

Factors Affecting Students' Perceived Impact on Learning and Satisfaction with Zoom at University in DKI Jakarta, Indonesia

Siti Julianingsih Nurfitriyani, Nilo Legowo

Information Systems Management Department, BINUS Graduate Program, Master of Information Systems Management, Bina Nusantara University, Jakarta 11480, Indonesia

siti.nurfitriyani@binus.ac.id, nlegowo@binus.edu

Abstract. Amidst the COVID-19 pandemic, universities worldwide, particularly in Indonesia, shifted to online learning through video conferencing platforms such as Zoom, aiming to maintain effective learning experiences. This mode of learning persists even as we transition into the New Normal period. However, concerns have arisen regarding the quality of online teaching and learning via Zoom, with challenges such as low student participation, students disabling webcams, and unresponsiveness to inquiries. Consequently, identifying the factors influencing student satisfaction and perceived learning impact using Zoom becomes critical to better understand their experiences, addressing concerns, and capitalizing on positive outcomes. This study engaged a sample of 398 undergraduate students from the top three universities in DKI Jakarta, who utilized Zoom as their primary video conferencing tool. The research model employed a combination of Flow Theory, Expectation-Confirmation Model (ECM), Technology Acceptance Model (TAM), and Information System Success Model. The findings revealed that student satisfaction was influenced by perceived usefulness, confirmation, and technical and educational system quality. Moreover, satisfaction, perceived enjoyment, and perceived ease of use significantly impacted the students' perceived learning outcomes with Zoom.

Keywords: perceived impact on learning, satisfaction, video conference, zoom

1. Introduction

The Covid-19 outbreak at the beginning of 2020 shocked the world due to its very fast spread in all countries, including one in Indonesia. Related to the Covid-19 pandemic, the Indonesian administration has taken numerous policies to decrease the transmission of Covid-19. This policy affects education, where learning must run online. This is in accordance with a government circular regarding the execution of education through the Covid-19 pandemic.

Learning patterns have changed, where online learning has become popular due to the increasing use of various technologies in online learning during the Covid-19 pandemic (X. Wang et al., 2022). Online learning has created flexible surroundings without physical and geographic boundaries (Spencer et al., 2020). Online learning through live video or video conferencing become the most widely methods that implemented while the Covid-19 pandemic happened. Online learning through video conferencing provides a new way that can adequately facilitate interaction between lecturers and students when they have to be across a distance (Başaran & Hussein, 2023; X. Wang et al., 2022). Learning through the video conference is expected to run effectively because it allows all participants to provide comments, and interact with each other through video and audio (Ekawardhana, 2020).

This research specifically discusses the video conferencing platform that is widely used by various universities especially in Indonesia, namely Zoom. This is evidenced by the number of Zoom users ranks first compared to other video conferencing platforms (Fajrin et al., 2020; Wishnujati et al., 2021).

Even though we are currently entering the New Normal period, several universities in Indonesia and other countries still rely on the use of distance learning technology such as video conferencing software in teaching and learning activities (Camilleri & Camilleri, 2022; Cesco et al., 2021).

However, there are concerns that online teaching and learning activities via Zoom do not have the same quality as face-to-face learning (Puška et al., 2021). One example is with online learning via Zoom, student participation tends to be low, students turn off their webcams and don't answer when called upon (Puška et al., 2021). In addition, there are still many obstacles that students experience during online learning, including inadequate internet access, lack of motivation, difficulties in coordinating work teams, and lack of guidance from teachers (Databoks, 2020; Katadata, 2020).

From these various obstacles, there will be a perceived impact related to online learning. The Indonesian Ministry of Education and Culture said that the impact of online learning caused many students to be unable to absorb learning materials properly because they were not familiar with the tools used, students became lazy because they were not motivated, and students had problems accessing the internet (Kemendikbud, 2021).

Table 1 : Survey Related to Student Difficulties in Online Learning

No	Question	Answer (%)	
		Yes	No
1	The lecturer's material is easy to comprehend.	49,1%	50,9%
2	The length of online learning time is determined by the requirements of the students.	32,1%	67,9%
3	Lecturers participate in the online discussions.	81,1%	18,9%
4	Stable internet network when online learning takes place	47,2%	52,8%
5	The living environment facilitates the online learning process.	43,4%	56,6%
6	Adequate internet quota for online learning	1,5%	58,5%
7	Interaction among students is effective in online learning	30,2%	69,8%
8	Students can adapt to online learning	71,2%	28,8%

Then, based on a survey above, which is distributed on several students at one of the universities in Indonesia who implemented online learning using Zoom, several problems were found, namely 50.9% felt that the material delivered by lecturers online was difficult to understand, 67.9% assessed the duration of online learning is ineffective, and 69.8% rated the interaction between students as ineffective during online learning (Turmuzi et al., 2021).

Derived from some of the problems above, student satisfaction with using Zoom in online learning

is still lacking and the use of Zoom must be evaluated by looking at student perceptions because they have concrete experience of using Zoom during virtual classes (Ifinedo, 2017; Muñoz-Carril et al., 2021; Suadi, 2021).

Online education quality during Covid-19 has attracted the attention of many researchers because most students are considered psychologically unprepared for the transformation to online learning (Belhaj et al., 2022). Therefore, identifying factors that correlated with satisfaction and students' perceived impact in online learning using Zoom is important because it can provide an overview of their experiences, both concerns and positive impacts. If students feel that the learning methods or media used are in accordance with their expectations and learning styles, they will continue to take up these learning methods or media to improve their learning (Ifinedo, 2017)(Muñoz-Carril et al., 2021). By knowing the impact felt by students concerning the usage of tools in learning, institutions can formulate strategies to raise the usage of these tools. However, from the exploration carried out, research models that identify the perceived impact in learning on the tools used have not been widely used and have only been carried out by (Ifinedo, 2017)(Muñoz-Carril et al., 2021). Thus, this research was conducted because there is a gap in the literature and the findings from this research can provide knowledge and understanding for researchers and educational practitioners about factors correlated to the students' perceived impact on learning and also satisfaction with Zoom.

Therefore, this research is proposed to analyze the factors that affecting satisfaction and perceived impact of students with Zoom and adopt a research model (Ifinedo, 2017)(Muñoz-Carril et al., 2021) and consider models from other studies.

2. Literature Review

2.1. Video Conference

According to (Subekti et al., 2020), video conferencing is real-time communication of both audio and video based on IP or the Internet. The advantages of video conferencing include better communication, collaboration, and information flow, more effective and better communication that enables faster exchange of information, and time, cost, and distance efficiencies in the communication process. Other collaborations can be used concurrently, such as the ability to share documents, presentations, and other applications related to the meeting agendas. In addition, according to (Batan, 2018), video conferencing is a technology for sending audio and video that is used together, which allows several users in different places to interact.

One application for conducting video conferencing is the Zoom application. Zoom provides remote conferencing facilities and integrates video conferencing, online discussion, communication, and mobile integration. It is an online meeting application developed by Eric Yuan in 2011 and started operating in January 2013.

Some of the features that can be used on Zoom include being able to communicate via video and audio with HD quality, being able to share screens directly, being able to share files in the form of images, audio, or video, being able to record processes that occur while using Zoom Cloud Meeting, being able to perform chat using text, and can do some reactions.

According to (Brahma, 2020), the Zoom Cloud Meeting application is one of the choices for online learning media during the Covid-19 pandemic. Lecturers and students can conduct video conferences in the form of presentations by sending messages, speaking, to sending learning files such as word, power point, and other teaching materials.

2.2. Perceived Usefulness (PU)

In Expectation Confirmation Model (ECM), perceived usefulness influence satisfaction, which is related to this if students feel the tools or methods used are useful and they feel they have benefited from using these tools, their satisfaction level will also be high (Bhattacharjee, 2001a, 2001b; Ifinedo, 2017; Muñoz-Carril et al., 2021). In addition, according to (Purwati et al., 2022), perceived usefulness

by students in using e-learning have a significant effect on student satisfaction because it makes it easy for students to obtain distance learning, especially throughout the Covid-19 pandemic. Several previous studies confirm that perceived usefulness has an influence on satisfaction (Daneji et al., 2019; Ifinedo, 2017; Muñoz-Carril et al., 2021; Persada et al., 2021; Purwati et al., 2022; Widjaja & Widjaja, 2022).

2.3. Confirmation (CF)

In Expectation Confirmation Model (ECM), the confirmation variable is a variable that influences satisfaction, where student will satisfied with the use of tools will be high if initial expectations are in accordance with the benefits students feel after using these tools (Bhattacharjee, 2001b; Ifinedo, 2017; Muñoz-Carril et al., 2021). Moreover, (Pereira & Tam, 2021) stated if user's expectations are closer to the user's actual experience of system services, the user will be more satisfied with the system. Derived from earlier research, confirmation is an important element of student satisfaction in using technology (Daneji et al., 2019; Ifinedo, 2017; Muñoz-Carril et al., 2021; Persada et al., 2021; Widjaja & Widjaja, 2022).

2.4. Technical System Quality (TSQ) and Educational System Quality (ESQ)

Associated to (Seta et al., 2018), user satisfaction is greatly affected by the quality of technical and educational systems. Education System Quality (ESQ) refers to the availability of attendance, communication, collaborative and active learning features in an e-learning system. Technical System Quality (TSQ) in an e-learning system refers to system navigation, easy findability of information, organized fast access, security, flexibility, interactivity refers to structured design, ease of integration with other systems, and reliable (Seta et al., 2018). In addition, according to (Shahzad et al., 2021), a user-friendly and modern graphic interface and the quality of the system can increase end-user satisfaction.

2.5. Perceived Enjoyment (PE)

Enjoyment in the experience of using tools will make students interested in the application of these tools in their learning activities and will have an effect on the positive impact felt by students (Ifinedo, 2017; Muñoz-Carril et al., 2021). (Pereira & Tam, 2021) stated that user satisfaction will be greater if the enjoyment level of the system is high. In addition, the higher the level of enjoyment felt by students towards learning based on video conferencing, it will result in better student acceptance (Tandra & Tjhin, 2022).

2.6. Perceived Ease of Use (PEU)

In TAM, perceived ease of use is one of the key factor in user acceptance of new technologies. In addition, (Ngo et al., 2020) looked at students' perceptions of using video conference tools based on ease of use and usefulness. Then, in the study there is a heavily relationship among the ease and usefulness of using a tool with motivation in the application and adoption of technology, learning impact, achievement and student performance (Alhumaid et al., 2020; Ifinedo, 2017; Muñoz-Carril et al., 2021).

2.7. Satisfaction (SF)

Student satisfaction with tools will affect the level of experience, positive impact and student performance (Alhumaid et al., 2020; Dwidienawati et al., 2020; Ifinedo, 2017; Muñoz-Carril et al., 2021; Riandi et al., 2021; Seta et al., 2018). According to (Al-Sofi, 2021; Yavuzalp & Bahcivan, 2021) students who are satisfied with learning with e-learning will have an effect on academic achievement.

2.8. Perceived Impact on Learning (PIL)

Perceived impact on learning implies to students' perceptions of learning success or the impact on academic results as an influence on the experience of using the system (McGill & Hobbs, 2008). According to (Ifinedo, 2017) the impact of learning, achievement, and student performance is influenced by the perceived ease of use, perceived usefulness of learning technology, increased

enjoyment of perceived enjoyment, and satisfaction with the technology used. (Muñoz-Carril et al., 2021) in his research states that perceived enjoyment, perceived usefulness, and attitudes, satisfaction as relevant factors on the perceived impact of learning mediated by technology.

3. Research Methodology

3.1. Research Model and Hypothesis

When analyzing factors that affected perceived impact of learning with Zoom, this study will combine the TAM (Davis, 1989), Expectation Confirmation Model (Bhattacharjee, 2001b), Flow Theory (Csikszentmihalyi, 1997), and Information Systems Success Model (Delone & McLean, 2003).

The incorporation of the model in this study was referenced by (Ifinedo, 2017; Muñoz-Carril et al., 2021). (Ifinedo, 2017) in his research took the perceived usefulness and perceived ease of use variables from the TAM model, confirmation variables, satisfaction from the ECM model, and perceived enjoyment variables from Flow Theory to see the association among these variables and the perceived impact on learning using blogs.

Furthermore, from two studies, satisfaction with learning tools or methods is a factor that has a relationship with perceived usefulness, confirmation, and perceived enjoyment variables. However, in this study, user satisfaction is also seen from other factors based on other studies, where several studies measure user satisfaction using the ISS Model (Delone & McLean, 2003). (Seta et al., 2018) adopted the ISS model to assess the success of the e-learning system. In this study, the e-learning system quality variable which is become separated into Technical System Quality (TSQ) and Educational System Quality (ESQ) are the key variable that drives user satisfaction with the e-learning system.

Derived from the TAM model, ECM, Flow Theory, ISS Model, and several related studies, the model designed for this research is as follows:

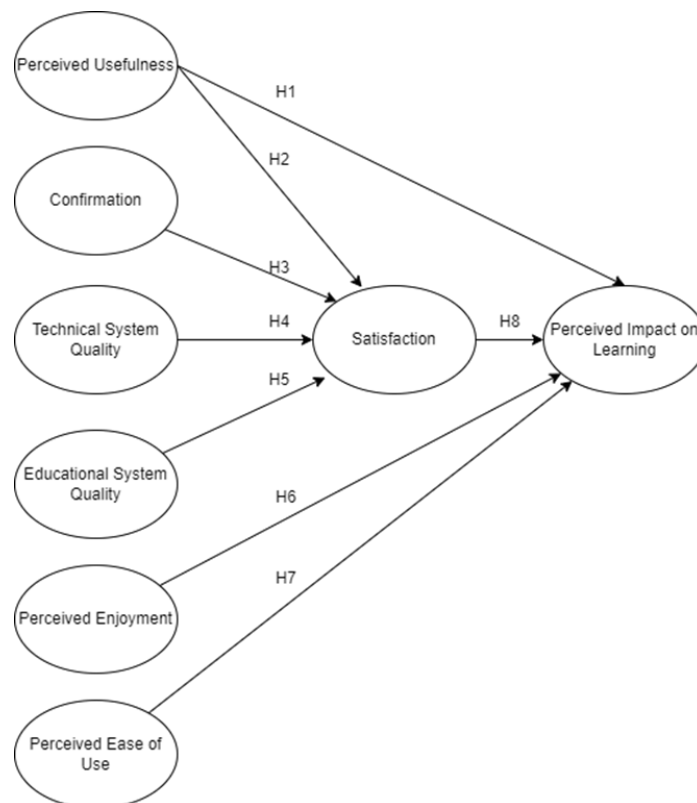


Fig 1: Research Model

Thus, below is the design of the hypothesis:

- H1: Perceived Usefulness has an effect on Perceived Impact on Learning
- H2: Perceived Usefulness has an effect on Satisfaction
- H3: Confirmation has an effect on Satisfaction
- H4: Technical System Quality has an effect on Satisfaction
- H5: Educational System Quality has an effect on Satisfaction
- H6: Perceived Enjoyment has an effect on Perceived Impact on Learning
- H7: Perceived Ease of Use has an effect on Perceived Impact on Learning
- H8: Satisfaction has an effect on Perceived Impact on Learning

3.2. Research Instrument

Questionnaire was used as a research vehicle for data collection. This method is one of the most popular methods of technology acceptance research (Mailizar et al., 2021; L. Y. K. Wang et al., 2019). This questionnaire was created using Gforms and allocated online. The scale used in the questionnaire for this study is a Likert scale from 1 to 5.

From the results of the data collection, it will be known related to the biographies of the respondents, who are undergraduate students at Universities A, B, or C, majors, semesters, verification of gender, age, and discuss questions about the video conferencing platform used for online learning on campus. Then in the next section involves 8 variables with 39 indicators. The following are the indicators and sources used in the research questionnaire:

Table 2. Variables and Indicators

Constructs	Indicators	Code	References
Perceived Usefulness (PU)	Improve academic performance	PU1	(Ifinedo, 2017; Muñoz-Carril et al., 2021; Patrick & Dewi, 2022)
	Increase the effectiveness of learning	PU2	
	Improve the quality of work	PU3	
	Effective for completing tasks	PU4	
	Effective for preparing for exams	PU5	
Confirmation (CF)	The use of the system for learning exceeds expectations	CF1	(Ifinedo, 2017; Muñoz-Carril et al., 2021)
	System service exceeds expectations	CF2	
	All expectations confirmed	CF3	
Technical System Quality (TSQ)	Easy to find information	TSQ1	(Alketbi et al., 2021; Bayastura et al., 2022; Hidayatullah et al., 2020; Patrick & Dewi, 2022; Riandi et al., 2021; Seta et al., 2018)
	Structured	TSQ2	
	Organized	TSQ3	
	Easy to use	TSQ4	
	Interactivity	TSQ5	
	Security	TSQ6	
	Reliability	TSQ7	
	Maintenance awake	TSQ8	
	Flexibility	TSQ9	
	Integrated and consistent	TSQ10	

Educational System Quality (ESQ)	Attendance facilities	ESQ1	(Alketbi et al., 2021; Riandi et al., 2021; Seta et al., 2018)
	Collaborative and active learning	ESQ2	
	Easy and convenient communication	ESQ3	
	Share information effectively and efficiently	ESQ4	
	Convenience of document storage	ESQ5	
	Find information quickly	ESQ6	
Perceived Enjoyment (PE)	Fun in using the system	PE1	(Bayastura et al., 2022; Ifinedo, 2017; Muñoz-Carril et al., 2021; Patrick & Dewi, 2022)
	Interesting to use	PE2	
	Enjoy the thrill of learning	PE3	
Perceived Ease of Use (PEU)	Interaction	PEU1	(Ifinedo, 2017; Muñoz-Carril et al., 2021; Patrick & Dewi, 2022)
	Working with a team made easy	PEU2	
	Supports classroom learning	PEU3	
Satisfaction (SF)	Satisfied as a learning tool	SF1	(Alketbi et al., 2021; Bayastura et al., 2022; Hidayatullah et al., 2020; Ifinedo, 2017; Muñoz-Carril et al., 2021; Patrick & Dewi, 2022; Riandi et al., 2021; Seta et al., 2018)
	Satisfied with creating and sharing knowledge	SF2	
	Satisfied for learning in class	SF3	
	Efficient for learning	SF4	
	Effective for learning	SF5	
	Satisfied with the system	SF6	
Perceived Impact on Learning (PIL)	Positive impact	PIL1	(Ifinedo, 2017; Muñoz-Carril et al., 2021; Seta et al., 2018)
	Important and valuable help	PIL2	
	Saving time	PIL3	

3.3. Data Collection and Data Analysis Techniques

Data collection was acted by allocating online surveys and involving the population population of undergraduate students at the 3 best universities in DKI Jakarta based on (UniRank, 2022). Then, to see the total population at each university, data was taken based on the PDDikti website (PDDikti, 2022). The following the population of undergraduate students at 3 universities for the odd academic year 2022:

Table 2. Population

No	University	Number of Undergraduate Students
1	University A	36.022
2	University B	20.296
3	University C	13.240
Total Population		69.558

From this population, research samples will be taken to represent the number and characteristics of the population (Pamulatri, 2022). Thus, the sample that will be taken is with the criteria of undergraduate students at universities A, B, and C who use Zoom as a video conferencing tools. A

random sampling technique is applied for the collected data because each element of the population has the same probability of being elected (Pamulatri, 2022). Then, in determining the number of samples used the Slovin method. From a population of 69558 students, the sample needed to represent the population is calculated with a margin of error of 5% (95% confidence level) with the following calculations:

$$n = \frac{n}{1 + Ne^2}$$

$$n = \frac{n}{1 + Ne^2} = \frac{69588}{1 + 69588(0.05)^2} = 397,71 \approx 398 \text{ students}$$

Based on the above calculation, the required sample is 398 students and then the proportion of student needs from each university is calculated as follows:

Table 4. Sample Proportions

No	University	Number of Undergraduate Students	Calculate	Sample
1	A	36.022	36022 / 69558 x 398	206
2	B	20.296	20296 / 69558 x 398	116
3	C	13.240	13240 / 69558 x 398	76
Total		69.558		398

Data analysis in this study was carried out using Smart-PLS software to process the data collection obtained. The measurement model consisted of validity and reliability tests, where validity test is carried out with two types, namely convergent validity by analyzing the factor loadings and AVE values, and discriminant validity by analyzing the cross loading value. The reliability test will be carried out by analyzing the value of cronbach's alpha and composite reliability. Then, an analysis of the results of the structural model consisting of R-Square, t-statistics, and p-value was carried out.

4. Results and Discussion

4.1. Respondents Demographics

In this research, respondents were undergraduate students from Universities A, B, and C who had or are currently using the Zoom application as a video conferencing medium during lectures, totaling 398 valid respondents. Respondents from University A consisted of 206 students, University B consisted of 116 students, and University C consisted of 76 students.

From the results obtained, it can be seen that students from University A are dominated by students from the Information Systems major as much as 87 students, then from University B it is dominated by students from the Accounting major as much as 16 students, and from University C it is dominated by students from the Accounting major as much as 30 students. Then, respondents are dominated by fifth semester students by 160 students. As many as 223 respondents are men and 175 respondents are women. All respondents are 17-25 years old, and it was found that the first ranked application used in lecture activities was the Zoom application, followed by Google Meet, Ms Teams, and Discord.

4.2. Measurement Model

In order for the research results to have good accuracy and quality, it is needed to test the validity and reliability (Ohliati & Abbas, 2019; Pamulatri, 2022).

The validity test for the PLS SEM method consisted of convergent validity and discriminant validity (Hidayat, 2018). In this study, convergent validity was analyzed by the value of Factor Loadings and Average Variance Extracted. The factor loading is used as a measure of the validity of the indicators (Benitez et al., 2019)(Benitez et al., 2019). 0.7 is the minimum value of factor loading. Meanwhile, the AVE criteria is to have at least 0.5 (Hair et al., 2020). The discriminant validity is used to ensure that

the correlation of observed variables with the construct is higher than with other constructs (Ghozali & Latan, 2014; Hair et al., 2011).

The reliability test is also known as internal consistency and in this study, the reliability of the construct is to look at the value of Cronbach's Alpha (α) and Composite Reliability (CR) with 0.7 as the minimum value (Benitez et al., 2019; Hair et al., 2020).

4.2.1. Convergent Validity

Convergent validity is a set of indicators represents one latent variable and the underlying latent variable. In this study, convergent validity was computed by the Factor Loadings and Average Variance Extracted value.

Table 5. Factor Loadings Results

Constructs	Indicators	Loading Factors	Result
<i>Perceived Usefulness (PU)</i>	PU1	0.742	Valid
	PU2	0.756	Valid
	PU3	0.722	Valid
	PU4	0.748	Valid
	PU5	0.759	Valid
<i>Confirmation (CF)</i>	CF1	0.808	Valid
	CF2	0.730	Valid
	CF3	0.833	Valid
<i>Technical System Quality (TSQ)</i>	TSQ1	0.712	Valid
	TSQ2	0.768	Valid
	TSQ3	0.710	Valid
	TSQ4	0.754	Valid
	TSQ5	0.751	Valid
	TSQ6	0.763	Valid
	TSQ7	0.748	Valid
	TSQ8	0.753	Valid
	TSQ9	0.722	Valid
	TSQ10	0.707	Valid
<i>Educational System Quality (ESQ)</i>	ESQ1	0.741	Valid
	ESQ2	0.774	Valid
	ESQ3	0.793	Valid
	ESQ4	0.819	Valid
	ESQ5	0.745	Valid
	ESQ6	0.764	Valid
<i>Perceived Enjoyment (PE)</i>	PE1	0.778	Valid
	PE2	0.792	Valid
	PE3	0.805	Valid
<i>Perceived Ease of Use (PEU)</i>	PEU1	0.769	Valid
	PEU2	0.790	Valid
	PEU3	0.831	Valid
<i>Satisfaction (SF)</i>	SF1	0.775	Valid
	SF2	0.712	Valid
	SF3	0.735	Valid
	SF4	0.741	Valid
	SF5	0.743	Valid
	SF6	0.722	Valid
<i>Perceived Impact on Learning (PIL)</i>	PIL1	0.800	Valid
	PIL2	0.779	Valid
	PIL3	0.792	Valid

Derived from the results above, all indicators in the survey model have values above 0.7, indicating

that all indicators have been validated.

Table 6. AVE Results

Constructs	AVE	Result
Perceived Usefulness (PU)	0.556	Valid
Confirmation (CF)	0.626	Valid
Technical System Quality (TSQ)	0.546	Valid
Educational System Quality (ESQ)	0.598	Valid
Perceived Enjoyment (PE)	0.627	Valid
Perceived Ease of Use (PEU)	0.636	Valid
Satisfaction (SF)	0.545	Valid
Perceived Impact on Learning (PIL)	0.625	Valid

Derived from the results above, all variables also valid because values of AVE are above 0.5.

4.2.2. Discriminant Validity

Furthermore, the discriminant validity test is completed by analyzing value of cross loading on each indicator.

Table 7. Cross Loading Results

	CF	ESQ	PE	PEU	PIL	PU	SF	TSQ
CF1	0.808	0.187	0.56	0.497	0.444	0.524	0.507	0.185
CF2	0.73	0.232	0.41	0.424	0.39	0.396	0.482	0.266
CF3	0.833	0.241	0.569	0.567	0.502	0.505	0.554	0.212
ESQ1	0.257	0.741	0.227	0.202	0.267	0.176	0.27	0.229
ESQ2	0.199	0.774	0.192	0.226	0.244	0.165	0.277	0.17
ESQ3	0.28	0.793	0.191	0.245	0.261	0.142	0.268	0.182
ESQ4	0.18	0.819	0.182	0.249	0.229	0.126	0.286	0.206
ESQ5	0.158	0.745	0.141	0.185	0.159	0.162	0.236	0.251
ESQ6	0.213	0.764	0.192	0.223	0.198	0.217	0.264	0.272
PE1	0.55	0.177	0.778	0.522	0.436	0.509	0.533	0.175
PE2	0.517	0.207	0.792	0.578	0.457	0.556	0.517	0.198
PE3	0.485	0.194	0.805	0.559	0.477	0.451	0.51	0.173
PEU1	0.566	0.243	0.562	0.769	0.445	0.482	0.545	0.22
PEU2	0.478	0.225	0.604	0.79	0.48	0.437	0.568	0.228
PEU3	0.472	0.223	0.51	0.831	0.511	0.403	0.544	0.259
PIL1	0.433	0.212	0.44	0.452	0.8	0.402	0.558	0.157
PIL2	0.543	0.268	0.512	0.511	0.779	0.407	0.578	0.23
PIL3	0.358	0.215	0.412	0.461	0.792	0.291	0.568	0.184
PU1	0.402	0.136	0.421	0.392	0.366	0.742	0.415	0.195
PU2	0.505	0.179	0.497	0.464	0.412	0.756	0.445	0.164
PU3	0.424	0.148	0.491	0.389	0.285	0.722	0.343	0.208
PU4	0.475	0.156	0.479	0.408	0.343	0.748	0.448	0.205
PU5	0.43	0.168	0.487	0.388	0.31	0.759	0.444	0.185
SF1	0.448	0.241	0.46	0.502	0.552	0.419	0.775	0.206
SF2	0.504	0.296	0.531	0.54	0.521	0.401	0.712	0.266
SF3	0.509	0.208	0.492	0.549	0.503	0.454	0.735	0.176
SF4	0.476	0.286	0.468	0.411	0.513	0.392	0.741	0.257
SF5	0.53	0.254	0.496	0.554	0.547	0.471	0.743	0.229

SF6	0.41	0.246	0.456	0.505	0.549	0.366	0.722	0.253
TSQ1	0.23	0.246	0.201	0.217	0.155	0.195	0.16	0.712
TSQ2	0.241	0.228	0.194	0.245	0.259	0.204	0.317	0.768
TSQ3	0.137	0.174	0.156	0.147	0.153	0.19	0.155	0.71
TSQ4	0.261	0.209	0.187	0.239	0.224	0.169	0.265	0.754
TSQ5	0.229	0.185	0.201	0.226	0.149	0.182	0.228	0.751
TSQ6	0.203	0.154	0.153	0.23	0.19	0.194	0.247	0.763
TSQ7	0.163	0.188	0.166	0.216	0.149	0.185	0.233	0.748
TSQ8	0.208	0.243	0.153	0.209	0.16	0.23	0.228	0.753
TSQ9	0.152	0.235	0.147	0.225	0.177	0.185	0.231	0.722
TSQ10	0.199	0.227	0.13	0.209	0.102	0.144	0.145	0.707

Derived from the results above, the cross loading values of all indicators with corresponding variables have a higher value than the cross loading values with other variables. These results indicate that all indicators in this study are declared valid.

4.2.3. Reliability Test

Reliability test was carried out by analyzing the value of cronbach's alpha and composite reliability on each research variables.

Table 8. Reliability Results

Construct	Cronbach's Alpha	Composite Reliability	Result
Perceived Usefulness (PU)	0.801	0.862	Reliable
Confirmation (CF)	0.700	0.834	Reliable
Technical System Quality (TSQ)	0.909	0.923	Reliable
Educational System Quality (ESQ)	0.865	0.899	Reliable
Perceived Enjoyment (PE)	0.703	0.835	Reliable
Perceived Ease of Use (PEU)	0.713	0.840	Reliable
Satisfaction (SF)	0.833	0.878	Reliable
Perceived Impact on Learning (PIL)	0.700	0.833	Reliable

Derived from the results above, all variables are reliable because cronbach's alpha and composite reliability are at least 0.7.

4.3. Structural Model

Therefore, the structural model is tested to see the correlation among variables (Ifinedo, 2017; Muñoz-Carril et al., 2021; Ramírez-Correa et al., 2017). The R-Square value contained in the table VI shows that the model in this study is 54.5% representing the condition of the factors that explain Perceived Impact on Learning and 50.4% representing the condition of the factors that explain Satisfaction.

Table 9. R-Square Results

Variable	R Square
Perceived Impact on Learning (PIL)	0.545
Satisfaction (SF)	0.504

4.4. Hypothesis Test

At this stage, the hypothesis is tested and the hypothesis is accepted if the t-statistics is greater than 1.96 and the p-values are less than 0.05. Bellow is the t-statistics and p-values between the variables produced in this study:

Table 10. Hypothesis Test Results

Hypothesis	T-Statistics	P-Values	Findings
PU → PIL	0.092	0.927	Rejected
PU → SF	4.291	0.000	Accepted
CF → SF	8.243	0.000	Accepted
TSQ → SF	2.489	0.013	Accepted
ESQ → SF	5.022	0.000	Accepted
PE → PIL	2.116	0.035	Accepted
PEU → PIL	2.672	0.008	Accepted
SF → PIL	8.718	0.000	Accepted

Based on the tests obtained, it was found that there was one rejected hypothesis and seven accepted hypotheses. Hypothesis testing results indicate that SF is affected by PU, TSQ, CF, and ESQ. Then, it was also found that PE, PEU, and SF had an influence on PIL.

H1: Perceived Usefulness has no significant effect on Perceived Impact on Learning

The H1 outcomes show that students' assessments of the usefulness of the Zoom applications does not has the correlation with the impact of learning, achievement, and student performance as well as the research did by (Nugroho et al., 2018), where in his research the perception of the usefulness of the e-learning system had no effect on student performance. In his research, (Nugroho et al., 2018) explains that perceived usefulness does not affect student performance, one of which is due to the limited scope because the research was performed in one particular educational institution and focused on the implementation of specific e-learning. In addition, research conducted by (Ifinedo, 2017) also shows consistent results where perceived usefulness does not affect perceived impact on learning. This is probably because students are still not used to using tools in these learning activities, so students may not be aware of the relevance of using tools to learning outcomes.

H2: Perceived Usefulness has a significant effect on Satisfaction

The H2 outcomes show that the perceived usefulness of students affects the satisfaction of using Zoom application, which means that if students feel that they are getting benefits from Zoom as a tool in video conferencing, such as improving performance, increase effectiveness, improve the quality of work, and be efficient in completing assignments and preparing for exams, then their level of satisfaction will also be high. Based on research conducted by (Ifinedo, 2017), it was found that if the level of perceived usefulness of blogs by students is high, then satisfaction with using blogs for learning is also high. Then (Muñoz-Carril et al., 2021) in his research found results that the perceived usefulness of students towards the application of the computer supported collaborative learning method affected student satisfaction with the application of the method. The results of these two studies are in line with the outcomes of the research obtained.

H3: Confirmation has a significant effect on Satisfaction

The H3 outcomes show that if students' initial expectations regarding the use of video conferencing (Zoom) applications in accordance with the benefits felt after using these tools, then student satisfaction will be high. Then confirmation is also the most influential variable based on the t-statistic and p-value. This is steady with previous research, where confirmation is an important element of student satisfaction in using technology (Ifinedo, 2017; Muñoz-Carril et al., 2021). According to (Ifinedo, 2017), if students' initial expectations about the benefits of using blogs are in accordance with perceived experiences, students will feel satisfied with using blogs in learning. In addition, research conducted by (Muñoz-Carril et al., 2021) also confirms that confirmation has a significant positive effect, with a greater effect size on perceived benefits.

H4: Technical System Quality has a significant effect on Satisfaction

The H4 results show the technical quality of the system related to ease of integration with other systems, fast and structured access, interactive and structured design, system navigation, high reliability, ease of information search, security, flexibility, will increase student satisfaction with the Zoom

application. According to (Seta et al., 2018), the technical quality of the e-learning system is used, which includes the security of the e-learning system that is maintained, the ease of integrated with other systems and has a significant effect on user satisfaction reliability.

H5: Educational System Quality has a significant effect on Satisfaction

The H5 results show the quality of the education system related to cooperative and active learning, attendance, storage and sharing of documents, adequate means of communication, learning assessment, to information efficiency and effectiveness will increase student satisfaction with the use of the Zoom application. According to (Seta et al., 2018), the quality of educational facilities, such as the availability of forums, chat, class discussions that make learning active has a significant influence on user satisfaction.

H6: Perceived Enjoyment has a significant effect on Perceived Impact on Learning

The H6 results show that if students feel comfortable with using Zoom application as a tool for video conferencing in their online learning activities, it will have a positive impact and lead to greater student acceptance of the use of these tools. According to (Ifinedo, 2017), if students feel that learning with computer-based collaboration learning makes them feel learning becomes easier and more fun, it will have a more positive impact on student learning outcomes. In addition, (Muñoz-Carril et al., 2021) also shows the influence between perceived enjoyment and the perceived impact on learning, where students who enjoy using tools in online learning will be more fulfilled with the learning activities and feel a positive impact on development their academic.

H7: Perceived Ease of Use has a significant effect on Perceived Impact on Learning

The H7 results show that if Zoom application is a tool that is easy to use in e-learning, it will increase motivation in the application and adoption of technology, the impact of learning, achievement and student performance, which is in line with (Alhumaid et al., 2020; Ifinedo, 2017; Muñoz-Carril et al., 2021). The use of e-learning systems compared to traditional learning supports students to improve their academic performance because of the convenience that is obtained from using the system (Alhumaid et al., 2020; Ifinedo, 2017; Muñoz-Carril et al., 2021) also states that the use of systems in learning that are designed appropriately so that students can assess the system as easy to use in learning activities will have a positive influence on the impact of student learning, achievement, and performance.

H8: Satisfaction has a significant effect on Perceived Impact on Learning

The H8 outcomes show that if students are satisfied with the application of Zoom in their online learning activities, it will have an impact on the level of experience, the positive impact and student performance. Then, satisfaction is also a variable that has a main influence on the perceived impact of student learning, so satisfaction is an important factor that can determine the impact, performance, and student achievement. According to (Ifinedo, 2017), student satisfaction with the learning system has a positive impact on the student learning outcomes and performance. In addition, (Muñoz-Carril et al., 2021) in his research stated that satisfaction is a factor that relevant with the perceived impact of learning through the use of technology.

5. Conclusions

This research designed to explore factors determining students' perceived impact on learning and satisfaction using Zoom by combining the research TAM (Davis, 1989), ECM (Bhattacharjee, 2001a), Flow Theory (Csikszentmihalyi, 1997), and ISS Model (Delone & McLean, 2003), and some related work.

In this study, it was found that 398 respondents were students from the three best universities in DKI Jakarta who utilized the video conferencing application, Zoom. Derived on the outcomes obtained, it was founded that the factors that effect the perceived impact on learning using Zoom application as a tool for video conferencing are perceived enjoyment related to whether students find the learning process enjoyable with Zoom. In addition, perceived impact on learning is also affected by the perceived ease of use which is connected to how students find the perceived ease of using Zoom in their learning

activities. Then, the perceived impact on learning is also affected by satisfaction related to satisfaction from the student side related to experience in using Zoom as a learning tool that can make learning effective and efficient. The satisfaction variable that has a heavily impact on perceived impact on learning is also influenced by perceived usefulness which is related to the level to which students believe that using Zoom will improve their learning, confirmation related to the degree to which the user's initial expectations about the system performance are confirmed after experiencing or using the system, measuring the quality of technical systems in using Zoom, and the quality of the education system in using Zoom.

From these findings, there are some suggestions that relevant universities can implement:

- It has been found that perceived usefulness influences satisfaction, this indicates that relevant universities need to ensure that the use of Zoom in learning activities provides various benefits for students, including improving performance, increasing effectiveness, improving the quality of work, and being efficient in completing assignments and preparing for exams. This can be done by providing licensed Zoom facilities so that students and lecturers can discuss without being limited in duration. In addition, it is necessary to ensure that lecturers have the skills to use the features available on Zoom to attract student interest and motivation during learning activities so that they can improve student academic performance.
- It has been found that confirmation influences satisfaction, so that the relevant institutions can make surveys which are distributed before and after learning activities are carried out to see and monitor whether student expectations regarding learning activities with Zoom are in accordance with the perceived experience. Surveys related to student initial expectations regarding the use of Zoom in learning activities can be distributed at the beginning of the semester and surveys related to student experiences in using Zoom can be distributed in the middle or end of the semester so that students have longer experience regarding using Zoom and can share experiences felt through surveys that by related universities. By evaluating students' expectations and experiences with Zoom, related universities can see the realization of the benefits felt by students which can increase student satisfaction with using Zoom in learning activities.
- It has been found that technical system quality influences satisfaction, so that the relevant universities needs to ensure that the use of Zoom in learning activities provides easy integration with other systems as well as fast and structured access such as Zoom meeting links for classes to be started which can be easily accessed through LMS or e-learning media used by related tertiary institutions. Then, related tertiary institutions can also ensure that Zoom has an interactive and structured design, ease of system navigation, high reliability, easy information search, and high security and flexibility in its use in learning activities so as to increase student satisfaction.
- It has been found that the quality level of educational system affects satisfaction, so that the relevant universities can ensure that the use of Zoom in learning activities can provide cooperative and active learning between lecturers and students, student attendance in learning via Zoom is recorded clearly and can be seen transparently by students, as well as ensuring Zoom provides efficient and effective facilities for exchanging information so as to increase student satisfaction.
- It has been found that perceived enjoyment influences the perception of the perceived impact on learning, so that the relevant universities can arrange learning activities using interactive, interesting, comfortable, and fun video conferencing media for students. Related to this, the concept of gamification can be applied, such as holding mini quizzes during learning so that students feel interested while at the same time providing enjoyment.
- It has been found that perceived ease of use affects the perception of the impact felt in learning, so that the universities can ensure that the video conferencing media used can provide convenience for students, for example video recording during class and the materials shared can be accessed.

- It has been found that satisfaction affects the perception of the impact felt in learning, so that the university could measure student satisfaction with the use of Zoom as a learning tool by routinely conducting surveys or feedback systems to confirm whether according to students the learning process that is taking place is effective and efficient.

However, this study also has limitations, where based on the R-Square value, all independent variables simultaneously have an effect of 50.4% on satisfaction and 54.5% on perceived impact on learning. While the remaining 49.6% and 45.5% are influenced by other variables not tested in the study. So, to improve this research, future research is expected to consider other variables that might influence satisfaction and perceived impact on learning, as well as broaden the reach of respondents, not only universities in DKI Jakarta, Indonesia so they can get more general results. Apart from that, other suggestions for further research can also be made in comparison with other video conferencing applications which may also be used in learning activities, not just focusing on one application.

References

- Al-Sofi, B. B. M. (2021). Student Satisfaction with E-learning Using Blackboard LMS during the Covid-19 Circumstances: Realities, Expectations, and Future Prospects. *Pegegung Egitim ve Ogretim Dergisi*, 11(4), 265–281. <https://doi.org/10.47750/pegegung.11.04.26>
- Alhumaid, K., Ali, S., Waheed, A., Zahid, E., Habes, M., & Info, A. (2020). COVID-19 & E-learning: Perceptions & Attitudes Of Teachers Towards E-Learning Acceptance in The Developing Countries. *Multicultural Education*, 6(2), 100–115. <https://doi.org/10.5281/zenodo.4060121>
- Alketbi, S., Akmal, S., Al-Shami, S. S. A., & Hamid, R. A. (2021). Conceptual framework: The role of cognitive absorption in delone and mclean success model in online learning in united arab emirates. *Academy of Strategic Management Journal*, 20(Special Issue 2), 1–9. <https://www.abacademies.org/abstract/conceptual-framework-the-role-of-cognitive-absorption-in-delone-and-mclean-success-model-in-online-learning-in-united-ar-11046.html>
- Başaran, S., & Hussein, K. A. (2023). Determinants of University Students' Intention to Use Video Conferencing Tools during COVID-19 Pandemic: Case of Somalia. *Sustainability*, 15(3), 2457. <https://doi.org/10.3390/su15032457>
- Batan. (2018). Layanan Video Konferensi Badan Tenaga Nuklir Nasional. *Pusat Pendayagunaan Informatika Dan Kawasan Strategis Nuklir*. [http://repo-nkm.batan.go.id/6208/1/SOP Layanan video konferensi-rev2.pdf](http://repo-nkm.batan.go.id/6208/1/SOP%20Layanan%20video%20konferensi-rev2.pdf)
- Bayastura, S. F., Warsito, B., Mutiara, D., Nugraheni, K., Informasi, M. S., & Diponegoro, U. (2022). Integration of UTAUT 2 and Delone & McLean to Evaluate Acceptance of Video Conference Application. 6(2), 198–217.
- Belhaj, F., Alotman, M., Hilal, N., & Jibai, B. (2022). An Empirical Study on the Factors Affecting Students' Motivation Toward Online Learning During Covid-19 Pandemic. *Journal of Logistics, Informatics and Service Science*, 9(4), 149–168. <https://doi.org/10.33168/LISS.2022.0411>
- Benitez, J., Henseler, J., Castillo, A., & Schuberth, F. (2019). Information & Management How to perform and report an impactful analysis using partial least squares : Guidelines for confirmatory and explanatory IS research. *Information & Management*, April, 103168. <https://doi.org/10.1016/j.im.2019.05.003>
- Bhattacharjee. (2001a). Understanding Information Systems Continuance: An Expectation-Confirmation Model. *MIS Quarterly*, 25(3), 351–370. <https://doi.org/10.2307/3250921>
- Bhattacharjee, A. (2001b). An empirical analysis of the antecedents of electronic commerce service continuance. *Decision Support Systems*, 32(2), 201–214. [https://doi.org/10.1016/S0167-9236\(01\)00111-7](https://doi.org/10.1016/S0167-9236(01)00111-7)

- Brahma, I. A. (2020). Penggunaan Zoom Sebagai Pembelajaran Berbasis Online Dalam Mata Kuliah Sosiologi dan Antropologi Pada Mahasiswa PPKN di STKIP Kusumanegara Jakarta. *Aksara: Jurnal Ilmu Pendidikan Nonformal*, 6(2), 97. <https://doi.org/10.37905/aksara.6.2.97-102.2020>
- Camilleri, M. A., & Camilleri, A. C. (2022). The Acceptance of Learning Management Systems and Video Conferencing Technologies: Lessons Learned from COVID-19. *Technology, Knowledge and Learning*, 27(4), 1311–1333. <https://doi.org/10.1007/s10758-021-09561-y>
- Cesco, S., Zara, V., Toni, A. F. De, Lugli, P., Betta, G., Evans, A. C. O., & Orzes, G. (2021). Higher Education in the First Year of COVID-19: Thoughts and Perspectives for the Future. *International Journal of Higher Education*, 10(3), 285. <https://doi.org/10.5430/ijhe.v10n3p285>
- Csikszentmihalyi, M. (1997). *Finding flow: The Psychology of engagement with Everyday Life*. Basic Books.
https://www.researchgate.net/publication/200026151_Finding_Flow_The_Psychology_of_Engagement_With_Everyday_Life
- Daneji, A. A., Ayub, A. F. M., & Khambari, M. N. M. (2019). The effects of perceived usefulness, confirmation and satisfaction on continuance intention in using massive open online course (MOOC). *Knowledge Management and E-Learning*, 11(2), 201–214. <https://doi.org/10.34105/j.kmel.2019.11.010>
- Databoks. (2020). *Internet Buruk Jadi Kendala Utama Anak Muda ASEAN Belajar dan Bekerja Online*. <https://databoks.katadata.co.id/datapublish/2020/09/18/internet-buruk-jadi-kendala-utama-anak-muda-asean-belajar-dan-bekerja-online>
- Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*. <https://doi.org/10.2307/249008>
- Delone, W., & McLean, E. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems*. <https://doi.org/10.1080/07421222.2003.11045748>
- Dwidienawati, D., Abdinagoro, S. B., Tjahjana, D., & Gandasari, D. (2020). Forced Shifting to e-Learning during the COVID-19 Outbreak: Information Quality, System Quality, Service Quality, and Goal Orientation influence to e-Learning Satisfaction and Perceived Performance. *International Journal of Advanced Trends in Computer Science and Engineering*, 9(2), 1518–1525. <https://doi.org/https://doi.org/10.30534/ijatcse/2020/93922020>
- Ekawardhana, N. E. (2020). Efektivitas Pembelajaran dengan Menggunakan Media Video Conference. *Prosiding Seminar Nasional Dan Ilmu Terapan*, 4(Vol 4 No 1 (2020)), 1–7. <https://ojs.widyakartika.ac.id/index.php/sniter/article/view/218>
- Fajrin, M. U., Tiorida, E., & Kunci, K. (2020). Faktor yang Memengaruhi Minat Perilaku Penggunaan Teknologi (Studi : Pengguna Aplikasi Video Conference selama Physical Distancing). *Prosiding The 11th Industrial Research Workshop and National Seminar*, 977–984. <https://doi.org/https://doi.org/10.35313/irwns.v11i1.2151>
- Ghozali, I., & Latan, H. (2014). *Partial Least Squares Konsep, Teknik, dan Aplikasi Menggunakan Program SmartPLS 3.0 untuk Penelitian Empiris*. Badan Penerbit Universitas Diponegoro.
- Hair, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, 109(August 2019), 101–110. <https://doi.org/10.1016/j.jbusres.2019.11.069>
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a Silver Bullet. *Journal of Marketing Theory and Practice*, 139–151.

Hidayat, A. (2018). *PLS SEM: Pengukuran Kecocokan Model (Inner dan Outer)*. https://www.statistikian.com/2018/08/pls-sem-pengukuran-kecocokanmodel-inner-dan-outer.html#Pengukuran_Model_Reflektif

Hidayatullah, S., Malang, U. M., Khourouh, U., Malang, U. M., Windhyastiti, I., Malang, U. M., Patalo, R. G., & Malang, U. M. (2020). *Implementasi Model Kesuksesan Sistem Informasi DeLone And McLean Terhadap Sistem Pembelajaran Berbasis Aplikasi Zoom Di Saat Pandemi Jurnal Teknologi dan Manajemen Informatika*. May. <https://doi.org/10.26905/jtmi.v6i1.4165>

Ifinedo, P. (2017). Students' perceived impact of learning and satisfaction with blogs. *International Journal of Information and Learning Technology*, 34(4), 322–337. <https://doi.org/10.1108/IJILT-12-2016-0059>

Katadata. (2020). *Survei SMRC: 92% Siswa Memiliki Banyak Masalah dalam Belajar Daring*. <https://katadata.co.id/ekarina/berita/5f3bc04617957/survei-smrc-92-siswa-memiliki-banyak-masalah-dalam-belajar-daring>

Kemendikbud. (2021). *Dampak Negatif Satu Tahun PJJ, Dorongan Pembelajaran Tatap Muka Menguat*. <https://www.kemdikbud.go.id/main/blog/2021/04/dampak-negatif-satu-tahun-pjj-dorongan-pembelajaran-tatap-muka-menguat>

Mailizar, M., Burg, D., & Maulina, S. (2021). Examining university students' behavioural intention to use e-learning during the COVID-19 pandemic: An extended TAM model. *Education and Information Technologies*, 26(6), 7057–7077. <https://doi.org/10.1007/s10639-021-10557-5>

McGill, T. J., & Hobbs, V. J. (2008). How students and instructors using a virtual learning environment perceive the fit between technology and task. *Journal of Computer Assisted Learning*, 24(3), 191–202. <https://doi.org/10.1111/j.1365-2729.2007.00253.x>

Muñoz-Carril, P. C., Hernández-Sellés, N., Fuentes-Abeledo, E. J., & González-Sanmamed, M. (2021). Factors influencing students' perceived impact of learning and satisfaction in Computer Supported Collaborative Learning. *Computers and Education*, 174(February). <https://doi.org/10.1016/j.compedu.2021.104310>

Ngo, T. T., Nguyen, T. T. T., & Tran, T.-G. (2020). Influence of Learning by Using Video Conferencing Tools on Perceptions and Attitude of Vietnamese Female Students in COVID-19 Pandemic. *SSRN Electronic Journal*, 1–11. <https://doi.org/10.2139/ssrn.3697029>

Nugroho, M. A., Dewanti, P. W., & Novitasari, B. T. (2018). The Impact of Perceived Usefulness and Perceived Ease of Use on Student ' s Performance in Mandatory E-Learning Use. *2018 International Conference on Applied Information Technology and Innovation (ICAITI)*, 26–30. <https://doi.org/10.1109/ICAITI.2018.8686742>

Ohliati, J., & Abbas, B. S. (2019). Measuring students satisfaction in using learning management system. *International Journal of Emerging Technologies in Learning*, 14(4), 180–189. <https://doi.org/10.3991/ijet.v14.i04.9427>

Pamulatri, Y. R. (2022). *Students' Perceptions on The Use of Video Conferencing Software for English Learning (A Survey Study of English Department Students ' Experiences During The COVID-19 Pandemic at UIN Fatmawati Sukarno Bengkulu)* [UIN Fatmawati Sukarno Bengkulu]. <http://repository.iainbengkulu.ac.id/id/eprint/9333>

Patrick, J., & Dewi, D. S. (2022). Analysis of Student Satisfaction Using Online Video Conference Application Based on Usability Criteria. *Proceedings of the Conference on Broad Exposure to Science and Technology 2021 (BEST 2021)*, 210(Best 2021), 211–215. <https://doi.org/10.2991/aer.k.220131.035>

PDDikti. (2022). *Profil Perguruan Tinggi*.

https://pddikti.kemdikbud.go.id/data_pt/NkM5MTc1NUUtNTBFNS00QUNGLUI0NTQtMzdBMDU4QkE5QkNC

Pereira, R., & Tam, C. (2021). Impact of enjoyment on the usage continuance intention of video-on-demand services. *Information and Management*, 58(7), 103501. <https://doi.org/10.1016/j.im.2021.103501>

Persada, S. F., Miraja, B. A., Nadlifatin, R., Belgiawan, P. F., Perwira Redi, A. A. N., & Lin, S. C. (2021). Determinants of Students' Intention to Continue Using Online Private Tutoring: An Expectation-Confirmation Model (ECM) Approach. *Technology, Knowledge and Learning*, 0123456789. <https://doi.org/10.1007/s10758-021-09548-9>

Purwati, A. A., Hamzah, M. L., & Mat, M. (2022). *Measurement of Website Functionality and Perceived Usefulness in Increasing User Satisfaction through the Role of Technology Readiness for E-Learning Users*. 12(5), 252–267. <https://doi.org/10.33168/JSMS.2022.0515>

Puška, A., Puška, E., Dragić, L., Maksimović, A., & Osmanović, N. (2021). Students' Satisfaction with E-learning Platforms in Bosnia and Herzegovina. *Technology, Knowledge and Learning*, 26(1), 173–191. <https://doi.org/10.1007/s10758-020-09446-6>

Ramírez-Correa, P. E., Rondan-Cataluña, F. J., Arenas-Gaitán, J., & Alfaro-Perez, J. L. (2017). Moderating effect of learning styles on a learning management system's success. *Telematics and Informatics*, 34(1), 272–286. <https://doi.org/10.1016/j.tele.2016.04.006>

Riandi, M. H., Respati, H., & Hidayatullah, S. (2021). Conceptual Model of User Satisfaction as Mediator of E-Learning Services and System Quality on Students' Individual Performance. *International Journal of Research in Engineering, Science and Management*, 4(1), 60–65. <https://doi.org/10.47607/ijresm.2021.466>

Seta, H. B., Wati, T., Muliawati, A., & Hidayanto, A. N. (2018). E-learning success model: An extension of delone & mclean is' success model. *Indonesian Journal of Electrical Engineering and Informatics*, 6(3), 281~291. <https://doi.org/10.11591/ijeei.v6i3.505>

Shahzad, A., Hassan, R., Aremu, A. Y., Hussain, A., & Lodhi, R. N. (2021). Effects of COVID-19 in E-learning on higher education institution students: the group comparison between male and female. *Quality and Quantity*, 55(3), 805–826. <https://doi.org/10.1007/s11135-020-01028-z>

Spencer, R., Sinno, J., Hatfield, K., Biderman, M., Doria, N., & Numer, M. (2020). Exploring Top Hat's Impact on Undergraduate Students' Belongingness, Engagement, and Self-Confidence: A Mixed Methods Study. *Journal of Research on Technology in Education*, 52(2), 197–215. <https://doi.org/10.1080/15391523.2020.1722977>

Suadi. (2021). *Students' Perceptions of the Use of Zoom and Whats App in ELT Amidst Covid19 Pandemic*. 2(1), 51–64. <https://doi.org/10.35961/salee.v2i01.212>

Subekti, H. A., Nubaiti, N., Masilawati, M., & Fitria, H. (2020). Pemanfaatan Video Conference Sebagai Media Pembelajaran Interaktif pada Mata Pelajaran Produktif di Sekolah Menengah Kejuruan. *Prosiding Seminar Nasional Program Pascasarjana Universitas PGRI Palembang*, 427–437. <https://jurnal.univpgri-palembang.ac.id/index.php/Prosidingpps/article/view/3855>

Tandra, L., & Tjhin, V. U. (2022). *Using an Extended Technology Acceptance Model to Explore Students' Use and Fatigue of Video Conference Online Learning During COVID-19 in Indonesia*. 11(September), 512–524. <http://journal.unigres.ac.id/index.php/GemaEkonomi/article/view/1946>

Turmuzi, M., Dasing, A. S. H., Baidowi, & Junaidi. (2021). Analisis Kesulitan Belajar Mahasiswa Secara Online (E-Learning) Selama Masa Pandemi Covid-19. *Edukatif: Jurnal Ilmu Pendidikan*, 3(3), 900–910. <https://doi.org/https://doi.org/10.31004/edukatif.v3i3.482>

- UniRank. (2022). *2021 Jakarta SCR University Ranking*. <https://www.4icu.org/id/jakarta-scr/>
- Wang, L. Y. K., Lew, S. L., Lau, S. H., & Leow, M. C. (2019). Usability factors predicting continuance of intention to use cloud e-learning application. *Heliyon*, 5(6), e01788. <https://doi.org/10.1016/j.heliyon.2019.e01788>
- Wang, X., Liu, T., Wang, J., & Tian, J. (2022). Understanding Learner Continuance Intention: A Comparison of Live Video Learning, Pre-Recorded Video Learning and Hybrid Video Learning in COVID-19 Pandemic. *International Journal of Human-Computer Interaction*, 38(3), 263–281. <https://doi.org/10.1080/10447318.2021.1938389>
- Widjaja, A., & Widjaja, Y. G. (2022). The influence of interaction, learner characteristics, perceived usefulness, and perceived satisfaction on continuance intention in e-learning system. *International Journal of Research in Business and Social Science (2147- 4478)*, 11(2), 381–390. <https://doi.org/10.20525/ijrbs.v11i2.1665>
- Wishnujati, K., Hastjarjo, S., Sebelas, U., Surakarta, M., & Apps, C. (2021). *Model Penerimaan Teknologi Pada Aplikasi Zoom Cloud Meeting*. 1–33. <https://www.jurnalkommas.com/docs/JurnalD1218028.pdf>
- Yavuzalp, N., & Bahcivan, E. (2021). A structural equation modeling analysis of relationships among university students' readiness for e-learning, self-regulation skills, satisfaction, and academic achievement. *Research and Practice in Technology Enhanced Learning*, 16(1). <https://doi.org/10.1186/s41039-021-00162-y>