Understanding the Generation Z Behavior on D-Learning: A Unified Theory of Acceptance and Use of Technology (UTAUT) Approach

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Abstract—The present research explores how the young people maximize their potential in learning based on their generation. The Generation Z is considered as the generation that is still in high school and college education, which made this generation dominated by internet of things. This research is needed to be conducted to minimize the gap between Generation X and Y as the teacher or content providers and Generation Z as the students. A measurement of Generation Z in accepting the technology on learning is conducted by using a behavioral model, namely a unified theory of acceptance and use of technology (UTAUT). A confirmatory factor analysis with structural equation model was conducted, and sampling of Generation Z respondents was performed. The total of 150 respondents' data was analyzed. The result shows that most of the measured variables have the significant and positive correlations. Facilitation condition factor is explored to be the most dominated factor to affect the Generation Z behavior intention. Several practical implications are discussed.

Keywords—Generation Z, Digital Learning, UTAUT, Confirmatory Factor Analysis, Behavior Intention

1 Introduction

Nowadays, the trends towards digital-oriented learnings in most activities are becoming a main concern that must be considered for every education process. The learning media, such as the use of videos in classroom, distance learning, collaborative online learning, and many more can be the most effective ways to engage and increase the understanding of learners [1]. The use of Massive Open Online Course (MOOC), which currently influences the traditional campus-based education, also shows great promises [2]. A digital-oriented learning, also called digital learning or D-learning, consists of broader technologies and digital tools to support learning aside from the two examples given before. These tools include online and formative assessment, online content and courses, and applications of technology in the classroom and school

building, D-learning can also be explained as the combination of mobile learning and e-learning [3]. The success of digital learning mediation is, without a doubt, influenced by how the user familiar and able to use the media optimally. Based on several evidences, most of the usages of technological media are dominated by millennial and post-millennial generations [4, 5]. While millennial usage of technology is as intense as the post-millennial, the post-millennial is more relevant to this study. It is because even the youngest of millennial which were born in 1995 is already 23 years old, not the biggest age group that are enrolled in education with only 55% participation rate. The biggest one, the 15-19 years old students, have 85% participation rate and they are all Generation Z. [6].

The Generation Z is the productive age generation after the Millennial. Generation Z is also labeled as the digital natives generation, borrowing the term from Prensky [7], meaning the generation which grows up in the digital age. It was investigated by many previous researchers that the paradigm of learning in every generation gives significant differences [8]. A simple example is how most baby boomers used a simple board with less technological touch for their learning. The next generation, which is Generation X, used a technology such as overhead projector and personal computer as the main part of learning media [9]. Technological domination came after that with Millennials as the primary users, even so, technologies that enable digital learning such as Web 2.0, Telepresence, and course management are yet available. It is different for the Generation Z, the enabling technologies are already matured [10]. The fact that the teachers is from previous generation, the Millennials, who are accustomed to dominant Information and Communication Technology (ICT) usage, also support this process of D-learning implementation of Generation Z. Generation Z online learning platforms are relatively matured, but it does not mean that project the entirety of the success rate of how the D-learning is being utilized, especially on behavioral aspect that is unpredictable. Therefore, it is important to understand how D-learning are being used by the Generation Z and their behavior towards them.

Among the numerous behavioral theories on IT adoption, the Unified Theory of Acceptance and Use of Technology (UTAUT) is selected. This theory is used by many researches to understand user behavior towards technology. Thus, this model is relatively suitable for assessing the Generation Z behavior towards the use of D-learning. The rest of this paper is organized as follows: section 2 describes the related literature on this research. Followed by section 3 is the research methodology, where the instrument development and the analysis tools are presented. In the section 4, the analysis, this research will try to reveal insights from the data in the form of statistical analysis and managerial implications. Concluded in section 5, we draw some conclusions on this research as well as the limitation and the suggestion for future research.

2   Literature Review

2.1   Generation Z

Generation Z is defined as people born after 1995, the year when the commercialization of the internet started [11]. Being exposed to vast amounts of digital technologies since they are born, Generation Z developed different characteristics compared to the generation before them, the Millennials. Generation Z, in this current time study, is the generation in which they all in education process. To be precise, the oldest people in this generation are 23 years old whom can be seen as fresh graduated student. The Generation Z, in a few decades, will become the major generation due to the cycle of life. In the education lifecycle, the Generation Z utilizes massive use of digital technologies. Not only for formal learnings, but also for the daily informal learning, even in the form of social media learnings, which are practically conducted also with the help of digital media [12]. The Generation Z is a very competent technology user, being exposed to social media and internet since they are born, Generation Z also becomes more and more dependent these kinds of modern technologies [13]. Thus, the online platform such as social media, online gaming, and online education as well as the online communications are the most common media used.

2.2   Digital Learning

Digital learning or D-learning is a term that is increasingly replacing electronic learning or e-learning. It is defined as the use of ICT in the open and distance learning. Digital learning encompasses many tools related to how technology can improve the learning process. These tools include the interactive learning resource, digital content learning, software or simulations that engage students in academic content, access to academic documents, online and computer-based assessment, educative videos, educative articles, and many other tools. Digital learning also encompasses learning supported by portable devices, or simply called m-learning. Digital learning is broader than e-learning or m-learning because digital learning can also be defined as the combination of both e-learning and m-learning [3]. Although many past researches discussed different types of usage implementation in digital learning, the results have many variations of outcome [14-17].

There are several considerations to ensure the optimality of digital learning implementation such as the infrastructure, the knowledge towards the technology, the surrounding environments and the maturity of the technology itself. As for the infrastructure, this dimension becomes important to support the implementation [18]. Many implementations of ideas are failed due to the lack of infrastructures [19]. Figure 1 shows how a campus represents an adequate system for digital learning infrastructure. As it can see from the Figure 1, there are many features provided to support the z-generation in using the functioned menu, such as course schedule, GPA, online course, and many more.

Fig. 1. Digital learning infrastructure Source: ITS online system [20]

The second consideration is the knowledge of the users, which is vital for the implementer of the process. The user's knowledge of technology will make the process of adjusting to the change when the improvement of the tools done faster and easier. Several researches show how the knowledge of technology helps the user in using the particular technology [21, 22]. The third component is the surrounding environment. It is necessary to ensure that the surrounding situation supports the implementation of a technology. An adequate knowledge and good infrastructures are nothing if the surroundings do not support the realization. The fourth aspect is the maturity of the technology, where the broad usage of technology escalates the successfulness of using the particular technology. This maturity effects of a particular can be seen from the previous research [23]. Tutorials and courses presented in videos and images through online sources are the projections of how the maturity aspect is justified.

2.3   UTAUT

The Unified Theory of Acceptance and Use of Technology (UTAUT) is a theory that developed by Venkatesh et al., [24] in 2003 aimed to explain user intention to use an information system (IS). The model is theorized that there are four constructs which will play a significant role as direct determinants of IS usage. These four constructs are: performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) as it can be seen in Figure 3. PE is understood as the level of user perceives the system will help him or her achieve the benefit in job performance.

EE is best understood as the stage of how the user perceives the ease in using the system. SI is defined as the degree of how user perceived them though of important from others in regards of how he or she use the system. FC is the level of user believes

that the infrastructures as well as the control behavior against the system exist to help the use of the system. Behavior Intention (BI) is the user perception of their likelihood to engage in certain behavior [25-28].
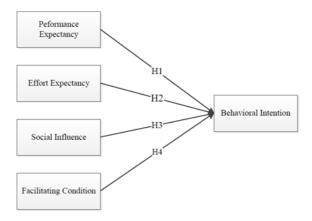

Fig. 2. UTAUT and the hypothesis

Numerous research studies use the UTAUT concept in the broad range of technologies [29-32] .The constructs and moderators were developed by doing reviews, mappings, and integration of eight dominant theories and models. Which are: the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behavior (TPB), a combined Theory of Planned Behavior and Technology Acceptance Model (C-TPB-TAM), the Model of PC Utilization (MPCU), the Innovation Diffusion Theory (IDT), and the Social Cognitive Theory (SCT) [33]. The present research excluded all the moderators with the purpose of finding a more general view on Generation Z and their behavior towards D-learning. Thus, the moderation, such as age others are not relevant in this study. The present research also used FC not to predict usage behavior, but rather the behavioral intention. Another study had also done this, the reason is to enhance the better understanding in predicting behavior intention [34].

In the present research, PE is defined as how the Generation Z people perceive D-learning usefulness in their activity as students. There were several studies related how the PE has a good influence on the users' BI for several cases [35-37]. This is also plausible applied to Generation Z, where they engage frequently with many digital objects during their performance activities. Thus, looking at the positive results from the past researches, the present research proposes the hypothesis of:

H1: Performance Expectancy is having a positive affect to Generation Z' Behavior Intention to use the D-learning.

EE in this research is defined as how the Generation Z feels the easy use of using the D- learning during their usage. In the past studies, many evidences showed how the EE has a positive influence on the users' BI [36, 37]. Thus, we proposed the following the second hypothesis:

H2: Effort Expectancy is having a positive affect to Generation Z' Behavior Intention to use the D-learning.

SI in the current study is described as how the Generation Z senses the influences of someone important to them suggesting the use of D-learning. Previous evidences in several studies reveal how the SI has a positive influence on the users' BI [35-37]. In regards of the previous studies, the following hypothesis is made:

H3: Social Influence is having a positive affect to Generation Z' Behavior Intention to use the D-learning.

FC in this case is projected as how the Generation Z perceives the infrastructure and the control behavior of his or her ability to support the use D-learning. Previous evidences in several studies reveal how the FC has a positive influence on the users' BI [35]. Therefore, this hypothesis is constructed:

H4: Facilitating Condition is having a positive affect to Generation Z' Behavior Intention to use the D-learning.

3   Research Methodology

The present research uses the confirmatory factor analysis approach, which means that we use the established model in confirming the ideation case of how the Generation Z' behavior intention in doing D-learning. We used questionnaire as a development instrument for extracting the data needed. The questionnaire consisted of two sections. The first section asks the respondents' information background. The second section asks the measured 5 variables projected with the total of 13 indicators, presented in questions which are shown in Table 1.

Table 1. List of questions and variables projected

Variables	Construct definition/Item in questionnaire	Variables	Construct definition/Item in questionnaire
PE1	I would find digital learning useful for my life as a student	SI2	People who are important to me think that I should do digital learning.
PE2	Doing digital learning enables me to accomplish tasks more quickly.	FC1	I have the resources necessary to do digital learning.
EE1	My interaction with digital learning systems would be clear and understandable.	FC2	I have the knowledge necessary to do digital learning.
EE2	It would be easy for me to become skilful at using digital learning systems	BI1	I intend to do digital learning in the next 1 year.
EE3	I would find digital learning systems easy to use.	BI2	I predict I would do digital learning in the next 1 year.
EE4	Learning to operate digital learning systems is easy for me.	BI3	I plan to do digital learning in the next 1 year.
SI1	People who influence my behavior think that I should do digital learning.		

The measured variable is used the five-point Likert scale, ranging from "I strongly disagree" to "I strongly agree". The design of sampling approach is conducted by
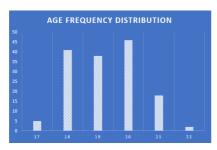
multiple cross-sectional designs, where several institutions' students are participating. The sampling was collected by non-probability sampling with the purposive sampling method, where the eligible respondents are in the Z Generation age range. The questionnaire media in this research are performed by online questionnaire. The online form was distributed in the span of three months, ranging from September to November 2018. The collected data will be analyzed by structural equation model (SEM) approach. The SEM in this research will be calculated by SPSS AMOS software. Four hypotheses are prepared to be evaluated. In order to validate the analysis, several tests will be conducted. The first test is the data test, where the reliability and the convergent validity are tested by several approaches such as: Cronbach alpha, composite reliability and average variance extracted. A rule of thumb for this minimum threshold tests are 0.7, 0.7, and 0.5 respectively. The second test is the model test, several tests such as: Goodness of Fit (GFI), Normed Fit Index (NFI), Comparative Fit Index (CFI), and Tucker Lewis Index (TLI) are used. The minimum threshold needed for those parameters are 0.8.

4 Analysis and Result

4.1 Descriptive statistics

Our 150 respondents consist of 65 male, 83 females, and 2 preferred not to answer. Our respondents came from the total of 13 cities across Indonesia. From those 13 cities, our respondents are spread around 13 universities in Indonesia. Identified as Generation Z, our respondents' age ranged from 17 to 22. The age distributions are shown in Figure 3. Our questionnaire also includes a question regarding their purpose of doing digital learning. From this question, we have found that most respondents (51 people or equal to 34%), do digital learning to learn things outside their school education.

The next group of 35 people (23.33%), they utilize digital learning as their main source of education. The third group of 23 people (15.33%), they use the digital learning as a complement to their main education. The next group of 22 people (14.67%), they implement the digital learning because they are required to do it. The last group of 19 people (12.67%), they utilize the digital learning for the entertainment purpose. Questions regarding what the used device on digital learning are also asked, where the result is also shown in Figure 3. The last information regarding digital learning demographics is what type of media our respondents use when doing digital learning, the top three medias that are used is: educational videos, university e-learning, and paid courses.
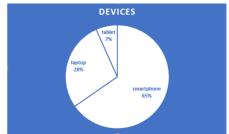
Fig. 3. Respondents' Age Distribution & Respondents' Device Use When Doing Digital Learning

4.2 Data Analysis

The model based on UTAUT was measured using SPSS AMOS 20, with the maximum likelihood method. We performed several measurements that consist of Factor Loadings, Cronbach's Alpha, Composite Reliability and Average Variance Extracted to test the reliability and convergent validity. Factor analyses are used to determine whether a set of variables measure similar concepts. It is also done to reduce the data size, getting small set of variables from a large set of variables. For the present research, it is used to determine whether the questions used in the questionnaire represent the same concept for each variable. The bigger factor loadings means more similar relationship between questions [38]. When determining the internal consistency, on how closely related a set of items are as a group, Cronbach's α is used. The value of Cronbach's α reflects the internal consistency between the indicators of a constructed factor [39]. Composite Reliability (CR) is an alternate reliability measurement tool aside from Cronbach's α. It is because CR draws on the standardized loadings or the factor loadings in the constructed formula and in turns provides a more precise estimation [40]. Average Variance Extracted (AVE) is the average quantity of variance in observed variable where the latent construct can be explained [41]. If the discriminant validity has factor that are more than one, to assess the convergence of each factor in the proposed model, AVE can be used. Questionnaire used in the present research has surpassed the minimum requirement for the reliability and convergent validity as shown on Table 2.

Table 2 presents the summary of our questionnaire reliability and convergence validity analysis result using observed variable for each factor in our online questionnaire. PE as our first factor has two observed parameters as presented by PE1 and PE2. The following factor is EE which has four observed parameters namely EE1, EE2, EE3, and EE4. The third factor is SI that has two observed parameters with symbol SI1 and SI2. The fourth factor is FC that has two observed parameters namely FC1 and FC2. The last factor is BI that has three observed parameters namely BI1, BI2, and BI3.

Each item in Table 2 have the value of factor loadings higher than 0.7 which is the recommended minimum value on determining whether a questionnaire is good enough in explaining dimensionality of PE, EE, SI, FC, and BI. Each item in the Cronbach's α column also surpasses the minimum value required, that is 0.7, this means that stable

consistency for each question can be proven in describing the measured factor. Supporting the consistency explained by the Cronbach's α, composite reliability (CR) minimum required value are also surpassed by every item representing all five factors, more than 0.6 CR. The next and last measurement is AVE, in which the overall variance is measured. With the recommended minimum AVE value of 0.5 and the fact that each factor surpasses this value, it indicates that the questionnaire used in the present research was good enough to explain factors by its convergent validity. To validate the SEM analysis, a model fit analysis was performed with the intention to measure the model fitness based on several indicators, the result is shown on Table 3. All the fit tests are surpassing the minimum threshold for model fit. This results indicate that the present model is fit enough to represent the practical condition in the field situation.

Table 2. Questionnaire reliability and convergent validity measurement result

Factor	Item	Factor Loadings (>0.7)[a] [42, 43]	Cronbach's α (>0.7)[a] [44, 45]	Composite Reliability (>0.6)[a] [46, 47]	AVE (>0.5)[a] [46, 47]
Performance Expectancy	PE1	0.75	0.7	0.7	0.5
	PE2	0.7			
Effort Expectancy	EE1	0.77	0.9	0.9	0.6
	EE2	0.87			
	EE3	0.76			
	EE4	0.8			
Social Influences	SI1	0.81	0.9	0.9	0.8
	SI2	0.95			
Facilitating Condition	FC1	0.81	0.8	0.8	0.8
	FC2	0.74			
Behavioral Intentions	BI1	0.81	0.9	0.9	0.7
	BI2	0.84			
	BI3	0.94			

[a] indicates the required value

Table 3. Model Fit Results

Model fit parameters	Result	Minimum Value
GFI	0.826	0.8 [48]
NFI	0.829	0.8 [49]
CFI	0.874	0.8 [49]
TLI	0.838	0.8 [50]

After doing questionnaire and model fit measurements, the next step is analyzing the hypotheses testing. The result is shown in the Fig. 4. which illustrate our SEM. From the Figure 4, a positive correlation of all 4 factors can be seen. PE has a positive correlation to BI with the value of 0.34. EE has a positive correlation to BI with the value of 0.20. SI has the smallest positive correlation to BI which is 0.18. Lastly, facilitating condition has a positive correlation to BI with the value of 0.38. Hence, all four hypotheses were proven to have positive path correlations. The total representation of Behavioral Intention in this research is 33%, which means the model able to describe the 33% total of Generation Z intention in using D-Learning.
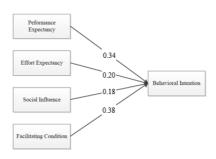
Fig. 4. Model result

In order to see the significance correlation on each hypothesis, a bootstrap is performed. We use 1000 dummy samples because the current sample research is relatively small (N<400), the 1000 dummy samples will be compared to real data and the analysis will generate the significant value with the bias corrected confidence intervals of 95, and maximum likelihood (ml) parameter were used as recommended by the empirical research [25-27]. The significance value of direct effect between each factor is shown on Table 4. Table 4 shows that FC has a major influence on the overall model compared to the other factors. This indicates that FC will have to be considered as the success factor of digital learning in the perspective of Generation Z.

Table 4. Significant Value on Each Hypothesis

Correlation between factor	Direct correlation	
	Estimate (β)	*Significance (p)*
BI ← PE	.343	.004
BI ← EE	.198	.029
BI ← SI	.182	.058
BI ← FC	.375	.004

4.3 Managerial Interpretation

In the present research, we have been trying to discuss how the UTAUT model able to analyze the Generation Z from statistical and managerial interpretation. From the analysis, the result shows that the UTAUT model described the 33% of total Z-Generation intention. The fourth hypothesis, as can be seen in the Fig.4. shows the biggest value, this means that the fourth hypothesis or Facilitating Conditions (βFC➔BI = 0.375) has the strongest path correlation to the Behavioural Intention factor compared to other path correlation. This shows that Generation Z's intention to do digital learning is strongly affected by the facility and resources needed to do digital learning. Facility and resources could equate to how easy the system is and at what level the Generation Z understand the digital learning systems. To improve this factor from the managerial perspective, an easier learning resources system can be developed. When we see the weakest correlation (βSI➔BI = 0.375), it indicates that the Z-Generation ability and

knowledge regarding the D-learning are majorly from the self-taught. This self-taught situation is good for independent learning. Thus, emphasizing the other aspects such as PE and EE to improve their internal perspective are preferred.

5　Conclusion

The present research investigates the behavioral intention of Z-Generation in using the D-Learning. We performed the confirmatory factor analysis and 150 respondents were participated. The respondents were measured by using the UTAUT model and four hypotheses were tested. The result shows how the UTAUT model able to depict the 33% of respondents' behavioral intention in using D-Learning. Four hypotheses are all accepted. The insights from this research are facility and resources could escalate the Generation Z understanding the digital learning systems. To support the factor from the managerial perspective, an easier learning resources system can be developed. The self-taught situation is good for independent learning. Thus, emphasizing the other aspects such as PE and EE as well as FC to improve their internal perspective is preferred. The study has several limitations, where the first is related to the limitation of the explored factors. Adding more factors should be conducted for future research. The second limitation is related to university respondents. Adding types of respondents such as high school or other relevant types of education are suggested to be measured in future research.

6　References

[1] E. Tan and N. Pearce, "Open education videos in the classroom: Exploring the opportunities and barriers to the use of YouTube in teaching introductory sociology," Research in Learning Technology, vol. 19, 2012.

[2] M. Brown, "Why Invest in MOOCs? Strategic Institutional Drivers," in "The 2018 OpenupEd Trend Report on MOOCs," European Association of Distance Teaching Universities, Maastricht, Netherlands2018, Available: https://tinyurl.com/2018OpenupEdtrendreport

[3] S. Kumar Basak, M. Wotto, and P. Bélanger, "E-learning, M-learning and D-learning: Conceptual definition and comparative analysis," E-Learning and Digital Media, vol. 15, no. 4, pp. 191-216, 2018. https://doi.org/10.1177/2042753018785180

[4] J. JIANG. (2018, November 15th). Millennials stand out for their technology use, but older generations also embrace digital life. Available: https://pewrsr.ch/2Fjz6zi

[5] M. A. J. JIANG. (2018, November 15th). Teens, Social Media & Technology 2018. Available: http://www.pewinternet.org/2018/05/31/teens-social-media-technology-2018/

[6] OECD, Education at a Glance 2018. 2018.

[7] M. Prensky, "Digital natives, digital immigrants part 1," On the horizon, vol. 9, no. 5, pp. 1-6, 2001. https://doi.org/10.1108/10748120110424816

[8] M. Monaco and M. Martin, "The millennial student: A new generation of learners," Athletic Training Education Journal, vol. 2, no. 2, pp. 42-46, 2007.

[9] J. Muttappallymyalil, S. Mendis, L. J. John, N. Shanthakumari, J. Sreedharan, and R. B. Shaikh, "Evolution of technology in teaching: Blackboard and beyond in Medical Education," Nepal journal of epidemiology, vol. 6, no. 3, p. 588, 2016.

[10] J. Naughton, "The evolution of the Internet: from military experiment to General Purpose Technology," Journal of Cyber Policy, vol. 1, no. 1, pp. 5-28, 2016. https://doi.org/10.1080/23738871.2016.1157619

[11] D. C. Mowery and T. Simcoe, "Is the Internet a US invention? —an economic and technological history of computer networking," Research Policy, vol. 31, no. 8-9, pp. 1369-1387, 2002. https://doi.org/10.1016/S0048-7333(02)00069-0

[12] A. Turner, "Generation Z: Technology and social interest," The Journal of Individual Psychology, vol. 71, no. 2, pp. 103-113, 2015. https://doi.org/10.1353/jip.2015.0021

[13] D. E. Greydanus and M. M. Greydanus, "Internet use, misuse, and addiction in adolescents: current issues and challenges," 2012.

[14] J. L. Alty, A. Al-Sharrah, and N. Beacham, "When humans form media and media form humans: An experimental study examining the effects different digital media have on the learning outcomes of students who have different learning styles," Interacting with Computers, vol. 18, no. 5, pp. 891-909, 2006. https://doi.org/10.1016/j.intcom.2006.04.002

[15] D. B. Clark, B. C. Nelson, H.-Y. Chang, M. Martinez-Garza, K. Slack, and C. M. D'Angelo, "Exploring Newtonian mechanics in a conceptually-integrated digital game: Comparison of learning and affective outcomes for students in Taiwan and the United States," Computers & Education, vol. 57, no. 3, pp. 2178-2195, 2011. https://doi.org/10.1016/j.compedu.2011.05.007

[16] M. Alnabhan and Y. Aljaraideh, "Collaborative M-Learning Adoption Model: A Case Study for Jordan," International Journal of Emerging Technologies in Learning (iJET), vol. 9, no. 8, pp. 4-10, 2014. https://doi.org/10.3991/ijet.v9i8.3639

[17] M. Huda et al., "Big data emerging technology: insights into innovative environment for online learning resources," International Journal of Emerging Technologies in Learning (iJET), vol. 13, no. 1, pp. 23-36, 2018. https://doi.org/10.3991/ijet.v13i01.6990

[18] L. Uden, I. T. Wangsa, and E. Damiani, "The future of E-learning: E-learning ecosystem," in Digital EcoSystems and technologies conference, 2007. DEST'07. Inaugural IEEE-IES, 2007, pp. 113-117: IEEE.

[19] A. J. Romiszowski, "How's the e-learning baby? Factors leading to success or failure of an educational technology innovation," Educational technology, vol. 44, no. 1, pp. 5-27, 2004.

[20] Google Play. myITS Mahasiswa - Apps on Google Play. Available: https://play.google.com/store/apps/details?id=id.ac.its.my.mahasiswa

[21] J. Lam and M. Lee, "Bridging the digital divide-The roles of Internet self-efficacy towards learning computer and the Internet among elderly in Hong Kong, China," in System Sciences, 2005. HICSS'05. Proceedings of the 38th Annual Hawaii International Conference on, 2005, pp. 266b-266b: IEEE. https://doi.org/10.1109/HICSS.2005.127

[22] P.-C. Sun, R. J. Tsai, G. Finger, Y.-Y. Chen, and D. Yeh, "What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction," Computers & education, vol. 50, no. 4, pp. 1183-1202, 2008. https://doi.org/10.1016/j.compedu.2006.11.007

[23] T. Albert, M. G. Moehrle, and S. Meyer, "Technology maturity assessment based on blog analysis," Technological Forecasting and Social Change, vol. 92, pp. 196-209, 2015. https://doi.org/10.1016/j.techfore.2014.08.011

[24] V. Venkatesh, M. G. Morris, G. B. Davis, and F. D. Davis, "User acceptance of information technology: Toward a unified view," MIS quarterly, pp. 425-478, 2003. https://doi.org/10.2307/30036540

[25] I. Mufidah, B. C. Jiang, S.-C. Lin, J. Chin, Y. P. Rachmaniati, and S. F. Persada, "Understanding the Consumers' Behavior Intention in Using Green Ecolabel Product through Pro-Environmental Planned Behavior Model in Developing and Developed

Regions: Lessons Learned from Taiwan and Indonesia," Sustainability, vol. 10, no. 5, p. 1423, 2018. https://doi.org/10.3390/su10051423

[26] J. Chin, B. Jiang, I. Mufidah, S. Persada, and B. Noer, "The Investigation of Consumers' Behavior Intention in Using Green Skincare Products: A Pro-Environmental Behavior Model Approach," Sustainability, vol. 10, no. 11, p. 3922, 2018. https://doi.org/10.3390/su10113922

[27] S.-C. Lin, R. Nadlifatin, A. R. Amna, S. F. Persada, and M. Razif, "Investigating citizen behavior intention on mandatory and voluntary pro-environmental programs through a pro-environmental planned behavior model," Sustainability, vol. 9, no. 7, p. 1289, 2017. https://doi.org/10.3390/su9071289

[28] Z. Shana and E. Abulibdeh, "Cloud Computing Issues for Higher Education: Theory of Acceptance Model," International Journal of Emerging Technologies in Learning (iJET), vol. 12, no. 11, pp. 168-184, 2017. https://doi.org/10.3991/ijet.v12i11.7473

[29] S. AlAwadhi and A. Morris, "The Use of the UTAUT Model in the Adoption of E-government Services in Kuwait," in Hawaii International Conference on System Sciences, Proceedings of the 41st Annual, 2008, pp. 219-219: Ieee. https://doi.org/10.1109/HICSS.2008.452

[30] K. I. Al-Qeisi, "Analyzing the use of UTAUT model in explaining an online behaviour: Internet banking adoption," Brunel University Brunel Business School PhD Theses, 2009.

[31] A. Gruzd, K. Staves, and A. Wilk, "Connected scholars: Examining the role of social media in research practices of faculty using the UTAUT model," Computers in Human Behavior, vol. 28, no. 6, pp. 2340-2350, 2012. https://doi.org/10.1016/j.chb.2012.07.004

[32] C.-S. Yu, "Factors affecting individuals to adopt mobile banking: Empirical evidence from the UTAUT model," Journal of Electronic Commerce Research, vol. 13, no. 2, p. 104, 2012.

[33] M. D. Williams, N. P. Rana, Y. K. Dwivedi, and B. Lal, "Is UTAUT really used or just cited for the sake of it? a systematic review of citations of UTAUT's originating article," in ECIS, 2011, p. 231.

[34] A. Kohnke, M. L. Cole, and R. Bush, "Incorporating UTAUT predictors for understanding home care patients' and clinician's acceptance of healthcare telemedicine equipment," Journal of technology management & innovation, vol. 9, no. 2, pp. 29-41, 2014.

[35] Y.-L. Wu, Y.-H. Tao, and P.-C. Yang, "Using UTAUT to explore the behavior of 3G mobile communication users," in Industrial Engineering and Engineering Management, 2007 IEEE International Conference on, 2007, pp. 199-203: IEEE.

[36] E. AbuShanab and J. Pearson, "Internet banking in Jordan: The unified theory of acceptance and use of technology (UTAUT) perspective," Journal of Systems and information Technology, vol. 9, no. 1, pp. 78-97, 2007. https://doi.org/10.1108/13287260710817700

[37] M. J. Wills, O. F. El-Gayar, and D. Bennett, "Examining healthcare professionals' acceptance of electronic medical records using UTAUT," Issues in Information Systems, vol. 9, no. 2, pp. 396-401, 2008.

[38] O. Torres-Reyna, "Getting started in factor analysis (using Stata 10)," Princeton University, New Jersey, 2010.

[39] L. J. Cronbach, "Coefficient alpha and the internal structure of tests," psychometrika, vol. 16, no. 3, pp. 297-334, 1951.

[40] C. L. Shook, D. J. Ketchen Jr, G. T. M. Hult, and K. M. Kacmar, "An assessment of the use of structural equation modeling in strategic management research," Strategic management journal, vol. 25, no. 4, pp. 397-404, 2004. https://doi.org/10.1002/smj.385

[41] A. M. Farrell and J. M. Rudd, "Factor analysis and discriminant validity: A brief review of some practical issues," 2009: Anzmac.

[42] C. S. Lin, S. Wu, and R. J. Tsai, "Integrating perceived playfulness into expectation-confirmation model for web portal context," Information & management, vol. 42, no. 5, pp. 683-693, 2005. https://doi.org/10.1016/j.im.2004.04.003

[43] C. Fornell and D. F. Larcker, "Evaluating structural equation models with unobservable variables and measurement error," Journal of marketing research, pp. 39-50, 1981. https://doi.org/10.1177/002224378101800104

[44] J. C. Roca, C.-M. Chiu, and F. J. Martínez, "Understanding e-learning continuance intention: An extension of the Technology Acceptance Model," International Journal of human-computer studies, vol. 64, no. 8, pp. 683-696, 2006. https://doi.org/10.1016/j.ijhcs.2006.01.003

[45] J. Nunnally and I. Bernstein, "Psychometric Theory McGraw-Hill New York Google Scholar," 1978.

[46] J.-H. Wu and S.-C. Wang, "What drives mobile commerce?: An empirical evaluation of the revised technology acceptance model," Information & management, vol. 42, no. 5, pp. 719-729, 2005. https://doi.org/10.1016/j.im.2004.07.001

[47] J.-H. Wu, Y.-C. Chen, and L.-M. Lin, "Empirical evaluation of the revised end user computing acceptance model," Computers in Human Behavior, vol. 23, no. 1, pp. 162-174, 2007. https://doi.org/10.1016/j.chb.2004.04.003

[48] P. J. Greenspoon and D. H. Saklofske, "Confirmatory factor analysis of the multidimensional students' life satisfaction scale," Personality and Individual Differences, vol. 25, no. 5, pp. 965-971, 1998. https://doi.org/10.1016/S0191-8869(98)00115-9

[49] G. Abedi, F. Rostami, and A. Nadi, "Analyzing the Dimensions of the Quality of Life in Hepatitis B Patientsusing Confirmatory Factor Analysis," Global journal of health science, vol. 7, no. 7, p. 22, 2015. https://doi.org/10.5539/gjhs.v7n7p22

[50] R. Singh, H. S. Sandhu, B. A. Metri, and R. Kaur, "Organizational performance and retail challenges: a structural equation approach," iBusiness, vol. 3, no. 02, p. 159, 2011.

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