Journal of Contemporary Research in Social Sciences
ISSN: 2641-0249
Vol. 7, No. 2, 67-78
2025
Publisher: Learning Gate
DOI: 10.55214/26410249.v7i2.8510

Driving student retention in digital learning: The mediation pathways of motivation, engagement, and satisfaction

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Abstract: Student retention becomes a problem in many distance education practices around the world since the dropout rate in online learning is higher compared to face-to-face learning. A high dropout rate is often associated with a low quality of learning and will affect the reputation of the institution. Various factors have been associated as the drivers of student retention, including student satisfaction, motivation, and engagement in online learning. Universitas Terbuka (UT) provides distance education that also needs to evaluate the implementation of online learning to maintain its student persistence. To obtain a better understanding of student retention associated with student motivation, engagement, and satisfaction, this research was developed by combining quantitative and qualitative approaches. The first stage was to conduct quantitative research by developing a research model considering previous studies and using four variables: motivation, engagement, satisfaction, and student retention. Data collection was carried out using a questionnaire to assess student perceptions of those variables. The questionnaire was developed based on the four variables in the model utilizing a 5-point Likert scale. Three hypotheses were proposed based on research models and tested using Structural Equation Modeling (SEM). The data collection process managed to collect 616 valid data points using a purposive sampling method. The results verified that all hypotheses were supported except the effect of satisfaction on retention. Given this result, it is crucial to explore further because it was found that satisfaction has no effect on retention, which is contrary to previous research. Therefore, qualitative research was carried out using Interpretive Structural Modeling (ISM) to explore this phenomenon in depth. The ISM results show that time management to study is the biggest obstacle for students to register for the next semester, followed by other obstacles. In the discussion section, managerial implications will be proposed to make a positive contribution to open and distance learning practice.

Keywords: *Distance education, Engagement, Motivation, Online learning, Student retention, Student satisfaction.*

1. Introduction

Student retention in distance education is a topic that still attracts the attention of scholars associated with various determinants (Alberti & da Silva Pereira, 2018; Bağrıacık Yılmaz & Karataş, 2022; Cinches, Chavez, Russell, & Polancos, 2022; Davidesco, Glaser, Stevenson, & Dagan, 2023). Online learning gained popularity as a mode of distance education in various parts of the world in recent years when the Covid-19 Pandemic occurred, coupled with technological developments. The advantages of distance education are mainly on the flexibility of learning to accommodate busyness and time constraints as well as its ability to accommodate students who are in different geographical area that have difficulties to attend face-to-face learning (Salimi & Kornelus, 2018). However, despite the popularity of distance learning, there are problems faced by various distance education institutions in various parts of the world, most of them is experiencing low student retention rates in online learning environments (Bawa, 2016; Elibol & Bozkurt, 2023). Research shows that the retention rates of students who study in an online environment are lower than those of students who attend face-to-face learning.

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Low student retention rates are a major problem for most distance education institutions which can have a negative impact on the university reputation.

This fact prompted academics to uncover which factors can increase student retention in online environment, and student satisfaction was found as the main factors determining the level of student retention. Ong (2023) found that satisfaction is one of the determining factors for student retention as indicated by loyalty to continue education within the framework of the self-determination theory and theory of planned behavior. Student satisfaction in learning shows the quality of the learning process and academic performance. When students reach satisfaction in learning, especially in an online environment, they will tend to continue and complete their studies (Bayrak, Tıbı, & Altun, 2020) that will lead to increase student retention that serve as a major problem in distance education institutions. Therefore, an understanding of the factors that influence student satisfaction in online learning will promote improvements in the implementation of online learning to gain a positive image of universities.

More attention has been paid to some variables that will have a positive effect on student satisfaction. Several variables have been validated as drivers of student satisfaction in online learning, among them are motivation (Hartnett, 2016; Raime, Shamsudin, Hashim, & Rahman, 2020) and engagement (Gray & DiLoreto, 2016; Muzammıl, Sutawıjaya, & Harsası, 2020). Student engagement becomes important in online learning environment which is shown through cognitive development and students' abilities to construct knowledge that can increase their learning success (Banna, Lin, Stewart, & Fialkowski, 2015). However, the facts show that in online environment, students have limited opportunities to be engaged with online learning organizers which is a separate problem for increasing student satisfaction and retention rates. On the other hand, motivation also has a positive influence on student engagement which affects retention rates. There has been a great deal of research on student motivation in distance education due to its necessity to initiate learning and to adapt behaviors needed to achieve learning goals (Xiong et al., 2015).

Efforts to increase student retention are a challenge for open and distance learning (ODL) institutions as they are associated with a large number of students. However, one of the objectives of the ODL institution is the ability to reach large numbers of students through a distance learning system that has the advantage of outreach beyond face-to-face learning. Therefore, ODL institutions, including Universitas Terbuka (UT), must be able to guarantee the quality of learning to obtain quality graduates as well. Recognizing the importance of student retention in the context of ODL, it is reasonable to explore how to increase student retention in terms of satisfaction, engagement, and motivation, including promoting policy directions for increasing student retention. Therefore, this study has two main objectives: (1) to analyze the effect of motivation on retention through engagement and satisfaction; and (2) provide policy directions for increasing student retention.

2. Related Literature and Conceptual Framework

A high student retention rate will show student satisfaction during learning process. Many ODL institutions focus on retention rates as a measure of student satisfaction as well as showing the institution's reputation. Measuring student satisfaction is important as a form of evaluating the learning process, especially in an online learning environment. Student satisfaction is students' subjective perceptions of how well a learning environment supports academic success (Lo, 2010). Garratt-Reed, Roberts, and Heritage (2016) believe that student satisfaction is an important predictor because it positively predicts student retention and is associated with learning outcomes. Students who are satisfied with their learning experience will determine their decision to enroll in the next online courses. Thus, understanding which factors will have positive influence on student satisfaction can help improve online courses (Kurucay & Inan, 2017). In this case, the active role of faculty members is required to be involved in designing, developing, and delivering online courses to find out student perceptions on their successful learning experiences (Bayrak et al., 2020). Strong student satisfaction implies that precisely challenging instructional methods are serving to trigger students' thinking and learning.

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Another predictor of student satisfaction that many scholars have agreed on is engagement. Dixson (2015) states that learner engagement refers to the effort made by learner to promote his or her psychological commitment to stay engaged in the learning process, to acquire knowledge and build his or her critical thinking. Briggs (2015) also defines student engagement as the level of interest demonstrated by students, how they interact with others in the course, and their motivation to learn about the topics. Students with high engagement may not be aware of investing effort in a course until completing a self-assessment on their learning. Universities have the opportunity to encourage the development of students' metacognitive thinking through self-assessments of their own performance so it will lead to student retention (Mahlberg, 2015).

Skinner, Kindermann, and Furrer (2009) considers student engagement to be an outcome of a motivational process that Eom and Ashill (2016) strengthening this idea due the findings that motivation will accumulate in learning process to develop student perceived learning to reach student success and satisfaction (Eom & Ashill, 2016). Robbins and Judge (2017) have explained the definition of motivation as a process that describes intensity, direction, and persistence of an individual to achieve a particular goal. Motivation encourages students' perceptions of their abilities in completing the learning process through their engagement to the course. Additionally, without engagement, no psychological course is effective in relation to learning and development. A highly motivated student will not necessarily encounter difficulties as they are actively involved in learning. Dogan (2015) explained the correlation between academic motivation and student engagement; academic motivation is a perception of regulation that positively or negatively affects a person's behaviors. Thus, academic motivation will lead to student engagement and establish satisfaction and retention.

Considering research gaps, research problems, and the interrelationships of important variables (motivation, engagement, satisfaction and retention) in the context of online learning, particularly at UT, this study develops a research framework as illustrated in Figure 1.

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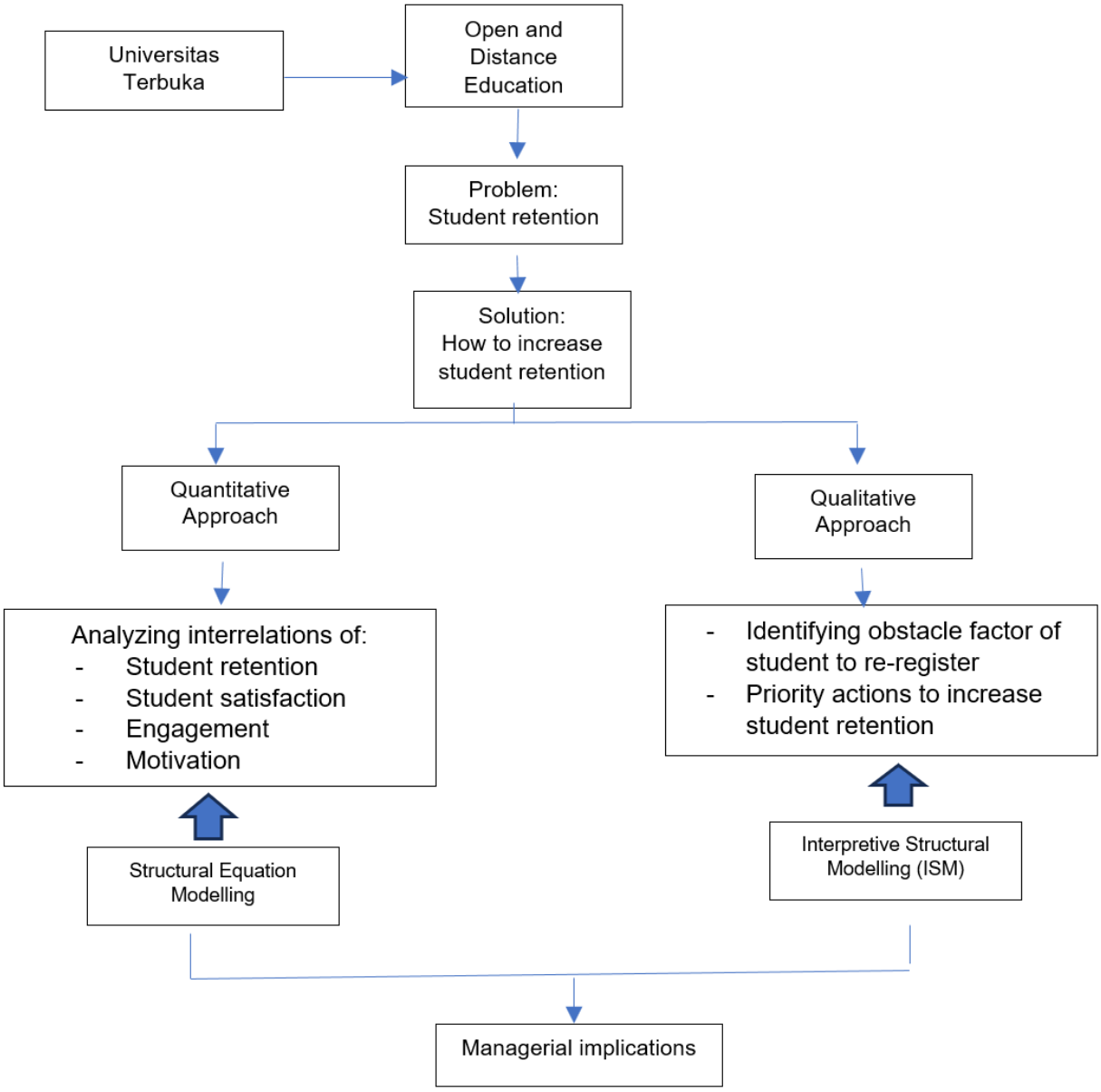

Figure 1.
Research Framework.

As shown in Figure 1, the research framework is employed as the foundation of the study. Generally, the study is carried out in two stages, the first is analyzing research models to increase retention through the variables of satisfaction, engagement, and motivation (quantitative approach), and the second is proposing action priorities or strategies to increase student retention (qualitative approach). The two stages of the research were first carrying out a quantitative analysis and continuing with a qualitative analysis. Structural Equation Modeling (SEM) was chosen as the analytical tool to verified interrelations among variables in quantitative approach, while the qualitative one using Interpretive Structural Modeling (ISM).

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The variables of motivation, engagement, student satisfaction, and retention were obtained based on previous relevant studies in the ODL context. However, modifications are needed at the level of research indicators to suit the research context. The variables, indicators, and references are presented in Table 1.

Table 1.
Summary of Variables and Indicators.

Varables	No of Indicators	References
Motivation	10 indicators	Eom and Ashill (2016)
Engagement	6 indicators	Gao, Jiang, and Tang (2020) Gray and DiLoreto (2016)
Satisfaction	6 indicators	Gao et al. (2020) Gray and DiLoreto (2016)
Retention	5 indicators	Al-Dossary (2008)

A research model and hypothesis were developed by considering previous theory and research background as shown in Fig. 2.

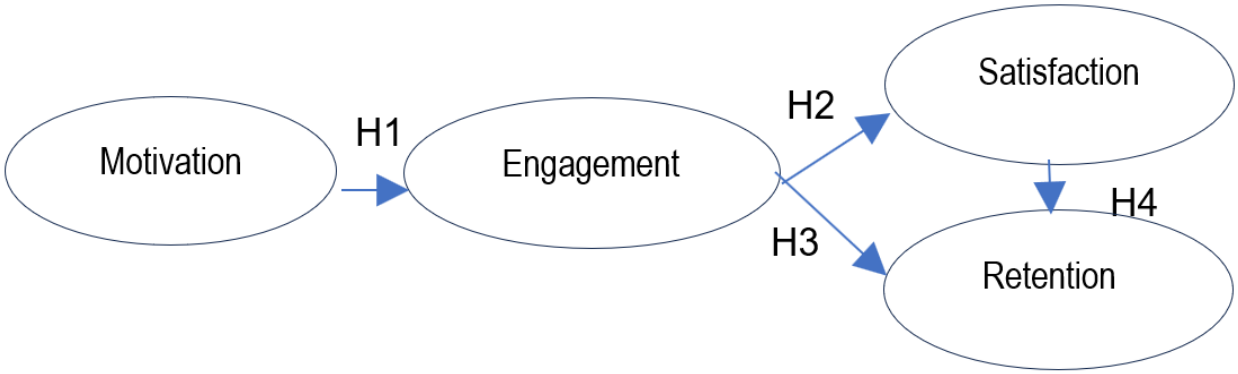

Figure 2.
Research Model.

As for the ISM qualitative approach, the research instruments were developed by identifying the obstacle elements of student decision to re-register. There were seven elements derived from expert judgment through a focused group discussion (FGD): financial problems, time management of job/other activities, difficulties in online learning, feeling isolated, family problems, time management of study, difficulty of learning independently.

3. Methodology

Having a solid research foundation that has been defined in the research framework, this study adapted two approaches, a quantitative and a qualitative approach. A quantitative approach is carried out to verify the influence between variables that support strengthening student retention; while a qualitative approach is used to deepen the quantitative results by analyzing the factors that become obstacles for student to make re-registration. These results will be used as a priority direction for managerial action to increase student retention. These two approaches were carried out so that this study obtained comprehensive results, verifying existing theories and providing enlightenment for the practical implications at UT. The quantitative approach is carried out by developing a theory-based research model based on previous studies. Later on, the qualitative approach is carried out by collecting expert opinions to determine the obstacle elements of students to re-register through a systems approach with the ISM method. Therefore, this study was designed as a study with a mixed method approach between quantitative and qualitative approaches.

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To obtain appropriate data, data collection was also carried out in two stages. The first stage is to collect quantitative data through questionnaires to students as respondents. A total of 616 data were successfully collected and met the requirements for further statistical processing, which were selected using purposive sampling. The research instrument was arranged as a statement and measured using a 5-point Likert scale with the following criteria: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. Based on the incoming responses, data analysis was carried out using SEM LISREL 8.72 to verify the influence among variables as defined in the research model. In the second stage (qualitative), FGDs were conducted with six experts from UT to obtain obstacle factors/elements and fill out the ISM instrument. ISM is a data analysis technique for determining the relationship between elements in a particular topic through experts' knowledge in the context you want to know (Shalamzari & Dodangeh, 2023). The basic idea of ISM is to use the experience and knowledge of experts to arrange a complex system into several sub-systems and build a multilevel structural model. ISM can be used to parse a high level of abstraction that is processed in a more structured manner, and the results can be used for long-term planning.

4. Results

4.1. SEM Results

After having all the fundamental needed regarding the study, we now proceed to discuss the results of the hypotheses and later the loading factors, including the goodness of fit of the tested framework, as shown in Figure 3.

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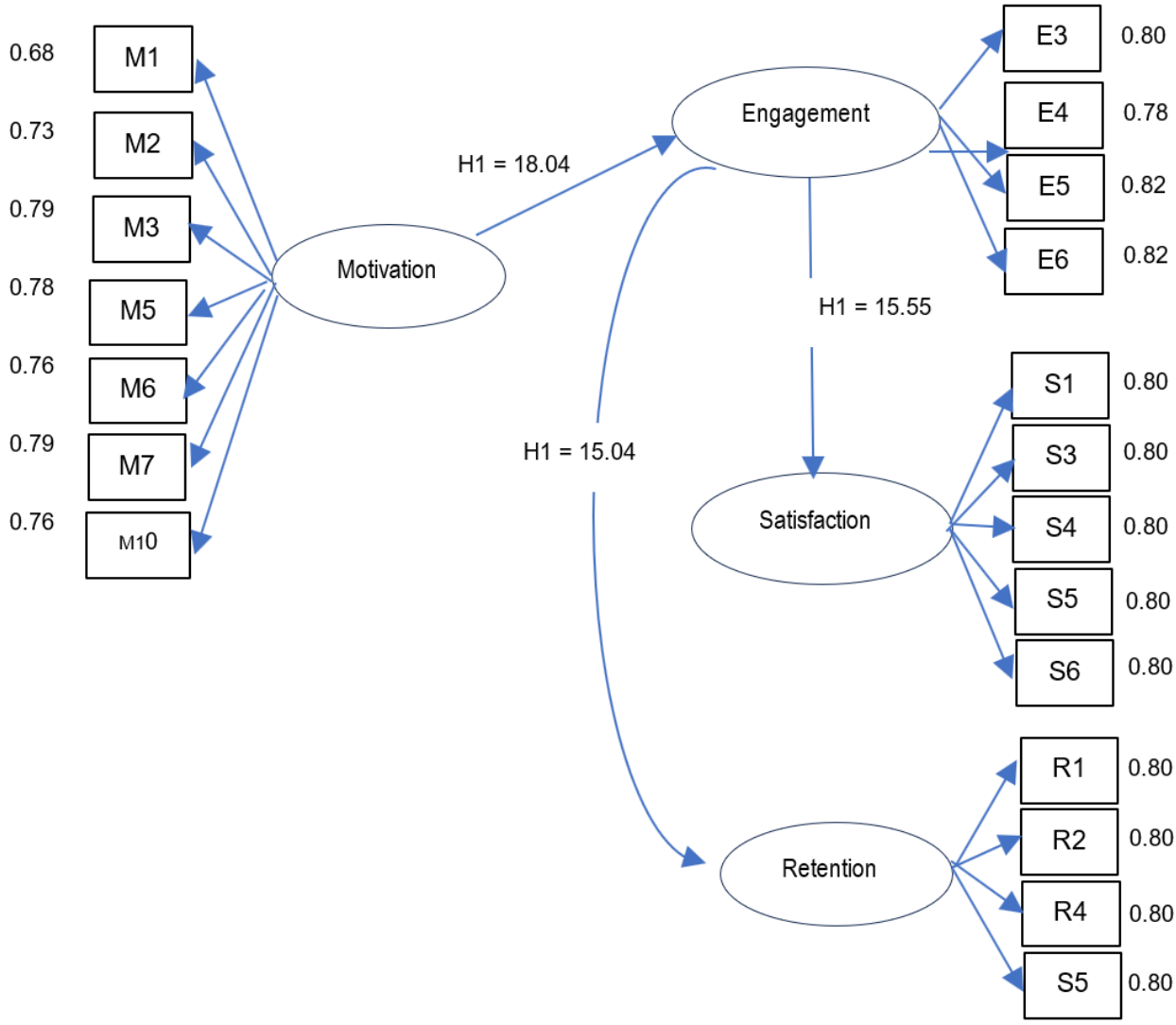

Figure 3.
Hypotheses and Loading Factor Results.

Having the results of SEM, we first should put attention to the value of the loading factors which will later be followed by values for hypotheses testing. In Figure 3, invalid indicators (loading factor values below 0.5) were excluded from the analysis so that valid indicators were obtained as shown in Figure 3. After ensuring that all valid indicators were in the research model, we now focus on the results of the hypotheses analysis. As shown in Figure 3, H1, H2 and H3 have statistical values of 18.04, 15.55 and 15.04 respectively that verified H1, H2, and H3 were positively supported. While H4 (the positive impact of satisfaction on retention) were not supported (does not appear in the SEM analysis).

Having the results of the loading factor and t-value, it is worth observing the goodness of fit of the framework to validate the accuracy of the proposed model. The analysis showed that, in general, all the criteria could be categorized in the "acceptable" classification (Table 2).

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Table 2.
Goodness of Fit.

	Goodness of Fit	Cut-off Value	Result	Remarks
RMSEA	Root mean square error of approximation	≤ 0.08	0.067	Good fit
GFI	Goodness of fit index	≥ 0.9	0.91	Good fit
CFI	Comparative fit index	0 ≤ CFI ≤ 1	0.98	Good fit
NFI	Normed fit index	≥ 0.9	0.98	Good fit
AGFI	Adjusted Goodnes of Fit Index	≥0.9	0.88	Adequate fit

4.2. ISM Results

The following research stage is to conduct an ISM analysis of the obstacle elements of student to re-register. The analysis of the obstacle elements at this stage is to determine the main reason why students don't register on the next semester so that appropriate strategic directions can be determined. The analysis was carried out based on expert judgment with six experts. The final assessment is based on the results of the ISM diagram, the value of Driver Power (DP), and the value of Dependence (D), which can be used to find the classification of elements. The following are the identified obstacle elements, as many as seven elements: (1) financial problem, (2) time management of job/other activities, (3) difficulties in online learning, (4) feeling isolated, (5) family problem, (6) time management of study, (7) difficulty of learning independently

At this stage, the steps for the ISM analysis are first, the experts will determine the obstacle elements and provide a comparative assessment of each element specified in the VAXO Table. The VAXO table is a relatively easy for experts to fill in their perception to compare the elements of a certain criteria. ISM output will show the problem mapping and problem structuring and ensure that the results of the ISM analysis are consistent. The dominant obstacle that emerges are employed as the major basis for proposing strategic direction. ISM analysis has the ability to map and structure abstract problems or constraints, making them easier to understand through VAXO coding. Furthermore, the results of expert input are arranged in a structural self-interaction matrix (SSIM) which is made from a reachability matrix (RM) table by replacing V, A, X and O with numbers 1 and 0. After the SSIM is filled in according to expert opinion, the symbols (V, A, X, O) can be replaced with symbols (1 and 0) with the existing provisions so that the value of the final element's reachability matrix (RM) can be known. The final stage is to determine the ranking based on the driver power and dependence value. This ISM analysis process goes through several stages as described previously, namely the formation of the Structural Self Interaction Matrix (SSIM), Reachability Matrix (RM) and hierarchical structure of element using Eximpro software. The results of the ISM analysis are shown in Table 3 – Table 4, as well as Fig. 4.

Table 3.
SSIM Matrix.

Description of constraint sub elements		1	2	3	4	5	6	7
Financial problem	1		A	V	A	V	A	A
Time management of job/other activities	2			V	V	V	A	A
Difficulties in online learning	3				A	V	A	X
Feeling isolated	4					V	A	X
Family problem	5						A	A
Time management of study	6							A
Difficulty of learning independently	7							

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Table 4.
Reachable Matrix.

Description of constraint sub elements		1	2	3	4	5	6	7
Financial problem	**1**	1	0	1	0	1	0	0
Time management of job/other activities	**2**	1	1	1	1	1	0	0
Difficulties in online learning	**3**	0	0	1	0	1	0	1
Feeling isolated	**4**	1	0	1	1	1	0	1
Family problem	**5**	0	0	0	0	1	0	0
Time management of study	**6**	1	1	1	1	1	1	0
Difficulty of learning independently	**7**	1	1	1	1	1	1	1

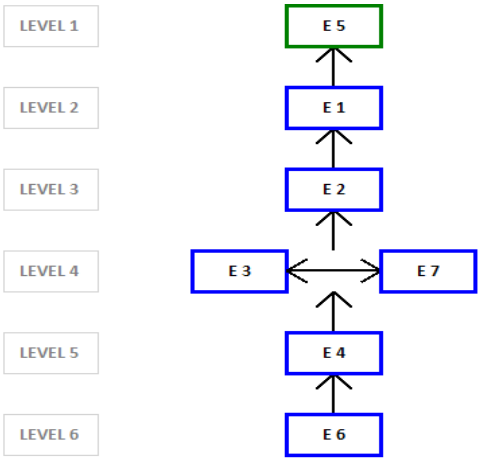

Figure 4.
Driver-Power Dependence Matrix.

In Figure 4, it can be noted that element no 6 (time management of study) has found as the element at the lowest level, followed by element no 4 (family problem) and other elements as have been structured in Fig.4. This structure has an important meaning that the lowest position of an element is the element that has the biggest impact on others. While in the study, the biggest obstacle for students not to register in the following semester is because they find it difficult to manage study time.

4.3. Critical Remarks

At this point, all the data analysis steps were completed. Now we come up with the most important part to analyze the statistical test results as previously described. Several critical notes can be highlighted according to the results as input for managerial implications. First, the results of this study proved that there is a positive and significant effect of motivation on engagement and engagement on satisfaction and retention. Motivation is the driving engine in the learning process. Motivation can affect what we learn, how we learn and when we choose to learn (Schunk & Usher, 2012). Previous research has shown that motivated learners are more likely to engage in challenging activities, engage actively, enjoy and adopt a deep approach to learning and show increased performance, as well as persistence and creativity (Ryan & Deci, 2000). The concept of motivation has been researched for decades in relation to improving learning outcomes. When students are actively involved in the learning process and derive pleasure and instrumental value from what they do, they tend to achieve better learning outcomes (Kahu, 2013). The opposite is also true for disengaged students who display a lack of interest and enthusiasm. The increased use of information and communication technology (ICT) in higher education has resulted in diverse learning environments and/or contexts for students (Lawlor, Marshall, & Tangney, 2016), for example whether student study in a face-to-face or online environment, or in a mixed from the two environments. In the context of online learning, engagement between

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students and teachers is very important to achieve learning success. The relationship between motivation and engagement is explicit and direct, with a focus on motivation that leads to and/or facilitates engagement (Leach & Zepke, 2012; Reeve, 2022); Student engagement arises from motivation (Fried & Konza, 2013; Leach & Zepke, 2012). Gourlay (2015) states that engagement is positioned as an activity that arises from a mindset of high motivation and determination. In the learning process, interactions between students and lecturers can increase student involvement which will lead to increased student performance as reflected in test results, grades, and satisfaction. Thus, in an online learning environment, it is necessary to improve the learning atmosphere which can be combined with an attractive learning platform so that it will increase student involvement. Ultimately this will lead to student satisfaction (Chen & Yao, 2016).

The results of the SEM analysis can then be combined with the ISM results which show that the biggest obstacle for students not to re-register mainly because they have difficulty in managing their time to study. Motivation is proven to have a positive effect on engagement and engagement also has an effect on satisfaction and retention. In this case, students who have high motivation to study need to get support from the university regarding how they should manage their time to study and other activities. UT is an institution that implements distance education which requires students to study independently. Independent study is a compulsion in a distance learning environment. However, students who are just entering a distance learning environment will definitely encounter difficulties when they have to study learning material independently. Therefore, the university has conducted self-study training activities for all new students to introduce them to the distance learning system, the use of the learning management system at UT, and time management of study as well. However, with the large number of students spread throughout Indonesia and abroad, not all students have the opportunity took part in the training at the same time due to various obstacles. Therefore, training on independent study should be designed not only at the beginning of the semester for new students, but also periodically for other semester. Students' understanding of the concept of independent learning is very important, including how they have to manage their study time which can be made a priority program by the university to be disseminated continuously through various media.

5. Conclusions

This research was designed as a mixed method research, combining quantitative and qualitative approaches. The quantitative approach is carried out using primary data based on student perceptions and analyzed using SEM. While the qualitative approach uses expert judgment to determine the obstacle elements and the hierarchical structure of these elements. The results of the quantitative method using SEM show that motivation has a positive impact on engagement, while engagement has a positive impact on satisfaction and retention as well. The results of the qualitative approach using ISM show that time management to study has been found out as the biggest obstacle on the reason for students to re-register in the next semester.

The results of this study contribute to the area of distance education in Indonesia, in particular, that students who are motivated to learn must get institutional support when they have difficulty managing their study time. Socialization and education policies regarding time management must be carried out regularly, bearing in mind that changing students' habits for independent study is not an easy matter. They must have a strong desire to study independently in an online environment with flexible study time, so strengthening their understanding of time management is a crucial factor.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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