then the actions needed to be implemented to improve the quality of e-learning service in general, aiming to realize e-learning student satisfaction. Many attributes form e-learning service quality in previous studies. These attributes include *course design* (Kuo et al., 2014; Moore & Shick, 2009); *interactions between students and instructors* (Billiger, D. U & Martindale, 2004; S. J. Lee et al., 2011; Paechter et al., 2010); *interactions between students and students* (Broadbent & Poon, 2015; Paechter et al., 2010); *technology-related* (Masrom et al., 2008; Pituch & Lee, 2006; Selim, 2007), and *support & administrative services* (Jesús Martínez-Argüelles et al., 2013; Levy, 2007). Each attribute of service quality gives different contribution to overall e-learning service quality, and in turn, the overall e-learning service quality influences e-learning student satisfaction.

As found by the previous research conducted by Tossy (2017) to students at Tanzania University, student satisfaction on e-learning system had a positive relationship with academic achievement. Students with high satisfaction level with the university's service were more likely to have high achievement. From the explanation above, it could be concluded that e-learning service quality has an indirect influence on academic achievement through student satisfaction as an intervening variable. Therefore, the following research hypothesis is proposed:

H<sub>4</sub>: There is an indirect influence of e-learning service quality on academic achievement through student satisfaction as an intervening variable

#### Indirect influence of academic engagement on academic achievement through student satisfaction as an intervening variable

Researchers have found that student engagement could be a strong predictor for student achievement and behavior at school, regardless their socio-economic status (Arhar & Kromm, 1993; Mounts & Steinberg, 1995; Voelkl, 1995). Students with high engagement level at schools are more likely to obtain higher scores (Goodenow, 1993) and test scores (Roderick & Engel, 2001) and have lower dropout rate (Klem & Connell, 2004). On the contrary, students with low engagement level have a risk to be exposed to various long-term bad consequences, including disturbing behavior in classroom, absenteeism, and dropout (V. E. Lee, 1995).

Based on the explanation above, it is safe to say that the higher the academic engagement which is supported by student satisfaction, the more likely for students to get high academic achievement. High academic engagement refers to the time and energy spent by students in learning activities. When students have high engagement, they will have a sense of belonging to the university. High engagement leads to student satisfaction and eventually it improves academic achievement. From this, it can be concluded that academic engagement has an indirect influence on academic achievement through student satisfaction as an intervening variable. Thus, the following research hypothesis is proposed:

H<sub>5</sub>: There is an indirect influence of academic engagement on academic achievement through student satisfaction as an intervening variable

## METHODS

This is explanatory research. The sample in this research was 222 accounting students taken using purposive sampling technique with a criterion of having ever taken a course which used e-learning in its learning activities. Academic achievement was taken from the questionnaire responses related to student's score in the form of latest GPA for 2019/2020 academic year in students used as the research sample. E-learning service quality was measured using the indicators adopted from Pham et al., (2019) consisting of 3 dimensions, namely: *e-learning system quality*, *e-learning instructor and course material quality*, and *e-learning administrative and support service quality*. Academic engagement was measured using the indicators adopted from Brown et al., (2017) consisting of 4 dimensions, namely: *skills*, *emotional*, *participation/interaction*, and *performance*. Student satisfaction was measured using the indicators adopted from S. J. Lee et al., (2011) consisting of 5 indicators, namely: interest in learning subjects, goal achievement, interest level, convenience level, level of willingness to recommend. Therefore, the flow chart of this research could be drawn as follows:

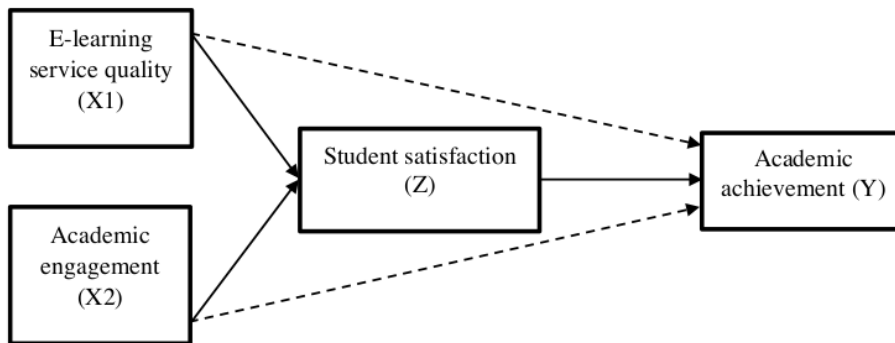


Figure 2. Research Flow Chart

## RESULTS

### Respondent profile

The profile of respondents could be classified by class of year and the type of e-learning used. The class of year consisted of 2, namely classes of 2017 and 2018. As could be seen in the following table, based on their class of year, the respondents were dominated by class of 2017, i.e. 129 students or 58.25% and the class of 2018 had 93 students or 41.89%. The profile of respondents by class of year could be seen in the table below:

Table 1. Class of Year of Respondents

Class of Year	Frequency	Percentage
2017	129	58.11%
2018	93	41.89%

Total	222	100.00%
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79 Furthermore, based on the type of e-learning used, respondents used 3 types of e-learning, namely *edmodo*, *sipejar*, and *google class*. As could be seen in the table below, based on the type of e-learning the respondents dominantly used *edmodo* amounting to 151 students or 68.02%, 46 students or 20.72% used *sipejar*, and 25 students or 11.26% used *google class*. The profile of respondents by type of e-learning could be seen in the table below:

**Table 2. Type of E-learning of Responden**

Type of e-learning	Frequency	Percentage
<i>Edmodo</i>	151	68.02%
<i>Sipejar</i>	46	20.72%
<i>Google Class</i>	25	11.26%
Total	222	100.00%

**Sub-structure 1 test**

56 This sub-structure 1 test was used to test the influence of e-learning service quality and academic engagement on student satisfaction. The result of sub-structure 1 simultaneous regression analysis test was shown in the following table:

**Table 3. Result of Sub-Structure 1 Simultaneous Regression Analysis Test**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	121.255	2	60.627	43.090	.000 <sup>b</sup>
	Residual	308.133	219	1.407		
	Total	429.387	221			

5 Based on the table above, it was found that the value of sig 0.000 < 0.05, thus according to the basis of decision making in F test, it could be concluded that the estimated model was worth using to explain the influence of e-learning service quality and academic engagement on student satisfaction. 27

**Table 4. Result of Sub-Structure 1 Variable Regression Coefficient**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.171	1.406		-.121	.904
	E-learning service quality (X1)	.188	.034	.351	5.613	.000
	Academic Engagement (X2)	.109	.024	.281	4.496	.000

65 From the table above, it could be explained that each association between e-learning service quality on student satisfaction and academic engagement on student satisfaction was significant since it had a significance value < 0.05.

**Sub-structure 2 test**

1 Sub-structure 2 test was used to test the influence of e-learning service quality, academic engagement and student satisfaction on academic achievement. The result of sub-structure 2 simultaneous regression analysis test was shown in the following table:

**Table 5. Result of Sub-Structure 2 Simultaneous Regression Analysis Test**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.162	3	1.387	73.854	.000 <sup>b</sup>
	Residual	4.095	218	.019		
	Total	8.258	221			

Based on the table above, it was found that the value of sig 0.000 < 0.05, thus based on the basis of decision making in F test, it could be concluded that the estimated model was worth using to explain the influence of e-learning service quality, academic engagement and student satisfaction on academic achievement.

**Table 6. Result of Sub-Structure 2 Variable Regression Coefficient**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.392	.162		8.569	.000
E-learning service quality (X1)	.008	.004	.113	2.025	.044
Academic Engagement (X2)	.028	.003	.520	9.548	.000
Student satisfaction (Z)	.031	.008	.225	3.991	.000

From the table above, it could be explained that the e-learning service quality, academic engagement, and student satisfaction variables had a positive and significant influence on academic achievement since their significance value < 0.05.

**Summary of Path Analysis Result**

Based on the sub-structure 1 and 2 tests, the summary of path analysis result could be written as follows:

**Table 7. Summary of Path Analysis Result**

No	Path Description	Path Coefficient	Influence	
			Direct	Indirect through Z
1	X <sub>1</sub> on Z	0.351	-	-
2	X <sub>2</sub> on Z	0.281	-	-
3	Z on Y	0.225	-	-
4	X <sub>1</sub> on Y	0.192	0.113	0.079
5	X <sub>2</sub> on Y	0.583	0.520	0.063

From the table above, it could be seen that student satisfaction could mediate the association between e-learning service quality and academic engagement on academic achievement, this could be seen from the extent of indirect influence at 0.079 and 0.063. The indirect influence of e-learning service quality on academic achievement through student satisfaction was 0.079, which was obtained from multiplying the beta coefficient of e-learning service quality on student satisfaction with the beta coefficient of student satisfaction on academic achievement, i.e. 0.351 x 0.225 = 0.079. Meanwhile, the indirect influence of academic engagement on academic achievement through student satisfaction was 0.063, which was obtained from multiplying the beta coefficient of academic engagement on student satisfaction with the beta coefficient of student satisfaction on academic achievement, i.e. 0.281 x 0.225 = 0.063.

**DISCUSSION**

**Direct influence of e-learning service quality on student satisfaction**

The research result indicated that there was a positive and significant influence between e-learning service quality on student satisfaction. This meant that when the e-learning service quality increased, student satisfaction would also increase. As suggested by Dehghan et al., (2014), student satisfaction occurred when they successfully achieved their goals. In particular, students would be satisfied when they had greater educational service experience than their expectation and, vice versa, students would not be satisfied when they had less educational service experience than their expectation (Abdel-Jaber, 2017). Thus, a good e-learning service quality level could significantly improve student satisfaction.

Based on Technology Acceptance Model (TAM) theory, e-learning was deemed as a technology innovation accepted by users (students and lecturers) since it met 2 cognitive response elements in TAM, namely *perceived usefulness* and *perceived ease of use* which led users to the final stage of TAM, namely *actual system use*. The e-learning used by most accounting department students of 2017 and 2018 classes was *Edmodo* and *Google Classroom*. Judging from the result of descriptive statistic analysis, it was indicated that 59.46% of students thought that the e-learning service quality was high. Meanwhile, student satisfaction was 54.96% and this was classified as high. From the three indicators in e-learning service quality attributes, the *e-learning system quality* indicator played the most important role in evaluating e-learning service quality, i.e. showing a percentage of 36.44%, then the *e-learning administrative and support service quality* indicator at 32.91%, and the *e-learning instructor and course material quality* indicator playing the lowest role at 32.45%. From this result, it could be said that the appearance of e-learning and information in e-learning played an important role in research on e-learning service quality in accounting students.

Students receiving good e-learning service quality thought that their need to the university was prioritized and fulfilled. This made the student satisfaction increase as well. This research result confirmed the research conducted by Al-Fraihat et al., (2020) who found that there was a positive association between e-learning service quality and *perception of satisfaction*. It was also supported by Pham et al., (2018, 2019) findings, i.e. that the attributes in e-learning service quality such as *course design, interaction between student and instructors, interaction between student and student, technology-related, and support and administrative service* as a whole had a positive and significant effect on student satisfaction.

#### Direct influence of academic engagement on student satisfaction

The research result indicated that there was a positive and significant influence of academic engagement on student satisfaction. This was in line with Loya (2014) who suggested that students with high participation had better intellectual and social integration with the university as compared to those students with low engagement. In particular, participation was generally associated with positive result in students, such as better academic achievement and improved student satisfaction. This was supported by Webber et al., (2013) who suggested that higher participation level with lecturers, campus employees, and other students collectively contributed not only to higher GPA score, but also to their improved satisfaction on all academic experiences.

The theoretical framework of academic engagement was firstly developed by Alexander Astin's (1984) who stated that students changed and developed as a result of their participation in learning activities. Furthermore, Brown et al., (2017) developed the component/dimensions of academic engagement which consisted of 4 dimensions, namely *skills, emotional, participation/interaction, and performance*. Judging from the descriptive statistic analysis result, it was indicated that 39.19% of students had relatively high academic engagement. Meanwhile, student satisfaction was 54.96% and this was high. From the four indicators in *academic engagement*, the *skills* indicator played the most important role in *academic engagement* assessment, i.e. showing a percentage of 25.66%, then *emotional* indicator at 25.18%, *participation/interaction* indicator at 24.94%, and *performance* indicator at 24.22%. From this result, it could be said that attendance in classroom teaching and learning, teaching and learning preparation, and attitude in classroom played important roles in *academic engagement* assessment in accounting students.

Students with high academic engagement led to high student satisfaction. This was because high academic engagement made students think that they were welcome, supported and involved in campus activities and this gave birth to their sense of belonging to the university and eventually it led to improved student satisfaction. This research result confirmed the result of research conducted Assunção et al., (2020) dan Navarro et al., (2018) which found that *academic engagement* had a positive influence on student satisfaction. This was also supported by Cheong & Ong (2016) who suggested "In particular, engagement is generally associated with positive student outcomes such as better academic achievements, retention, and satisfaction with the institution". From this, it could be seen that *academic engagement* had a positive influence on student satisfaction (Webber et al., 2013).

#### Direct influence of student satisfaction on academic achievement

The research result indicated that there was positive and significant influence of student satisfaction on academic achievement. Student satisfaction was defined as a short-term attitude in the form of happy or disappointed feeling as a result of their experience with the educational service received (Elliott, K.M. & Healy, 2001). Some factors which might influence student satisfaction as suggested by Appleton-Knapp & Krentler (2006) were *institutional* and *personal factors*. The *institutional factors* included teaching quality, quality and timeliness of lecturer's feedback, lecturer's teaching style, and class size (Porter & Umbach, 2001). The *personal factors* included age, sex, occupation, temperament, preferred learning style and grade point average (GPA).

The theoretical framework of student satisfaction suggested that students with high satisfaction level with university's service were more likely to have high achievement. High satisfaction with the university would make students loyal on university. Students' loyal attitude would lead to improved academic achievement. This research result confirmed Tossy (2017) who found the fact that student satisfaction on *e-learning system* had a positive relationship with *student achievement*. This was also supported by Martínez-Argüelles & Batalla-Busquet (2016) who stated that providing good university's service quality could improve student satisfaction and eventually it led to *student loyalty*. Students who were loyal had extremely high commitment to contribute to the development of university in general and their education program in particular (Pham et al., 2018). Students' specific contribution on university could take the form of improved *student achievement* during their study.

#### **Indirect influence of e-learning service quality on academic achievement through student satisfaction as an intervening variable**

The research result indicated that there was an indirect influence of *e-learning service* on academic achievement through student satisfaction. Student satisfaction in this research was used as an intervening variable or the variable which mediated the association between *e-learning service quality* and academic achievement. Based on the discussion in hypothesis 1, it could be seen that *e-learning service quality* had a positive influence on student satisfaction, meaning that the higher the *e-learning service quality* the more likely for student satisfaction to increase. Also, based on the discussion in hypothesis 3, i.e. the influence of student satisfaction on academic achievement, it was found that there was a positive influence of student satisfaction on academic achievement. The existence of student satisfaction variable in this interaction served as a mediation or intermediary between *e-learning service quality* and academic achievement in accounting students.

This research also supported the result of previous research conducted by Tossy (2017) in students at Tanzania University who stated that student satisfaction on *e-learning system* had a positive association with academic achievement. Students with high satisfaction level on university's service were more likely to have high achievement.

#### **Indirect influence of academic engagement on academic achievement through student satisfaction as an intervening variable**

The research result indicated that there was an indirect influence of *academic engagement* on academic achievement through student satisfaction. Student satisfaction in this research was used as an intervening variable the variable which mediated the association between *academic engagement* and academic achievement. Based on the discussion in hypothesis 2, it was found that *academic engagement* had a positive influence on student satisfaction, meaning that the higher the *academic engagement* the more likely for student satisfaction to increase. Also, based on the discussion in hypothesis 3, i.e. the influence of student satisfaction on academic achievement, it was found that there was a positive influence of student satisfaction on academic achievement. The presence of student satisfaction variable in this interaction served the mediation purpose or as an intermediary between *academic engagement* and academic achievement in accounting students.

This research also supported the result of previous research which found that *academic engagement* could be a strong predictor on *achievement* and student's behavior at schools, regardless their socio-economic status (Arhar & Kroger, 1993; Mounts & Steinberg, 1995; Voelkl, 1995). Students' with high *engagement* at schools were more likely to get higher scores (Goodenow, 1993) and test scores (Roderick & Engel, 2001), and they had lower dropout rate (Klem & Connolly, 2004). On the contrary, students with lower engagement level had greater risks of catching bad long-term

consequences, including disturbing behavior in the classroom, absenteeism, and dropout (V. E. Lee, 1995).

## CONCLUSION

Based on the research result and discussion given, it could be concluded that there is a direct and significant influence of e-learning service quality and academic engagement on student satisfaction and there was a direct positive and significant influence of student satisfaction on academic achievement of accounting department students. The research result indicated that when the e-learning service quality was good and it was equipped with similarly good academic engagement, student satisfaction was more likely to be good, hence at the end of the day it would have a good impact on academic achievement. This research also successfully gave an empirical evidence of indirect influence of e-learning service quality on academic achievement through student satisfaction of accounting department students. Thus, in order to increase students' academic achievement, university could improve their e-learning service quality, since high e-learning service quality could increase student satisfaction which would result in a maximum academic achievement. The research result also found that academic engagement had an indirect influence on academic achievement through student satisfaction, thus in order to increase students' academic achievement, campuses could increase their academic engagement, since high academic engagement could improve student satisfaction and this would result in a maximum academic achievement. Meanwhile, the limitation of this research was that the measurement of academic achievement was from students' GPA where GPA constituted students' learning outcome in general which did not come just from the e-learning service quality and academic engagement. Future research is expected to use another measurement of academic achievement.

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