

A PLS-SEM APPROACH TO UNDERSTAND ARCS, MCCLELLANDS, AND SDT FOR THE MOTIVATIONAL DESIGN OF ONLINE LEARNING SYSTEM USAGE IN HIGHER EDUCATION

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ABSTRACT

This study aims to test the structural models of several integrated motivational constructs empirically. The motivational construct refers to three theoretical models: Attention-Relevance-Confidence-Satisfaction (ARCS), McClelland's needs, and Self-Determination Theory (SDT). Data were collected from lecturers and students as respondents at two universities in Makassar, Indonesia. Data analysis employed quantitative methods. Data were presented using structural equation modeling (SEM) with the help of PLS version 3 software. The results obtained indicated that the need for achievement construct from the McClellands needs theory and the relatedness construct from SDT theory were constructs that directly impacted the motivation to use online learning, both according to lecturers and students. Meanwhile, the construct of ARCS model in this study did not directly influence the motivation to use online learning in universities. However, it was influenced by other variables. The final results of this study can only prove two motivational theories with constructs that have a direct positive impact on the motivation to use online learning in higher education.

Keywords: PLS-SEM, ARCS, McClelland's needs, SDT, online learning motivational.

INTRODUCTION

This article is part of a study on "an integrated motivation model to explain the factors that influence the use of online learning systems in tertiary institutions". This research is a National Competitive Basic Research (two-years time frame) funded by the Ministry of Research, Technology, and Higher Education of the Republic of Indonesia. In the first year, the research aimed to develop and test motivational instruments with measurement model analysis. The first-year research results provided alternative instruments to investigate and obtain information related to motivation in online learning system based on indicators of three fundamental theories of motivation (Mahande & Akram, 2020)McClelland's needs, and Self-

Determinant Theory (SDTMcClelland's needs, and Self-Determinant Theory (SDT. In the second year, the study empirically tested the structural model of several motivational constructs through structural equation modeling (SEM), which was strengthened through qualitative methods (this article). The structural equation analysis was confirmed by the research question (hypothesis) that was asked.

RESEARCH METHODS AND DESIGNS

This research used quantitative and qualitative methods. Qualitative data were obtained based on a literature study to obtain integrated motivation variables, as shown in Table 1. Besides, qualitative data were obtained through interviews with representatives of lecturers and students about suggestions for online learning and motivation to use online learning. The qualitative interview results confirmed the argumentation of the hypothesis testing results.

Table 1. The construct of motivation integrated into the use of online learning

Theoretical Supports	Constructs	Indicators/items
ARCS theory (Keller, 2008); Taha & Thang, 2014); Huang & Hew, 2016)	Attention (At)	Online learning system and design attract attention (At1)
		Online learning content can build curiosity (At2)
		More interactive online learning (At3)
		Online learning using learning methods that are of interest (At4)
		More interesting online assignments and exercises (At5)
	Relevance (Rv)	Online learning relevant to the demands of current learning (Rv1)
		Online learning strategies and methods in accordance with the learning achievements (Rv2)
		Online learning content relevant to learning outcomes (Rv3)
		Adaptive-engaging online learning content (Rv4)
		Online learning increases knowledge (Con1)
	Confidence (Con)	Online learning is the key to success in the future (Con2)
		Online learning provides a good learning experience (Con3)
		Online learning userfriendly learning (Con4)
		Online learning provides meaningful feedback (Con5)
		Satisfaction (Sas)
Received an award/recognition from online learning implementation (Sas2)		
The pleasure of completing an online learning course (Sas3)		
Structured and systematic online learning design (Sas4)		
McClelland's needs theory (Turabik & Baskan, 2015; Raeisi, Hadadi, Faraji, & Salehian, 2012power and affiliation; Moore, Grabsch, & Rotter, 2010; Vero & Puka, 2017)	Need for Affiliation (nAff)	
		The desire to fulfil tasks through online learning (nAff2)
		The desire to build close relationships through online learning (nAff3)
	Need for Power (nPow)	The desire of institutions that require online learning (nPow1)
		Desire yourself to use online learning (nPow2)
		The desire to obtain the highest position from the use of online learning (nPow3)
		The desire to become an online learning system manager at an institution (nPow4)
	Need for Achievement (nAch)	The desire to do something more than ordinary learning (nAch1)
		Solve online learning problems (nAch2)
		Taking personal responsibility in using online learning (nAch3)
		Demonstrating good performance in online learning (nAch4)

Self-Determination (SDT) Theory (Sergis, Sampson, & Pelliccione, 2018; Jacobi, 2018)	Autonomy (Au)	Essential and useful online learning (Au1)
		Online learning is very flexible (Au2)
		Have control of learning to decide what should and should not be done (Au3)
		An explanation is provided along with examples of using online learning (Au4)
	Competency (Com)	Have the ability to engage in online learning (Com1)
		Able to meet the learning achievements that are the targets of online learning (Com2)
		Able to access and spell questions online (Com3)
	Relatedness (RI)	Collaboration and communication related to learning and assignments through online education (R1)
		Feel closer to and/or fellow lecturers (RI2)
		Interact more often with friends (RI3)
Actively contributing throughout the class in group activities (R4)		
The motivation to use the online learning system (MuOI)	Attention to online learning (MuOI1)	
	The relevance of online learning (MuOI2)	
	Trust in online learning (MuOI3)	
	Satisfaction with online learning (MuOI4)	
	Affiliated needs through online learning (MuOI5)	
	The need to control through online learning (MuOI6)	
	Achievement needs of using online learning (MuOI7)	
Autonomy online learning (MuOI8)		
Online learning competencies (MuOI9)		
Linkages online learning (MuOI10)		

Source: Mahande & Akram, 2020)McClelland's needs, and Self-Determinant Theory (SDT)McClelland's needs, and Self-Determinant Theory (SDT)

Meanwhile, quantitative data were obtained using a survey approach. Surveys are considered the correct data collection method because they allow for standardized data collection (Yudatama et al., 2019; Maziriri & Madinga, 2018) and allow researchers to generate information that answers important construct questions of the integrated motivation models, which are Attention-Relevance-Confidence-Satisfaction (ARCS), McClelland needs, and Self-Determination Theory (SDT), that influence the motivation to use online learning in universities. As many as 71 lecturers and 210 students were selected from two universities, namely, Universitas Negeri Makassar (UNM) and Universitas Muhammadiyah Makassar (Unismuh) in Indonesia. For testing, the researcher proposed the constructs of the ARCS motivation model, which consists of Attention, Relevance, Confidence, Satisfaction; McClelland needs, which consist of the need for Affiliation, need for power, need for Achievement; and SDT, which consists of Autonomy, Competency, Relatedness, and motivation to use online learning as outcome variables. The researcher proposed this model to test the validity of the proposed model and determine whether the data, which had been collected in the field, fit into the proposed conceptual model (Mahande & Akram, 2020). To meet the validity and reliability of the test results, data were analyzed using partial least square (PLS) software version 3 by considering the values of Cronbach's Alpha (0.7), Composite Reliability (0.7), AVE (0.5), and Loading Factor (0.7) (Nunnally & Bernstein, 1994; Barclay, Higgins, & Thompson, 1995; Hair, 2017). The bootstrap process and the T-statistic were used above 1.96 at the 95% confidence interval to determine the level of significant path coefficients. The data from the measurement model analysis can be seen in Table 2. There were several items/indicators that were removed and marked "out" (See Table 2, outer loadings column for lecturers and students). These items did not meet the loading criteria.

Table 2. The result analysis of reflective measurement model

Constructs/ Factors	Items	Factor Loadings		Composite Reliability (CR)		Cronbach's Alpha		Average Variance Extracted (AVE)	
		Lecturers	Students	Lecturers	Students	Lecturers	Students	Lecturers	Students
Attention (At)	At1	Out	0.789	0.876	0.883	0.725	0.824	0.780	0.665
	At2	Out	0.833						
	At3	0.844	0.784						
	At4	0.921	0.829						
	At5	Out	Out						
Relevance (Rv)	Rv1	Out	0.770	0.896	0.900	0.826	0.852	0.741	0.694
	Rv2	0.830	0.857						
	Rv3	0.874	0.877						
	Rv4	0.878	0.824						
Confidence (Con)	Con1	0.789	0.751	0.882	0.838	0.823	0.744	0.653	0.565
	Con2	Out	Out						
	Con3	0.873	0.768						
	Con4	0.767	0.741						
	Con5	0.798	0.745						
Satisfaction (Sas)	Sas1	0.846	0.770	0.872	0.872	0.806	0.805	0.632	0.631
	Sas2	0.798	0.813						
	Sas3	0.775	0.822						
	Sas4	0.757	0.770						
Need for Affiliation (nAff)	nAff1	0.874	0.819	0.918	0.870	0.865	0.776	0.788	0.690
	nAff2	0.888	0.830						
	nAff3	0.901	0.843						
Need for Power (nPow)	nPow1	Out	0.848	0.869	0.884	0.780	0.804	0.688	0.718
	nPow2	0.823	0.852						
	nPow3	0.843	0.841						
	nPow4	0.823	Out						
Need for Achievement (nAch)	nAch1	0.838	0.748	0.888	0.895	0.810	0.844	0.726	0.682
	nAch2	0.914	0.836						
	nAch3	0.801	0.852						
	nAch4	Out	0.863						
Autonomy (Au)	Au1	0.878	0.858	0.868	0.884	0.771	0.803	0.688	0.718
	Au2	0.848	0.867						
	Au3	0.757	0.816						
	Au4	Out	Out						
Competency (Com)	Com1	0.850	0.886	0.862	0.918	0.798	0.866	0.713	0.788
	Com2	0.811	0.905						
	Com3	0.871	0.873						
Relatedness (Rl)	Rl1	Out	0.766	0.902	0.878	0.836	0.817	0.755	0.642
	Rl2	0.838	0.798						
	Rl3	0.933	0.819						
	Rl4	0.832	0.821						
The motivation to use the online learning system (MoUl)	MuOl1	0.729	0.789	0.934	0.943	0.918	0.932	0.638	0.622
	MuOl2	Out	0.783						
	MuOl3	0.732	0.790						
	MuOl4	0.790	0.775						
	MuOl5	0.811	0.764						
	MuOl6	Out	0.816						
	MuOl7	0.850	0.817						
	MuOl8	0.810	0.789						
	MuOl9	0.827	0.771						
	MuOl10	0.833	0.788						

Source: Mahande & Akram, 2020)McClelland's needs, and Self-Determinant Theory (SDT)McClelland's needs, and Self-Determinant Theory (SDT)

Structural Model Analysis

The PLS estimation results of the structural equation modeling, path coefficient values, and item loads for the research construction are presented in Figure. 3, lecturer models and four student models (Table 3 summary of results).

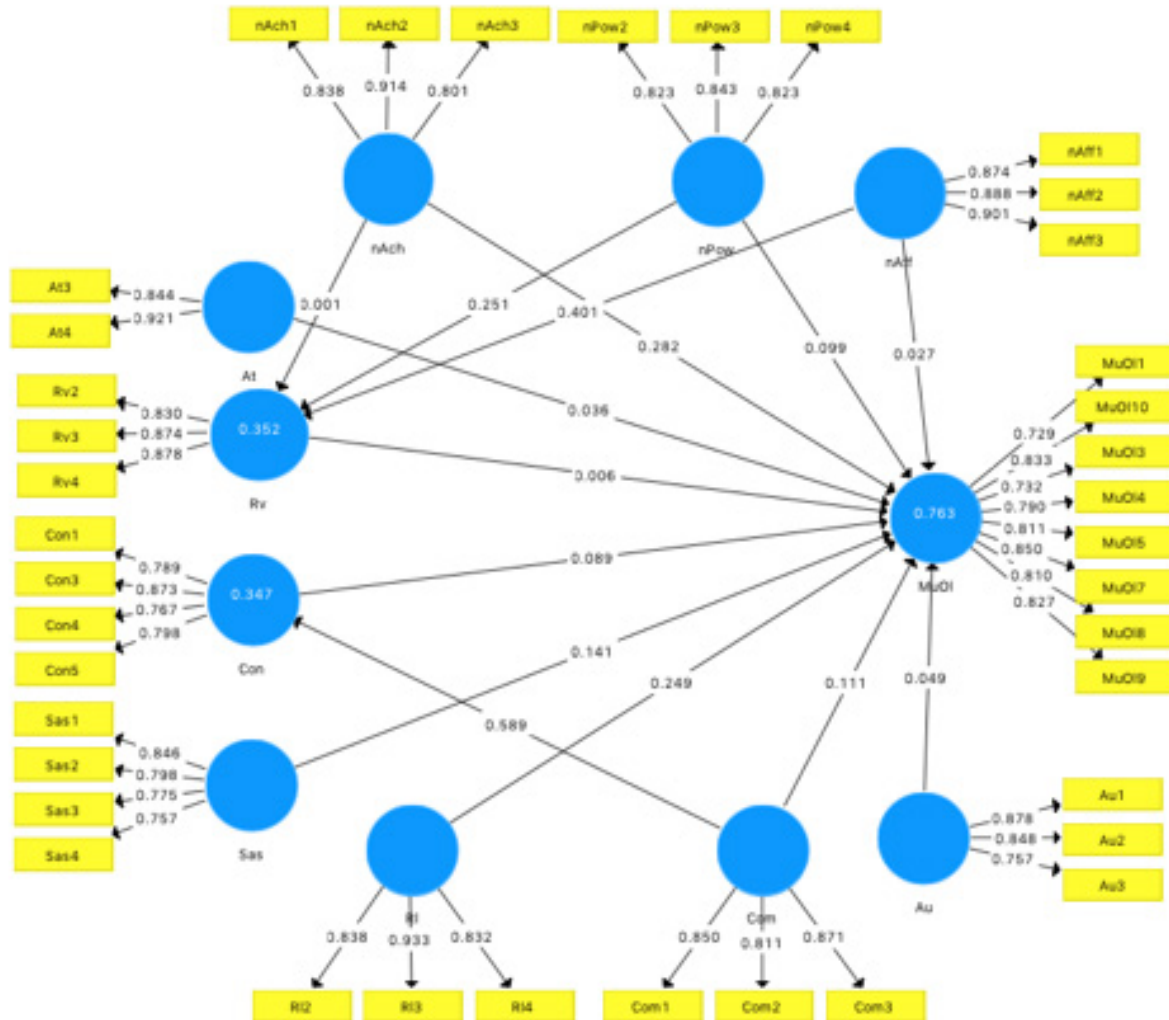


Figure 1. SEM analysis of the Lecturer Research Model

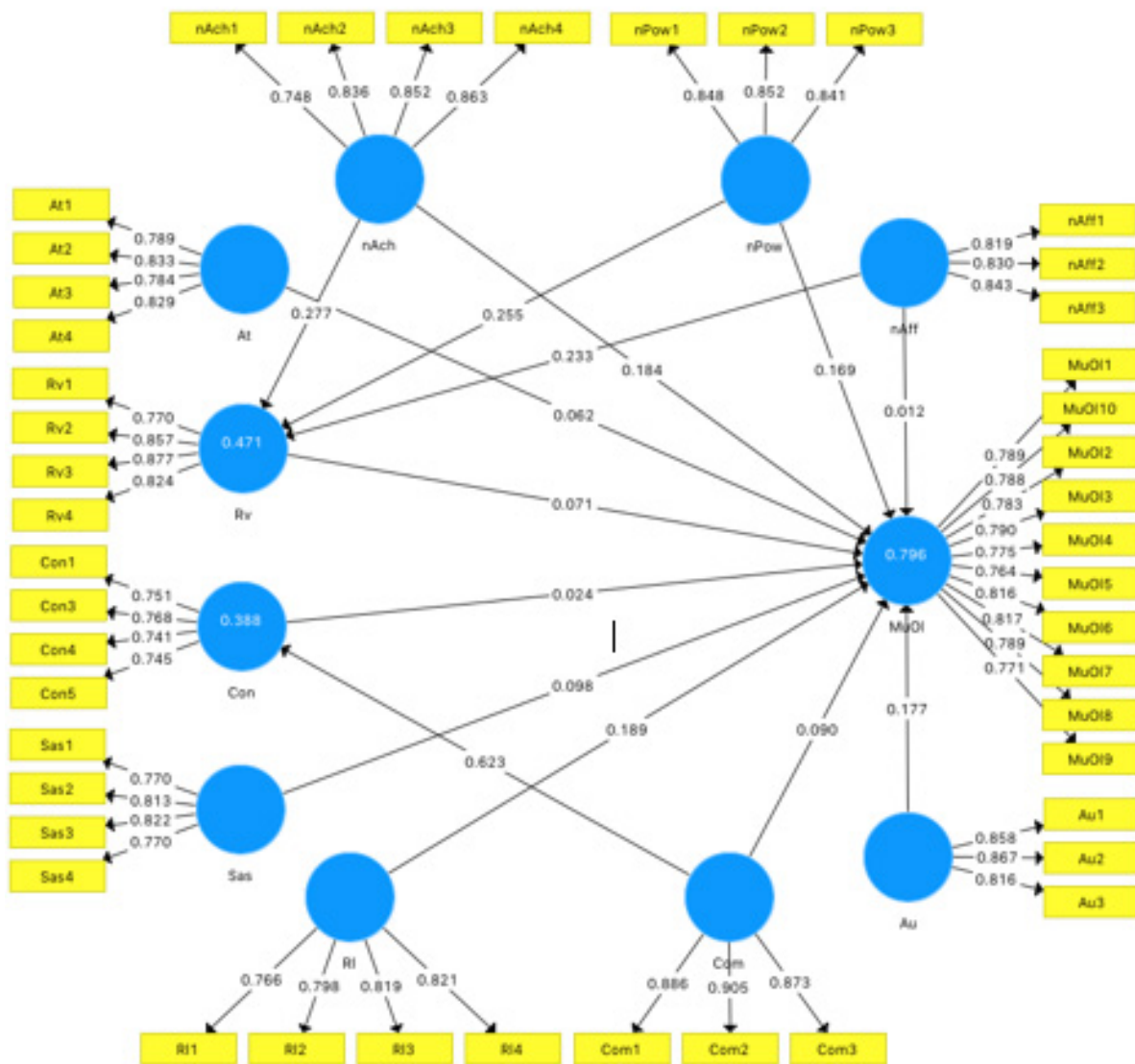


Figure 2. SEM analysis of the Student Research Model

Furthermore, the following Table 3 summarizes the results of the Lecturer and Student model hypothesis testing.

Table 3. The results of the analysis of the Lecturer structural equation model

Path	Hypothesis	Path coefficient (β)		T-Statistics		Decision	
		L	S	L	S	L	S
At -> MuOl	H1	0.036	0.062	0.345	0.958	Negative and insignificant	Negative and insignificant
Rv -> MuOl	H2	0.006	0.071	0.051	1.101	Negative and insignificant	Negative and insignificant
Con -> MuOl	H3	0.089	0.024	0.961	0.351	Negative and insignificant	Negative and insignificant
Sas -> MuOl	H4	0.141	0.098	0.800	1.647	Negative and insignificant	Negative and insignificant
nAff -> MuOl	H5	0.027	0.012	0.267	0.164	Negative and insignificant	Negative and insignificant
nPow -> MuOl	H6	0.099	0.169	0.807	2.042	Negative and insignificant	Positive and significant
nAch -> MuOl	H7	0.282	0.184	2.375	2.612	Positive and significant	Positive and significant
Au -> MuOl	H8	0.049	0.177	0.424	2.933	Negative and insignificant	Positive and significant
Com -> MuOl	H9	0.111	0.090	0.896	1.431	Negative and insignificant	Negative and insignificant
RI -> MuOl	H10	0.249	0.189	2.328	2.955	Positive and significant	Positive and significant
Com -> Con	H11	0.589	0.623	5.322	10.813	Positive and significant	Positive and significant
nAff -> Rv	H12	0.401	0.233	2.725	2.421	Positive and significant	Positive and significant
nPow -> Rv	H13	0.251	0.255	1.502	2.315	Negative and insignificant	Positive and significant
nAch -> Rv	H14	0.001	0.277	0.005	3.185	Negative and insignificant	Positive and significant

Note: L=lecturers, S= Students

As shown in Figure 1, Figure 2, and Table 3, the structural model analysis also documented R-squared or all independent variables' ability to explain the variance of the dependent variable. The analysis showed an acceptable level of variance of lecturer confidence model (34.7%). This meant that there was 65.3% (100% -34.7%) variance of the dependent variable that was explained by other factors.

Table 4. R-squared

Factors/Variables	R-squared		Adjusted R-squared	
	Lecturers	Students	Lecturers	Students
Con	0.347	0.388	0.337	0.386
MuOl	0.763	0.796	0.723	0.786
Rv	0.352	0.471	0.323	0.463

Note: Con=confidence, Rv: relevance, MuOl: The motivation for the use of online learning

DISCUSSION

Hypothesis 1

Examined the effect of Attention (At) on the motivation of lecturers and students to use online learning (MuOl). This hypothesis was not supported (not proven) and therefore, it can be stated that attention did not affect the motivation of lecturers and students to use online learning (Table 3). This study's results are relevant to the results of research conducted by Mohamad et al. (2015), which stated that attention, especially the ease of using online learning through flipped learning model, did not affect the motivation to use online learning. Even though the hypothesis did not support it, several attention indicators contributed to the motivation to use online learning. From the perceptions of lecturers and students, it was explained that interactive online learning using more attractive learning methods was the leading indicator of attention that could motivate online learning in higher education. The excerpt of the interview with a lecturer is as follows:

“... Online learning is exciting during the learning process. Online learning should be a concern for the teaching staff at every university. Through online learning, we can introduce students to effective learning methods using technology” (Lecturer-number 1).

More specifically, students' perceptions also added that attention to an attractive online learning system and design and content that can build curiosity could motivate online learning. During interview, student stated: *“Online learning can build curiosity, ... online learning systems are made with good systems with managers who are truly competent in online learning and a little innovation” (Students-number 1).* The results of research conducted by Taha & Thang (2014) confirmed that students' attention was more on an attractive system and good design. Likewise, the results of research of Huang & Hew (2016) stated that courses had things that make students curious to get high response from them.

Hypothesis 2

Examined the effect of Relevance (Rv) on the motivation of lecturers and students to use online learning (MuOl). This hypothesis was not supported and therefore, it can be stated that relevance did not affect the motivation of lecturers and students to use online learning. Although the hypothesis did not support it, several indicators made a significant contribution to the motivational relevance factor for online learning. From the lecturers' perceptions, it was explained that adaptive and exciting online learning content was the leading indicator to demonstrate the relevance factor of online learning in universities. Meanwhile, students' perceptions were more on content that was relevant to learning outcomes. This also fits the statement of Taha & Thang (2014) that adaptive, exciting, and relevant content to learning outcomes would significantly determine the motivational relevance factor for online learning. In connection with that, Taha & Thang (2014) emphasized that engaging, collaborative learning was essential and created exciting and adaptive content. The results of the interview with the lecturer indicate this:

“In the future, education will be dominated by online learning, but it should be adjusted according to learning outcomes because not all courses can be taught online. So, it needs an in-depth study in determining the course so that the goals and direction can be achieved according to the learning outcomes” (Lecturer-number 2).

Likewise, students said: *“Online learning may be needed in today's digital era, but it must pay attention to several aspects so as not to reduce student competence” (Students-number 2).*

Hypothesis 3

Examined the effect of Confidence (Con) on the motivation of lecturers and students to use online learning (MuOl). This hypothesis was not supported and therefore, it can be stated that confidence did not affect the motivation of lecturers and students to use online learning.

Although the relationship did not correlate, several confidence indicators had a significant contribution to using online learning. From the perceptions of lecturers and students, it was explained that online learning that provided a good learning experience would make a significant contribution to confidence. According to

the lecturers' perceptions, online learning, which provided meaningful feedback, contributed to confidence, while according to students, online learning that could increase knowledge could contribute to confidence. Huang & Hew (2016) stated that feedback after training or something else in the course would help students feel appreciated for their effort. Good feedback is informative and motivating (Keller, 1987 quoted from (Jokelova, 2013)its theoretical concepts, and strategies that can be used in an online learning environment. The acronym ARCS stands for Attention, Relevance, Confidence, and Satisfaction. The concepts behind the Attention component of the model discussed in the paper are the ones of curiosity, sensation seeking, and the theory of cognitive dissonance. McClelland's theory of needs, White's competence theory, and the flow theory are the concepts behind the Relevance component. Locus of control, the attribution theory, learned helplessness, and self-efficacy are discussed as a theoretical background of the Confidence component. The theoretical bases of the Satisfaction component are behaviorism, and the theory of equity.”,”container-title”:"2013 IEEE 11th International Conference on Emerging eLearning Technologies and Applications (ICETA. Feedback can increase student motivation (Izmirli & Izmirli, 2015). Result of interviews with lecturers is as follows:

“... Please focus on who is filling in the feedback... feedback aims to make us more aware of our material's quality, which ones need to be maintained, improved, and eliminated. So the feedback should be given after the students have been given a grade so that they are freer in giving feedback” (Lecturer-number 3).

This confirms that learning experiences, feedback, and increased knowledge are strong indicators to explain confidence in motivating online learning. In addition to learning experiences, lecturers during interview said: *“Online learning can monitor the development of students' learning processes and be able to meet learning targets that attract student attention”* (Lecturer-number 4). Likewise, students said: *“Online learning makes our learning activities easier and can help achieve learning goals”* (Students-number 3).

Hypothesis 4

*Examined the effect of Satisfaction (Sas) on the motivation of lecturers and students to use online learning (MuOl). This hypothesis was not supported and therefore, it can be stated that satisfaction did not affect the motivation of lecturers and students to use online learning. Even though the relationship did not have a significant effect, several indicators made an immense contribution to satisfaction. From the perception of lecturers, it was stated that the convenience of learning through online learning was able to explain satisfaction well. Meanwhile, according to students, satisfaction in completing online learning courses was essential. Students' perceptions were in accordance with the research results of Huang & Hew (2016), which stated that there was a satisfactory feeling of accomplishment when a course is completed. Together, lecturers and students stated that obtaining awards/recognition from the application of online learning was an essential indicator of satisfaction. Likewise, rewarding intrinsically attractive assignments with unexpected rewards (Keller, 1987 quoted from (Jokelova, 2013)its theoretical concepts, and strategies that can be used in an online learning environment. The acronym ARCS stands for Attention, Relevance, Confidence, and Satisfaction. The concepts behind the Attention component of the model discussed in the paper are the ones of curiosity, sensation seeking, and the theory of cognitive dissonance. McClelland's theory of needs, White's competence theory, and the flow theory are the concepts behind the Relevance component. Locus of control, the attribution theory, learned helplessness, and self-efficacy are discussed as a theoretical background of the Confidence component. The theoretical bases of the Satisfaction component are behaviorism, and the theory of equity.”,”container-title”:"2013 IEEE 11th International Conference on Emerging eLearning Technologies and Applications (ICETA. This confirms that the convenience of learning, completion of courses for students coupled with appreciation/recognition of online learning applications were determinants of the satisfaction factor as a motivating factor for online learning. Furthermore, students through interviews stated and suggested: *“So far we are delighted with online learning, but I suggest focusing more on increasing the speed and ease of access to viewing and learning content”* (Students-number 4).*

Hypothesis 5

Examined the effect of Need for Affiliation (nAff) on the motivation of lecturers and students to use online learning (MuOl). This hypothesis was not supported and therefore, it can be stated that the need for affiliation did not affect the motivation of lecturers and students to use online learning. Although the relationship did not correlate, several indicators had a significant contribution to affiliation's need. In terms of lecturers and students, their desire to build close relationships through online learning and their desire to fulfill assignments through online education were indicators that significantly contributed to the need for affiliation in building motivation to use online learning. The lecturer also emphasized that *"the interaction between lecturers and students is further enhanced in online learning through an interview quote"* (Lecturer-number 5). The desire to build relationships in order to build a strong community is part of motivation (Moore et al., 2010). Students also expressed this: *"online learning can facilitate activities or interactions between students and lecturers such as assigning assignments and the learning process itself"* (Students-number 5). This means the desire to build relationships through collaborative completion of tasks will significantly contribute to the increasing need for affiliation as a motivating factor for using online learning.

Hypothesis 6

Examined the effect of Need for Power (nPow) on the motivation of lecturers and students to use online learning (MuOl). This hypothesis was not supported and therefore, it can be stated that the need for Affiliation did not affect the motivation of lecturers to use online learning. Meanwhile, in students, this hypothesis was supported and therefore, it can be stated that the need for power had a positive impact on students' motivation to use online learning (MuOl). This student model research results were consistent with the research results that showed that the need for power had a direct effect on the motivation to use online learning (Raeisi et al., 2012)power and affiliation. This means that students will be motivated to use online education based on the need for power.

On the other hand, the lecturer model contradicted the research results (Raeisi et al., 2012)power and affiliation. However, the lecturers and students jointly emphasized that their desire to use online learning and get a position from online learning was a strong indicator that built the need for power factor to explain online learning motivation. The lecturer's statement supported this:

"The current digital era requires us to change our learning paradigm both in terms of patterns and levels of implementation, ... online learning is good, ..."online learning needs to be promoted" (Lecturer-number 6). Likewise, students stated: *"the application of online learning should be applied in every lesson and balanced with face-to-face meetings"* (Students-number 6).

Hypothesis 7

Examined the influence of Need for Achievement (nAch) on the motivation of lecturers and students to use online learning (MuOl). This hypothesis was supported. Therefore, it can be stated that the need for achievement had a positive impact on the motivation of lecturers and students to use online learning (MuOl). This study's results were consistent with the research results that showed that the need for achievement had a direct effect on motivation to use online learning (Raeisi et al., 2012)power and affiliation. The results of this study confirmed the strength of the need for achievement factors from McClelland's theory of needs. This also meant that lecturers and students would be motivated to use online learning based on the need for achievement. Specifically, according to the lecturer, the desire to solve online learning problems and do something other than just ordinary education was an indicator that made a big contribution to the need for achievement.

Meanwhile, according to students, taking personal responsibility in online learning and solving problems could motivate them during online learning, which was an essential indicator of the need for achievement. This was in line with the statement of McClelland that was quoted from (Jokelova, 2013)its theoretical concepts, and strategies that can be used in an online learning environment. The acronym ARCS stands for Attention, Relevance, Confidence, and Satisfaction. The concepts behind the Attention component of

the model discussed in the paper are the ones of curiosity, sensation seeking, and the theory of cognitive dissonance. McClelland's theory of needs, White's competence theory, and the flow theory are the concepts behind the Relevance component. Locus of control, the attribution theory, learned helplessness, and self-efficacy are discussed as a theoretical background of the Confidence component. The theoretical bases of the Satisfaction component are behaviorism, and the theory of equity.”, ”container-title”:”2013 IEEE 11th International Conference on Emerging eLearning Technologies and Applications (ICETA that lecturers and students with high achievement needed focus on personal improvement, they wanted to do well, they aimed to complete learning assignments. Students stated during interview: *“Online learning can improve students’ independent learning abilities and this is the participation of the students themselves”* (Students-number 7). Thus, the motivation to use online learning may be higher if the need for achievement indicators such as providing personal responsibility, learning exploration, and problem-solving in online learning is getting better.

Hypothesis 8

Examined the effect of Autonomy (Au) on the motivation of lecturers and students to use online learning (MuOl). This hypothesis was not supported and therefore, it can be stated that autonomy did not affect the motivation of lecturers to use online learning. Meanwhile, in students, this hypothesis was supported and therefore, autonomy had a positive impact on students’ motivation to use online learning (MuOl). From the student side, of course, this study’s results were consistent with the research results that showed that autonomy directly affected the motivation to use online learning (Sergis et al., 2018b); (Jacobi, 2018). On the one hand, from the students’ perceptions, this proved the strength of the autonomy factor of Self-Determination Theory developed by Rian & Decy in explaining the motivation for using online learning.

On the other hand, according to autonomy lecturers’ perception, they had not explained the relationship with the motivation to use online learning. However, according to the lecturer, online learning was essential and useful. This was consistent with the quote from the lecturer during interview: *“Online learning is very mobile and it is good for students” Online learning is very flexible, interactive and teaches self-study*” (Lecturer-number 7). Students added: *“Online learning is easier and more flexible” ... online learning gives students motivation to learn to be more independent and confident in doing questions*” (Students-number 8). The online course format was considered to be a flexible learning option by both faculty and students (Jacobi, 2018). The flexibility of online learning gives students a sense of autonomy they need to invest in learning (Jacobi, 2018). Flexibility is one factor motivating students to study online (Izmirli & Izmirli, 2015). Students can invest more time in hands-on activities and peer/lecturer collaborations rather than accepting lectures dominated by lecturers, limiting autonomy (Sergis et al., 2018b). The results of this study also provide information that lecturers and students claim autonomy to have control over what to do and what not to do. The great thing about online learning is that students have power and control over their learning (Jacobi, 2018). If you want to motivate people, give them the feeling that they are the ultimate arbiters about how this will happen and how they will learn and apply it (Jacobi, 2018). Online learning is considered to be essential and useful because it supports flexibility and learning control that are optimized from online learning.

Hypothesis 9

Examined the effect of Competency (Com) on the motivation of lecturers and students to use online learning (MuOl). This hypothesis was not supported and therefore, it can be stated that competency did not affect the motivation of lecturers and students to use online learning. However, some indicators contributed to competency. For lecturers, the ability to access and work on questions was essential, and for students, the ability to meet learning outcomes was the target of online learning. Below is excerpt from interview with lecturer:

“It takes systematic training to improve learning competencies, especially in accessing essay questions and videos as learning media” (Lecturer-number 8). The ability to access and work on items that target learning outcomes is essential in explaining the competency factor of the motivation for using online learning.

Hypothesis 10

Examined the effect of Relatedness (Rl) on the motivation of lecturers and students to use online learning (MuOl). This hypothesis was supported and therefore, it can be stated that relatedness had a positive impact on the motivation of lecturers and students to use online learning (MuOl). This study's results were consistent with the research results that showed that relatedness had a direct effect on the motivation to use online learning (Sergis et al., 2018b; Jacobi, 2018). This study's results also confirmed the strength of related factors, especially in relation to the motivation to use online learning. Relatedness is a variable of Self-Determination Theory developed by Deci and Ryan. This means that lecturers and students will be motivated to use online learning based on good relatedness. Good relatedness can be seen from the indicators that build it. According to the lecturers' perceptions, interacting more frequently with friends was the best indicator of relatedness. In the interview, a lecturer stated: "*The interaction and collaboration between lecturers and students should be paid more attention to and improved*" (Lecturer-number 9). Meanwhile, according to students' perceptions, actively contributing to group activities throughout the class was the best thing. Students said: "*This can also maintain closeness between lecturers and students*" (Students-number 9). Providing time flexibility for students to be actively involved with lecturers' collaborative activities does have a significant impact on students' internal feelings (Sergis et al., 2018b). It is part of the social context that supports and promotes online learning.

Hypothesis 11

Examined the significant positive effect of Competency (Com) on the Confidence (Con) of lecturers and students. This hypothesis was supported and therefore, it can be stated that competency positively impacted confidence of lecturers and students. Competency is a variable of SDT and confidence is a variable of ARCS model. This study's results were consistent with the results of studies that showed that competency had a direct effect on confidence (Keller, 2008). This means that lecturers and students will have high confidence if they have good competency, which is competency to be directly involved in online learning, meet learning outcomes, and access and work on online questions. This will help confidence in gaining a better learning experience.

Hypothesis 12

Examined the effect of Need for Affiliation (nAff) on Relevance (Rv) of lecturers and students. This hypothesis was supported and therefore, it can be stated that the need for affiliation had a positive impact on lecturers' and students' relevance. Need for Affiliation is a variable of McClelland's theory of needs and relevance is a variable of ARCS model. This study's results were consistent with the results of studies that showed that the need for Affiliation had a direct effect on relevance (Jokelova, 2013) its theoretical concepts, and strategies that can be used in an online learning environment. The acronym ARCS stands for Attention, Relevance, Confidence, and Satisfaction. The concepts behind the Attention component of the model discussed in the paper are the ones of curiosity, sensation seeking, and the theory of cognitive dissonance. McClelland's theory of needs, White's competence theory, and the flow theory are the concepts behind the Relevance component. Locus of control, the attribution theory, learned helplessness, and self-efficacy are discussed as a theoretical background of the Confidence component. The theoretical bases of the Satisfaction component are behaviorism, and the theory of equity." "container-title": "2013 IEEE 11th International Conference on Emerging eLearning Technologies and Applications (ICETA). This means that if you have an excellent need for affiliation, it will strengthen the relevance factor. Building close relationships and readiness for assignments through online learning will optimize adaptive and exciting content. In connection with this, Taha & Thang (2014) stated that engaging, new collaborative learning is essential. This means that the relationship between lecturers and students will encourage the development of more adaptive and exciting content.

Hypothesis 13

Examined the effect of Need for Power (nPow) on the Relevance (Rv) of lecturers and students. This hypothesis was not supported and therefore, it can be stated that the need for power did not affect lecturers' relevance. Meanwhile, in students, this hypothesis was supported and thus, it can be stated that the need for power had a positive impact on student relevance. From the lecturer's side, the need for power had not explained the relevance factor. From the student side, this study's results were consistent with the research results that showed that the need for Affiliation had a direct effect on relevance (Jokelova, 2013)its theoretical concepts, and strategies that can be used in an online learning environment. The acronym ARCS stands for Attention, Relevance, Confidence, and Satisfaction. The concepts behind the Attention component of the model discussed in the paper are the ones of curiosity, sensation seeking, and the theory of cognitive dissonance. McClelland's theory of needs, White's competence theory, and the flow theory are the concepts behind the Relevance component. Locus of control, the attribution theory, learned helplessness, and self-efficacy are discussed as a theoretical background of the Confidence component. The theoretical bases of the Satisfaction component are behaviorism, and the theory of equity.”,”container-title”:”2013 IEEE 11th International Conference on Emerging eLearning Technologies and Applications (ICETA. The better the need for power was, the better the bearing became. The higher the self-desire to use online learning and gain a position from using online learning was, the faster the relevance of online learning strategies and methods, learning Achievement, and adaption became.

Hypothesis 14

Examined the effect of Need for Achievement (nAch) on the Relevance (Rv) of lecturers and students. This hypothesis was not supported and therefore, it can be stated that the need for Achievement did not affect lecturers' relevance. Meanwhile, in students, this hypothesis was supported and consequently, it could be stated that need for achievement had a positive impact on student relevance. This study's results on the student side were consistent with the research results, which showed that the need for Achievement had a direct effect on relevance (Jokelova, 2013)its theoretical concepts, and strategies that can be used in an online learning environment. The acronym ARCS stands for Attention, Relevance, Confidence, and Satisfaction. The concepts behind the Attention component of the model discussed in the paper are the ones of curiosity, sensation seeking, and the theory of cognitive dissonance. McClelland's theory of needs, White's competence theory, and the flow theory are the concepts behind the Relevance component. Locus of control, the attribution theory, learned helplessness, and self-efficacy are discussed as a theoretical background of the Confidence component. The theoretical bases of the Satisfaction component are behaviorism, and the theory of equity.”,”container-title”:”2013 IEEE 11th International Conference on Emerging eLearning Technologies and Applications (ICETA. On the lecturer side, it was not consistent. This meant that the need for Achievement was unable to explain the relevance factor. On the contrary, from the student side, the better the need for Achievement was, the better the relevance became. The more students showed good performance in online learning and took personal responsibility in learning, the more relevant online learning strategies and methods would increased learning Achievement and support adaptive learning.

LIMITATIONS AND IMPLICATIONS

This research was only conducted at two universities in Makassar, Indonesia. Thus, the research results on the motivation to use online learning cannot be generalized for all universities. However, the results of this study have theoretical and practical implications. The theoretical implication of the results of this study provides an integrated motivation model (ARCS, McClellands Needs, and Self-Determination Theory), which can be used and developed to identify and produce new motivation models by using online learning in universities or other institutions as needed. Practical implications of the findings of this study explain that the motivation to use online learning must pay attention to, among others, the need for achievement and relatedness of the lecturers and students. Therefore, for practitioners/academics in online learning, these findings can increase understanding of the relationship between integrated motivation and online learning, especially before developing and implementing online education in universities. This is a useful contribution for future literature.

CONCLUSIONS AND RECOMMENDATIONS

The need for achievement and relatedness influenced the motivation of lecturer to use online learning. In terms of need for achievement, lecturers wanted to solve problems through online learning and do something bigger than ordinary education. In terms of relatedness, lecturers wanted to interact more often with friends and feel closer to fellow friends. The motivation of students to use online learning was also directly influenced by the need for achievement, need for power, and relatedness. In terms of need for achievement, their primary motivation was to show good performance in online learning and take personal responsibility. In terms of need for power, students had desire to use online learning and wanted institutions to implement online learning. Meanwhile, relatedness was related to actively contributing throughout the class in group activities.

Further research can use this integrated motivation model, with larger populations in different contexts than the current study. Although this study's results indicate that only a few latent variables were proven to affect significantly, they need to be further tested in different contexts with the relationship between other latent variables.

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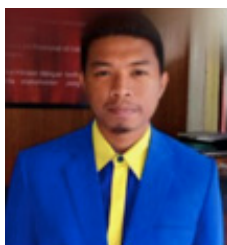
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REFERENCES

- Barclay, D., Higgins, C., & Thompson, R. (1995). The Partial Least Square (PLS). Approach to causal modeling: Personal computer adoption and use as an illustration. *Technol. Stud*, 2(2), 2.
- Hair, J. F. (Ed.). (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (Second edition). Sage.
- Huang, B., & Hew, K. F. T. (2016). Measuring learners' motivation level in massive open online courses. *International Journal of Information and Education Technology*, 6(10), 759–764.
- Izmirli, S., & Izmirli, O. S. (2015). FACTORS MOTIVATING PRESERVICE TEACHERS FOR ONLINE LEARNING WITHIN THE CONTEXT OF ARCS MOTIVATION MODEL. *Turkish Online Journal of Distance Education*, 16(2). <https://doi.org/10.17718/tojde.26620>
- Jacobi, L. (2018). What Motivates Students in the Online Communication Classroom? An Exploration of Self-Determination Theory. *Journal of Educators Online*, 15(2), 1–16. <https://doi.org/10.9743/jeo.2018.15.2.1>
- Jokelova, A. (2013). ARCS motivational model: Theoretical concepts and its use in online courses. *2013 IEEE 11th International Conference on Emerging ELearning Technologies and Applications (ICETA)*, 189–194. <https://doi.org/10.1109/ICETA.2013.6674427>
- Keller, J. M. (2008). First principles of motivation to learn and e³-learning. *Distance Education*, 29(2), 175–185. <https://doi.org/10.1080/01587910802154970>
- Mahande, R. D., & Akram, A. (2020). MOTIVATIONAL FACTORS UNDERLYING THE USE OF ONLINE LEARNING SYSTEM IN HIGHER EDUCATION: AN ANALYSIS OF MEASUREMENT MODEL. *Turkish Online Journal of Distance Education*, 22(1), 89–105. <https://doi.org/10.17718/tojde.849888>
- Maziriri, E. T., & Madinga, N. W. (2018). Data to model the prognosticators of luxury consumption: A partial least squares-structural equation modelling approach (PLS-SEM). *Data in Brief*, 21, 753–757. <https://doi.org/10.1016/j.dib.2018.10.032>
- Mohamad, S. N. M., Salleh, M. A. M., & Salam, S. (2015). Factors Affecting Lecturers Motivation in Using Online Teaching Tools. *Procedia - Social and Behavioral Sciences*, 195, 1778–1784. <https://doi.org/10.1016/j.sbspro.2015.06.378>
- Moore, L. L., Grabsch, D. K., & Rotter, C. (2010). Using Achievement Motivation Theory to Explain Student Participation in a Residential Leadership Learning Community. *Journal of Leadership Education*, 9(2), 22–34. <https://doi.org/10.12806/V9/I2/RF2>
- Nunnally, J. C., & Bernstein, I. (1994). *Psychometric theory*. McGraw-Hill.

- Raeisi, M., Hadadi, N., Faraji, R., & Salehian, M. H. (2012). *McClelland's motivational needs: A case study of physical education teachers in West Azarbaijan*. 4.
- Sergis, S., Sampson, D. G., & Pelliccione, L. (2018a). Investigating the impact of Flipped Classroom on students' learning experiences: A Self-Determination Theory approach. *Computers in Human Behavior*, 78, 368–378. <https://doi.org/10.1016/j.chb.2017.08.011>
- Sergis, S., Sampson, D. G., & Pelliccione, L. (2018b). Investigating the impact of Flipped Classroom on students' learning experiences: A Self-Determination Theory approach. *Computers in Human Behavior*, 78, 368–378. <https://doi.org/10.1016/j.chb.2017.08.011>
- Taha, A. M., & Thang, S. M. (2014). A Preliminary Study on the Influence of a Literature Online Support System (LitOSS) on Malaysian Learners' Motivation. *Procedia - Social and Behavioral Sciences*, 118, 251–258. <https://doi.org/10.1016/j.sbspro.2014.02.034>
- Turabik, T., & Baskan, G. A. (2015). The Importance of Motivation Theories in Terms Of Education Systems. *Procedia - Social and Behavioral Sciences*, 186, 1055–1063. <https://doi.org/10.1016/j.sbspro.2015.04.006>
- Vero, E., & Puka, E. (2017). The Importance of Motivation in an Educational Environment. *FORMAZIONE & INSEGNAMENTO. Rivista Internazionale Di Scienze Dell'educazione e Della Formazione*, 15(1), 57–66.
- Yudatama, U., Hidayanto, A. N., Nazief, B. A. A., & Phusavat, K. (2019). Data to model the effect of awareness on the success of IT Governance implementation: A partial least squares structural equation modeling approach (PLS-SEM). *Data in Brief*, 25, 104333. <https://doi.org/10.1016/j.dib.2019.104333>