

# Students' acceptance to Covid-19 distance learning: The role of geographical areas in Indonesian higher education

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**Abstract:** This study was conducted to investigate the perspectives of sports science students on factors affecting distance learning in the setting of Indonesian higher education institutions (HEIs). This study applied an extended technology acceptance model (TAM) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual use. An online survey was used to collect data from 1291 Indonesian sports science students for the study. The structural model was tested using the partial least squares structural equation modeling (PLS-SEM). Multi-group analysis (MGA) was conducted to understand the role of geographical areas in moderating all hypothetical relationships. The findings show that users were not excited informed by weak means (below 3) for most items of enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use. All relationships were supported except the relationship between experience and perceived usefulness. The strongest significant association emerged between intention to use and actual use. Meanwhile, the least considerable correlation existed between self-efficacy and perceived usefulness. Three out of 12 hypotheses were confirmed regarding the difference of geographical areas, rural and urban, concerning all relationship paths. The findings add to a deeper understanding of the acceptability of distance learning, and this study will be especially useful to instructors and educators in HEIs.

**Keywords:** Sports science students; distance learning; higher education; COVID-19; pandemic.

## 1. Introduction

The world health organization (WHO) declared COVID-19 as a global pandemic in In March 2020. The last report on June 23, 2021 (the writing of this manuscript) showed that the overall number of cases has already exceeded 177 million globally. Mortality remained high, with over 9000 deaths recorded each day; however, all areas except two (Eastern Mediterranean and Africa) reported decreased new deaths. Compared to the previous week of May 2021, the global number of cases and fatalities dropped by 6% and 12%, respectively, with slightly more than 2.5 million new weekly cases and over 64 000 deaths. [1]. In education, one of the efforts to decrease the spread of the pandemic was made by closing schools at all levels. The distance learning policy was conducted with the help of the available technologies in facilitating teaching and learning activities, replacing face-to-face instruction.

Researchers from all around the world have already conducted extensive studies on the global pandemic in education [2]–[4]. In Indonesia, like in any other nation, COVID-19 has had a significant impact on schooling [2]. Higher education institutions (HEIs) have been compelled to substitute traditional learning with distance learning [3]. Courses, persons, and technology were all challenges in distant education. These issues affect developed and developing countries; but, access to technology is more pronounced in developing countries [4]. To go deeper to the challenges of distance learning during COVID-19 pandemic, academics are recommended to understand factors affecting the acceptance as a new approach of pedagogy [5], especially in a specific context of the study and among particular objects. Therefore, this

study aims to disclose factors affecting distance learning in the context of Indonesian HEIs; it is conducted to understand the perceptions of sports science students. Besides, we also inform the difference on all paths regarding respondents' geographical areas (urban and rural).

## 2. Review of Literature

### 2.1. Distance learning during COVID-19 pandemic

Distance learning has been around for a long time in higher education. When there is a physical distance between students and their instructors, the situation refers to learning mediated through technology equipment. Distance learning is far from a new phenomenon; tracing its history, it began in the early 18th century as a correspondence study to allow eager learners outside of the city to continue their education without having to be on-site. Since then, it has progressed and grown in popularity, especially with the quick expansion of technological innovation [6]. Other modules in distant education, such as blended learning (or hybrid-learning), have emerged in tandem, defining a combination of face-to-face and technology-mediated instructions that provides a resilient and accessible learning experience. In current condition, many educational institutions have been forced to adopt distant learning to keep up with the present COVID-19 scenario.[7], [8].

When WHO declared COVID-19 a global pandemic, nations were forced to implement preventive measures to stem the virus's spread, including suspending schools' face to face learning. Higher education quickly responded to this massive transition by launching distance learning, utilizing existing learning support systems like Social Media and Learning Management Systems [9], [10]. Although this fast shift offered continuity to the learning process, it also exacerbated educational gaps among students, particularly those who reside in rural regions or in low-income nations and those who lack fundamental information and technology skills. Such qualities may make it more difficult to gain access to contemporary technological resources that are needed to support the distance learning trend. Considering that the current scenario may endure for a longer period, they suggest a long-term move to online learning. This circumstance will require educational institutions to prepare and equip themselves with the instruments needed to facilitate the acceptance of such a trend, especially among users [11]. Thus, this study explores the factors through the implementation of TAM to understand factors affecting students' acceptance of distance learning and whether or not the paths differ based on geographical areas, rural and urban.

### 2.2. TAM variables: perceived ease of use, perceived usefulness, attitude, intention to use, and actual use

In the field of social science, TAM is a commonly adapted model by educational researchers. The model states that people's feelings about behavioral intention toward adopting a system, which in this study is in the setting of distance learning, is predicted by their perceived usefulness and perceived ease of use [12]. TAM's original premise is that perceived ease of use is claimed to predict perceived usefulness [12]. Furthermore, a system's attitudes and perceived usefulness impact behavioral intention (the degree to which people perform or do not perform for a given future activity). Finally, behavioral intention predicts the actual use of a system [12]. Besides the original constructs, some external factors were reported to be associated with the first TAM constructs. [13]–[15].

One of the most significant components in TAM is the perceived usefulness. Perceived usefulness is defined as the degree to which system users feel that the system will increase their performance [12]; in this study, we determined the system as distance learning. Further, users' attitude toward and intention to use a system is influenced by his or her perceived usefulness [12]. Perceived usefulness of a system is also expected to influence the user's decision to accept or reject it. The degree to which a person believes that using any system is straightforward and friendly is described as perceived ease of use [16]. From the TAM concept, perceived ease of use is one of the drivers that can affect perceived usefulness and attitude toward a system. Users are more willing to adopt a new system if they believe it is simple to use [12], [14].

Attitude is defined as users' certain behavior linked with the use of a system [12]. In the original TAM model, attitude is hypothesized to influence intention to use a system. Further, Intention to use in this study is described as students' desire to utilize technologies for the distance learning setting; the intention is expected to significantly influence actual use [17]. The final part of the TAM is the actual use,

or the act of applying something, which expresses the reality of users to utilize or not to utilize any technology; in this study, the actual use is the implementation of technology for distance learning [12]. In the proposed model of this study, actual use has no impact on the other components of this model since it is the final stage in the chain of technological acceptance.

Table 1. Some recent TAM-related studies in the educational context

No	Sources	Method	Results
1	[18]	Meta-analysis	TAM explains technology acceptance properly; yet, the role of certain key constructs and the importance of external variables contrast some existing beliefs about the TAM. Implications for research and practice are discussed
2	[19]	A survey involved 550 high school students, and the data were analyzed using PLS-SEM.	The original TAM variables (perceived attitude, perceived usefulness, and perceived ease of use) had direct correlations with behavioral intention and played mediating roles between the external variables and behavioral intention
3	[20]	The study was conducted on the 375 students in universities of South Korea during Covid-19.	The results suggested that all factors in TAM positively influenced the behavioral intention to use and accept the e-learning system by the learners during this pandemic.
4	[5]	. PLS-SEM was employed to test the proposed research model. The survey gathered data from 1692 Polish students.	The strongest exogenous variable of student's acceptance of education shift to distance learning is enjoyment. Perceived ease of use and perceived usefulness were reported to be significant in affecting attitude towards and intention to use
5	[21]	An online survey was completed by 365 undergraduate students from a university in Sydney, Australia. Confirmatory factor analysis, SEM, and multi-group analyses were used to analyze the data.	Facilitating conditions were positively associated with the perceived usefulness of technology, which in turn was positively associated with academic self-efficacy. Surprisingly, perceived ease of use did not have a statistically significant association with perceived usefulness. Academic self-efficacy was positively associated with academic achievement.
6	[22]	The suggested structural model was tested using Lisrel software with a total of 352 valid replies.	The results clearly confirmed the positive influence of the intrinsic motivations, autonomy, and relatedness, to improve perceptions regarding the usefulness and ease of use of Open Source Software, and; therefore, on behavioral intention to use the software.
7	[17]	The information was gathered from 650 university students. After data filtering, structural equation modeling was used to evaluate 513 valid replies.	Satisfaction, perceived ease of use, perceived usefulness, information quality, self-efficacy, social influence, and benefits were reported to be significant in predicting behavioral intention regarding e-learning portal acceptance. Perceived ease of use significantly predicted perceived usefulness and pleasure. The appeal had a significant effect on pleasure and satisfaction. Enjoyment is significantly correlated with satisfaction
8	[23]	The research was conducted through a survey of 974 students analyzed with PLS-SEM of expanded TAM with enabling conditions as the external component.	The finding of significant relationships between facilitating condition and perceived ease of use and between facilitating condition and perceived usefulness was reported, and (3) the significant relationships among core components of TAM were found except for one, the relationship between perceived usefulness and attitude.

## 2.2. External variables; Experience, enjoyment, and self-efficacy

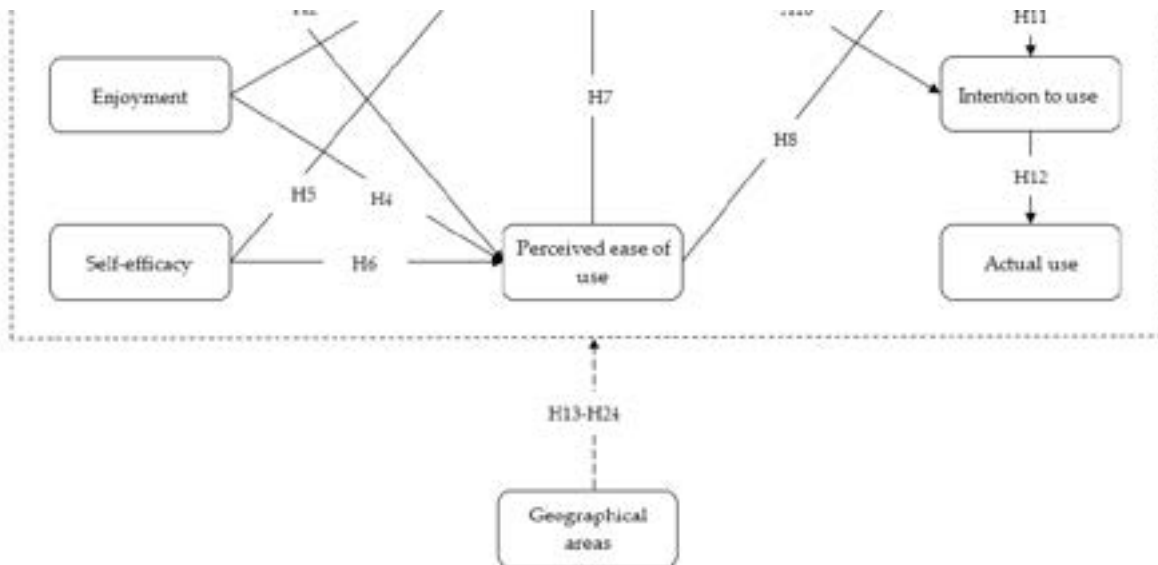
In this study, extended factors such as enjoyment, self-efficacy, and experience were suggested to predict perceived ease of use and usefulness [5]. In this study, experience is defined as the amount and type of technical abilities for distance learning that a person has acquired through time [24]. One of the most significant external variables is experience. Individuals with more advanced technological abilities are more likely to be enthusiastic about using any online/distance learning instrument [5]. In this study, we

expect that experience of distance learning during COVID-19 influences perceive ease of use and perceived usefulness.

Furthermore, enjoyment or pleasure is defined to be the degree to which the action of implementing any system is seen to become pleasurable, independent of the results. A system that is pleasant seems to be viewed as simple to use and beneficial in which users' desire to utilize it can increase. Many studies have shown that consumers' perceptions of ease of use are influenced by how much fun they have when using a system. In addition, researchers have discovered a substantial positive relationship between online learning system enjoyment and perceived usefulness, which boosts students' propensity to use (real usage) these systems [5]. Self-efficacy in this study is described as the confidence of ability to complete a task using technology for distance learning during COVID-19. According to the findings, students with stronger e-learning self-efficacy are also more inclined to employ e-learning and computer-supported education. Self-efficacy is thought to significantly impact perceived ease of use and perceived usefulness. All hypotheses included in this study are performed in Figure 1, and prior studies related to TAM application in recent years within the educational environment are shown in Table 1.

## 2.2. Geographical areas in moderating hypothetical relationships

In addition to the structural model reported in the current study, geographical areas (rural and urban) were included to understand how all hypothetical relationships are different. Prior studies have focused on the differences in technology integration based on demographic information [25]–[28]. For example, genders were reported to be significantly different regarding multimedia utilization for learning [27]. Based on the geographical areas, rural and urban, learning behavioral patterns and access to technology were revealed to become significantly different [26], [28]. Therefore, besides hypotheses for the structural model, twelve hypotheses (H13-H24) were included regarding the differences between geographical areas concerning all paths (Fig.1), for example, there is a significant difference regarding the relationship between experience and perceived usefulness based on respondents' geographical areas (H13), and there is a significant difference regarding the relationship between intention to use and actual use based on respondents' geographical areas (H24)



**Figure 1.** A proposed model exploring sports science students' acceptance to Covid-19 distance learning: The role of geographical areas in Indonesian higher education.

## 3. Materials and Methods

### *3.1. Design of the Study*

This research was conducted using an online survey from March 2021 to June 2021 in five Indonesian HEIs, after the Indonesian government announced school closures on May 20, 2020. Before the primary data collection, a survey instrument was developed and validated to assess variables that predict the usage of e-learning by Indonesian sport science students during Covid-19. The model measurement and evaluation were carried out using SmartPLS 3.3, led by the Partial Least Squares Structural Equation Modeling methods (PLS-SEM).

### *3.2. Instrumentation*

The review of literature can aid researchers in defining and analyzing ideas and concepts related to the theoretical research framework. [29]. It tries to determine the study's objective approach to instrumentation. The instrument is designed to meet the research goals [29]. Adapted survey tools were used in this study to assess the elements that influence students' acceptance of distance learning [5], [13], [30], [31]. The new instrument for the current study was produced based on the adaptation process; the indicators differed and developed to meet COVID-19 and distant learning settings. Twenty-nine indicators were modified for the instrument during the initial setup procedure. The indicators were addressed with three educational technology specialists from Malaysia and Indonesia via video conferences as part of the content validity process to ensure that the instrument was appropriate for the study's context and setting. [32]. Ten indicators were updated after the video call meetings. In contrast, three others were deleted owing to inappropriate circumstances, mostly because the research issue is distance learning usage during a pandemic that varies from typical conditions.

### *3.3. Data Collection and Analysis*

A Google Forms survey was used to collect data for the study. The questionnaire (n 26) was piloted on a small group of students for the initial examination of reliability; the Cronbach alpha test was conducted for this process. All variables were reliable, with alphas of more than .70. The final set of questions was improved after the pilot study, and the questionnaire was disseminated. The survey was launched on June 1, 2021 and was open until June 15, 2021. The majority of answers, though, came in the first week. Active students from three institutions were asked to take part in the study via an electronic invitation. The survey received 1472 responses; 1291 data were measurable. One hundred and eighty-one responses were dropped because missing values appeared or the same answers for every question were identified. Nine hundred and ninety-four are male students; meanwhile, 296 female respondents are females. Eight hundred respondents are from rural areas, and 489 are from urban areas.

Two phases are involved in evaluating PLS-SEM findings. The first phase is a review of the reflective measurement model. This is an essential component of the evaluation since it ensures that the measurement quality is maintained. The examination of the structural model is carried out in phase 2 after the measurement model was evaluated. Phase 2 examines the structural theory, which entails considering the given hypotheses and addressing the connections among the latent variables [33].

## **4. Results**

### *4.1. Preliminary Findings*

The percentage of missing data in the present study ranged from 0% to .5 percent for each item. The missing data was utterly random (MCAR) (Kline, 2005). Table 1 displays the means, standard deviations, correlation matrices, skewness, and kurtosis for all variables; univariate normality was found for experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual usage (skewness and kurtosis values in the range of the cut-off values). The Likert scale went from 1 to 5, with 5 being the highest score. Most items achieved means of below three from enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use. The findings show that users were not excited; these feelings suggest that distance learning could have a lesser potential than face-to-face learning.

### *4.2. Measurement Model*

The examination of the measurement model in this study includes reflective metrics. We began by looking at the indicator loadings. Loadings greater than .50 show that the construct accounts for more than half of the variation in the indicator, indicating that the indicator is reliable [34]. The internal consistency dependability of the constructions was tested. Better numbers imply higher levels of dependability for the composite reliability criteria. Reliability ratings of .70 to .95 are considered "acceptable to good" [33]. Internal consistency dependability is measured using Cronbach's alpha, which assumes the same criteria. Reliability ratings of .70 to .95 are considered appropriate [35]. The convergent validity, or the amount to which a construct converges in its indicators by explaining the variance of the items, was then computed. The items' average variance extracted (AVE) linked with a specific construct is used to measure convergent validity, which is also referred to as communality. The AVE must be .500 or greater to be considered acceptable [36]. This level or above suggests that the concept accounts for (more than) 50% of the variation in its components on average.

Discriminant validity is the final stage in reflective measurement [37]. This study demonstrates how empirically different a concept is from others. In PLS-SEM, discriminant validity is determined by examining heterotrait–monotrait ratio of correlations. If the route model includes variables defined as conceptually and extremely similar, a value of .900 is proposed as a threshold, depicted in our model. In PLS-SEM, the heterotrait–monotrait ratio criterion is a novel requirement for assessing discriminant validity that outperforms the Fornell–Larcker criterion and cross-loading assessments [33].

Table 2 informs the results and evaluation of the measurement model. All reflected measurement models were reported to have to meet the criteria in the examination. All of the outside loadings are larger than .500, implying that all indicators are trustworthy. In addition, all AVEs were greater than .500, indicating that the measurements were convergently valid. Composite reliability was found to have values of  $\geq .8730$ , higher than .700 as the minimum cut-off value for composite reliability [33]. In addition, Cronbach's alpha values were in the range of .7200 to .9410, also in a good range. Discriminant validity was assessed using the heterotrait–monotrait ratio criterion. The results all fell short of the .900 threshold. The bootstrapping technique was then used with 5000 samples, using the "no sign" adjustments option at the .05 significant level. The statistical computation shows no values of the heterotrait–monotrait ratio confidence intervals contain values greater than .900, suggesting that all heterotrait–monotrait ratio values are significantly different from 1. As a consequence, discriminant validity has been demonstrated (Table 3).

**Table 2.** Normality, descriptive statistics, and measurement model criteria.

Construct	Items	Mean	SD	Kurt.	Skew.	Mark	Load	$\alpha$	rho_A	CR	AVE
Perceived usefulness	PU1	2.5630	1.2910	-.8110	.4240		.9150	.8960	.8970	.9350	.8280
	PU2	2.5480	1.2540	-.7240	.4430		.9260				
	PU3	2.6070	1.2310	-.7420	.3720	Dropped CR < .9500					
	PU4	2.7750	1.2840	-.9300	.2390		.8890				
Perceived ease of use	PEOU 1	3.0300	1.2860	-.9920	-.0020		.8210	.8900	.8940	.9240	.7520
	PEOU 2	2.6890	1.2330	-.7850	.2930		.8890				
	PEOU 3	2.5770	1.1970	-.6250	.4080		.8810				
	PEOU 4	2.8200	1.2470	-.8520	.1920		.8760				
	ATU1	2.7520	1.2850	-.9650	-.1670	Dropped low-load					
Attitude	ATU2	3.2830	1.1560	-.6170	-.1650		.8330	.7200	.7940	.8730	.7760
	ATU3	2.8610	1.1850	-.7080	.1080		.9260				

	ATU4	2.7040	1.3270	-1.0180	.2230	Dropped, low load					
Intention to use	ITU1	2.6050	1.2730	-.8670	.3060		.9030	.9090	.9100	.9430	.8460
	ITU2	2.4950	1.2030	-.6630	.4060		.9300				
	ITU3	2.5390	1.2220	-.7150	.3910		.9260				
Actual use Experience	AU1	3.0810	1.2430	-.8340	-.0730		1.0000	1.0000	1.0000	1.0000	1.0000
	EXP1	3.3990	1.2330	-.7870	-.2810		.7890	.8590	.8870	.9030	.7000
	EXP2	3.6540	1.2200	-.6230	-.5400		.8060				
	EXP3	3.3780	1.2170	-.7950	-.2520		.8880				
Enjoyment	EXP4	3.1390	1.2330	-.8420	-.0640		.8600				
	EJ1	2.6940	1.2300	-.7550	.2630		.9490	.9410	.9420	.9620	.8950
	EJ2	2.8060	1.2210	-.7620	.2070		.9430				
Self-efficacy	EJ3	2.7000	1.2350	-.7690	.2530		.9470				
	SE1	3.0910	1.1630	-.5850	-.0040		.8950	.8870	.8880	.9300	.8160
	SE2	3.0990	1.1520	-.5390	.0100		.9130				
	SE3	3.0550	1.1340	-.4590	.0040		.9010				

**Table 3.** Heterotrait–monotrait ratio for discriminant validity (< .900) [33]

	Actual use	Attitude	Enjoyment	Experience	Intention to use	Perceived ease of use	Perceived usefulness
Attitude	.6180						
Enjoyment	.5940	.7770					
Experience	.4700	.6700	.6660				
Intention to use	.6220	.7570	.8180	.5430			
Perceived ease of use	.5820	.8530	.7730	.6190	.7590		
Perceived usefulness	.5340	.8190	.7630	.5540	.8010	.8300	
Self-efficacy	.5260	.7260	.6920	.6100	.6380	.6440	.6180

#### 4.3. Structural Model

To assess the structural model, studies [38], [39] recommend looking at measures like  $R^2$ ,  $f^2$ ,  $Q^2$ , SRMR, and statistical significances. Table 6 shows the  $R^2$  and path coefficients of the endogenous constructs. We follow [33] recommendation in terms of  $R^2$  values, which indicates that  $R^2$  values of .670, .330, and .190, respectively, indicate strong, moderate, and weak  $R^2$  values.  $f^2$  values of .020, .150, and .350, according to [38], suggest small, medium, and large effects, respectively. To test for statistical significance, Hair et al. [33] recommend a minimum t value of 1.65 at p .1. Furthermore, for a given endogenous component,  $Q^2$  values larger than zero indicate a reasonable degree of prediction accuracy [38], [40] (see Table 6 for  $R^2$  and  $Q^2$  results and Table 4 for  $f^2$  results). Based on the recommended assessment standards and current research, the  $Q^2$  findings indicate sufficient prediction accuracy for exogenous variables [38], [40]. According to Henseler [41], the SRMR is the only approximate model fit criteria for evaluating PLS route modeling, consistent with prior research [42]. The bootstrap-based test is also used to calculate values for the discrepancy measures, which include the squared Euclidean Distance (dULS) and the Geodesic Distance (dG) [41]. Table 3 compares the values of the SRMR, dULS, and dG discrepancy measures; SRMR below .08 shows a valid and reliable model. The structural model was estimated using the consistent PLS bootstrapping option with 5,000 subsamples in this investigation [43]. All hypotheses were supported but H1 (the relationship between experience and perceived usefulness,  $t = .1900$ ;  $p = .8500$ ). The strongest correlation emerged between intention to use and actual use that supports the last hypothesis (H12) with a t value of 26.6890. In contrast, the lowest correlation was reported between self-efficacy and perceived usefulness with a t value of 3.050.

**Table 4.** The results of structural model,  $f^2$ , SRMR, dULS, and dG [38], [39].

H	Path	$\beta$	t values	p values	Sig	$f^2$	Items	Value
H1	Experience -> Perceived usefulness	.0050	.1900	.8500	No	.0000	SRMR	.053
H2	Experience -> Perceived ease of use	.1440	5.0700	.0000	Yes	.0260	dULS	.762
H3	Enjoyment -> Perceived usefulness	.3110	9.2350	.0000	Yes	.0970	dG	.334
H4	Enjoyment -> Perceived ease of use	.5110	16.8430	.0000	Yes	.2800		
H5	Self-efficacy -> Perceived usefulness	.0800	3.0500	.0020	Yes	.0090		
H6	Self-efficacy -> Perceived ease of use	.1710	6.0150	.0000	Yes	.0360		
H7	Perceived ease of use -> Perceived usefulness	.4750	13.4150	.0000	Yes	.2720		
H8	Perceived ease of use -> Attitude	.4280	11.5280	.0000	Yes	.1790		
H9	Perceived usefulness -> Attitude	.3620	9.9690	.0000	Yes	.1280		
H10	Perceived usefulness -> Intention to use	.5410	18.6240	.0000	Yes	.3590		
H11	Attitude -> Intention to use	.2670	8.8150	.0000	Yes	.0870		
H12	Intention to use -> Actual use	.5930	26.6890	.0000	Yes	.5410		

**Table 5.** The results of structural model,  $f^2$ , SRMR, dULS, and dG [38], [39].

Path	$R^2$	$Q^2$
Received usefulness	.618	.508
Perceived ease of use	.540	.402
Attitudes	.544	.408
Intention to use	.561	.471
Actual use	.351	.349

#### 4.3. MGA results

As previously informed, eight hundred respondents of this study lived in rural areas; while, 489 stayed in urban areas. The moderating roles of geographical areas, urban and rural, were examined through MGA computation for H13, H14, H15, H16, H17, H18, H19, H20, H21, H22, H23, and H24. The MGA results reveal that respondents' geographical areas do not significantly moderate the impact of most predictors on their exogenous constructs; thus, the results show that MGA process rejects nine hypotheses out (H13, H14, H16, and H17, H18, H20, H22, H23, H24) of twelve hypotheses. For example, the p-value of the difference regarding the relationship between experience and perceived usefulness is reported to be insignificant ( $\beta = 0.227$ ;  $p = 0.0840$ ) that rejects H13. Another example is the difference regarding the path coefficient between intention to use and actual use that is also insignificant ( $\beta = 0.0140$ ;  $p = .7770$ ), rejecting hypothesis 24. The three hypotheses are reported to be accepted: H15, H19, and H21. Geographical areas, urban and rural, are significantly different regarding the relationships between enjoyment and perceived usefulness ( $\beta = 10.2470$ ;  $p < .001$ ), supporting H15. Similarly, the path differences between perceived ease of use and perceived usefulness ( $\beta = 0.2320$ ;  $p < .01$ ) and between perceived usefulness and attitude ( $\beta = -0.1540$ ;  $p < .05$ ) are also reported to be significant. All information about the detail of the computational results on the MGA approach is informed in Table 6.

**Table 6.** MGA results regarding all paths based on respondents' geographical areas, rural and urban.

H	Path	$\beta$ rural	$\beta$ urban	p value rural	p value urban	$\beta$ rural-urban	p value rural-urban
H1	Experience -> Perceived usefulness	0.0360	-0.0480	0.2240	0.2330	0.0840	0.0940
H1	Experience -> Perceived ease of use	0.1710	0.0870	0.0000	0.0450	0.0840	0.1310



4	H1	<i>Enjoyment -&gt; Perceived usefulness</i>	0.2170	0.4640	0.0000	0.0000	-0.2470	0.0000
5	H1	Enjoyment -> Perceived ease of use	0.5010	0.5290	0.0000	0.0000	-0.0280	0.6490
6	H1	Self-efficacy -> Perceived usefulness	0.0630	0.1070	0.0490	0.0110	-0.0450	0.4020
7	H1	Self-efficacy -> Perceived ease of use	0.1720	0.1730	0.0000	0.0010	-0.0010	0.9950
8	H1	<i>Perceived ease of use -&gt; Perceived usefulness</i>	0.5640	0.3320	0.0000	0.0000	0.2320	0.0010
9	H2	Perceived ease of use -> Attitude	0.4760	0.3620	0.0000	0.0000	0.1130	0.1400
0	H2	<i>Perceived usefulness -&gt; Attitude</i>	0.2980	0.4510	0.0000	0.0000	-0.1540	0.0490
1	H2	Perceived usefulness -> Intention to use	0.5420	0.5380	0.0000	0.0000	0.0040	0.9570
2	H2	Attitude -> Intention to use	0.2700	0.2640	0.0000	0.0000	0.0060	0.9210
3	H2	Intention to use -> Actual use	0.5970	0.5830	0.0000	0.0000	0.0140	0.7770
4								

## 5. Discussion

Consistent with prior studies [5], [17], [22], [23], the extended TAM used in this study was successful in explaining the distant learning process of adoption as seen by Indonesian students of sports science. The scale can be studied and altered in the future by other academics who are interested in performing studies in the relevant field, especially during pandemics like Covid-19, based on the findings. The instrument contributes significantly to the advancement of academic approaches for structural equation research. The model is reported to be valid and reliable based on the content validity and measurement model processes. From the descriptive statistical findings, it could be discussed that the students of the current study have a low perception (means below three or disagree) on enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use regarding distance learning during COVID-19. From the results, only items from three variables, namely experience, enjoyment, and actual use, gained mean values of slightly above 3. These low and medium means of items were also reported by the previous study [5]. The location of the study was categorized as a developing country, similar to this study setting.

Through bootstrapping process with 5,000 sub-samples, the study's findings revealed that all hypotheses were supported for the non-original TAM variables but one correlation between experience and perceived usefulness. The insignificant relationship might appear because the students perceive the first experience. This research took place during the COVID-19 epidemic, which has affected every country on the planet and has left no country unaffected. All educational stakeholders, including students, were taken off guard and adjusted as fast as possible to the new reality. The survey "caught" HEI students in the midst of a distant learning phase, during which they were all required to switch from face-to-face to online instruction [5]. In addition, experience was reported to significantly perceived ease of use. Enjoyment is significantly related to perceived usefulness and perceived ease of use. Besides, self-efficacy was a significant predictor of perceived usefulness and perceived ease of use, similar to previous studies [5], [17], [19], [23]. For TAM variables, all exogenous variables were significantly related to the endogenous variables. Perceived ease of use is a significant predictor of perceived usefulness and attitude, and perceived usefulness gained significant relationships with attitude and intention to use. Besides, the attitude was reported to be significant in predicting intention to use. Finally, the relationship between intention to use and actual use was informed to be the strongest. The significance revealed by this study can be a guide for all Indonesian stakeholders to face challenges during future pandemics. The introduction to distance learning should be supported by appropriate policies in improving perceived usefulness, perceived ease of use, attitude, and intention to use distance learning technology. The proper

and appropriate infrastructure, training, seminar, curriculum, and quality tutors should support the system [17], [23].

Besides the structural model, the current study also investigated the role of geographical areas in moderating the relationships of all paths. Mostly, the effects of the endogenous constructs on their exogenous constructs are not significantly moderated by the geographical areas of the respondents involved in this study. Only three relationships are significantly different; enjoyment -> perceived usefulness, perceived ease of use -> perceived usefulness; and perceived usefulness -> attitude. The equality of students' perception could trigger the dominance of the insignificances, knowledge, skills, and information regarding the use of technology in education [26], [28]. More studies should be conducted regarding demographic information towards technology integration, especially during pandemics like Covid-19. Even though most paths are not significantly different, respondents living in urban areas have higher perceptions of all items and constructs than those who live in rural areas. The findings might refer to the slight differences in the infrastructure of internet access where most rural areas have lower connection speed than urban areas [28].

## 6. Conclusions

The current study took place during COVID-19 pandemic, which has left no country unaffected. Most HEIs should focus on distance learning as an effort to replace face-to-face instruction. This scheduling allowed students to provide the most up-to-date feedback on the approaches and devices utilized within the distance learning, as well as explore their emotions while they were still experiencing the situation. The study is based on a survey of particular students, sports science students, who were asked how they felt about distance learning during COVID-19. The survey provided an opportunity to examine students' attitudes about distance learning and, in particular, the instruments used by HEIs in the process. If the COVID-19 scenario requires HEIs to continue operating online, this research will be a significant addition to policymaking.

Nonetheless, some limitations emerged regarding the findings of the study. The specific sample of the study is one of the limitations; thus, respondents from across fields of study should be considered. Comparative studies on other demographic information like genders and years in university are also recommended to gain a better understanding of COVID-19's influence on HEIs. The article includes a quick analysis of the condition of Indonesian HEIs distance learning due to COVID-19. The article does not provide a complete picture of what is happening in higher education. However, we believe that sharing experience is vital in the current circumstances and that each HEI contributes significantly to the worldwide fight with similar situations in the future. It is also suggested to undertake further in-depth analysis on the experiences of educational institutions, analyzing more examples and using different methods such as observation, interview, and experimentation.

**Funding:** This research was co-funded by Universitas Negeri Makassar, LPDP Indonesia, and Research and Innovation Management Centre (RIMC) of Universiti Utara Malaysia.

**Institutional Review Board Statement:** The study was conducted according to the guidelines of Declaration of Helsinki, and approved by *Lembaga Pengabdian dan Penelitian*, Universitas Negeri Makassar on 7 July 2021

**Informed Consent Statement:** Informed consent was obtained from all respondents involved in the study.

**Data Availability Statement:** Data is available upon request through contact with the corresponding author.

**Acknowledgments:** We thank all support from all related Indonesia HEIs involved in this study. We also address our gratitude to all respondents of the study.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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# Students' acceptance to Covid-19 distance learning: The role of geographical areas in Indonesian higher education

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**Abstract:** This study was conducted to investigate the perspectives of sports science students on factors affecting distance learning in the setting of Indonesian higher education institutions (HEIs). This study applied an extended technology acceptance model (TAM) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual use. An online survey was used to collect data from 1291 Indonesian sports science students for the study. The structural model was tested using the partial least squares structural equation modeling (PLS-SEM). Multi-group analysis (MGA) was conducted to understand the role of geographical areas in moderating all hypothetical relationships. The findings show that users were not excited informed by weak means (below 3) for most items of enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use. All relationships were supported except the relationship between experience and perceived usefulness. The strongest significant association emerged between intention to use and actual use. Meanwhile, the least considerable correlation existed between self-efficacy and perceived usefulness. Three out of 12 hypotheses were confirmed regarding the difference of geographical areas, rural and urban, concerning all relationship paths. The findings add to a deeper understanding of the acceptability of distance learning, and this study will be especially useful to instructors and educators in HEIs.

**Keywords:** Sports science students; distance learning; higher education; COVID-19; pandemic.

## 1. Introduction

The world health organization (WHO) declared COVID-19 as a global pandemic in In March 2020. The last report on June 23, 2021 (the writing of this manuscript) showed that the overall number of cases has already exceeded 177 million globally. Mortality remained high, with over 9000 deaths recorded each day; however, all areas except two (Eastern Mediterranean and Africa) reported decreased new deaths. Compared to the previous week of May 2021, the global number of cases and fatalities dropped by 6% and 12%, respectively, with slightly more than 2.5 million new weekly cases and over 64 000 deaths. [1]. In education, one of the efforts to decrease the spread of the pandemic was made by closing schools at all levels. The distance learning policy was conducted with the help of the available technologies in facilitating teaching and learning activities, replacing face-to-face instruction.

Researchers from all around the world have already conducted extensive studies on the global pandemic in education [2]–[4]. In Indonesia, like in any other nation, COVID-19 has had a significant impact on schooling [2]. Higher education institutions (HEIs) have been compelled to substitute traditional learning with distance learning [3]. Courses, persons, and technology were all challenges in distant education. These issues affect developed and developing countries; but, access to technology is more pronounced in developing countries [4]. To go deeper to the challenges of distance learning during COVID-19 pandemic, academics are recommended to understand factors affecting the acceptance as a new approach of pedagogy [5], especially in a specific context of the study and among particular objects. Therefore, this

study aims to disclose factors affecting distance learning in the context of Indonesian HEIs; it is conducted to understand the perceptions of sports science students. Besides, we also inform the difference on all paths regarding respondents' geographical areas (urban and rural).

## 2. Review of Literature

### 2.1. Distance learning during COVID-19 pandemic

Distance learning has been around for a long time in higher education. When there is a physical distance between students and their instructors, the situation refers to learning mediated through technology equipment. Distance learning is far from a new phenomenon; tracing its history, it began in the early 18th century as a correspondence study to allow eager learners outside of the city to continue their education without having to be on-site. Since then, it has progressed and grown in popularity, especially with the quick expansion of technological innovation [6]. Other modules in distant education, such as blended learning (or hybrid-learning), have emerged in tandem, defining a combination of face-to-face and technology-mediated instructions that provides a resilient and accessible learning experience. In current condition, many educational institutions have been forced to adopt distant learning to keep up with the present COVID-19 scenario.[7], [8].

When WHO declared COVID-19 a global pandemic, nations were forced to implement preventive measures to stem the virus's spread, including suspending schools' face to face learning. Higher education quickly responded to this massive transition by launching distance learning, utilizing existing learning support systems like Social Media and Learning Management Systems [9], [10]. Although this fast shift offered continuity to the learning process, it also exacerbated educational gaps among students, particularly those who reside in rural regions or in low-income nations and those who lack fundamental information and technology skills. Such qualities may make it more difficult to gain access to contemporary technological resources that are needed to support the distance learning trend. Considering that the current scenario may endure for a longer period, they suggest a long-term move to online learning. This circumstance will require educational institutions to prepare and equip themselves with the instruments needed to facilitate the acceptance of such a trend, especially among users [11]. Thus, this study explores the factors through the implementation of TAM to understand factors affecting students' acceptance of distance learning and whether or not the paths differ based on geographical areas, rural and urban.

### 2.2. TAM variables: perceived ease of use, perceived usefulness, attitude, intention to use, and actual use

In the field of social science, TAM is a commonly adapted model by educational researchers. The model states that people's feelings about behavioral intention toward adopting a system, which in this study is in the setting of distance learning, is predicted by their perceived usefulness and perceived ease of use [12]. TAM's original premise is that perceived ease of use is claimed to predict perceived usefulness [12]. Furthermore, a system's attitudes and perceived usefulness impact behavioral intention (the degree to which people perform or do not perform for a given future activity). Finally, behavioral intention predicts the actual use of a system [12]. Besides the original constructs, some external factors were reported to be associated with the first TAM constructs. [13]–[15].

One of the most significant components in TAM is the perceived usefulness. Perceived usefulness is defined as the degree to which system users feel that the system will increase their performance [12]; in this study, we determined the system as distance learning. Further, users' attitude toward and intention to use a system is influenced by his or her perceived usefulness [12]. Perceived usefulness of a system is also expected to influence the user's decision to accept or reject it. The degree to which a person believes that using any system is straightforward and friendly is described as perceived ease of use [16]. From the TAM concept, perceived ease of use is one of the drivers that can affect perceived usefulness and attitude toward a system. Users are more willing to adopt a new system if they believe it is simple to use [12], [14].

Attitude is defined as users' certain behavior linked with the use of a system [12]. In the original TAM model, attitude is hypothesized to influence intention to use a system. Further, Intention to use in this study is described as students' desire to utilize technologies for the distance learning setting; the intention is expected to significantly influence actual use [17]. The final part of the TAM is the actual use,

or the act of applying something, which expresses the reality of users to utilize or not to utilize any technology; in this study, the actual use is the implementation of technology for distance learning [12]. In the proposed model of this study, actual use has no impact on the other components of this model since it is the final stage in the chain of technological acceptance.

Table 1. Some recent TAM-related studies in the educational context

No	Sources	Method	Results
1	[18]	Meta-analysis	TAM explains technology acceptance properly; yet, the role of certain key constructs and the importance of external variables contrast some existing beliefs about the TAM. Implications for research and practice are discussed
2	[19]	A survey involved 550 high school students, and the data were analyzed using PLS-SEM.	The original TAM variables (perceived attitude, perceived usefulness, and perceived ease of use) had direct correlations with behavioral intention and played mediating roles between the external variables and behavioral intention
3	[20]	The study was conducted on the 375 students in universities of South Korea during Covid-19.	The results suggested that all factors in TAM positively influenced the behavioral intention to use and accept the e-learning system by the learners during this pandemic.
4	[5]	. PLS-SEM was employed to test the proposed research model. The survey gathered data from 1692 Polish students.	The strongest exogenous variable of student's acceptance of education shift to distance learning is enjoyment. Perceived ease of use and perceived usefulness were reported to be significant in affecting attitude towards and intention to use
5	[21]	An online survey was completed by 365 undergraduate students from a university in Sydney, Australia. Confirmatory factor analysis, SEM, and multi-group analyses were used to analyze the data.	Facilitating conditions were positively associated with the perceived usefulness of technology, which in turn was positively associated with academic self-efficacy. Surprisingly, perceived ease of use did not have a statistically significant association with perceived usefulness. Academic self-efficacy was positively associated with academic achievement.
6	[22]	The suggested structural model was tested using Lisrel software with a total of 352 valid replies.	The results clearly confirmed the positive influence of the intrinsic motivations, autonomy, and relatedness, to improve perceptions regarding the usefulness and ease of use of Open Source Software, and; therefore, on behavioral intention to use the software.
7	[17]	The information was gathered from 650 university students. After data filtering, structural equation modeling was used to evaluate 513 valid replies.	Satisfaction, perceived ease of use, perceived usefulness, information quality, self-efficacy, social influence, and benefits were reported to be significant in predicting behavioral intention regarding e-learning portal acceptance. Perceived ease of use significantly predicted perceived usefulness and pleasure. The appeal had a significant effect on pleasure and satisfaction. Enjoyment is significantly correlated with satisfaction
8	[23]	The research was conducted through a survey of 974 students analyzed with PLS-SEM of expanded TAM with enabling conditions as the external component.	The finding of significant relationships between facilitating condition and perceived ease of use and between facilitating condition and perceived usefulness was reported, and (3) the significant relationships among core components of TAM were found except for one, the relationship between perceived usefulness and attitude.

## 2.2. External variables; Experience, enjoyment, and self-efficacy

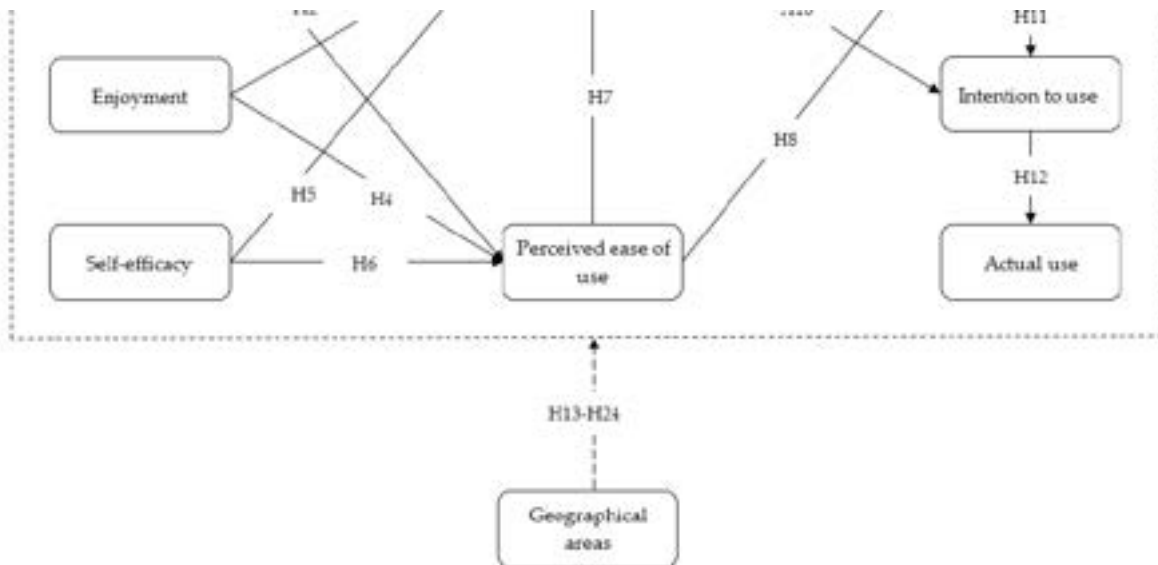
In this study, extended factors such as enjoyment, self-efficacy, and experience were suggested to predict perceived ease of use and usefulness [5]. In this study, experience is defined as the amount and type of technical abilities for distance learning that a person has acquired through time [24]. One of the most significant external variables is experience. Individuals with more advanced technological abilities are more likely to be enthusiastic about using any online/distance learning instrument [5]. In this study, we

expect that experience of distance learning during COVID-19 influences perceive ease of use and perceived usefulness.

Furthermore, enjoyment or pleasure is defined to be the degree to which the action of implementing any system is seen to become pleasurable, independent of the results. A system that is pleasant seems to be viewed as simple to use and beneficial in which users' desire to utilize it can increase. Many studies have shown that consumers' perceptions of ease of use are influenced by how much fun they have when using a system. In addition, researchers have discovered a substantial positive relationship between online learning system enjoyment and perceived usefulness, which boosts students' propensity to use (real usage) these systems [5]. Self-efficacy in this study is described as the confidence of ability to complete a task using technology for distance learning during COVID-19. According to the findings, students with stronger e-learning self-efficacy are also more inclined to employ e-learning and computer-supported education. Self-efficacy is thought to significantly impact perceived ease of use and perceived usefulness. All hypotheses included in this study are performed in Figure 1, and prior studies related to TAM application in recent years within the educational environment are shown in Table 1.

## 2.2. Geographical areas in moderating hypothetical relationships

In addition to the structural model reported in the current study, geographical areas (rural and urban) were included to understand how all hypothetical relationships are different. Prior studies have focused on the differences in technology integration based on demographic information [25]–[28]. For example, genders were reported to be significantly different regarding multimedia utilization for learning [27]. Based on the geographical areas, rural and urban, learning behavioral patterns and access to technology were revealed to become significantly different [26], [28]. Therefore, besides hypotheses for the structural model, twelve hypotheses (H13-H24) were included regarding the differences between geographical areas concerning all paths (Fig.1), for example, there is a significant difference regarding the relationship between experience and perceived usefulness based on respondents' geographical areas (H13), and there is a significant difference regarding the relationship between intention to use and actual use based on respondents' geographical areas (H24)



**Figure 1.** A proposed model exploring sports science students' acceptance to Covid-19 distance learning: The role of geographical areas in Indonesian higher education.

## 3. Materials and Methods



### *3.1. Design of the Study*

This research was conducted using an online survey from March 2021 to June 2021 in five Indonesian HEIs, after the Indonesian government announced school closures on May 20, 2020. Before the primary data collection, a survey instrument was developed and validated to assess variables that predict the usage of e-learning by Indonesian sport science students during Covid-19. The model measurement and evaluation were carried out using SmartPLS 3.3, led by the Partial Least Squares Structural Equation Modeling methods (PLS-SEM).

### *3.2. Instrumentation*

The review of literature can aid researchers in defining and analyzing ideas and concepts related to the theoretical research framework. [29]. It tries to determine the study's objective approach to instrumentation. The instrument is designed to meet the research goals [29]. Adapted survey tools were used in this study to assess the elements that influence students' acceptance of distance learning [5], [13], [30], [31]. The new instrument for the current study was produced based on the adaptation process; the indicators differed and developed to meet COVID-19 and distant learning settings. Twenty-nine indicators were modified for the instrument during the initial setup procedure. The indicators were addressed with three educational technology specialists from Malaysia and Indonesia via video conferences as part of the content validity process to ensure that the instrument was appropriate for the study's context and setting. [32]. Ten indicators were updated after the video call meetings. In contrast, three others were deleted owing to inappropriate circumstances, mostly because the research issue is distance learning usage during a pandemic that varies from typical conditions.

### *3.3. Data Collection and Analysis*

A Google Forms survey was used to collect data for the study. The questionnaire (n 26) was piloted on a small group of students for the initial examination of reliability; the Cronbach alpha test was conducted for this process. All variables were reliable, with alphas of more than .70. The final set of questions was improved after the pilot study, and the questionnaire was disseminated. The survey was launched on June 1, 2021 and was open until June 15, 2021. The majority of answers, though, came in the first week. Active students from three institutions were asked to take part in the study via an electronic invitation. The survey received 1472 responses; 1291 data were measurable. One hundred and eighty-one responses were dropped because missing values appeared or the same answers for every question were identified. Nine hundred and ninety-four are male students; meanwhile, 296 female respondents are females. Eight hundred respondents are from rural areas, and 489 are from urban areas.

Two phases are involved in evaluating PLS-SEM findings. The first phase is a review of the reflective measurement model. This is an essential component of the evaluation since it ensures that the measurement quality is maintained. The examination of the structural model is carried out in phase 2 after the measurement model was evaluated. Phase 2 examines the structural theory, which entails considering the given hypotheses and addressing the connections among the latent variables [33].

## **4. Results**

### *4.1. Preliminary Findings*

The percentage of missing data in the present study ranged from 0% to .5 percent for each item. The missing data was utterly random (MCAR) (Kline, 2005). Table 1 displays the means, standard deviations, correlation matrices, skewness, and kurtosis for all variables; univariate normality was found for experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual usage (skewness and kurtosis values in the range of the cut-off values). The Likert scale went from 1 to 5, with 5 being the highest score. Most items achieved means of below three from enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use. The findings show that users were not excited; these feelings suggest that distance learning could have a lesser potential than face-to-face learning.

### *4.2. Measurement Model*

The examination of the measurement model in this study includes reflective metrics. We began by looking at the indicator loadings. Loadings greater than .50 show that the construct accounts for more than half of the variation in the indicator, indicating that the indicator is reliable [34]. The internal consistency dependability of the constructions was tested. Better numbers imply higher levels of dependability for the composite reliability criteria. Reliability ratings of .70 to .95 are considered "acceptable to good" [33]. Internal consistency dependability is measured using Cronbach's alpha, which assumes the same criteria. Reliability ratings of .70 to .95 are considered appropriate [35]. The convergent validity, or the amount to which a construct converges in its indicators by explaining the variance of the items, was then computed. The items' average variance extracted (AVE) linked with a specific construct is used to measure convergent validity, which is also referred to as communality. The AVE must be .500 or greater to be considered acceptable [36]. This level or above suggests that the concept accounts for (more than) 50% of the variation in its components on average.

Discriminant validity is the final stage in reflective measurement [37]. This study demonstrates how empirically different a concept is from others. In PLS-SEM, discriminant validity is determined by examining heterotrait–monotrait ratio of correlations. If the route model includes variables defined as conceptually and extremely similar, a value of .900 is proposed as a threshold, depicted in our model. In PLS-SEM, the heterotrait–monotrait ratio criterion is a novel requirement for assessing discriminant validity that outperforms the Fornell–Larcker criterion and cross-loading assessments [33].

Table 2 informs the results and evaluation of the measurement model. All reflected measurement models were reported to have to meet the criteria in the examination. All of the outside loadings are larger than .500, implying that all indicators are trustworthy. In addition, all AVEs were greater than .500, indicating that the measurements were convergently valid. Composite reliability was found to have values of  $\geq .8730$ , higher than .700 as the minimum cut-off value for composite reliability [33]. In addition, Cronbach's alpha values were in the range of .7200 to .9410, also in a good range. Discriminant validity was assessed using the heterotrait–monotrait ratio criterion. The results all fell short of the .900 threshold. The bootstrapping technique was then used with 5000 samples, using the "no sign" adjustments option at the .05 significant level. The statistical computation shows no values of the heterotrait–monotrait ratio confidence intervals contain values greater than .900, suggesting that all heterotrait–monotrait ratio values are significantly different from 1. As a consequence, discriminant validity has been demonstrated (Table 3).

**Table 2.** Normality, descriptive statistics, and measurement model criteria.

Construct	Items	Mean	SD	Kurt.	Skew.	Mark	Load	$\alpha$	rho_A	CR	AVE
Perceived usefulness	PU1	2.5630	1.2910	-.8110	.4240		.9150	.8960	.8970	.9350	.8280
	PU2	2.5480	1.2540	-.7240	.4430		.9260				
	PU3	2.6070	1.2310	-.7420	.3720	Dropped CR < .9500					
	PU4	2.7750	1.2840	-.9300	.2390		.8890				
Perceived ease of use	PEOU 1	3.0300	1.2860	-.9920	-.0020		.8210	.8900	.8940	.9240	.7520
	PEOU 2	2.6890	1.2330	-.7850	.2930		.8890				
	PEOU 3	2.5770	1.1970	-.6250	.4080		.8810				
	PEOU 4	2.8200	1.2470	-.8520	.1920		.8760				
	ATU1	2.7520	1.2850	-.9650	-.1670	Dropped low-load					
Attitude	ATU2	3.2830	1.1560	-.6170	-.1650		.8330	.7200	.7940	.8730	.7760
	ATU3	2.8610	1.1850	-.7080	.1080		.9260				

	ATU4	2.7040	1.3270	-1.0180	.2230	Dropped, low load					
Intention to use	ITU1	2.6050	1.2730	-.8670	.3060		.9030	.9090	.9100	.9430	.8460
	ITU2	2.4950	1.2030	-.6630	.4060		.9300				
	ITU3	2.5390	1.2220	-.7150	.3910		.9260				
Actual use Experience	AU1	3.0810	1.2430	-.8340	-.0730		1.0000	1.0000	1.0000	1.0000	1.0000
	EXP1	3.3990	1.2330	-.7870	-.2810		.7890	.8590	.8870	.9030	.7000
	EXP2	3.6540	1.2200	-.6230	-.5400		.8060				
	EXP3	3.3780	1.2170	-.7950	-.2520		.8880				
Enjoyment	EXP4	3.1390	1.2330	-.8420	-.0640		.8600				
	EJ1	2.6940	1.2300	-.7550	.2630		.9490	.9410	.9420	.9620	.8950
	EJ2	2.8060	1.2210	-.7620	.2070		.9430				
Self-efficacy	EJ3	2.7000	1.2350	-.7690	.2530		.9470				
	SE1	3.0910	1.1630	-.5850	-.0040		.8950	.8870	.8880	.9300	.8160
	SE2	3.0990	1.1520	-.5390	.0100		.9130				
	SE3	3.0550	1.1340	-.4590	.0040		.9010				

**Table 3.** Heterotrait–monotrait ratio for discriminant validity (< .900) [33]

	Actual use	Attitude	Enjoyment	Experience	Intention to use	Perceived ease of use	Perceived usefulness
Attitude	.6180						
Enjoyment	.5940	.7770					
Experience	.4700	.6700	.6660				
Intention to use	.6220	.7570	.8180	.5430			
Perceived ease of use	.5820	.8530	.7730	.6190	.7590		
Perceived usefulness	.5340	.8190	.7630	.5540	.8010	.8300	
Self-efficacy	.5260	.7260	.6920	.6100	.6380	.6440	.6180

#### 4.3. Structural Model

To assess the structural model, studies [38], [39] recommend looking at measures like  $R^2$ ,  $f^2$ ,  $Q^2$ , SRMR, and statistical significances. Table 6 shows the  $R^2$  and path coefficients of the endogenous constructs. We follow [33] recommendation in terms of  $R^2$  values, which indicates that  $R^2$  values of .670, .330, and .190, respectively, indicate strong, moderate, and weak  $R^2$  values.  $f^2$  values of .020, .150, and .350, according to [38], suggest small, medium, and large effects, respectively. To test for statistical significance, Hair et al. [33] recommend a minimum t value of 1.65 at p .1. Furthermore, for a given endogenous component,  $Q^2$  values larger than zero indicate a reasonable degree of prediction accuracy [38], [40] (see Table 6 for  $R^2$  and  $Q^2$  results and Table 4 for  $f^2$  results). Based on the recommended assessment standards and current research, the  $Q^2$  findings indicate sufficient prediction accuracy for exogenous variables [38], [40]. According to Henseler [41], the SRMR is the only approximate model fit criteria for evaluating PLS route modeling, consistent with prior research [42]. The bootstrap-based test is also used to calculate values for the discrepancy measures, which include the squared Euclidean Distance (dULS) and the Geodesic Distance (dG) [41]. Table 3 compares the values of the SRMR, dULS, and dG discrepancy measures; SRMR below .08 shows a valid and reliable model. The structural model was estimated using the consistent PLS bootstrapping option with 5,000 subsamples in this investigation [43]. All hypotheses were supported but H1 (the relationship between experience and perceived usefulness,  $t = .1900$ ;  $p = .8500$ ). The strongest correlation emerged between intention to use and actual use that supports the last hypothesis (H12) with a t value of 26.6890. In contrast, the lowest correlation was reported between self-efficacy and perceived usefulness with a t value of 3.050.

**Table 4.** The results of structural model,  $f^2$ , SRMR, dULS, and dG [38], [39].

H	Path	$\beta$	t values	p values	Sig	$f^2$	Items	Value
H1	Experience -> Perceived usefulness	.0050	.1900	.8500	No	.0000	SRMR	.053
H2	Experience -> Perceived ease of use	.1440	5.0700	.0000	Yes	.0260	dULS	.762
H3	Enjoyment -> Perceived usefulness	.3110	9.2350	.0000	Yes	.0970	dG	.334
H4	Enjoyment -> Perceived ease of use	.5110	16.8430	.0000	Yes	.2800		
H5	Self-efficacy -> Perceived usefulness	.0800	3.0500	.0020	Yes	.0090		
H6	Self-efficacy -> Perceived ease of use	.1710	6.0150	.0000	Yes	.0360		
H7	Perceived ease of use -> Perceived usefulness	.4750	13.4150	.0000	Yes	.2720		
H8	Perceived ease of use -> Attitude	.4280	11.5280	.0000	Yes	.1790		
H9	Perceived usefulness -> Attitude	.3620	9.9690	.0000	Yes	.1280		
H10	Perceived usefulness -> Intention to use	.5410	18.6240	.0000	Yes	.3590		
H11	Attitude -> Intention to use	.2670	8.8150	.0000	Yes	.0870		
H12	Intention to use -> Actual use	.5930	26.6890	.0000	Yes	.5410		

**Table 5.** The results of structural model,  $f^2$ , SRMR, dULS, and dG [38], [39].

Path	$R^2$	$Q^2$
Received usefulness	.618	.508
Perceived ease of use	.540	.402
Attitudes	.544	.408
Intention to use	.561	.471
Actual use	.351	.349

#### 4.3. MGA results

As previously informed, eight hundred respondents of this study lived in rural areas; while, 489 stayed in urban areas. The moderating roles of geographical areas, urban and rural, were examined through MGA computation for H13, H14, H15, H16, H17, H18, H19, H20, H21, H22, H23, and H24. The MGA results reveal that respondents' geographical areas do not significantly moderate the impact of most predictors on their exogenous constructs; thus, the results show that MGA process rejects nine hypotheses out (H13, H14, H16, and H17, H18, H20, H22, H23, H24) of twelve hypotheses. For example, the p-value of the difference regarding the relationship between experience and perceived usefulness is reported to be insignificant ( $\beta = 0.227$ ;  $p = 0.0840$ ) that rejects H13. Another example is the difference regarding the path coefficient between intention to use and actual use that is also insignificant ( $\beta = 0.0140$ ;  $p = .7770$ ), rejecting hypothesis 24. The three hypotheses are reported to be accepted: H15, H19, and H21. Geographical areas, urban and rural, are significantly different regarding the relationships between enjoyment and perceived usefulness ( $\beta = 10.2470$ ;  $p < .001$ ), supporting H15. Similarly, the path differences between perceived ease of use and perceived usefulness ( $\beta = 0.2320$ ;  $p < .01$ ) and between perceived usefulness and attitude ( $\beta = -0.1540$ ;  $p < .05$ ) are also reported to be significant. All information about the detail of the computational results on the MGA approach is informed in Table 6.

**Table 6.** MGA results regarding all paths based on respondents' geographical areas, rural and urban.

H	Path	$\beta$ rural	$\beta$ urban	p value rural	p value urban	$\beta$ rural-urban	p value rural-urban
H1	Experience -> Perceived usefulness	0.0360	-0.0480	0.2240	0.2330	0.0840	0.0940
H1	Experience -> Perceived ease of use	0.1710	0.0870	0.0000	0.0450	0.0840	0.1310

4	H1	<i>Enjoyment -&gt; Perceived usefulness</i>	0.2170	0.4640	0.0000	0.0000	-0.2470	0.0000
5	H1	Enjoyment -> Perceived ease of use	0.5010	0.5290	0.0000	0.0000	-0.0280	0.6490
6	H1	Self-efficacy -> Perceived usefulness	0.0630	0.1070	0.0490	0.0110	-0.0450	0.4020
7	H1	Self-efficacy -> Perceived ease of use	0.1720	0.1730	0.0000	0.0010	-0.0010	0.9950
8	H1	<i>Perceived ease of use -&gt; Perceived usefulness</i>	0.5640	0.3320	0.0000	0.0000	0.2320	0.0010
9	H2	Perceived ease of use -> Attitude	0.4760	0.3620	0.0000	0.0000	0.1130	0.1400
0	H2	<i>Perceived usefulness -&gt; Attitude</i>	0.2980	0.4510	0.0000	0.0000	-0.1540	0.0490
1	H2	Perceived usefulness -> Intention to use	0.5420	0.5380	0.0000	0.0000	0.0040	0.9570
2	H2	Attitude -> Intention to use	0.2700	0.2640	0.0000	0.0000	0.0060	0.9210
3	H2	Intention to use -> Actual use	0.5970	0.5830	0.0000	0.0000	0.0140	0.7770
4								

## 5. Discussion

Consistent with prior studies [5], [17], [22], [23], the extended TAM used in this study was successful in explaining the distant learning process of adoption as seen by Indonesian students of sports science. The scale can be studied and altered in the future by other academics who are interested in performing studies in the relevant field, especially during pandemics like Covid-19, based on the findings. The instrument contributes significantly to the advancement of academic approaches for structural equation research. The model is reported to be valid and reliable based on the content validity and measurement model processes. From the descriptive statistical findings, it could be discussed that the students of the current study have a low perception (means below three or disagree) on enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use regarding distance learning during COVID-19. From the results, only items from three variables, namely experience, enjoyment, and actual use, gained mean values of slightly above 3. These low and medium means of items were also reported by the previous study [5]. The location of the study was categorized as a developing country, similar to this study setting.

Through bootstrapping process with 5,000 sub-samples, the study's findings revealed that all hypotheses were supported for the non-original TAM variables but one correlation between experience and perceived usefulness. The insignificant relationship might appear because the students perceive the first experience. This research took place during the COVID-19 epidemic, which has affected every country on the planet and has left no country unaffected. All educational stakeholders, including students, were taken off guard and adjusted as fast as possible to the new reality. The survey "caught" HEI students in the midst of a distant learning phase, during which they were all required to switch from face-to-face to online instruction [5]. In addition, experience was reported to significantly perceived ease of use. Enjoyment is significantly related to perceived usefulness and perceived ease of use. Besides, self-efficacy was a significant predictor of perceived usefulness and perceived ease of use, similar to previous studies [5], [17], [19], [23]. For TAM variables, all exogenous variables were significantly related to the endogenous variables. Perceived ease of use is a significant predictor of perceived usefulness and attitude, and perceived usefulness gained significant relationships with attitude and intention to use. Besides, the attitude was reported to be significant in predicting intention to use. Finally, the relationship between intention to use and actual use was informed to be the strongest. The significance revealed by this study can be a guide for all Indonesian stakeholders to face challenges during future pandemics. The introduction to distance learning should be supported by appropriate policies in improving perceived usefulness, perceived ease of use, attitude, and intention to use distance learning technology. The proper

and appropriate infrastructure, training, seminar, curriculum, and quality tutors should support the system [17], [23].

Besides the structural model, the current study also investigated the role of geographical areas in moderating the relationships of all paths. Mostly, the effects of the endogenous constructs on their exogenous constructs are not significantly moderated by the geographical areas of the respondents involved in this study. Only three relationships are significantly different; enjoyment -> perceived usefulness, perceived ease of use -> perceived usefulness; and perceived usefulness -> attitude. The equality of students' perception could trigger the dominance of the insignificances, knowledge, skills, and information regarding the use of technology in education [26], [28]. More studies should be conducted regarding demographic information towards technology integration, especially during pandemics like Covid-19. Even though most paths are not significantly different, respondents living in urban areas have higher perceptions of all items and constructs than those who live in rural areas. The findings might refer to the slight differences in the infrastructure of internet access where most rural areas have lower connection speed than urban areas [28].

## 6. Conclusions

The current study took place during COVID-19 pandemic, which has left no country unaffected. Most HEIs should focus on distance learning as an effort to replace face-to-face instruction. This scheduling allowed students to provide the most up-to-date feedback on the approaches and devices utilized within the distance learning, as well as explore their emotions while they were still experiencing the situation. The study is based on a survey of particular students, sports science students, who were asked how they felt about distance learning during COVID-19. The survey provided an opportunity to examine students' attitudes about distance learning and, in particular, the instruments used by HEIs in the process. If the COVID-19 scenario requires HEIs to continue operating online, this research will be a significant addition to policymaking.

Nonetheless, some limitations emerged regarding the findings of the study. The specific sample of the study is one of the limitations; thus, respondents from across fields of study should be considered. Comparative studies on other demographic information like genders and years in university are also recommended to gain a better understanding of COVID-19's influence on HEIs. The article includes a quick analysis of the condition of Indonesian HEIs distance learning due to COVID-19. The article does not provide a complete picture of what is happening in higher education. However, we believe that sharing experience is vital in the current circumstances and that each HEI contributes significantly to the worldwide fight with similar situations in the future. It is also suggested to undertake further in-depth analysis on the experiences of educational institutions, analyzing more examples and using different methods such as observation, interview, and experimentation.

**Funding:** This research was co-funded by Universitas Negeri Makassar, LPDP Indonesia, and Research and Innovation Management Centre (RIMC) of Universiti Utara Malaysia.

**Institutional Review Board Statement:** The study was conducted according to the guidelines of Declaration of Helsinki, and approved by *Lembaga Pengabdian dan Penelitian*, Universitas Negeri Makassar on 7 July 2021

**Informed Consent Statement:** Informed consent was obtained from all respondents involved in the study.

**Data Availability Statement:** Data is available upon request through contact with the corresponding author.

**Acknowledgments:** We thank all support from all related Indonesia HEIs involved in this study. We also address our gratitude to all respondents of the study.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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# **Sports Science Students' Acceptance to Distance Learning: Covid-19 Context in Indonesian Higher Education**

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**Abstract:** This study was conducted to investigate the perspectives of sports science undergraduate students on factors affecting distance learning in the setting of Indonesian higher education institutions (HEIs). This study applied an extended Technology Acceptance Model (TAM) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual use. The suggested research model was tested using the partial least squares structural equation modeling (PLS-SEM). An online survey was used to collect data from 1291 Indonesian sports science undergraduate students for the study. The findings show that users were not excited informed by weak means (below 3) for most items of enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use. All relationships were supported except the relationship between experience and perceived usefulness. The strongest significant association emerged between intention to use and actual use. Meanwhile, the least considerable correlation existed between self-efficacy and perceived usefulness. The findings add to a deeper understanding of the acceptability of distance learning, and this study will be especially useful to instructors and educators in higher education institutions (HEIs).

**Keywords:** Sports science students; distance learning; higher education; COVID-19; pandemic.

## **Introduction**

The World Health Organization (WHO) China Country Office was notified on December 31, 2019, that cases of pneumonia of unknown origin had been discovered in Wuhan City, Hubei Province, China [1]. In January 2020, there were 282 confirmed cases of 2019-nCoV reported from four countries: China, Thailand, Japan, and the Republic of Korea are four of the world's most populous countries [2]. WHO declared that COVID-19 as a global pandemic in In March 2020 [4]. The last report on June 23, 2021 (the writing of this manuscript) showed that the overall number of cases has already exceeded 177 million globally. Globally, mortality remained high, with over 9000 deaths recorded each day; however, all areas except two (Eastern Mediterranean and Africa) reported a decrease in new deaths. Compared to the previous week of May, the global number of cases and fatalities dropped by 6% and 12%, respectively, with slightly more than 2.5 million new weekly cases and over 64 000 deaths. [3].

Researchers from all around the world have already conducted an extensive study on the global pandemic in education. In Indonesia, like in any other nation, the epidemic has had a significant impact on schooling [4]. Higher education institutions (HEIs) have been compelled to substitute face-to-face learning with distance learning as a result of the global health crisis [5]. Courses, persons, technology, and context were all challenges in distant education. These issues affect both rich and developing countries; but, access to technology and context are more important in developing countries.[6]. To go deeper to the challenges of distance learning during COVID-19 pandemic, academics are recommended to understand factors affecting the acceptance as a new approach of pedagogy [7], especially in a specific context of the study and among certain objects. Therefore, this study aims to disclose factors affecting distance learning in the context of Indonesian HEIs conducted to understand the perceptions of sports science undergraduate students.

## **2 Literature review**

### **2.1 Distance education during COVID-19 pandemic**

Distance learning has been around for a long time in higher education. When there is a physical distance between the student and the instructor, it refers to learning mediated through technology equipment. Distance learning is far from a new phenomenon; tracing its history, it began in the early 18th century as correspondence study to allow eager learners outside of the city to further their education without having to be on-site. Since then, it has progressed and grown in popularity, especially with the quick expansion of technological innovation.[8]. Other modules in distant education, such as blended learning (or hybrid-learning), have emerged in tandem, defining a combination of face-to-face and technology-mediated instructions that provides a resilient, accessible learning experience. Many educational institutions have been forced to adopt distant learning to keep up with the present COVID-19 scenario.[9], [10].

When the World Health Organization initially declared COVID-19 a global pandemic on March 11, 2020, nations were forced to implement preventive measures to stem the virus's spread, including suspending schools and HEIs attendance indefinitely. Higher education quickly responded to this massive transition by launching distance learning, utilizing existing learning support systems like Blackboard and Moodle [11], [12]. Although this fast shift offered continuity to the learning process, it also exacerbated educational gaps among students, particularly those who reside in rural regions or in low-income nations and those who lack fundamental information technology skills. Such qualities may make it more difficult to gain

access to contemporary technological resources that are needed to support the distant learning trend. Considering that the current scenario may endure for a longer period, we suggest a long-term move to online learning. This circumstance will require educational institutions to prepare and equip themselves with the instruments needed to facilitate the acceptance of such a trend [13].

### 2.2.1 TAM variables: perceived ease of use, perceived usefulness, attitude, intention to use, and actual use

In the field of social science, TAM has been the most commonly used and reported model. The TAM states that people’s feelings about behavioral intention performance toward adopting a system, which in this study is in the setting of remote education, is predicted by their perceived usefulness and perceived ease of use [14]. TAM’s original premise is that perceived ease of use is claimed to predict perceived usefulness [14]. Furthermore, a system’s attitudes and perceived usefulness impact behavioral intent (the degree to which people perform or do not perform for a given future activity). Finally, behavioral intention predicts the actual use of a system characterized as its use [14]. Various external factors were found to be associated with the first TAM constructs. [15]–[17].

Table 1. Some recent TAM-related studies in educational context

No	Sources	Method	Results
1	[18]	Meta analysis	TAM explains technology acceptance properly; yet, the role of certain key constructs and the importance of external variables contrast some existing beliefs about the TAM. Implications for research and practice are discussed
2	[19]	A poll involved 550 high school students, and the data was analyzed using PLS-SEM.	The original TAM variables (perceived attitude, perceived usefulness, and perceived ease of use) had direct correlations with behavioral intention and played mediating roles between the external variables and behavioral intention
3	[20]	The study was conducted on the 375 students in universities of South Korea during Covid-19. The study examined the instructor characteristics (instructor attitude, competency & interaction), student characteristics (student	The results suggested that all factors positively influenced the behavioral intention to use and accept the e-learning system by the learners during this pandemic.

			motivation, mindset & collaboration), and technology acceptance model (perceived ease of use & perceived usefulness) on the behavioral intention of students to accept and use e-learning in the future.	
4		[7]	The study adopted General Extended Technology Acceptance Model for E-Learning (GETAMEL) during school closure due to COVID-19. PLS-SEM was employed to test the proposed research model. The survey gathered data from 1692 Polish students.	The best predictor of student's acceptance of shifting education to distance learning is enjoyment, followed by Self-Efficacy. Both Perceived Ease of Use and Perceived Usefulness predict student's Attitude Towards Using and Intention to Use the distance learning.
5		[21]	An online survey was completed by 365 undergraduate students from a university in Sydney, Australia. Confirmatory factor analysis, SEM, and multi-group analyses were used to analyze the data (MGA).	Facilitating conditions were positively associated with the perceived usefulness of technology, which in turn was positively associated with academic self-efficacy. Surprisingly, perceived ease of use did not have a statistically significant association with perceived usefulness. Academic self-efficacy was positively associated with academic achievement.
6		[22]	The suggested structural model was tested using Lisrel software with a total of 352 valid replies.	The results clearly confirmed the positive influence of the intrinsic motivations; autonomy and relatedness, to improve perceptions regarding the usefulness and ease of use of Open Source Software (OSS), and; therefore, on behavioral intention to use OSS.
7		[23]	The information was gathered from 650 university students. After data filtering, structural equation modeling was used to evaluate 513 valid replies.	Satisfaction, perceived ease of use, perceived usefulness, information quality, self-efficacy, social influence, and benefits were reported to be significant in predicting behavioral intention regarding e-learning portal acceptance. Perceived ease of use significantly predicted perceived usefulness and pleasure. The appeal had a significant effect on pleasure and satisfaction. Enjoyment is significantly correlated with satisfaction
8		[24]	The research was conducted through a survey of 974 students from five	The finding of significant relationships between facilitating

			Indonesian higher education institutions. The theoretical foundation for this study was an expanded Technology Acceptance Model (TAM) with enabling conditions as the external component. PLS-SEM was used as a method of analysis.	condition and perceived ease of use and between facilitating condition and perceived usefulness was reported, and (3) the significant relationships among core components of TAM were found except for one, the relationship between perceived usefulness and attitude.
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One of the most significant components in TAM is the perceived usefulness of technology. Perceived usefulness is defined as the degree to which system users feel that the system will increase their performance [14]; in this study, we determined the system as distance learning. According to the original TAM, users' attitude toward and intention to use a system are influenced by his or her perceived usefulness (H9) [14]. Perceived usefulness of a system is also expected to influence the user's decision to accept or reject it (H10). The degree to which a person believes that using any system is straightforward and friendly is described as perceived ease of use [25]. From the TAM concept, perceived ease of use is one of the drivers that can affect attitude toward a system, behavioral intentions and actual use. Users are more willing to adopt a new system if they believe it is simple to use [16]. A user's attitude toward and perceived usefulness toward a system is influenced by perceived ease of use [14].

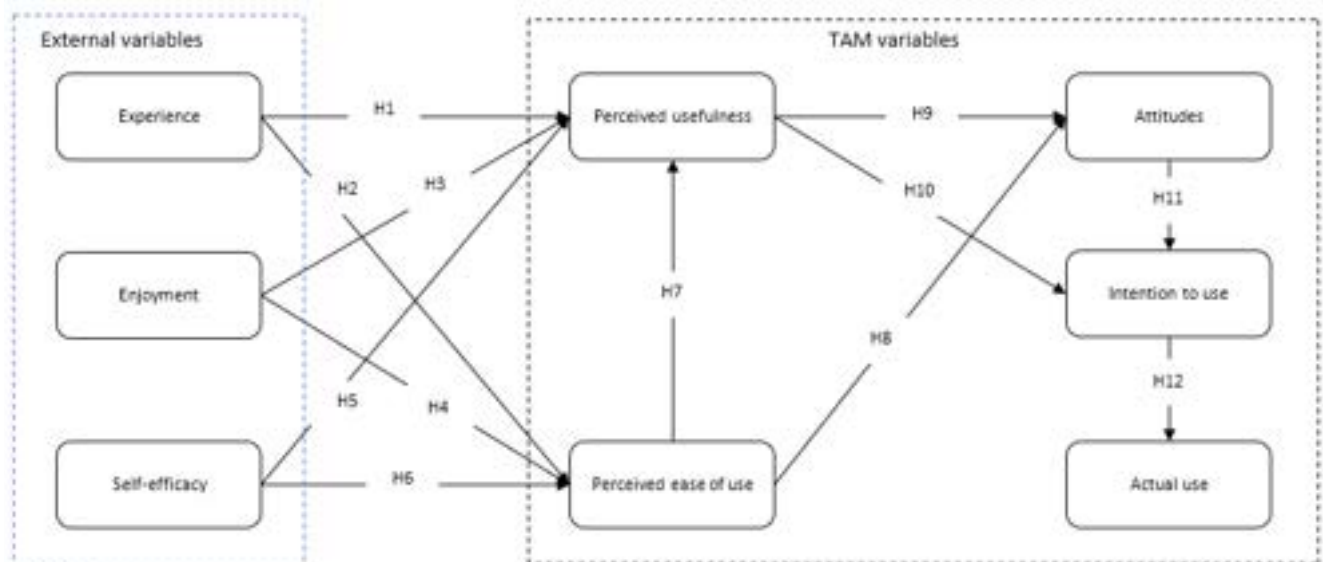
Attitude is defined as users' certain behavior linked with the use of a system [14]. In the original TAM model, attitude is hypothesized to influence intention to use technology (H11). Intention to use in this study is described as students' desire to utilize technologies for the distance learning setting; the intention is expected to significantly influence actual use, H12 [23]. The final part of the TAM is the actual use, or the act of applying something, which expresses the reality of a user to use or not to use any technology; in this study, the actual use is the implementation of technology for distance learning [14]. In the proposed model of this study, actual use has no impact on the other components of this model since it is the final stage in the chain of technological acceptance.

### **2.2.2 External variables; Experience, enjoyment, and self-efficacy**

In this study, extended factors such as enjoyment, self-efficacy, and experience were suggested to predict perceived ease of use and usefulness [7]. In this study, experience is defined as the amount and type of technical abilities for distance learning that a person has acquired through time [26]. One of the most significant external variables is experience. Individuals with more advanced technological abilities are more likely to be enthusiastic about

using any online/distance learning instrument [7]. In this study, we expect that experience of distance learning during COVID-19 influences perceived ease of use (H2) and perceived usefulness (H1).

Furthermore, enjoyment or pleasure is defined to be the degree to which the action of implementing any system is seen to become pleasurable, independent of the results. A system that is pleasant seems to be viewed as simple to use and beneficial in which users' desire to utilize it can increase. Many studies have shown that consumers' perceptions of ease of use are influenced by how much fun they have when using a system (H4). In addition, researchers have discovered a substantial positive relationship between online learning system enjoyment and perceived usefulness (H3), which boosts students' propensity to use (real usage) these systems [7]. Self-efficacy in this study is described as the confidence of ability to complete a task using technology for distance learning during COVID-19. According to the findings, students with stronger e-learning self-efficacy are also more inclined to employ e-learning and computer-supported education. Self-efficacy is thought to significantly impact perceived ease of use (H6) and perceived usefulness (H5). All hypotheses included in this study are performed in Figure 1, and prior studies related to TAM application in recent years within the educational environment are shown in Table 1



**Figure 1.** proposed model exploring Sport Science Students' Acceptance of Distance Learning: Covid-19 Context in Indonesia

### *f methods*

This research was conducted using an online poll from March 2021 to June 2021, after the Indonesian government announced school closures on May 20, 202. Before the primary data collection, a survey instrument was developed and validated to assess variables that predict the usage of e-learning by Indonesian sport science students during Covid-19. The model measurement and evaluation were carried out using SmartPLS 3.3, led by the Partial Least Squares Structural Equation Modeling methods (PLS-SEM).

### *Instrumentation*

The review of literature can aid researchers in defining and analyzing ideas and concepts related to the theoretical research framework. [27]. It tries to determine the study's objective approach to instrumentation. The device is designed to meet the research goals [27]. Adapted survey tools were used in this study to assess the elements that influence students' acceptance of distance learning [7], [15], [28], [29]. The new instrument for the current study was produced based on the adaptation process; the indicators differed, developed to meet the settings, Covid-19, and distant learning. Twenty-nine indicators were modified for the instrument during the initial setup procedure. The indicators were addressed with three educational technology specialists from Malaysia and Indonesia via video conferences as part of the content validity process to ensure that the instrument was appropriate for the study's context and setting. [30]. Ten indicators were updated after the video call meetings. In contrast, three others were deleted owing to inappropriate circumstances, mostly because the research issue is distance learning usage during a pandemic that varies from typical conditions.

### *Data collection and analysis*

A Google Forms poll was used to collect data for the study. The questionnaire (n 26) was piloted on a small group of students for the initial examination of reliability; the Cronbach alpha test was conducted for this process. All variables were reliable with alphas of more than .70. The final set of questions was improved after the pilot study, and the questionnaire was disseminated. The survey was launched on June 1, 2021, and was open until June 15, 2021. The majority of answers, though, came in the first week. Active students from three institutions were asked to take part in the study via an electronic invitation. The poll received 1472 responses; however, 1291 data were measurable. One hundred and eighty-one responses were

dropped because missing values appeared or the same answers for every question were identified.

Two phases are involved in evaluating PLS-SEM findings. The first phase is a review of the reflective measurement model. This is an essential component of the evaluation since it ensures that the measurement quality is maintained. The examination of the structural model is carried out in phase 2 after the measurement model was evaluated. Phase 2 examines the structural theory, which entails considering the given hypotheses and addressing the connections among the latent variables [31].

## **Findings**

### **Preliminary analysis**

The percentage of missing data in the present study ranged from 0% to .5 percent for each item. The missing data was utterly random (MCAR) (Kline, 2005). Table 1 displays the means, standard deviations, correlation matrices, skewness, and kurtosis for all variables; univariate normality was found for experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual usage (skewness and kurtosis values in the range of the cut-off values). The Likert scale went from 1 to 5, with 5 being the highest score. Most items achieved means of below three from enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use. The findings show that users were not excited; these feelings suggest that remote learning could have a lesser potential than face-to-face learning.

### ***f* easurement model**

The examination of the measurement model in this study includes reflective metrics. We began by looking at the indicator loadings. Loadings greater than .50 show that the construct accounts for more than half of the variation in the indicator, indicating that the indicator is reliable [32]. The internal consistency dependability of the constructions was tested. Better numbers imply higher levels of dependability for the composite reliability criteria. Reliability ratings of .70 to .95 are considered "acceptable to good" [31]. Internal consistency dependability is measured using Cronbach's alpha, which assumes the same criteria. Reliability ratings of .70 to .95 are considered appropriate [33]. The convergent validity, or the amount to which a construct converges in its indicators by explaining the variance of the items, was then computed. The average variance extracted (AVE) across all items linked with a specific construct is used to measure convergent validity, which is also referred to as communality. The



AVE must be .50 or greater to be considered acceptable [34]. This level or above suggests that the concept accounts for (more than) 50% of the variation in its components on average.

Discriminant validity is the final stage in reflective measurement [35]. This study demonstrates how empirically different a concept is from others. In PLS-SEM, discriminant validity is determined by examining heterotrait–monotrait ratio of correlations. If the route model includes variables defined as conceptually and extremely similar, a value of .900 is proposed as a threshold, depicted in our model. In PLS-SEM, the heterotrait–monotrait ratio of correlations is a novel criterion for assessing discriminant validity that outperforms the Fornell–Larcker criterion and cross-loading assessments [31].

Table 2 informs the results and evaluation of the criteria outcomes. All reflected measurement models were reported to have to meet the criteria in the examination. All of the outside loadings are larger than .500, implying that all indicators are trustworthy. In addition, all AVEs were greater than .50, indicating that the measurements were convergently valid. Composite reliability was found to have values of  $\geq .8730$ , higher than .700 as the minimum cut-off value for composite reliability [31]. In addition, Cronbach’s alpha values were in the range of .7200 to .9410, also in a good range. Discriminant validity was assessed using the heterotrait–monotrait ratio criterion. The results all fell short of the .900 threshold. The bootstrapping technique was then used with 5000 samples, using the “no sign” adjustments option at the .05 significant level. The statistical computation shows that none of the heterotrait–monotrait ratio confidence intervals include the value greater than .900, suggesting that all heterotrait–monotrait ratio values are significantly different from 1. As a consequence, discriminant validity has been demonstrated (Table 3).

**Table 2.** Descriptive statistic, normality test, and measurement model values of the proposed model

Construct	Items	Mean	SD	Kurtosis	Skewness	Remarks	Load	$\alpha$	rho_A	CR	AVE
Perceived usefulness	PU1	2.5630	1.2910	-.8110	.4240		.9150	.8960	.8970	.9350	.8280
	PU2	2.5480	1.2540	-.7240	.4430		.9260				
	PU3	2.6070	1.2310	-.7420	.3720	Dropped, CR <.9500					
	PU4	2.7750	1.2840	-.9300	.2390		.8890				
Perceived ease of use	PEOU1	3.0300	1.2860	-.9920	-.0020		.8210	.8900	.8940	.9240	.7520
	PEOU2	2.6890	1.2330	-.7850	.2930		.8890				
	PEOU3	2.5770	1.1970	-.6250	.4080		.8810				
	PEOU4	2.8200	1.2470	-.8520	.1920		.8760				
Attitude	ATU1	2.7520	1.2850	-.9650	.1670	Dropped, low-load					
	ATU2	3.2830	1.1560	-.6170	-.1650		.8330	.7200	.7940	.8730	.7760
	ATU3	2.8610	1.1850	-.7080	.1080		.9260				
	ATU4	2.7040	1.3270	-1.0180	-.2230	Dropped, low-load					
Intention to use	ITU1	2.6050	1.2730	-.8670	.3060		.9030	.9090	.9100	.9430	.8460
	ITU2	2.4950	1.2030	-.6630	.4060		.9300				
	ITU3	2.5390	1.2220	-.7150	.3910		.9260				
Actual use	AU1	3.0810	1.2430	-.8340	-.0730		1.0000	1.0000	1.0000	1.0000	1.0000
Experience	EXP1	3.3990	1.2330	-.7870	-.2810		.7890	.8590	.8870	.9030	.7000
	EXP2	3.6540	1.2200	-.6230	-.5400		.8060				
	EXP3	3.3780	1.2170	-.7950	-.2520		.8880				
	EXP4	3.1390	1.2330	-.8420	-.0640		.8600				
Enjoyment	EJ1	2.6940	1.2300	-.7550	.2630		.9490	.9410	.9420	.9620	.8950
	EJ2	2.8060	1.2210	-.7620	.2070		.9430				
	EJ3	2.7000	1.2350	-.7690	.2530		.9470				
Self-efficacy	SE1	3.0910	1.1630	-.5850	-.0040		.8950	.8870	.8880	.9300	.8160
	SE2	3.0990	1.1520	-.5390	.0100		.9130				
	SE3	3.0550	1.1340	-.4590	.0040		.9010				

**Table 3. Heterotrait–monotrait ratio for discriminant validity (< .900)**

	Actual use	Attitude	Enjoyment	Experience	Intention to use	Perceived ease of use	Perceived usefulness
Attitude	.6180						
Enjoyment	.5940	.7770					
Experience	.4700	.6700	.6660				
Intention to use	.6220	.7570	.8180	.5430			
Perceived ease of use	.5820	.8530	.7730	.6190	.7590		
Perceived usefulness	.5340	.8190	.7630	.5540	.8010	.8300	
Self-efficacy	.5260	.7260	.6920	.6100	.6380	.6440	.6180

### *Structural model*

To assess the structural model, studies [36], [37] recommend looking at measures like  $R^2$ ,  $f^2$ ,  $Q^2$ , SRMR, and statistical significances. Figure 2 shows the  $R^2$  and path coefficients of the endogenous constructs. We follow [31] recommendation in terms of  $R^2$  values, which indicates that  $R^2$  values of .670, .330, and .190, respectively, indicate strong, moderate, and weak  $R^2$  values.  $f^2$  values of .020, .150, and .350, according to [36], suggest small, medium, and large effects, respectively. To test for statistical significance, Hair et al. [31] recommend a minimum  $t$  value of 1.65 at  $p$  .1. Furthermore, for a given endogenous component,  $Q^2$  values larger than zero indicate a reasonable degree of prediction accuracy [36], [38] (see Figure 2 for  $R^2$  and  $Q^2$  results and Table 4 for  $f^2$  results). Based on the recommended assessment standards and current research, the  $Q^2$  findings indicate sufficient prediction accuracy for exogenous variables [36], [38]. According to Henseler [39], the SRMR is the only approximate model fit criteria for evaluating PLS route modeling, consistent with prior research [40]. The bootstrap-based test is also used to calculate values for the discrepancy measures, which include the squared Euclidean Distance (d ULS) and the Geodesic Distance (dG) [39]. Table 3 compares the values of the SRMR, dULS, and dG discrepancy measures; SRMR below .08 shows a valid and reliable model. The structural model was estimated using the consistent PLS bootstrapping option with 5,000 subsamples in this investigation [41]. All hypotheses were supported but H1 (the relationship between experience and perceived usefulness,  $t = .1900$ ;  $p = .8500$ ). The strongest correlation emerged between intention to use and actual use that supports the last hypothesis (H12) with a  $t$  value of 26.6890. In contrast, the lowest correlation was reported between self-efficacy and perceived usefulness with a  $t$  value of 3.050.

Table 4. Path coefficient of the structural model and significance testing results,  $f^2$ , SRMR, dULS, and dG.

H	Path	$\beta$	t values	p values	Sig	$f^2$	Items	Value
H1	Experience -> Perceived usefulness	.0050	.1900	.8500	No	.0000	SRMR	.053
H2	Experience -> Perceived ease of use	.1440	5.0700	.0000	Yes	.0260	dULS	.762
H3	Enjoyment -> Perceived usefulness	.3110	9.2350	.0000	Yes	.0970	dG	.334
H4	Enjoyment -> Perceived ease of use	.5110	16.8430	.0000	Yes	.2800		
H5	Self-efficacy -> Perceived usefulness	.0800	3.0500	.0020	Yes	.0090		
H6	Self-efficacy -> Perceived ease of use	.1710	6.0150	.0000	Yes	.0360		
H7	Perceived ease of use -> Perceived usefulness	.4750	13.4150	.0000	Yes	.2720		
H8	Perceived ease of use -> Attitude	.4280	11.5280	.0000	Yes	.1790		
H9	Perceived usefulness -> Attitude	.3620	9.9690	.0000	Yes	.1280		
H10	Perceived usefulness -> Intention to use	.5410	18.6240	.0000	Yes	.3590		
H11	Attitude -> Intention to use	.2670	8.8150	.0000	Yes	.0870		
H12	Intention to use -> Actual use	.5930	26.6890	.0000	Yes	.5410		

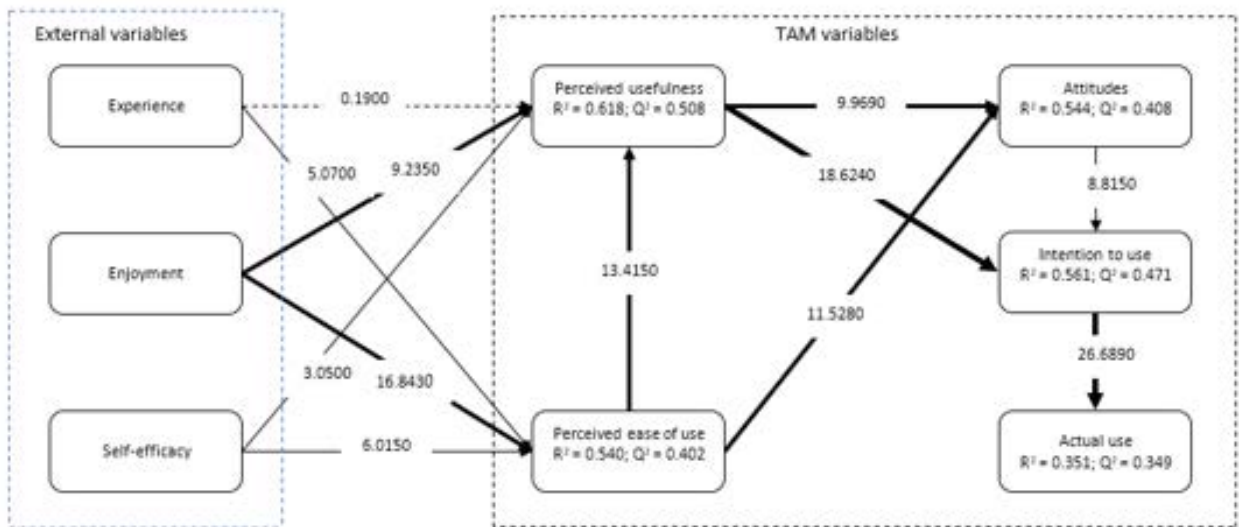


Figure 2. The results were estimated through PLS-SEM's bootstrapping results in the SmartPLS 3.3 ( $n = 1291$ ).

#### 4 Discussion

Consistent with prior studies [7], [22]–[24], The extended TAM used in this study was successful in explaining the distant learning process of adoption as seen by Indonesian students

of sports science education. The scale can be studied and altered in the future by other academics who are interested in performing studies in the relevant field, especially during pandemics like Covid-19, based on the findings. The instrument contributes significantly to the advancement of academic approaches for structural equation research. The model is said to be valid and dependable, thanks to the content validity and measurement model. From the descriptive statical findings, it can be discussed that students have a low to medium feeling (means below 3) on enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use regarding distance learning during COVID-19. From the results, only items from three variables, namely experience, enjoyment, and actual use, gained mean values of slightly above 3. These low and medium means of items were also reported by the previous study [7]. The location of the study was categorized as a developing country, similar to this study setting.

Through bootstrapping process with 5,000 sub-samples, the study's findings revealed that all hypotheses were supported for the non-original TAM variables but one correlation between experience and perceived usefulness. The insignificant relationship might appear because the students perceive the first experience. This research took place during the COVID-19 epidemic, which has affected every country on the planet and has left no country unaffected. All educational stakeholders, including students, were taken off guard and adjusted as fast as possible to the new reality. The poll "caught" HEI students in the midst of a distant learning phase, during which they were all required to switch from face-to-face to online instruction [7]. In addition, experience was reported to significantly perceived ease of use. Enjoyment is significantly related to perceived usefulness and perceived ease of use. Besides, self-efficacy was a significant predictor of perceived usefulness and perceived ease of use, similar to previous studies [7], [19], [23], [24]. For TAM variables, all exogenous variables were significantly related to the endogenous variables. Perceived ease of use is a significant predictor of perceived usefulness and attitude, and perceived usefulness gained significant relationships with attitude and intention to use. Besides, the attitude was reported to be significant in predicting intention to use. Finally, the relationship between intention to use and actual use was informed to be the strongest. The significance revealed by this study can be a guide for all Indonesian stakeholders to face challenges during future pandemics. The introduction to distance learning should be supported by appropriate policies in improving perceived usefulness, perceived ease of use, attitude, and intention to use distance learning technology. The proper and appropriate

infrastructure, training, seminar, curriculum, and quality tutors should support the system [23], [24].

### 3 Conclusion

The study reported in this publication took place during the coronavirus pandemic, which has affected every country on the planet and has left no country unaffected. All educational institutions were caught off guard and had to focus all of their efforts on swiftly adapting to the new reality. This scheduling allowed students to provide the most up-to-date feedback on the methods and tools utilized in the process, as well as explore their emotions while they were still experiencing them. One of the accomplishments of this study, according to the authors, is imagining such cutting-edge pupils' attitudes. The study presented in this paper is based on a poll of particular students, sports science education students, who were asked how they felt about remote learning during COVID-19. The poll provided an opportunity to examine students' attitudes about remote learning and, in particular, the instruments used by HEIs in the process. If the COVID-19 scenario requires HEIs to continue operating online, this research will be a significant addition to policymaking.

Nonetheless, there are several limits to this effort. Comparative study would be a good idea to gain a better understanding of COVID-19's influence on HEIs. The article includes a quick analysis of the condition that Indonesian higher education institutions are in as a result of the epidemic. The article does not provide a complete picture of what is happening in higher education. However, the authors believe that sharing experience is vital in the current circumstances, and that each HEI contributes significantly to the worldwide fight with the new reality. The authors believe it is appropriate and necessary to undertake further in-depth study on the experiences of educational institutions in the nation, analyzing more examples and using different methods such as observation, interview, and experimentation.

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## Ethical Statement

Hereby, I, Associate **Nama**, consciously assure that for the manuscript entitled "Sports Science Students' Acceptance to Distance Learning: Covid-19 Context in Indonesian Higher Education", the following is fulfilled:

- 1) This material is the authors' own original work, which has not been previously published elsewhere.
- 2) The paper is not currently being considered for publication elsewhere.
- 3) The paper reflects the authors' own research and analysis in a truthful and complete manner.
- 4) The paper properly credits the meaningful contributions of co-authors and co-researchers.
- 5) The results are appropriately placed in the context of prior and existing research.
- 6) All sources used are properly disclosed (correct citation). Literally copying of text must be indicated as such by using quotation marks and giving proper reference.
- 7) All authors have been personally and actively involved in substantial work leading to the paper, and will take public responsibility for its content.

I agree with the above statements and declare that this submission follows the policies in the Guide for Authors and in the Ethical Statement.

Date:

Signature:

**Nama**  
Ethical Committee

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## Ethical Statement

Hereby, I, Associate **Nama**, consciously assure that for the manuscript entitled "Sports Science Students' Acceptance to Distance Learning: Covid-19 Context in Indonesian Higher Education", the following is fulfilled:

- 1) This material is the authors' own original work, which has not been previously published elsewhere.
- 2) The paper is not currently being considered for publication elsewhere.
- 3) The paper reflects the authors' own research and analysis in a truthful and complete manner.
- 4) The paper properly credits the meaningful contributions of co-authors and co-researchers.
- 5) The results are appropriately placed in the context of prior and existing research.
- 6) All sources used are properly disclosed (correct citation). Literally copying of text must be indicated as such by using quotation marks and giving proper reference.
- 7) All authors have been personally and actively involved in substantial work leading to the paper, and will take public responsibility for its content.

I agree with the above statements and declare that this submission follows the policies in the Guide for Authors and in the Ethical Statement.

Date:

Signature:

**Nama**  
Ethical Committee

## Questionnaire

### Gender

1. Male
2. Female

### Living area

1. City
2. Village

### Perceived Usefulness (PU)

1. Using distance learning would enhance my effectiveness in studying.
2. Using distance learning would improve my course performance.
3. Using distance learning would improve my productivity in courses.
4. I find distance learning useful for my studies.

### Perceived Ease of Use (PEOU)

1. I find distance learning easy to use.
2. Mastering distance learning would be easy for me.
3. My interaction with distance learning is clear and understandable.
4. It would be easy for me to find the required information using distance learning.

### Attitudes (ATU)

1. I like the idea of using distance learning.
2. I have a generally favorable attitude towards using distance learning.
3. I believe it is (would be) a good idea to use distance learning for my study process.

### Intention to Use (ITU)

1. I intend to use distance learning during the semester.
2. I will return to distance learning often.
3. I intend to use distance learning frequently for my study process.

### Actual Use (AU)

1. I use distance learning frequently.

### Experience (EXP)

1. I enjoy using computers.
2. I am comfortable using the internet.
3. I am comfortable saving and locating files.
4. I am comfortable with using software for distance learning.

### Enjoyment (ENJ)

1. I find distance learning process enjoyable.
2. The actual process of using distance learning is pleasant.
3. I have fun using distance learning.

### Self-Efficacy (SE)

1. I am confident of using distance learning even if there is no one around to show me how to do it.
2. I am confident of using distance learning even if I have never used such a system before.
3. I am confident of using distance learning even if I have only the software manuals for reference.

## Questionnaire

### Gender

1. Male
2. Female

### Living area

1. City
2. Village

### Perceived Usefulness (PU)

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### Actual Use (AU)

1. I use distance learning frequently.

### Experience (EXP)

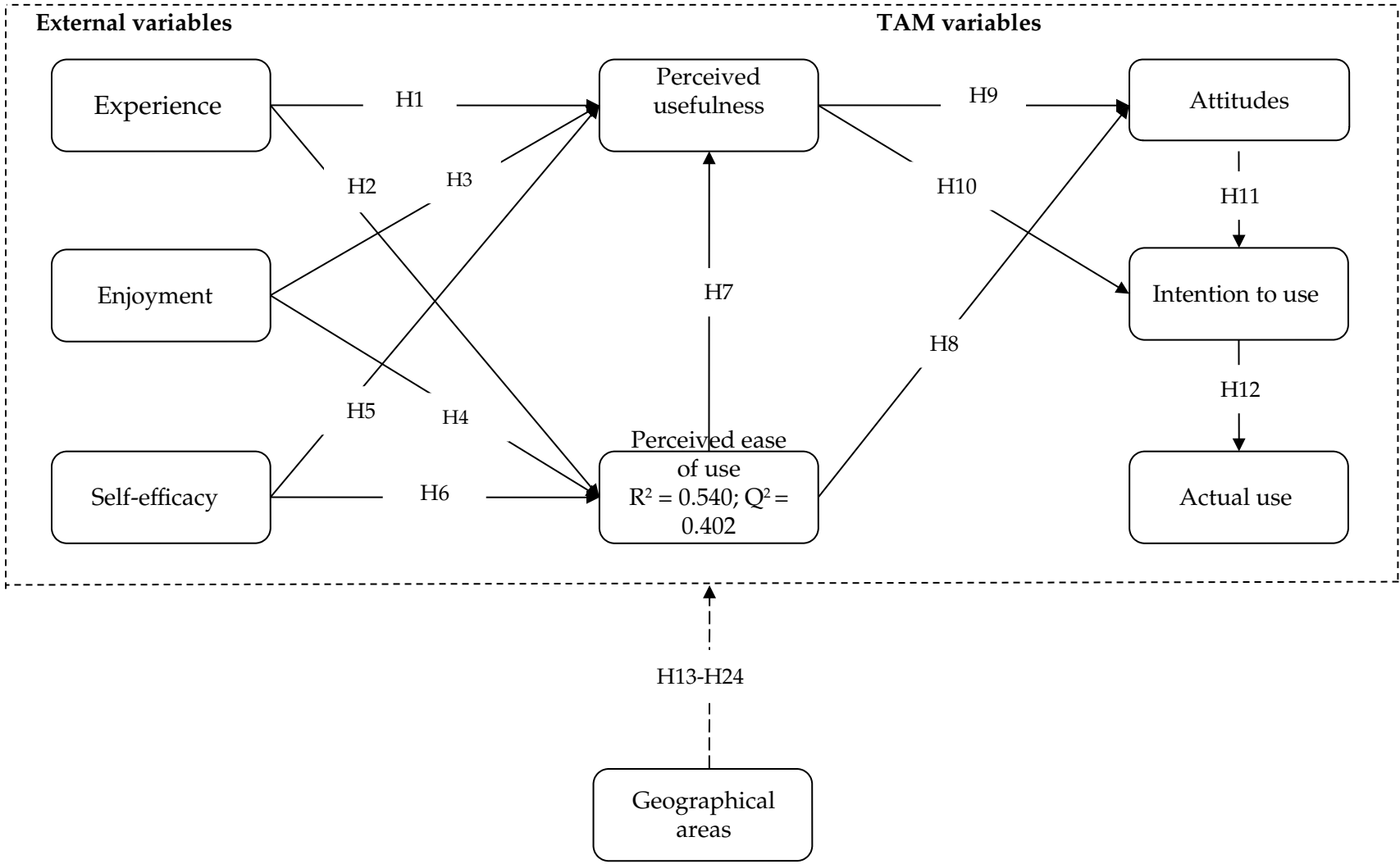
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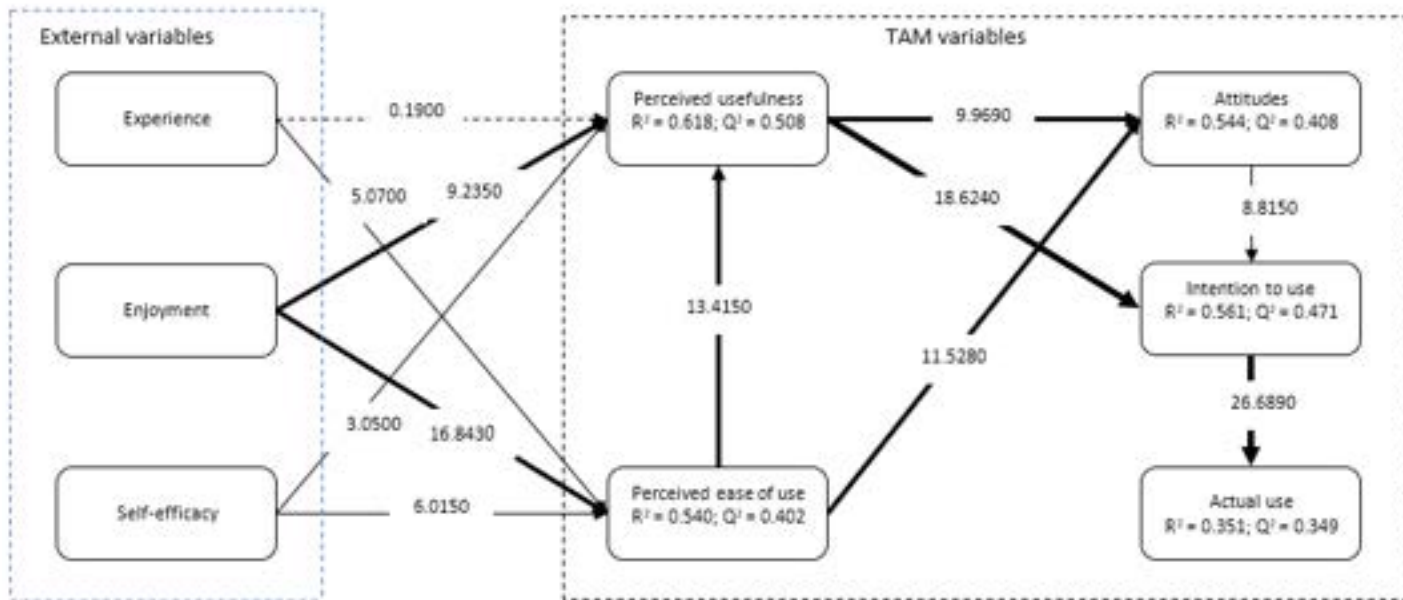
### Self-Efficacy (SE)

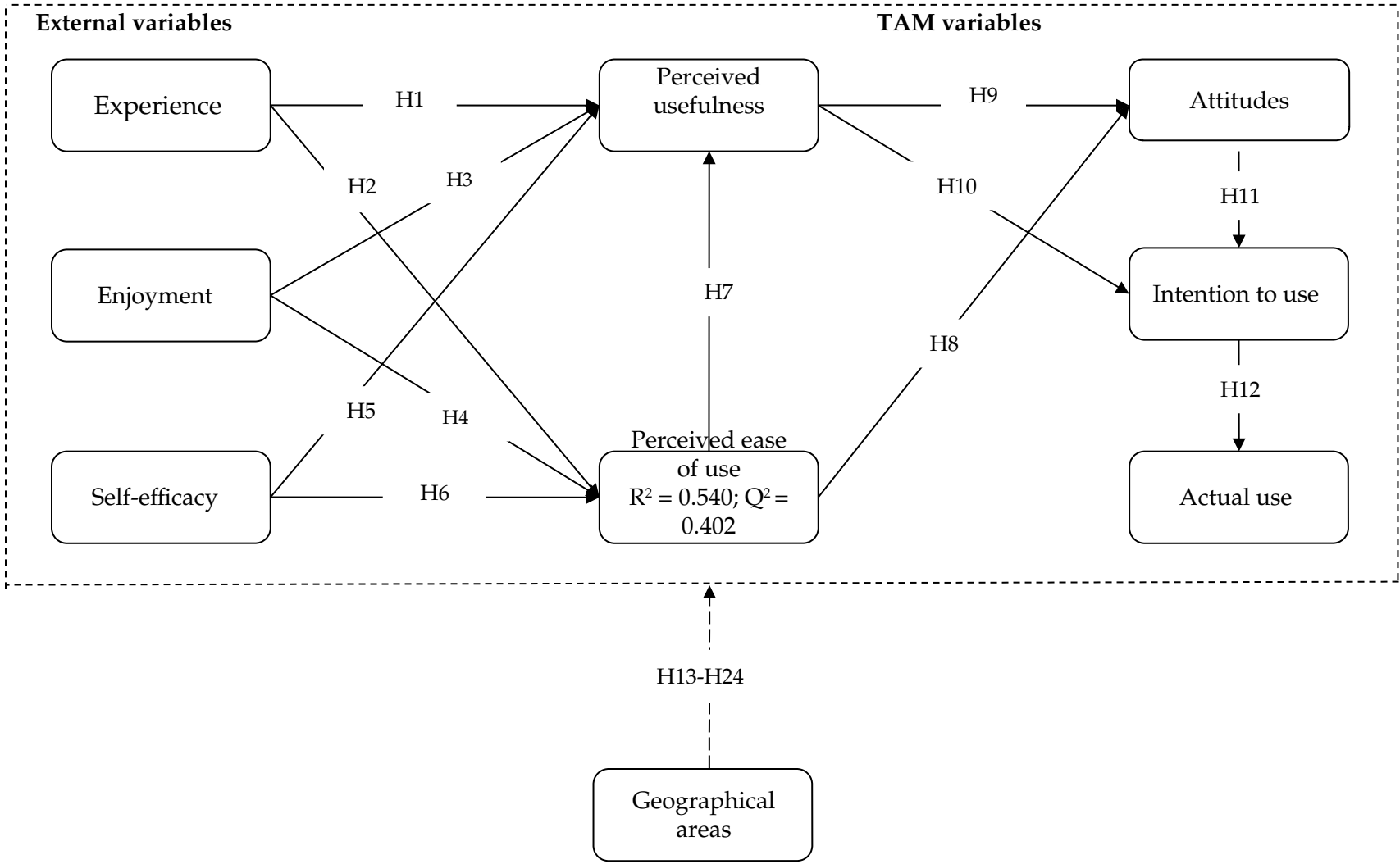
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2. I am confident of using distance learning even if I have never used such a system before.
3. I am confident of using distance learning even if I have only the software manuals for reference.



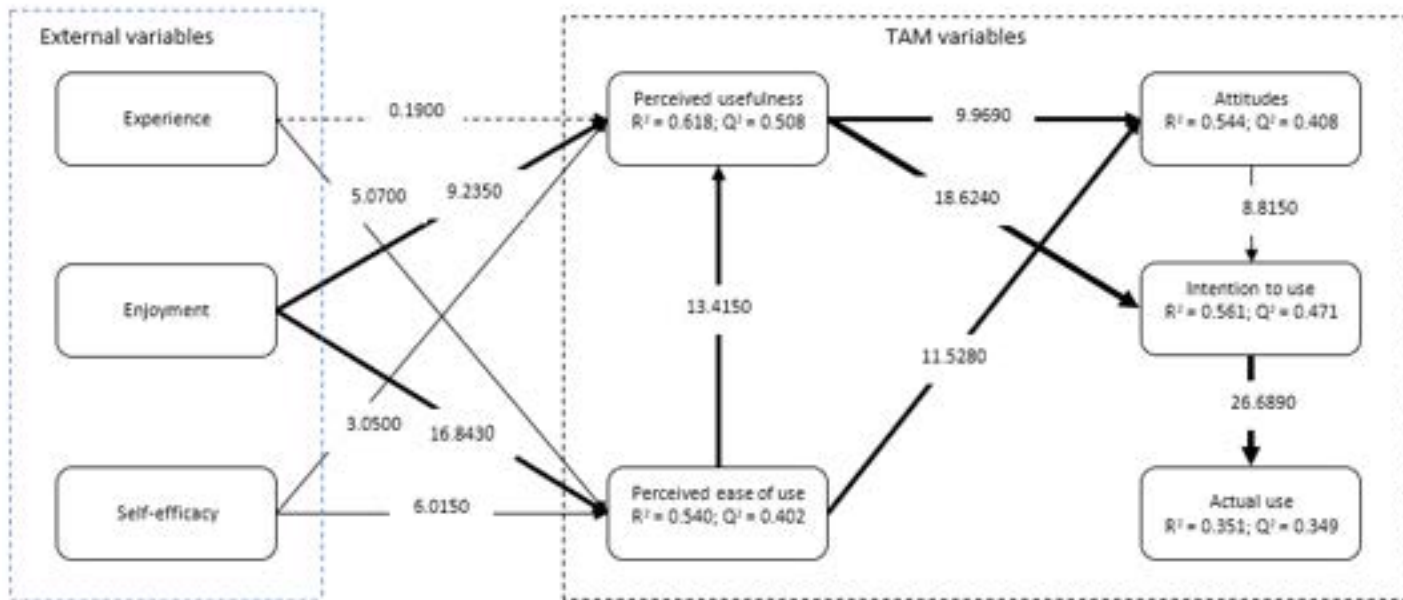












Dear Heliyon

We thank editors and reviewers for the comments established to improve the paper. We had maximal efforts to revise it. We hope that the paper can be considered to be accepted in Heliyon.

Regards,

Authors

**Editor's comments and responses:**

No	Comments (Editors)	responses
1.	Since the paper is limited to Indonesian higher education, therefore, please assign a section in the LR to discuss the teaching methods in Indonesian during the COVID-19.	We added some details and elaboration about teaching in Indonesia during Covid-19 <i>"Effectiveness of teaching methods in Indonesian HEIs during the COVID-19</i> Due to the COVID-19 pandemic, many schools and colleges around the world have been closed. Many universities in Indonesia also carry out similar policies, for example, the Universitas Indonesia, Universitas Gajah Madha, and Universitas Negeri Makassar. This policy, whose aim is none other than to prevent the spread of COVID-19 infection, is in line with WHO's call that all elements of society need to participate in preventing and minimizing the impact of the disease. This policy encourages universities to conduct distance learning methods. Guided by the ministry of education and culture, Indonesian HEIs use various tools in delivering their teaching and learning process during the closure. Social media like Facebook, Youtube, and WhatsApp are integrated during instructional activities (Chan <i>et al</i> 2020; Sobaih <i>et al</i> 2020). Learning management systems, such as Edmodo, Moodle, Atutor, And Olat, have also been options for lecturers in teaching their students (Cavus <i>et al</i> 2021; Raza <i>et al</i> 2021). Some universities build their own LMS facilities to facilitate the teaching (Universitas Indonesia with EMAS, Universitas Gajah Madha with eLisa, and

		Universitas Negeri Makassar with SYAM OK UNM). However, most HEIs lecturers rely on video conferencing applications to meet the needs of virtual meetings conducted mainly through two tools; Zoom and Google meet (Yudha <i>et al</i> , 2021)."
2.	How did you develop figure 1, which models did you adopt?	<p><i>Revised as suggested, we added the elaboration on the proposed model</i></p> <p><i>Proposed model</i></p> <p>This study applied an extended technology acceptance model (TAM) from Davis (1998) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual use. Geographical area was also included to understand differences regarding demographic information between the paths. For the structural model, twelve hypotheses were included; similarly, twelve hypotheses were also proposed to test differences. We discussed the proposed model with two statisticians and one educational expert; the model in Figure 1 is elaborated in detail.</p>
3.	Discuss the study research method in detail.	<p>We revised accordingly; the method was revised in detail e.g., "<i>he population of the current study covers all sport science students in Indonesian HEIs</i>"<i>Meanwhile, the target population of the study includes students in four Indonesian cities</i>"<i>We distributed the survey through Google Forms with a random sampling technique used to collect data for the study</i>"</p>
4.	Discuss the study research questions in detail.	<p>We discussed by mentioning the research questions in the paper</p> <ol style="list-style-type: none"> <li>1. "What factors affecting distance learning among Indonesian sports science students during COVID-19?"</li> <li>2. Are there any differences in regards to all paths in the structural model based on respondents' geographical areas?</li> </ol>
5.	Discuss the study new findings in detail, and justify if the research questions are answered or not	<p>Revised as suggested, we discussed the new findings on details and improved the discussion of the paper e.g., "The results of the study confirm the first research questions in which most relationships are supported based on the analysis of the data."</p> <p>The computation of MGA in the smartPLS 3.3. revealed that most paths have no differences regarding geographical areas; only a few</p>

		significant differences are reported to confirm the second research question.
6.	Also add up-to-date references to support your discussion.	<p>We added up-to-date references “(Chan <i>et al</i> 2020; Sobaih <i>et al</i> 2020), etc.</p> <p>Cavus, N., Mohammed, Y.B. and Yakubu, M.N. (2021), "Determinants of learning management systems during covid-19 pandemic for sustainable education", <i>Sustainability (Switzerland)</i>, Vol. 13 No. 9, available at:<a href="https://doi.org/10.3390/su13095189">https://doi.org/10.3390/su13095189</a>.</p> <p>Chan, A.K.M., Nickson, C.P., Rudolph, J.W., Lee, A. and Joynt, G.M. (2020), "Social media for rapid knowledge dissemination: early experience from the COVID-19 pandemic", <i>Anaesthesia</i>, available at:<a href="https://doi.org/10.1111/anae.15057">https://doi.org/10.1111/anae.15057</a>.</p> <p>Raza, S.A., Qazi, W., Khan, K.A. and Salam, J. (2021), "Social Isolation and Acceptance of the Learning Management System (LMS) in the time of COVID-19 Pandemic: An Expansion of the UTAUT Model", <i>Journal of Educational Computing Research</i>, Vol. 59 No. 2, available at:<a href="https://doi.org/10.1177/0735633120960421">https://doi.org/10.1177/0735633120960421</a>.</p> <p>Sobaih, A.E.E., Hasanein, A.M. and Elnasr, A.E.A. (2020), "Responses to COVID-19 in higher education: Social media usage for sustaining formal academic communication in developing countries", <i>Sustainability (Switzerland)</i>, Vol. 12 No. 16, available at:<a href="https://doi.org/10.3390/su12166520">https://doi.org/10.3390/su12166520</a>.</p> <p>Yudha, C.B., Zulela, Z. and Handayani, T. (2021), "Learning in Networks During the Covid-19 Pandemic", <i>Jurnal Basicedu</i>, Vol. 5 No. 2, available at:<a href="https://doi.org/10.31004/basicedu.v5i2.869">https://doi.org/10.31004/basicedu.v5i2.869</a>.</p>
7.	Proofreading and grammar check is needed.	We sent and paid the manuscript to a professional proofreader for the proofreading process.

No	Comments (Reviewer 1)	responses
1.	Methods: The population, sample size and sampling method should be mentioned.	The population, sample size and sampling method are mentioned. =the population of the current study covers all sport science students in

		<i>Indonesia HEIs</i> Meanwhile, the target population of the study includes students in four Indonesian cities We distributed the survey through Google Forms with a random sampling technique used to collect data for the study
2.	Results: It is OK.	Thank you, we improved the results by revising the paper related to the editor's comment
3.	Interpretation: It is OK, but it is better to interpret the findings based on the student's majors (sports). In present situation the findings are discussed generally.	We explored more on the interpretation of the finding by specifying the research on the specific field of study, e.g., The specific major, sport science, involved in this study helps us to focus on a certain field of study so that other researchers can manage to either conduct research in other areas or all fields regarding the implementation of technology into teaching". Particularly in sports science education, specific sports-based instructional activities should always be improved during distance learning (Sukendro <i>et al.</i> , 2020).
4.	Other comments: The authors should answer to this question that why they selected the sports science students?	Revised as suggested <i>"Sports science students were selected as the survey respondents since not many studies were conducted within the area; besides, specific learning materials and sports-based activities make the current study novel and unique"</i>

No	Comments (Reviewer 2)	responses
1.	Methods: appropriate	Thank you
2.	Results: good	Thank you for your comment
3.	Interpretation: good meaningful discussion and analysis	Thank you, we really appreciate it
4.	Other comments: I found it interesting and meaningful study. However, by reviewing the theme of the paper i suggest to review the below-mentioned paper to improve the quality of the paper and relevancy to the COVID-19.  Abbas, H. S. M., Xu, X., & Sun, C. (2021). China health technology and stringency containment measures during COVID-19	We added two suggested references that have relevance to our paper Abbas, H. S. M., Xu, X., & Sun, C. (2021). China health technology and stringency containment measures during COVID-19 pandemic: A discussion of first and second wave of COVID-19. Health and Technology, 11(2), 405-410. Ullah, A., Pingu, C., Ullah, S., Abbas, H. S. M., & Khan, S. (2021). The role of e-governance in combating COVID-19 and promoting



<p>pandemic: A discussion of first and second wave of COVID-19. <i>Health and Technology</i>, 11(2), 405-410.</p> <p>Ullah, A., Pinglu, C., Ullah, S., Abbas, H. S. M., &amp; Khan, S. (2021). The role of e-governance in combating COVID-19 and promoting sustainable development: a comparative study of China and Pakistan. <i>Chinese Political Science Review</i>, 6(1), 86-118.</p> <p>Abbas, H.S.M., Xu, X. and Sun, C. (2021), "Role of COVIDsafe app and control measures in Australia in combating COVID-19 pandemic", <i>Transforming Government: People, Process and Policy</i>, Vol. ahead-of-print No. ahead-of-print. <a href="https://doi.org/10.1108/TG-01-2021-0004">https://doi.org/10.1108/TG-01-2021-0004</a></p>	<p>sustainable development: a comparative study of China and Pakistan. <i>Chinese Political Science Review</i>, 6(1), 86-118.</p>
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# Students' acceptance to ~~Covid-19~~ distance learning ~~during Covid-19~~: The role of geographical areas ~~in among~~ Indonesian ~~higher education~~sports science students

Syahrudin Syahrudin<sup>1\*</sup>, Mohd Faiz Mohd Yaakob<sup>2</sup>, Abdul Rasyad<sup>3</sup>, Arif Wahyu Widodo<sup>3</sup>, Sukendro Sukendro<sup>4</sup>, Suwardi Suwardi<sup>1</sup>, Ahmad Lani<sup>5</sup>, Liliana Puspa Sari<sup>6</sup>, Mansur Mansur<sup>7</sup>, Razali Razali<sup>7</sup>, Asry Syam<sup>8</sup>

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**Abstract:** This study was conducted to investigate the perspectives of sports science students on factors affecting distance learning in the setting of Indonesian higher education institutions (HEIs). This study ~~applied-proposed~~ an extended technology acceptance model (TAM) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual use. An online survey was used to collect data from 1291 ~~Indonesian sports science students for the study~~respondents. The structural model was tested using the partial least squares structural equation modeling (PLS-SEM). Multi-group analysis (MGA) was conducted to understand the role of geographical areas in moderating all hypothetical relationships. The findings show that ~~the users~~respondents were not excited ~~to online learning informed by~~due to the weak means (below 3) for most items of enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use. All relationships were supported except the relationship between experience and perceived usefulness. ~~The strongest significant association emerged between intention to use and actual use. Meanwhile, the least considerable-significant one correlation was existed~~ between self-efficacy and perceived usefulness. Three out of 12 hypotheses were confirmed regarding the differences of geographical areas, rural and urban, concerning all relationship paths. The findings add to a deeper understanding of the acceptability of distance learning ~~during pandemics like COVID-19, and this study will be especially useful to instructors and educators in HEIs.~~

**Keywords:** Sports science students; distance learning; higher education; COVID-19; pandemic.

## 1. Introduction

The world health organization (WHO) declared COVID-19 as a global pandemic in ~~in~~ March 2020. The last report on June 23, 2021 (the writing of this manuscript) showed that the overall number of cases has ~~ds~~ already exceeded 177 million globally. Mortality remained high, with over 9000 deaths recorded each day; however, all areas except two (Eastern Mediterranean and Africa) reported decreased new deaths. Compared to the previous week of May 2021, the global number of cases and fatalities dropped by 6% and 12%, respectively, with slightly more than 2.5 million new weekly cases and over 64,000 deaths. (WHO, 2021). In education, one of the efforts to decrease the ~~spread of the pandemic~~pandemic spread was made by closing schools at all levels. The distance learning policy was ~~conducted-issued~~ with the help of the available technologies in facilitating teaching and learning activities, replacing face-to-face instruction.

Researchers ~~from all around the world~~worldwide have already conducted extensive studies on the global pandemic in education (Abbas *et al.*, 2021; Andersson and Grönlund, 2009; Sukendro *et al.*, 2020; Watermeyer *et al.*, 2021)(~~Andersson and Grönlund, 2009; Sukendro et al., 2020; Watermeyer et al., 2021~~). In

Indonesia, like in ~~any other nation~~ other countries, COVID-19 has had a significant impact ~~on schooling in education~~ (Sukendro *et al.*, 2020). Higher education institutions (HEIs) have ~~maximized their efforts~~ been ~~compelled~~ to substitute traditional learning with distance learning (Watermeyer *et al.*, 2021). Courses, persons, and technology were all challenges in distance education. These issues affect developed and developing countries; but, access to technology is more pronounced in developing countries (Andersson and Grönlund, 2009). To go deeper ~~into the challenges of distance learning during COVID-19 pandemic~~, academics are recommended to understand factors affecting the acceptance as a new pedagogical approach (Rizun and Strzelecki, 2020), especially in a specific ~~context of the study~~ study context and among particular objects. Therefore, this study aims to disclose factors affecting distance learning in the context of Indonesian HEIs; it is conducted to understand the perceptions of sports science students. Besides, ~~we also inform the differences were also elaborated regarding on all paths in the structural model regarding based on~~ respondents' geographical areas (urban and rural). ~~Two research questions were established regarding the aims of the study~~

1. ~~What factors affecting distance learning among Indonesian sports science students during COVID-19?~~
2. ~~Are there any differences regarding all paths in the structural model based on respondents' geographical areas?~~

## 2. Review of Literature

### 2.1. Distance learning during COVID-19 pandemic

Distance learning has been around for a long time in higher education. When there is a physical distance between students and their instructors, the situation refers to learning mediated through technology equipment. Distance learning is far from a new phenomenon. ~~Tracing its history, it began in the early 18th century as a correspondence study to allow eager learners outside of the city to continue their education without having to be on-site. Since then, it has progressed and grown in popularity, especially with the quick expansion of technological innovation (Kentnor, 2015). Other modules in distance education, such as blended learning (or hybrid learning), have also emerged in tandem, defining a combination of face-to-face and technology-mediated instructions that provides a resilient and accessible learning experience. In the current condition, many educational institutions have been forced to adopt distance learning to keep up with the present pandemic, the COVID-19 scenario.~~ (Alqurshi, 2020; Kawaguchi-Suzuki *et al.*, 2020).

~~When WHO declared COVID-19 a global pandemic, Nations were forced to implement preventive measures to stem the virus's spread of COVID-19, including suspending schools' face-to-face learning. Specifically, HEIs~~ Higher education quickly responded to this massive transition by launching distance learning, utilizing existing learning support systems like social media and learning management systems (Aristovnik *et al.*, 2020; Coman *et al.*, 2020). Although this ~~fast~~ shift offered continuity to ~~the learning process, it also exacerbated educational gaps among students, particularly those who reside in rural regions or in low-income nations and those who~~ the learning process, it also exacerbated educational gaps among students, particularly those who reside in rural regions or low-income areas and lack fundamental information and technology skills. Such qualities may make it more ~~difficult~~ challenging to ~~gain access to contemporary technological resources that are~~ access contemporary technological resources needed to support the distance learning trend. Considering that the current scenario may endure ~~for a longer period~~ longer, they ~~suggest~~ a long-term move to online learning ~~is suggested~~. The ~~condition is~~ circumstance will require ~~HEIs~~ educational institutions to prepare and equip themselves with the instruments needed to facilitate the acceptance of such a trend, especially among users (Shawaqfeh *et al.*, 2020). Thus, this study explores ~~the factors through the implementation of TAM to understand~~ factors affecting students' acceptance of distance learning and whether or not the paths differ based on geographical areas, rural and urban.

### 2.2. Teaching methods in Indonesian HEIs during the COVID-19

~~Due to the COVID-19 pandemic, many schools and colleges around the world have been closed. Many universities in Indonesia also carry out similar policies, for example, the Universitas Indonesia, Universitas Gajah Madha, and Universitas Negeri Makassar. This policy, whose aim is none other than to~~

prevent the spread of COVID-19 infection, is in line with WHO's call that all elements of society need to prevent and minimize the impact of the disease. This policy encourages HEIs to conduct distance learning methods. Guided by the ministry of education and culture, Indonesian HEIs use various tools in delivering their teaching and learning process during the closure. Social media like Facebook, Youtube, and WhatsApp are integrated during instructional activities (Chan *et al.*, 2020; Sobaih *et al.*, 2020). Learning management systems, such as Edmodo, Moodle, Atutor, and Olat, have also been options for lecturers in teaching their students (Cavus *et al.*, 2021; Raza *et al.*, 2021). Some universities build their own LMS facilities to facilitate the teaching (Universitas Indonesia with EMAS, Universitas Gajah Madha with eLisa, and Universitas Negeri Makassar with SYAM OK UNM). However, most HEIs lecturers rely on video conferencing applications to meet the needs of virtual meetings conducted mainly through two tools; Zoom and Google meet (Yudha *et al.*, 2021).

### 2.3. Proposed model

This study applied an extended technology acceptance model (TAM) from Davis (1989) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual use. Geographical area was also included to understand differences regarding demographic information between the paths. For the structural model, twelve hypotheses were included; similarly, twelve hypotheses were also proposed to test of differences. We discussed the proposed model with two statisticians and one educational expert; the model in Figure 1 is elaborated in detail.

#### 2.24. TAM variables: perceived ease of use, perceived usefulness, attitude, intention to use, and actual use

In the field of social science, TAM is a commonly adapted model by educational researchers. The model states that people's feelings about behavioral intention toward adopting a system, which in this study is in the setting of distance learning, is predicted by their perceived usefulness and perceived ease of use (Davis, 1989). TAM's original premise is that perceived ease of use is claimed to predict perceived usefulness (Davis, 1989). Furthermore, the a-system's attitudes and perceived usefulness impact behavioral intention (the degree to which people perform or do not perform for a given future activity). Finally, behavioral intention predicts the actual use of a system (Davis, 1989). Besides the original constructs, some external factors were reported to be associated with the first TAM constructs. (Mukminin *et al.*, 2020; Rejón-Guardia *et al.*, 2020; Venkatesh *et al.*, 2003).

One of the most significant components in TAM is the perceived usefulness. Perceived usefulness is defined as the degree to which system users feel that the system will increase their performance (Davis, 1989); in this study, we determined the system as distance learning. Further, users' attitude toward and intention to use a system is influenced by his-or-hetheir perceived usefulness (Davis, 1989). Perceived usefulness of a system is also expected to influence the user's decision to accept or reject it. The degree to which a person believes that using any system is straightforward and friendly is described as perceived ease of use (Iqbal and Bhatti, 2017). From the TAM concept, perceived ease of use is one of the drivers that can affect perceived usefulness and attitude toward a system. Users are more willing to adopt a new system-approach if they believe it is simple to use (Davis, 1989; Mukminin *et al.*, 2020).

Attitude is defined as users' certain behavior linked with the use of a system (Davis, 1989). In the original TAM model, attitude is hypothesized to influence intention to use-a-system. Further, intention to use in this study is described as students' desire to utilize technologies for the distance learning setting; -the intention is expected to significantly influence actual use (Zardari *et al.*, 2021). The final part of the TAM is the actual use, or the act of applying somethinga system, which expresses the reality of users to utilize or not to utilize any-technology;-i In this study, the actual use is the implementation of technology for distance learning (Davis, 1989). In the proposed model of this study, actual use has no impact on the other components of this model-since it is the final stage in-of the chain-of-technological acceptance model.

Table 1. Some recent TAM-related studies in the educational context

No	Sources	Method	Results
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1	(Scherer <i>et al.</i> , 2019)	Meta-analysis	TAM explained technology acceptance properly; yet, the role of certain key constructs and the importance of external variables contrasted some existing beliefs about the TAM. Implications for research and practice are discussed
2	(Mutambara and Bayaga, 2021)	A survey involved 550 high school students, and the data were analyzed using PLS-SEM.	The original TAM variables (perceived attitude, perceived usefulness, and perceived ease of use) had direct correlations with behavioral intention and played mediating roles between the external variables and behavioral intention
3	(Baber, 2021)	The study was conducted on the 375 students in universities of South Korea during Covid-19.	The results suggested that all factors in TAM positively influenced the behavioral intention to use and accept the e-learning system by the learners during this pandemic.
4	(Rizun and Strzelecki, 2020)	. PLS-SEM was employed to test the proposed research model. The survey gathered data from 1692 Polish students.	The strongest exogenous variable of student's acceptance of education shift to distance learning <i>was</i> enjoyment. Perceived ease of use and perceived usefulness were <i>also</i> reported to be significant in affecting attitude towards and intention to use
5	(Hanham <i>et al.</i> , 2021)	An online survey was completed by 365 undergraduate students from a university in Sydney, Australia. Confirmatory factor analysis, SEM, and <i>multi-group MGA</i> analyses were used to analyze the data.	Facilitating conditions were positively associated with the perceived usefulness <i>of technology</i> , which <i>in turn</i> was positively associated with academic self-efficacy. Surprisingly, perceived ease of use did not have a statistically significant association with perceived usefulness. Academic self-efficacy was positively <i>associated with related to</i> academic achievement.
6	(Racero <i>et al.</i> , 2020)	The suggested structural model was tested using Lisrel software with a total of 352 valid replies.	The results <i>clearly</i> confirmed the positive influence of the intrinsic motivations, autonomy, and relatedness, to improve perceptions regarding the usefulness and ease of use of open source software, and; therefore, on behavioral intention to use the software.
7	(Zardari <i>et al.</i> , 2021)	The information was gathered from 650 university students. After data filtering, structural equation modeling was used to evaluate 513 valid replies.	Satisfaction, perceived ease of use, perceived usefulness, information quality, self-efficacy, social influence, and benefits were reported to be significant in predicting behavioral intention regarding e-learning portal acceptance. Perceived ease of use significantly predicted perceived usefulness and pleasure. The appeal had a significant effect on pleasure and satisfaction. Enjoyment is significantly correlated with satisfaction
8	(Sukendro <i>et al.</i> , 2020)	The research was conducted through a survey of 974 students analyzed with PLS-SEM of expanded TAM with enabling conditions as the external component.	The findings of significant relationships between facilitating condition and perceived ease of use and between facilitating condition and perceived usefulness <i>was</i> reported, and <i>(3)</i> the significant relationships among core components of TAM were found except for one, the relationship between perceived usefulness and attitude.

## 2.2. External variables; Experience, enjoyment, and self-efficacy

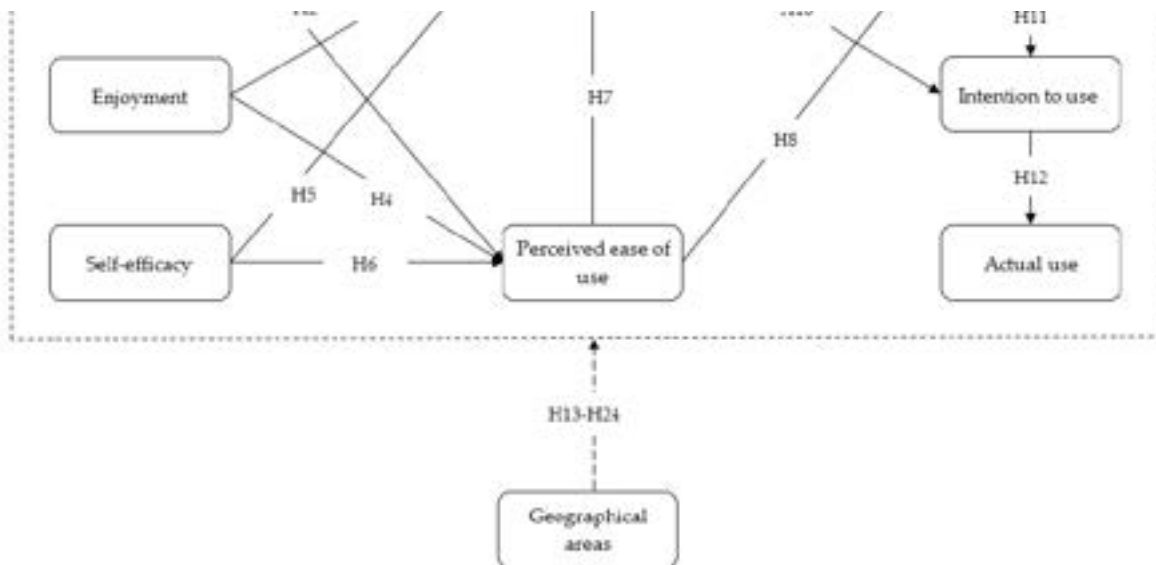
In this study, extended factors such as enjoyment, self-efficacy, and experience were suggested. This study suggested extended factors such as enjoyment, self-efficacy, and experience to predict perceived ease of use and usefulness (Rizun and Strzelecki, 2020). In this study, experience is defined as the amount and type of technical abilities for distance learning that a person has acquired through time (Abdullah and Ward, 2016). One of the most significant external variables is experience. Individuals with more advanced technological abilities are more likely to be enthusiastic about using any online/distance learning instrument (Rizun and Strzelecki, 2020). In this study, we expect that experience of distance learning during COVID-19 influences perceive ease of use and perceived usefulness.



Furthermore, enjoyment or pleasure is defined to be the degree to which the action of implementing any system is seen to become pleasurable, independent of the results. A ~~system that is pleasant~~ pleasant system seems to be viewed as simple to use and beneficial in which users' desire ~~to utilize it~~ can increase. Many studies have shown that ~~consumers' users'~~ perceptions of ease of use are influenced by how much fun they have when using a system. In addition, researchers have discovered a substantial positive relationship between ~~online learning system~~ enjoyment and perceived usefulness, which boosts students' ~~propensity to use (real-actual usage)~~ these systems (Rizun and Strzelecki, 2020). Self-efficacy in this study is described as the confidence ~~of ability~~ to complete a task using technology for distance learning during COVID-19. ~~According to the findings, s~~Students with stronger e-learning self-efficacy are ~~also~~ more inclined to employ e-learning and computer-supported education. Self-efficacy is thought to ~~significantly impact perceived ease of use and perceived usefulness~~ impact perceived ease of use and perceived usefulness. All hypotheses included in this study are performed in Figure 1, and prior studies related to TAM application in recent years within the educational environment are shown in Table 1.

## 2.2. Geographical areas in moderating hypothetical relationships

In addition to the structural ~~model reported in the current study~~ assessment, geographical areas (rural and urban) were included to understand how all hypothetical relationships are different. Prior studies have focused on the differences in technology integration based on demographic information (Aslan and Zhu, 2017; Habibi *et al.*, 2021; Ramírez-Correa *et al.*, 2015; Ullah *et al.*, 2021; Yang and Hsieh, 2013) (~~Aslan and Zhu, 2017; Habibi et al., 2021; Ramirez-Correa et al., 2015; Yang and Hsieh, 2013~~). For example, genders were reported to be significantly different regarding multimedia utilization for learning (Ramírez-Correa *et al.*, 2015). Based on the geographical areas, rural and urban, learning behavioral patterns and access to technology were revealed to be ~~come~~ significantly different (Habibi *et al.*, 2021; Yang and Hsieh, 2013). Therefore, besides hypotheses for the structural model, twelve hypotheses (H13-H24) were included regarding the differences between geographical areas concerning all paths (Fig.1), for example, there is a significant difference regarding the relationship between experience and perceived usefulness based on respondents' geographical areas (H13), and there is a significant difference regarding the relationship between intention to use and actual use based on respondents' geographical areas (H24)



**Figure 1.** A proposed model ~~exploring sports science students' acceptance to Covid-19 distance learning: The role of geographical areas in Indonesian higher education.~~

## 3. Materials and Methods

### 3.1. Design of the Study

This research was conducted using an online survey from March 2021 to June 2021 in five Indonesian HEIs, after the Indonesian government announced school closures on May 20, 2020. Before the primary data collection, a survey instrument was developed and validated to assess variables that predict the usage of e-learning by Indonesian sport science students during Covid-19. The model measurement and evaluation were carried out using SmartPLS 3.3, ~~through led by the Partial Least Squares Structural Equation Modeling methods (PLS-SEM procedures).~~

### 3.2. Instrumentation

~~The r~~Review of literature can aid researchers in defining and analyzing ideas and concepts related to the theoretical research framework ~~and~~ (Habibi *et al.*, 2020). ~~It tries to determine the study's objective approach to~~ instrumentation. The instrument is designed to meet the research goals (Habibi *et al.*, 2020). ~~Adapted survey tools were used in this stud~~This study used an adapted survey to assess the elements that influence students' acceptance of distance learning (Rizun and Strzelecki, 2020; Sabah, 2016; Venkatesh *et al.*, 2003, 2008). The new instrument for the current study was produced based on the adaptation process; the indicators differed and ~~were~~ developed to meet COVID-19 and distance learning settings. Twenty-nine indicators were modified for the instrument during the initial set-up procedures. The indicators were addressed with three educational technology specialists from Malaysia and Indonesia via video conferences as part of the content validity process to ensure that the instrument was appropriate for the ~~study's~~ context and setting. (Halek *et al.*, 2017). Ten indicators were updated after the video call meetings. In contrast, three others were deleted ~~suggested by the experts owing to inappropriate circumstances, mostly because the research issue is distance learning usage during a pandemic that varies from typical conditions.~~

### 3.3. Population, Sample, and Data Collection and Analysis

~~The population of the current study covers all sport science students in Indonesian HEIs. Sports science students were selected as the survey respondents since not many studies were conducted within the area; besides, specific learning materials and sports-based activities make the current study novel and unique. Meanwhile, the target population of the study includes students in four Indonesian cities. We distributed the survey through Google Forms with a random sampling~~A Google Forms technique survey was used to collect data for the study. The questionnaire (n. 26) was piloted on a small group of students ~~for the initial examination of to examine~~ reliability; the Cronbach alpha test was conducted ~~for this process~~. All variables were reliable, with alphas of more than .70. The final set of questions was improved after the pilot study, and the questionnaire was disseminated. The survey was launched on June 1, 2021, and was open until June 15, 2021. The majority of answers, though, came in the first week. Active students from three institutions were asked to take part in the study via an electronic invitation. The survey received 1472 responses; 1291 data were measurable. One hundred and eighty-one responses were dropped because missing values appeared or the same answers for every question were identified. Nine hundred and ninety-four are male students; meanwhile, 296 female respondents are females. Eight hundred respondents are from rural areas, and 489 are from urban areas.

### 3.4. Data Analysis

~~Two-Three~~ phases are involved in evaluating PLS-SEM findings. The first phase is a review of the ~~reflective~~ measurement model. This is an essential component of the evaluation since it ensures that the measurement quality is maintained. ~~The measurement model was done to examine the reliability and validity of the variables. There are four assessments for the measurement models; we assessed and reported the computation of reflective indicator loadings, internal consistency reliability, convergent validity, and discriminant validity).~~ Secondly, ~~the~~ examination of the structural model ~~was is~~ carried out ~~in phase 2~~ after the measurement model ~~was evaluate~~ processed. Phase ~~2~~The structural model examines

the structural theory, which entails considering the given hypotheses and addressing the connections among the latent variables (Hair *et al.*, 2019). To assess the structural model, some measures were reported, namely Coefficient of determination ( $R^2$ ), effect sizes ( $f^2$ ), predictive relevance ( $Q^2$ ), model fit, and statistical significances. Finally, multi-group analysis (MGA) was done to understand the moderating roles of geographical areas, urban and rural, to determine the difference between all paths of the structural model (Carranza *et al.*, 2020; Matthews, 2017).

## 4. Results

### 4.1. Preliminary Findings

The percentage of missing data in the present study ranged from 0% to .5 percent for each item. The missing data was utterly random (MCAR) (Kline, 2005). Table 1 displays the means, standard deviations, correlation matrices, skewness, and kurtosis for all variables; univariate normality was found for experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual usage (skewness and kurtosis values in the range of the cut-off values). The Likert scale went from 1 to 5, with 5 being the highest score. Most items achieved means of below three ~~from enjoyment, perceived ease of use, perceived: enjoyment, perceived ease of use,~~ usefulness, attitude, and intention to use. The findings show that users were not excited; these feelings suggest that distance learning could have a lesser potential than face-to-face learning.

### 4.2. Measurement Model

The examination of the measurement model in this study includes reflective metrics. We began by looking at the indicator loadings. Loadings greater than .50 show that the construct accounts for more than half of the variation in the indicator, ~~indicating that the indicator is reliable~~ (Md Noor *et al.*, 2019). The internal consistency dependability of the constructions was tested. Better numbers imply higher levels of dependability for the composite reliability criteria. Reliability ratings of .70 to .95 are considered "acceptable to good" (Hair *et al.*, 2019). Internal consistency dependability is measured using Cronbach's alpha, which assumes the same criteria. Reliability ratings of .70 to .95 are considered appropriate (Shmueli *et al.*, 2019). The convergent validity, or the amount to which a construct converges in its indicators by explaining the variance of the items, was then computed. The items' average variance extracted (AVE) linked with a specific construct is used to measure convergent validity, ~~which is also referred to as communality~~. The AVE must be .500 or greater to be considered acceptable (Ogbeibu *et al.*, 2021). ~~This level or above suggests that the concept accountings~~ for (more than) 50% of the variation in its components on average.

Discriminant validity is the final stage in reflective measurement (Palos-Sanchez *et al.*, 2019) ~~that~~. ~~This study~~ demonstrates how empirically different a concept is from others. In PLS-SEM, discriminant validity is determined by examining heterotrait-monotrait ratio of correlations. If the route model includes variables defined as conceptually and extremely similar, a value of .900 is proposed as a threshold; ~~depicted in our model~~. In PLS-SEM, the heterotrait-monotrait ratio criterion is a novel requirement for assessing discriminant validity that outperforms the Fornell-Larcker criterion and cross-loading assessments (Hair *et al.*, 2019).

Table 2 and 3 informs the results and evaluation of the measurement model; ~~All reflected measurement models computations~~ were reported to ~~have to~~ meet the criteria in the examination. ~~All of the outside loadings are larger than .500, implying that all indicators are trustworthy. In addition, all AVEs were greater than .500, indicating that the measurements were convergently valid. Composite reliability was found to have values of  $\geq .8730$ , higher than .700 as the minimum cut-off value for composite reliability (Hair *et al.*, 2019). In addition, Cronbach's alpha values were in the range of .7200 to .9410, also in a good range. Discriminant validity was assessed using the heterotrait-monotrait ratio criterion. The results all fell short of the .900 threshold. The bootstrapping technique was then used with 5000 samples, using the "no sign" adjustments option at the .05 significant level. The statistical computation shows no values of the heterotrait-monotrait ratio confidence intervals contain values greater than .900, suggesting that all heterotrait-monotrait ratio values are significantly different from 1. As a consequence, discriminant validity has been demonstrated (Table 3). In addition, all AVEs were~~



greater than .500, indicating that the measurements were convergently valid. Composite reliability was found to have values of  $\geq .8730$ , higher than .700 as the minimum cut-off value for composite reliability (Hair *et al.*, 2019). In addition, Cronbach's alpha values were in the range of .7200 to .9410, also in a good range.

**Table 2.** Normality, descriptive statistics, and measurement model criteria.

Construct	Items	Mean	SD	Kurt.	Skew.	Mark	Load	$\alpha$	rho_A	CR	AVE
Perceived usefulness	PU1	2.5630	1.2910	-.8110	.4240		.9150	.8960	.8970	.9350	.8280
	PU2	2.5480	1.2540	-.7240	.4430		.9260				
	PU3	<del>2.6070</del>	<del>1.2310</del>	<del>-7420</del>	<del>.3720</del>	Droppe ed, CR <.9500					
Perceived ease of use	PU4	2.7750	1.2840	-.9300	.2390		.8890				
	PEOU 1	3.0300	1.2860	-.9920	-.0020		.8210	.8900	.8940	.9240	.7520
	PEOU 2	2.6890	1.2330	-.7850	.2930		.8890				
	PEOU 3	2.5770	1.1970	-.6250	.4080		.8810				
	PEOU 4	2.8200	1.2470	-.8520	.1920		.8760				
	ATU4	<del>2.7520</del>	<del>1.2850</del>	<del>-9650</del>	<del>.1670</del>	Droppe ed, low load					
Attitude	ATU2	3.2830	1.1560	-.6170	-.1650		.8330	.7200	.7940	.8730	.7760
	ATU3	2.8610	1.1850	-.7080	.1080		.9260				
	ATU4	<del>2.7040</del>	<del>1.3270</del>	<del>-</del>	<del>.2230</del>	Droppe ed, low load					
Intention to use	ITU1	2.6050	1.2730	-.8670	.3060		.9030	.9090	.9100	.9430	.8460
	ITU2	2.4950	1.2030	-.6630	.4060		.9300				
	ITU3	2.5390	1.2220	-.7150	.3910		.9260				
Actual use Experience	AU1	3.0810	1.2430	-.8340	-.0730		1.0000	1.0000	1.0000	1.0000	1.0000
	EXP1	3.3990	1.2330	-.7870	-.2810		.7890	.8590	.8870	.9030	.7000
	EXP2	3.6540	1.2200	-.6230	-.5400		.8060				
	EXP3	3.3780	1.2170	-.7950	-.2520		.8880				
Enjoyment	EXP4	3.1390	1.2330	-.8420	-.0640		.8600				
	EJ1	2.6940	1.2300	-.7550	.2630		.9490	.9410	.9420	.9620	.8950
	EJ2	2.8060	1.2210	-.7620	.2070		.9430				
Self-efficacy	EJ3	2.7000	1.2350	-.7690	.2530		.9470				
	SE1	3.0910	1.1630	-.5850	-.0040		.8950	.8870	.8880	.9300	.8160
	SE2	3.0990	1.1520	-.5390	.0100		.9130				
	SE3	3.0550	1.1340	-.4590	.0040		.9010				

**Table 3.** Heterotrait–monotrait ratio for discriminant validity (< .900) (Hair *et al.*, 2019)

	Actual use	Attitude	Enjoyment	Experience	Intention to use	Perceived ease of use	Perceived usefulness
Attitude	.6180						

Enjoyment	.5940	.7770					
Experience	.4700	.6700	.6660				
Intention to use	.6220	.7570	.8180	.5430			
Perceived ease of use	.5820	.8530	.7730	.6190	.7590		
Perceived usefulness	.5340	.8190	.7630	.5540	.8010	.8300	
Self-efficacy	.5260	.7260	.6920	.6100	.6380	.6440	.6180

### 4.3. Structural Model

To assess the structural model, studies (Henseler *et al.*, 2014; Ringle *et al.*, 2020) recommend looking at measures like  $R^2$ ,  $f^2$ ,  $Q^2$ , SRMR, and statistical significances. Researchers (Henseler *et al.*, 2014; Ringle *et al.*, 2020) recommend looking at measures like  $R^2$ ,  $f^2$ ,  $Q^2$ , model fit, and statistical significances to assess the structural model. Table 6 shows the  $R^2$  and path coefficients of the endogenous constructs. We followed (Hair *et al.*, 2019) recommendation in terms of regarding  $R^2$  values, which indicates that  $R^2$  the values of .670, .330, and .190, respectively, indicate strong, moderate, and weak  $R^2$  values.  $f^2$  values of .020, .150, and .350, according to (Ringle *et al.*, 2020), suggest small, medium, and large effects, respectively. To test for statistical significance, Hair *et al.* (Hair *et al.*, 2019) recommend a minimum  $t$  value of 1.65 at  $p < .1$ . Furthermore, for a given endogenous component,  $Q^2$  values larger than zero indicate a reasonable degree of prediction accuracy (Hair *et al.*, 2014; Ringle *et al.*, 2020). (see Table 6 for  $R^2$  and  $Q^2$  results and Table 4 for  $f^2$  results). Based on the recommended assessment standards and current research, the  $Q^2$  findings indicate sufficient prediction accuracy for exogenous variables (Hair *et al.*, 2014; Ringle *et al.*, 2020). According to Henseler (Henseler *et al.*, 2016), the SRMR is the only approximate model fit criteria for evaluating PLS route modeling, consistent with prior research (Sarstedt *et al.*, 2016). The bootstrap-based test  $iwass$  also used to calculate values for the discrepancy measures, which include the squared euclidean distance (dULS) and the geodesic distance (dG) (Henseler *et al.*, 2016). Table 3 compares the values of the SRMR, dULS, and dG discrepancy measures; SRMR below .08 shows a valid and reliable model. To test for statistical significance, Hair *et al.* (2019) recommend a minimum  $t$  value of 1.65 at  $p < .05$ . The structural model was estimated using the consistent PLS bootstrapping option with 5,000 subsamples in this investigation (Lowry and Gaskin, 2014). All hypotheses were supported but H1 (the relationship between experience and perceived usefulness,  $t = .1900$ ;  $p = .8500$ ). The strongest correlation emerged between intention to use and actual use that supports, supporting the last hypothesis (H12) with a  $t$  value of 26.6890. In contrast, the lowest correlation was reported between self-efficacy and perceived usefulness with a  $t$  value of 3.050.

**Table 4.** The results of structural model,  $f^2$ , SRMR, dULS, and dG (Henseler *et al.*, 2014; Ringle *et al.*, 2020).

H	Path	$\beta$	t values	p values	Sig	$f^2$	Items	Value
H1	Experience -> Perceived usefulness	.0050	.1900	.8500	No	.0000	SRMR	.053
H2	Experience -> Perceived ease of use	.1440	5.0700	.0000	Yes	.0260	dULS	.762
H3	Enjoyment -> Perceived usefulness	.3110	9.2350	.0000	Yes	.0970	dG	.334
H4	Enjoyment -> Perceived ease of use	.5110	16.8430	.0000	Yes	.2800		
H5	Self-efficacy -> Perceived usefulness	.0800	3.0500	.0020	Yes	.0090		
H6	Self-efficacy -> Perceived ease of use	.1710	6.0150	.0000	Yes	.0360		
H7	Perceived ease of use -> Perceived usefulness	.4750	13.4150	.0000	Yes	.2720		
H8	Perceived ease of use -> Attitude	.4280	11.5280	.0000	Yes	.1790		
H9	Perceived usefulness -> Attitude	.3620	9.9690	.0000	Yes	.1280		
H10	Perceived usefulness -> Intention to use	.5410	18.6240	.0000	Yes	.3590		
H11	Attitude -> Intention to use	.2670	8.8150	.0000	Yes	.0870		
H12	Intention to use -> Actual use	.5930	26.6890	.0000	Yes	.5410		

**Table 5.** The results of  $R^2$  and  $Q^2$  structural model,  $f^2$ , SRMR, dULS, and dG (Henseler *et al.*, 2014; Ringle *et al.*, 2020).

Path	R <sup>2</sup>	Q <sup>2</sup>
Received usefulness	.618	.508
Perceived ease of use	.540	.402
Attitudes	.544	.408
Intention to use	.561	.471
Actual use	.351	.349

#### 4.3. MGA results

As previously informed, eight hundred respondents of this study lived in rural areas; while, 489 stayed in urban areas. The moderating roles of geographical areas, urban and rural, were examined through MGA computation for H13, H14, H15, H16, H17, H18, H19, H20, H21, H22, H23, and H24. The MGA results revealed that respondents' geographical areas do not significantly moderate the impact of most predictors on their exogenous constructs; thus, the results show that the MGA process rejects nine hypotheses out (H13, H14, H16, and H17, H18, H20, H22, H23, H24) of twelve hypotheses. For example, the p-value of the difference regarding the relationship between experience and perceived usefulness was reported to be insignificant ( $\beta = 0.227$ ;  $p = 0.0840$ ) that rejects H13. Another example is the difference regarding the path coefficient between intention to use and actual use that is also insignificant ( $\beta = 0.0140$ ;  $p = .7770$ ), rejecting hypothesis 24. The three hypotheses were reported to be accepted: H15, H19, and H21. Geographical areas, urban and rural, are significantly different regarding the relationships between enjoyment and perceived usefulness ( $\beta = 10.2470$ ;  $p < .001$ ), supporting H15. Similarly, the path differences between perceived ease of use and perceived usefulness ( $\beta = 0.2320$ ;  $p < .01$ ) and between perceived usefulness and attitude ( $\beta = -0.1540$ ;  $p < .05$ ) are also reported to be significant. All information about the detail of the computational results on the MGA approach is informed in Table 6.

Table 6. MGA results regarding all paths based on respondents' geographical areas, rural and urban.

H	Path	$\beta$ rural	$\beta$ urban	p value rural	p value urban	$\beta$ rural- urba n	p value rural- urba n
H1 3	Experience -> Perceived usefulness	0.0360	-0.0480	0.224 0	0.2330	0.084 0	0.094 0
H1 4	Experience -> Perceived ease of use	0.1710	0.0870	0.000 0	0.0450	0.084 0	0.131 0
H1 5	<b>Enjoyment -&gt; Perceived usefulness</b>	<b>0.2170</b>	<b>0.4640</b>	<b>0.000 0</b>	<b>0.0000</b>	<b>- 0.247 0</b>	<b>0.000 0</b>
H1 6	Enjoyment -> Perceived ease of use	0.5010	0.5290	0.000 0	0.0000	- 0.028 0	0.649 0
H1 7	Self-efficacy -> Perceived usefulness	0.0630	0.1070	0.049 0	0.0110	- 0.045 0	0.402 0
H1 8	Self-efficacy -> Perceived ease of use	0.1720	0.1730	0.000 0	0.0010	- 0.001 0	0.995 0
H1 9	<b>Perceived ease of use -&gt; Perceived usefulness</b>	<b>0.5640</b>	<b>0.3320</b>	<b>0.000 0</b>	<b>0.0000</b>	<b>0.232 0</b>	<b>0.001 0</b>
H2 0	Perceived ease of use -> Attitude	0.4760	0.3620	0.000 0	0.0000	0.113 0	0.140 0
H2	<b>Perceived usefulness -&gt; Attitude</b>	<b>0.2980</b>	<b>0.4510</b>	<b>0.000</b>	<b>0.0000</b>	<b>-</b>	<b>0.049</b>

1				0		0.154	0
H2	Perceived usefulness -> Intention to use	0.5420	0.5380	0.000	0.0000	0.004	0.957
2				0		0	0
H2	Attitude -> Intention to use	0.2700	0.2640	0.000	0.0000	0.006	0.921
3				0		0	0
H2	Intention to use -> Actual use	0.5970	0.5830	0.000	0.0000	0.014	0.777
4				0		0	0

## 5. Discussion

Consistent with prior studies (Racero *et al.*, 2020; Rizun and Strzelecki, 2020; Sukendro *et al.*, 2020; Zardari *et al.*, 2021), the extended TAM used in this study was successful in explaining the distance learning process of adoption, as seen by Indonesian students of sports science students. The specific major, sport science, involved in this study helps us focus on a certain field of study. Other researchers can conduct studies in other areas or all fields regarding the implementation of technology into teaching. The scale can be studied and altered in the future by other academics who are interested in performing studies in the relevant field, especially during pandemics like Covid-19, based on the findings. Based on the findings, the scale can be studied and adopted in the future by other academics interested in performing studies in the relevant field, especially during pandemics like Covid-19. The instrument contributes significantly to the advancement of academic approaches for structural equation research. The model is reported to be valid and reliable based on the content validity and measurement model processes. From the descriptive statistical findings, it could be discussed that the students of the current study have a low perception (means below three or disagree) on enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use regarding distance learning during due to the COVID-19. From the results, only items from three variables, namely experience, enjoyment, and actual use, gained mean values of slightly above 3. These low and medium means of items were also reported by the previous study. Previous study also reported these low and medium means of items (Rizun and Strzelecki, 2020); ~~†~~ The location of the study was categorized as a developing country, similar to this study setting.

Through bootstrapping process with 5,000 sub-samples, the study's findings revealed that all hypotheses were supported for the non-original TAM variables; however, but one correlation between experience and perceived usefulness was insignificant. The insignificant relationship might appear because the sports science students involved in this study perceived the first experience of attending online learning due to pandemics like COVID-19. In other words, they have no experience in doing online learning before. This research took place during the COVID-19 epidemic, which has affected every country on the planet and has left no country unaffected. All educational stakeholders, including sports science students, should adjust were taken off guard and adjusted as fast as possible to the new reality to the new reality and condition as fast as possible. The survey could be a reference to the respondents' perception regarding teaching and learning processes "caught" HEI students in the midst of during the COVID-19-a distance learning phase, during which they were all required to switch from face-to-face to online instruction (Rizun and Strzelecki, 2020). In addition, the experience was reported to significantly perceived ease of use. Enjoyment is significantly related to perceived usefulness and perceived ease of use. Besides, self-efficacy was a significant predictor of perceived usefulness and perceived ease of use, similar to previous studies (Mutambara and Bayaga, 2021; Rizun and Strzelecki, 2020; Sukendro *et al.*, 2020; Zardari *et al.*, 2021).

For TAM variables, all exogenous variables were significantly related to the endogenous variables. Perceived ease of use was a significant predictor of perceived usefulness and attitude, and perceived usefulness gained significant relationships with attitude and intention to use. Besides, the attitude was reported to be significant in predicting intention to use. Finally, the relationship between intention to use and actual use was informed to be the strongest. The significance revealed by this study could be a guide for all Indonesian stakeholders to face challenges during future pandemics, especially for sports science students. The introduction to distance learning should be supported by appropriate policies in improving perceived usefulness, perceived ease of use, attitude, and intention to use distance learning technology (Sukendro *et al.*, 2020; Zardari *et al.*, 2021). The proper and appropriate infrastructure, training, seminar, curriculum, and quality tutors should support the system. Specific sports-based

instructional activities should always be improved during distance learning (Sukendro *et al.*, 2020). The study results confirm the first research questions in which most relationships are supported based on the analysis of the data.

Besides the structural model, the current study also investigated the role of geographical areas in moderating the relationships of all paths. ~~Mostly,~~ The effects of the endogenous constructs on the ~~if~~ exogenous constructs are not significantly moderated by the geographical areas of the respondents-sports science students involved in this study. Only three relationships are significantly different; enjoyment -> perceived usefulness, perceived ease of use -> perceived usefulness; and perceived usefulness -> attitude. The equality of students' perception could trigger the dominance of the insignificances, knowledge, skills, and information regarding the use of technology in education (Habibi *et al.*, 2021; Yang and Hsieh, 2013). More studies should be conducted regarding demographic information towards technology integration, especially during pandemics like COVID-19. Even though most paths are not significantly different, respondents living in urban areas have higher perceptions of all items and constructs than those who live in rural areas. The findings might refer to the slight differences in ~~the infrastructure of internet access~~ internet access infrastructure, where most rural areas have lower connection speed than urban areas (Habibi *et al.*, 2021). The computation of MGA in the smartPLS 3.3. revealed that most paths have no differences regarding geographical areas; only a few significant differences are reported to confirm the second research question.

## 6. Conclusions

The current study took place during the COVID-19 pandemic, which has left no country unaffected. Most HEIs should focus on distance learning as an effort to replace face-to-face instruction. This scheduling allowed students to provide the most up-to-date feedback on the approaches and devices utilized within the distance learning, ~~as well as~~ and explore their emotions while they were still experiencing the situation. The study is based on a survey of ~~particular students~~, sports science students, who were asked how they felt about distance learning during COVID-19. The survey provided an opportunity to examine students' attitudes about distance learning and, in particular, the instruments used by HEIs in the process. If the COVID-19 scenario requires HEIs to continue operating online, this research will ~~be a significant addition~~ significantly contribute to policymaking.

Nonetheless, some limitations emerged regarding the findings of the study. The specific sample of the study is one of the limitations; thus, respondents from across fields of study should be considered. Comparative studies on other demographic information like genders and years in university are also recommended to ~~gain a better understanding of~~ understand COVID-19's influence on HEIs better ~~COVID-19's influence on HEIs~~. The article includes a quick analysis of the condition of Indonesian HEIs distance learning due to COVID-19. The article does not provide a complete picture of what is happening in higher education. However, we believe that sharing experience is vital in the current circumstances and that each HEI contributes significantly to the worldwide fight with similar situations in the future. It is also suggested to undertake further in-depth analysis on the experiences of educational institutions, analyzing more examples and using different methods such as observation, interview, and experimentation.

**Funding:** This research was co-funded by Universitas Negeri Makassar, LPDP Indonesia, and Research and Innovation Management Centre (RIMC) of Universiti Utara Malaysia.

**Institutional Review Board Statement:** The study was conducted according to the guidelines of Declaration of Helsinki, and approved by *Lembaga Pengabdian dan Penelitian*, Universitas Negeri Makassar on ~~7 July~~ July 7 2021

**Informed Consent Statement:** Informed consent was obtained from all respondents involved in the study.

**Data Availability Statement:** Data is available upon request through contact with the corresponding author.

**Acknowledgments:** We thank all support from all related Indonesia HEIs involved in this study. We also address our gratitude to all respondents of the study.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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Editor and Reviewer comments:

Editor's comments:

Since the paper is limited to Indonesian higher education, therefore, please assign a section in the LR to discuss the teaching methods in Indonesian during the COVID-19

How did you develop figure 1, which models did you adopt?

Discuss the study research method in detail.

Discuss the study research questions in detail.

Discuss the study new findings in detail, and justify if the research questions are answered or not

Also add up-to-date references to support your discussion.

proofreading and grammar check is needed.

Reviewer #1: Methods: The population, sample size and sampling method should be mentioned.

Results: It is OK.

Interpretation: It is OK, but it is better to interpret the findings based on the student's majors (sports). In present situation the findings are discussed generally.

Other comments: The authors should answer to this question that why they selected the sports science students?

Reviewer #2: Methods:  
appropriate

Results:  
good

Interpretation:  
good meaningful discussion and analysis

Other comments:

I found it interesting and meaningful study. However, by reviewing the theme of the paper i suggest to review the below-mentioned paper to improve the quality of the paper and relevancy to the COVID-19.

Abbas, H. S. M., Xu, X., & Sun, C. (2021). China health technology and stringency containment

measures during COVID-19 pandemic: A discussion of first and second wave of COVID-19. *Health and Technology*, 11(2), 405-410.

Ullah, A., Pinglu, C., Ullah, S., Abbas, H. S. M., & Khan, S. (2021). The role of e-governance in combating COVID-19 and promoting sustainable development: a comparative study of China and Pakistan. *Chinese Political Science Review*, 6(1), 86-118.

Abbas, H.S.M., Xu, X. and Sun, C. (2021), "Role of COVIDsafe app and control measures in Australia in combating COVID-19 pandemic", *Transforming Government: People, Process and Policy*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/TG-01-2021-0004>

# Students' acceptance to distance learning during Covid-19: The role of geographical areas among Indonesian sports science students

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**Abstract:** This study was conducted to investigate the perspectives of sports science students on factors affecting distance learning in the setting of Indonesian higher education institutions (HEIs). This study proposed an extended technology acceptance model (TAM) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual use. An online survey was used to collect data from 1291 respondents. The structural model was tested using the partial least squares structural equation modeling (PLS-SEM). Multi-group analysis (MGA) was conducted to understand the role of geographical areas in moderating all hypothetical relationships. The findings show that the respondents were not excited to online learning due to the weak means (below 3) for most items of enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use. All relationships were supported except the relationship between experience and perceived usefulness. The strongest significant association emerged between intention to use and actual use. Meanwhile, the least significant one was between self-efficacy and perceived usefulness. Three out of 12 hypotheses were confirmed regarding the differences of geographical areas, rural and urban, concerning all relationship paths. The findings add to a deeper understanding of the acceptability of distance learning during pandemics like COVID-19.

**Keywords:** Sports science students; distance learning; higher education; COVID-19; pandemic.

## 1. Introduction

The world health organization (WHO) declared COVID-19 as a global pandemic in March 2020. The last report on June 23, 2021 (the writing of this manuscript) showed that the overall number of cases had already exceeded 177 million globally. Mortality remained high, with over 9000 deaths recorded each day; however, all areas except two (Eastern Mediterranean and Africa) reported decreased new deaths. Compared to the previous week of May 2021, the global number of cases and fatalities dropped by 6% and 12%, respectively, with slightly more than 2.5 million new weekly cases and over 64,000 deaths. (WHO, 2021). In education, one of the efforts to decrease the pandemic spread was made by closing schools at all levels. The distance learning policy was issued with the help of the available technologies in facilitating teaching and learning activities, replacing face-to-face instruction.

Researchers worldwide have already conducted extensive studies on the global pandemic in education (Abbas *et al.*, 2021; Andersson and Grönlund, 2009; Sukendro *et al.*, 2020a; Watermeyer *et al.*, 2021). In Indonesia, like in other countries, COVID-19 has had a significant impact in education (Sukendro *et al.*, 2020a). Higher education institutions (HEIs) have maximized their efforts to substitute traditional learning with distance learning (Watermeyer *et al.*, 2021). Courses, persons, and technology were all challenges in distance education. These issues affect developed and developing countries; but, access to technology is more pronounced in developing countries (Andersson and Grönlund, 2009). To go deeper

into the challenges of distance learning during the pandemic, academics are recommended to understand factors affecting the acceptance as a new pedagogical approach ([Rizun and Strzelecki, 2020](#)), especially in a specific study context and among particular objects. Therefore, this study aims to disclose factors affecting distance learning in the context of Indonesian HEIs; it is conducted to understand the perceptions of sports science students. Besides, differences were also elaborated regarding all paths in the structural model based on respondents' geographical areas (urban and rural). Two research questions were established regarding the aims of the study

1. What factors affecting distance learning among Indonesian sports science students during COVID-19?
2. ~~Are there any differences regarding~~How are all paths in the structural model different based on respondents' geographical areas?

## 2. Review of Literature

### 2.1. Distance learning during COVID-19 pandemic

Distance learning has been around for a long time in higher education. When there is a physical distance between students and their instructors, the situation refers to learning mediated through technology equipment. Distance learning is far from a new phenomenon. Tracing its history, it began in the early 18th century as a correspondence study to allow learners outside of the city to continue their education without having to be on-site. Since then, it has progressed and grown in popularity, especially with the quick expansion of technological innovation ([Kentnor, 2015](#)). Other modules in distance education, such as blended learning (or hybrid learning), have also emerged, defining a combination of face-to-face and technology-mediated instructions that provides a resilient and accessible learning experience. In the current condition, many educational institutions have been forced to adopt distance learning to keep up with the present pandemic, the COVID-19 ([Alqurshi, 2020](#); [Kawaguchi-Suzuki et al., 2020](#)).

Nations were forced to implement preventive measures to stem the spread of COVID-19, including suspending schools' face-to-face learning. Specifically, HEIs quickly responded to this massive transition by launching distance learning, utilizing existing learning support systems like social media and learning management systems ([Aristovnik et al., 2020](#); [Coman et al., 2020](#)). Although this shift offered continuity to the learning process, it also exacerbated educational gaps among students, particularly those who reside in rural regions or low-income areas and lack fundamental information and technology skills. Such qualities may make it more challenging to access contemporary technological resources needed to support the distance learning trend. Considering that the current scenario may endure longer, a long-term move to online learning is suggested. The condition requires HEIs to prepare and equip themselves with the instruments needed to facilitate the acceptance of such a trend, especially among users ([Shawaqfeh et al., 2020](#)). Thus, this study explores factors affecting students' acceptance of distance learning and whether or not the paths differ based on geographical areas, rural and urban.

### 2.2. Teaching methods in Indonesian HEIs during the COVID-19

Due to the COVID-19 pandemic, many schools and colleges around the world have been closed. Many universities in Indonesia also carry out similar policies, for example, the Universitas Indonesia, Universitas Gajah Madha, and Universitas Negeri Makassar. This policy, whose aim is none other than to prevent the spread of COVID-19 infection, is in line with WHO's call that all elements of society need to prevent and minimize the impact of the disease. This policy encourages HEIs to conduct distance learning methods. Guided by the ministry of education and culture, Indonesian HEIs use various tools in delivering their teaching and learning process during the closure. Social media like Facebook, Youtube, and WhatsApp are integrated during instructional activities ([Chan et al., 2020](#); [Sobaih et al., 2020](#)). Learning management systems, such as Edmodo, Moodle, Atutor, and Olat, have also been options for lecturers in teaching their students ([Cavus et al., 2021](#); [Raza et al., 2021](#)). Some universities build their own LMS facilities to facilitate the teaching (Universitas Indonesia with EMAS, Universitas Gajah Madha with eLisa, and Universitas Negeri Makassar with SYAM OK UNM). However, most HEIs lecturers rely on video conferencing applications to meet the needs of virtual meetings conducted mainly through two tools; Zoom and Google meet ([Yudha et al., 2021](#)).

### 2.3. Proposed model

This study applied an extended technology acceptance model (TAM) from Davis (1989) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual use. Geographical area was also included to understand differences regarding demographic information between the paths. For the structural model, twelve hypotheses were included; similarly, twelve hypotheses were also proposed to test of differences. We discussed the proposed model with two statisticians and one educational expert; the model in Figure 1 is elaborated in detail.

### 2.4. TAM variables: perceived ease of use, perceived usefulness, attitude, intention to use, and actual use

In the field of social science, TAM is a commonly adapted model by educational researchers. The model states that people's feelings about behavioral intention toward adopting a system, which in this study is in the setting of distance learning, is predicted by their perceived usefulness and perceived ease of use (Davis, 1989a). TAM's original premise is that perceived ease of use is claimed to predict perceived usefulness (Davis, 1989b). Furthermore, the system's attitudes and perceived usefulness impact behavioral intention (the degree to which people perform or do not perform for a given future activity). Finally, behavioral intention predicts the actual use of a system (Davis, 1989a). Besides the original constructs, some external factors were reported to be associated with the first TAM constructs. (Mukminin et al., 2020a; Rejón-Guardia et al., 2020; Venkatesh et al., 2003).

One of the most significant components in TAM is the perceived usefulness. Perceived usefulness is defined as the degree to which system users feel that the system will increase their performance (Davis, 1989a)(Davis, 1989a); in this study, we determined the system as distance learning. Further, users' attitude toward and intention to use a system is influenced by their perceived usefulness (Davis, 1989a). Perceived usefulness of a system is also expected to influence the user's decision to accept or reject it. The degree to which a person believes that using any system is straightforward and friendly is described as perceived ease of use (Iqbal and Bhatti, 2017). From the TAM concept, perceived ease of use is one of the drivers that can affect perceived usefulness and attitude toward a system. Users are more willing to adopt a new approach if they believe it is simple to use (Davis, 1989a; Mukminin et al., 2020b).

Attitude is defined as users' certain behavior linked with the use of a system (Davis, 1989a). In the original TAM model, attitude is hypothesized to influence intention to use. Further, intention to use in this study is described as students' desire to utilize technologies for the distance learning setting; the intention is expected to significantly influence actual use (Zardari et al., 2021). The final part of the TAM is the actual use, or the act of applying a system, which expresses the reality of users to utilize or not to utilize technology. In this study, the actual use is the implementation of technology for distance learning (Davis, 1989a). In the proposed model of this study, actual use has no impact on the other components since it is the final stage of the technological acceptance model.

Table 1. Some recent TAM-related studies in the educational context

No	Sources	Method	Results
1	(Scherer et al., 2019)	Meta-analysis	TAM explained technology acceptance properly; yet, the role of certain key constructs and the importance of external variables contrasted some existing beliefs about the TAM.
2	(Mutambar a and Bayaga, 2021)	A survey involved 550 high school students, and the data were analyzed using PLS-SEM.	The original TAM variables (perceived attitude, perceived usefulness, and perceived ease of use) had direct correlations with behavioral intention and played mediating roles between the external variables and behavioral intention
3	(Baber, 2021)	The study was conducted on the 375 students in universities of South Korea during Covid-19.	The results suggested that all factors in TAM positively influenced the behavioral intention to use and accept the e-learning system by the learners during this pandemic.
4	(Rizun and Strzelecki, 2020)	. PLS-SEM was employed to test the proposed research model. The survey gathered data from 1692 Polish students.	The strongest exogenous variable of student's acceptance of education shift to distance learning was enjoyment. Perceived ease of use and perceived usefulness were also reported to be significant in affecting attitude towards and intention to use

5	<a href="#">(Hanham et al., 2021)</a>	An online survey was completed by 365 undergraduate students from a university in Sydney, Australia. Confirmatory factor analysis, SEM, and MGA analyses were used to analyze the data.	Facilitating conditions were positively associated with the perceived usefulness, which was positively associated with academic self-efficacy. Surprisingly, perceived ease of use did not have a statistically significant association with perceived usefulness. Academic self-efficacy was positively related to academic achievement.
6	<a href="#">(Racero et al., 2020)</a>	The suggested structural model was tested using Lisrel software with a total of 352 valid replies.	The results confirmed the positive influence of the intrinsic motivations, autonomy, and relatedness, to improve perceptions regarding the usefulness and ease of use of open source software, and; therefore, on behavioral intention to use the software.
7	<a href="#">(Zardari et al., 2021)</a>	The information was gathered from 650 university students. After data filtering, structural equation modeling was used to evaluate 513 valid replies.	Satisfaction, perceived ease of use, perceived usefulness, information quality, self-efficacy, social influence, and benefits were reported to be significant in predicting behavioral intention regarding e-learning portal acceptance. Perceived ease of use significantly predicted perceived usefulness and pleasure. The appeal had a significant effect on pleasure and satisfaction. Enjoyment is significantly correlated with satisfaction
8	<a href="#">(Sukendro et al., 2020b)</a>	The research was conducted through a survey of 974 students analyzed with PLS-SEM of expanded TAM with enabling conditions as the external component.	The findings of significant relationships between facilitating condition and perceived ease of use and between facilitating condition and perceived usefulness were reported, and the significant relationships among core components of TAM were found except for one, the relationship between perceived usefulness and attitude.

## 2.2. External variables; Experience, enjoyment, and self-efficacy

This study suggested extended factors such as enjoyment, self-efficacy, and experience to predict perceived ease of use and usefulness ([Rizun and Strzelecki, 2020](#)). In this study, experience is defined as the amount and type of technical abilities for distance learning that a person has acquired through time ([Abdullah and Ward, 2016](#)). One of the most significant external variables is experience. Individuals with more advanced technological abilities are more likely to be enthusiastic about using any online/distance learning instrument ([Rizun and Strzelecki, 2020](#)). In this study, we expect that experience of distance learning during COVID-19 influences perceive ease of use and perceived usefulness.

Furthermore, enjoyment or pleasure is defined to be the degree to which the action of implementing any system is seen to become pleasurable, independent of the results. A pleasant system seems to be viewed as simple to use and beneficial in which users' desire can increase. Many studies have shown that users' perceptions of ease of use are influenced by how much fun they have when using a system. In addition, researchers have discovered a substantial positive relationship between enjoyment and perceived usefulness, which boosts students' actual use ([Rizun and Strzelecki, 2020](#)). Self-efficacy in this study is described as the confidence to complete a task using technology for distance learning during COVID-19. Students with stronger e-learning self-efficacy are more inclined to employ e-learning and computer-supported education. Self-efficacy is thought to impact perceived ease of use and perceived usefulness. All hypotheses included in this study are performed in Figure 1, and prior studies related to TAM application in recent years within the educational environment are shown in Table 1.

## 2.2. Geographical areas in moderating hypothetical relationships

In addition to the structural assessment, geographical areas (rural and urban) were included to understand how all hypothetical relationships are different. Prior studies have focused on the differences in technology integration based on demographic information ([Aslan and Zhu, 2017](#); [Habibi et al., 2021](#); [Ramírez-Correa et al., 2015](#); [Ullah et al., 2021](#); [Yang and Hsieh, 2013](#)). For example, genders were reported to be significantly different regarding multimedia utilization for learning ([Ramírez-Correa et al., 2015](#)). Based on the geographical areas, rural and urban, learning behavioral patterns and access to technology



were revealed to be significantly different (Habibi *et al.*, 2021; Yang and Hsieh, 2013). Therefore, besides hypotheses for the structural model, twelve hypotheses (H13-H24) were included regarding the differences between geographical areas concerning all paths (Fig.1), for example, there is a significant difference regarding the relationship between experience and perceived usefulness based on respondents' geographical areas (H13), and there is a significant difference regarding the relationship between intention to use and actual use based on respondents' geographical areas (H24)

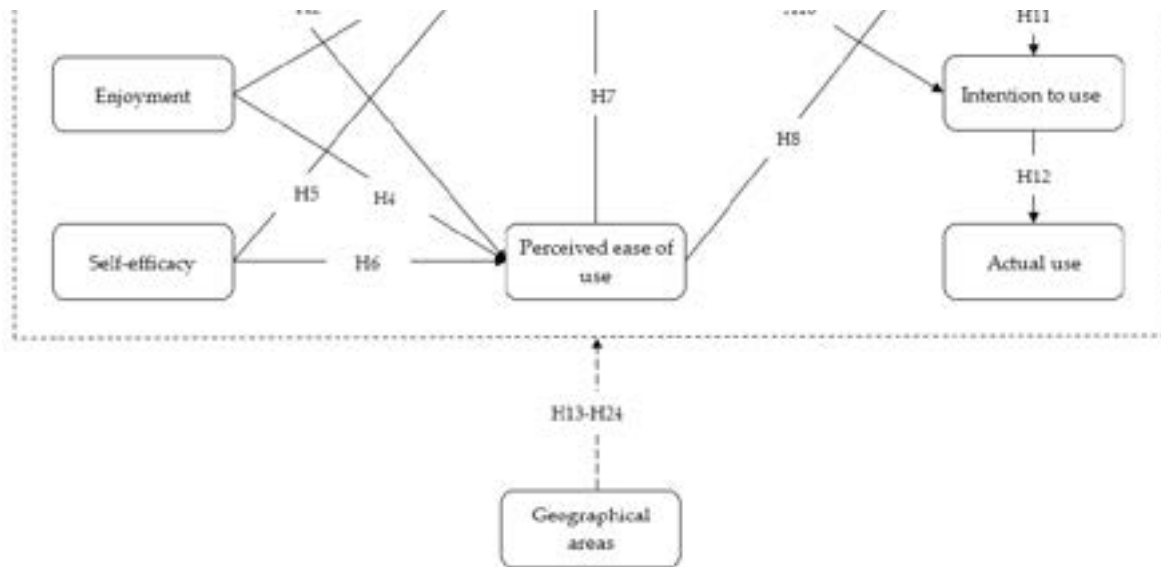


Figure 1. A proposed model.

### 3. Materials and Methods

#### 3.1. Design of the Study Research Method

This research was conducted using an online survey from March 2021 to June 2021 in five Indonesian HEIs, after the Indonesian government announced school closures on May 20, 2020. Before the primary data collection, a survey instrument was developed and validated to assess variables that predict the usage of e-learning by Indonesian sport science students during Covid-19. The model measurement and evaluation were carried out using SmartPLS 3.3, through PLS-SEM procedures. Surveys offer a high level of general capabilities when it comes to representing a wide group of people. Because of the large number of people that respond to surveys, the information acquired provides a more accurate picture of the broader population's relative qualities. Aside from low-cost research, surveys can be sent to participants in a variety of ways, including e-mail, print, and the internet. Due to the survey method's high representativeness, finding statistically significant results is often easier than with other data collection methods. As a result, the data gathered may be measured with better precision (Evans and Mathur, 2005). However, there are a few survey flaws that can be problematic. The survey cannot be altered at any point throughout the data collection procedure. Participants may not be able to give precise answers to controversies-related questions due to the difficulties of recalling relevant facts. Before the primary data collection, a survey instrument was developed and validated to assess variables that predict the usage of e-learning by Indonesian sport science students during Covid-19. The model measurement and evaluation were carried out using SmartPLS 3.3, through PLS-SEM procedures (Mukminin *et al.*, 2020b; Yusop *et al.*, 2021).

### 3.2. Instrumentation

Review of literature can aid researchers in defining and analyzing ideas and concepts related to the theoretical research framework and instrumentation. The instrument is designed to meet the research goals (Habibi *et al.*, 2020). This study used an adapted survey to assess the elements that influence students' acceptance of distance learning (Rizun and Strzelecki, 2020; Sabah, 2016; Venkatesh *et al.*, 2003, 2008). The new instrument for the current study was produced based on the adaptation process; the indicators differed and were developed to meet COVID-19 and distance learning settings. Twenty-nine indicators were modified for the instrument during the initial set-up procedures. The indicators were addressed with three educational technology specialists from Malaysia and Indonesia via video conferences as part of the content validity process to ensure that the instrument was appropriate for the context and setting (Halek *et al.*, 2017). Ten indicators were updated after the video call meetings. In contrast, three others were deleted suggested by the experts,

### 3.3. Population, Sample, and Data Collection

The population of the current study covers all sport science students in Indonesian HEIs. Sports science students were selected as the survey respondents since not many studies were conducted within the area; besides, specific learning materials and sports-based activities make the current study novel and unique. Meanwhile, the target population of the study includes students in four Indonesian cities. We distributed the survey through Google Forms with a random sampling technique used to collect data for the study. The questionnaire (n. 26) was piloted on a small group of students to examine reliability; the Cronbach alpha test was conducted. All variables were reliable, with alphas of more than .70. The final set of questions was improved after the pilot study, and the questionnaire was disseminated. The survey was launched on June 1, 2021, and was open until June 15, 2021. The majority of answers, though, came in the first week. Active students from three institutions were asked to take part in the study via an electronic invitation. The survey received 1472 responses; 1291 data were measurable. One hundred and eighty-one responses were dropped because missing values appeared or the same answers for every question were identified. Nine hundred and ninety-four are male students; meanwhile, 296 female respondents are females. Eight hundred respondents are from rural areas, and 489 are from urban areas.

### 3.4. Data Analysis

Three phases are involved in evaluating PLS-SEM findings. The first phase is a review of the measurement model. This is an essential component of the evaluation since it ensures that the measurement quality is maintained. The measurement model was done to examine the reliability and validity of the variables. There are four assessments for the measurement models; we assessed and reported the computation of reflective indicator loadings, internal consistency reliability, convergent validity, and discriminant validity). Secondly, the examination of the structural model was carried out after the measurement model process. The structural model examines the structural theory, which entails considering the given hypotheses and addressing the connections among the latent variables (Hair *et al.*, 2019). To assess the structural model, some measures were reported, namely Coefficient of determination ( $R^2$ ), effect sizes ( $f^2$ ), predictive relevance ( $Q^2$ ), model fit, and statistical significances. Finally, multi-group analysis (MGA) was done to understand the moderating roles of geographical areas, urban and rural, to determine the difference between all paths of the structural model (Carranza *et al.*, 2020; Matthews, 2017).

## 4. Results

### 4.1. Preliminary Findings



The percentage of missing data in the present study ranged from 0% to .5 percent for each item. The missing data was utterly random (MCAR) (Kline, 2005). Table 1 displays the means, standard deviations, correlation matrices, skewness, and kurtosis for all variables; univariate normality was found for experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual usage (skewness and kurtosis values in the range of the cut-off values). The Likert scale went from 1 to 5, with 5 being the highest score. Most items achieved means of below three: enjoyment, perceived ease of use, usefulness, attitude, and intention to use. The findings show that users were not excited; these feelings suggest that distance learning could have a lesser potential than face-to-face learning.

#### 4.2. Measurement Model

The examination of the measurement model in this study includes reflective metrics. We began by looking at the indicator loadings. Loadings greater than .50 show that the construct accounts for more than half of the variation in the indicator (Noor et al., 2019). The internal consistency dependability of the constructions was tested. Better numbers imply higher levels of dependability for the composite reliability criteria. Reliability ratings of .70 to .95 are considered “acceptable to good” (Hair et al., 2019). Internal consistency dependability is measured using Cronbach’s alpha, which assumes the same criteria. Reliability ratings of .70 to .95 are considered appropriate (Shmueli et al., 2019). The convergent validity, or the amount to which a construct converges in its indicators by explaining the variance of the items, was then computed. The items’ average variance extracted (AVE) linked with a specific construct is used to measure convergent validity. The AVE must be .500 or greater to be considered acceptable (Ogbeibu et al., 2021), accounting for (more than) 50% of the variation in its components on average. Discriminant validity is the final stage (Palos-Sanchez et al., 2019) that demonstrates how empirically different a concept is from others. In PLS-SEM, discriminant validity is determined by examining heterotrait–monotrait ratio of correlations. If the route model includes variables defined as conceptually and extremely similar, a value of .900 is proposed as a threshold. In PLS-SEM, the heterotrait–monotrait ratio criterion is a novel requirement for assessing discriminant validity that outperforms the Fornell–Larcker criterion and cross-loading assessments (Hair et al., 2019). Table 2 and 3 inform the results of the measurement model; all computations were reported to meet the criteria in the examination.

**Table 2.** Normality, descriptive statistics, and measurement model criteria.

Construct	Items	Mean	SD	Kurt.	Skew.	Mark	Load	$\alpha$	rho_A	CR	AVE
Perceived usefulness	PU1	2.5630	1.2910	-.8110	.4240		.9150	.8960	.8970	.9350	.8280
	PU2	2.5480	1.2540	-.7240	.4430		.9260				
	PU3	2.6070	1.2310	-.7420	.3720	Dropped CR < .9500					
	PU4	2.7750	1.2840	-.9300	.2390		.8890				
Perceived ease of use	PEOU 1	3.0300	1.2860	-.9920	-.0020		.8210	.8900	.8940	.9240	.7520
	PEOU 2	2.6890	1.2330	-.7850	.2930		.8890				
	PEOU 3	2.5770	1.1970	-.6250	.4080		.8810				
	PEOU 4	2.8200	1.2470	-.8520	.1920		.8760				
	ATU1	2.7520	1.2850	-.9650	-.1670	Dropped low load					
	ATU2	3.2830	1.1560	-.6170	-.1650		.8330	.7200	.7940	.8730	.7760
Attitude	ATU3	2.8610	1.1850	-.7080	.1080		.9260				
	ATU4	2.7040	1.3270	-1.0180	-.2230	Dropped					

						low-load					
Intention to use	ITU1	2.6050	1.2730	-.8670	.3060		.9030	.9090	.9100	.9430	.8460
	ITU2	2.4950	1.2030	-.6630	.4060		.9300				
	ITU3	2.5390	1.2220	-.7150	.3910		.9260				
Actual use Experience	AU1	3.0810	1.2430	-.8340	-.0730		1.0000	1.0000	1.0000	1.0000	1.0000
	EXP1	3.3990	1.2330	-.7870	-.2810		.7890	.8590	.8870	.9030	.7000
	EXP2	3.6540	1.2200	-.6230	-.5400		.8060				
	EXP3	3.3780	1.2170	-.7950	-.2520		.8880				
Enjoyment	EXP4	3.1390	1.2330	-.8420	-.0640		.8600				
	EJ1	2.6940	1.2300	-.7550	.2630		.9490	.9410	.9420	.9620	.8950
	EJ2	2.8060	1.2210	-.7620	.2070		.9430				
Self-efficacy	EJ3	2.7000	1.2350	-.7690	.2530		.9470				
	SE1	3.0910	1.1630	-.5850	-.0040		.8950	.8870	.8880	.9300	.8160
	SE2	3.0990	1.1520	-.5390	.0100		.9130				
	SE3	3.0550	1.1340	-.4590	.0040		.9010				

**Table 3.** Heterotrait–monotrait ratio for discriminant validity (< .900) (Hair et al., 2019)(Hair et al., 2019)

	Actual use	Attitude	Enjoyment	Experience	Intention to use	Perceived ease of use	Perceived usefulness
Attitude	.6180						
Enjoyment	.5940	.7770					
Experience	.4700	.6700	.6660				
Intention to use	.6220	.7570	.8180	.5430			
Perceived ease of use	.5820	.8530	.7730	.6190	.7590		
Perceived usefulness	.5340	.8190	.7630	.5540	.8010	.8300	
Self-efficacy	.5260	.7260	.6920	.6100	.6380	.6440	.6180

#### 4.3. Structural Model

Researchers (Henseler et al., 2014; Ringle et al., 2020) recommend looking at measures like  $R^2$ ,  $f^2$ ,  $Q^2$ , model fit, and statistical significances to assess the structural model. We followed (Hair et al., 2019) recommendation regarding  $R^2$  values; the values of .670, .330, and .190, respectively, indicate strong, moderate, and weak.  $f^2$  values of .020, .150, and .350, according to (Ringle et al., 2020), suggest small, medium, and large effects, respectively. Furthermore, for a given endogenous component,  $Q^2$  values larger than zero indicate a reasonable degree of prediction accuracy (Hair et al., 2014; Ringle et al., 2020). Based on the recommended assessment standards, the  $Q^2$  findings indicate sufficient prediction accuracy for exogenous variables (Hair et al., 2014; Ringle et al., 2020). According to Henseler (Henseler et al., 2016), the SRMR is the only approximate model fit criteria for evaluating PLS modeling, consistent with prior research (Sarstedt et al., 2016). The bootstrap-based test was also used to calculate values for the discrepancy measures, which include the squared euclidean distance (dULS) and the geodesic distance (dG) (Henseler et al., 2016). Table 3 compares the values of the SRMR, dULS, and dG discrepancy measures; SRMR below .08 shows a valid and reliable model. To test for statistical significance, Hair et al. (2019) recommend a minimum t value of 1.65 at  $p < .05$ . The structural model was estimated using the consistent PLS bootstrapping option with 5,000 subsamples in this investigation (Lowry and Gaskin, 2014). All hypotheses were supported but H1 (the relationship between experience and perceived usefulness,  $t = .1900$ ;  $p = .8500$ ). The strongest correlation emerged between intention to use and actual use, supporting the last hypothesis (H12) with a t value of 26.6890. In contrast, the lowest correlation was reported between self-efficacy and perceived usefulness with a t value of 3.050.

**Table 4.** The results of structural model,  $f^2$ , SRMR, dULS, and dG (Henseler et al., 2014; Ringle et al., 2020).

H	Path	$\beta$	t values	p values	Sig	$f^2$	Items	Value
H1	Experience -> Perceived usefulness	.0050	.1900	.8500	No	.0000	SRMR	.053
H2	Experience -> Perceived ease of use	.1440	5.0700	.0000	Yes	.0260	dULS	.762
H3	Enjoyment -> Perceived usefulness	.3110	9.2350	.0000	Yes	.0970	dG	.334
H4	Enjoyment -> Perceived ease of use	.5110	16.8430	.0000	Yes	.2800		
H5	Self-efficacy -> Perceived usefulness	.0800	3.0500	.0020	Yes	.0090		
H6	Self-efficacy -> Perceived ease of use	.1710	6.0150	.0000	Yes	.0360		
H7	Perceived ease of use -> Perceived usefulness	.4750	13.4150	.0000	Yes	.2720		
H8	Perceived ease of use -> Attitude	.4280	11.5280	.0000	Yes	.1790		
H9	Perceived usefulness -> Attitude	.3620	9.9690	.0000	Yes	.1280		
H10	Perceived usefulness -> Intention to use	.5410	18.6240	.0000	Yes	.3590		
H11	Attitude -> Intention to use	.2670	8.8150	.0000	Yes	.0870		
H12	Intention to use -> Actual use	.5930	26.6890	.0000	Yes	.5410		

**Table 5.** The results of R<sup>2</sup> and Q<sup>2</sup>.

Path	R <sup>2</sup>	Q <sup>2</sup>
Received usefulness	.618	.508
Perceived ease of use	.540	.402
Attitudes	.544	.408
Intention to use	.561	.471
Actual use	.351	.349

#### 4.3. MGA results

As previously informed, eight hundred respondents of this study lived in rural areas; while, 489 stayed in urban areas. The moderating roles of geographical areas, urban and rural, were examined through MGA computation for H13, H14, H15, H16, H17, H18, H19, H20, H21, H22, H23, and H24. The MGA results revealed that respondents' geographical areas do not significantly moderate the impact of most predictors on their exogenous constructs; thus, the results show that the MGA process rejects nine hypotheses out (H13, H14, H16, and H17, H18, H20, H22, H23, H24) of twelve hypotheses. For example, the p-value of the difference regarding the relationship between experience and perceived usefulness was insignificant ( $\beta = 0.227$ ;  $p = 0.0840$ ) that rejects H13. Another example is the difference regarding the path coefficient between intention to use and actual use that was also insignificant ( $\beta = 0.0140$ ;  $p = .7770$ ), rejecting hypothesis 24. Three hypotheses were reported to be accepted: H15, H19, and H21. Geographical areas, urban and rural, were significantly different regarding the relationships between enjoyment and perceived usefulness ( $\beta = 10.2470$ ;  $p < .001$ ), supporting H15. Similarly, the path differences between perceived ease of use and perceived usefulness ( $\beta = 0.2320$ ;  $p < .01$ ) and between perceived usefulness and attitude ( $\beta = -0.1540$ ;  $p < .05$ ) were also reported to be significant. All information about the detail of the computational results on the MGA approach is informed in Table 6.

**Table 6.** MGA results regarding all paths based on respondents' geographical areas, rural and urban.

H	Path	$\beta$ rural	$\beta$ urban	p value rural	p value urban	$\beta$ rural-urban	p value rural-urban
H13	Experience -> Perceived usefulness	0.0360	-0.0480	0.2240	0.2330	0.0840	0.0940
H14	Experience -> Perceived ease of use	0.1710	0.0870	0.0000	0.0450	0.0840	0.1310
H15	Enjoyment -> Perceived usefulness	0.2170	0.4640	0.0000	0.0000	-0.2470	0.0000
H16	Enjoyment -> Perceived ease of use	0.5010	0.5290	0.0000	0.0000	-0.0280	0.6490
H17	Self-efficacy -> Perceived usefulness	0.0630	0.1070	0.0490	0.0110	-0.0450	0.4020

H18	Self-efficacy -> Perceived ease of use	0.1720	0.1730	0.0000	0.0010	-0.0010	0.9950
H19	Perceived ease of use -> Perceived usefulness	0.5640	0.3320	0.0000	0.0000	0.2320	0.0010
H20	Perceived ease of use -> Attitude	0.4760	0.3620	0.0000	0.0000	0.1130	0.1400
H21	Perceived usefulness -> Attitude	0.2980	0.4510	0.0000	0.0000	-0.1540	0.0490
H22	Perceived usefulness -> Intention to use	0.5420	0.5380	0.0000	0.0000	0.0040	0.9570
H23	Attitude -> Intention to use	0.2700	0.2640	0.0000	0.0000	0.0060	0.9210
H24	Intention to use -> Actual use	0.5970	0.5830	0.0000	0.0000	0.0140	0.7770

## 5. Discussion

Consistent with prior studies ([Racero et al., 2020](#); [Rizun and Strzelecki, 2020](#); [Sukendro et al., 2020b](#); [Zardari et al., 2021](#)), the extended TAM used in this study was successful in explaining the distance learning process of adoption, as seen by Indonesian sports science students. The specific major, sport science, involved in this study helps us focus on a certain field of study. Other researchers can conduct studies in other areas or all fields regarding the implementation of technology into teaching. Based on the findings, the scale can be studied and adopted in the future by other academics interested in performing studies in the relevant field, especially during pandemics like Covid-19. The instrument contributes significantly to the advancement of academic approaches for structural equation research. The model is reported to be valid and reliable based on the content validity and measurement model processes. From the descriptive statical findings, it could be discussed that the students of the current study have a low perception (means below three or disagree) on enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use regarding distance learning due to the COVID-19. From the results, only items from three variables, namely experience, enjoyment, and actual use, gained mean values of slightly above 3. The previous study also reported these low and medium means of items ([Rizun and Strzelecki, 2020](#)); the location of the study was categorized as a developing country, similar to this study setting.

Through bootstrapping process with 5,000 sub-samples, the findings revealed that all hypotheses were supported for the non-original TAM variables; however, one correlation between experience and perceived usefulness was insignificant. The insignificant relationship might appear because the sports science students involved in this study perceived the first experience of attending online learning due to pandemics like COVID-19. In other words, they have no experience in doing online learning before. This research took place during the COVID-19 epidemic, which has affected every country on the planet and has left no country unaffected. All educational stakeholders, including sports science students, should adjust to the new reality and condition as fast as possible. The survey could be a reference to the respondents' perception regarding teaching and learning processes during the COVID-19 distance learning phase, during which they were all required to switch from face-to-face to online instruction ([Rizun and Strzelecki, 2020](#))(~~[Rizun and Strzelecki, 2020](#)~~). In addition, the experience was reported to significantly perceived ease of use. Enjoyment is significantly related to perceived usefulness and perceived ease of use. Besides, self-efficacy was a significant predictor of perceived usefulness and perceived ease of use, similar to previous studies ([Mutambara and Bayaga, 2021](#); [Rizun and Strzelecki, 2020](#); [Sukendro et al., 2020b](#); [Zardari et al., 2021](#)).

For TAM, all exogenous variables were significantly related to the endogenous variables. Perceived ease of use was a significant predictor of perceived usefulness and attitude, and perceived usefulness gained significant relationships with attitude and intention to use. Besides, the attitude was reported to be significant in predicting intention to use. Finally, the relationship between intention to use and actual use was informed to be the strongest. The significance revealed by this study could be a guide for all Indonesian stakeholders to face challenges during future pandemics, especially for sports science students. The introduction to distance learning should be supported by appropriate policies in improving perceived usefulness, perceived ease of use, attitude, and intention to use distance learning technology ([Sukendro et al., 2020b](#); [Zardari et al., 2021](#)). The proper and appropriate infrastructure, training, seminar, curriculum, and quality tutors should support the system. Specific sports-based instructional activities should always be improved during distance learning (Sukendro et al., 2020b). The study results can be justified to confirm the first research questions in which most relationships are supported based on the analysis of the data. The proper and appropriate infrastructure, training, seminar, curriculum, and

quality tutors should support the system. Specific sports-based instructional activities should always be improved during distance learning (Sukendro *et al.*, 2020b).

Besides the structural model, the current study also investigated the role of geographical areas in moderating the relationships of all paths. The effects of the endogenous constructs on the exogenous constructs are not significantly moderated by the geographical areas of the sports science students involved in this study. Only three relationships are significantly different; enjoyment -> perceived usefulness, perceived ease of use -> perceived usefulness; and perceived usefulness -> attitude. The equality of students' perception could trigger the dominance of the insignificances, knowledge, skills, and information regarding the use of technology in education (Habibi *et al.*, 2021; Yang and Hsieh, 2013). More studies should be conducted regarding demographic information towards technology integration, especially during pandemics like COVID-19. Even though most paths are not significantly different, respondents living in urban areas have higher perceptions of all items and constructs than those who live in rural areas. ~~The findings might refer to the slight differences in internet access infrastructure, where most rural areas have lower connection speed than urban areas~~ [NO PRINTED FORM]: The computation of MGA in the smartPLS 3.3. revealed that most paths have no differences regarding geographical areas; only a few significant differences are reported to confirm the second research question. The findings might refer to the slight differences in internet access infrastructure, where most rural areas have lower connection speed than urban areas

## 6. Conclusions

The current study took place during the COVID-19 pandemic, which has left no country unaffected. Most HEIs should focus on distance learning as an effort to replace face-to-face instruction. This scheduling allowed students to provide the most up-to-date feedback on the approaches and devices utilized within the distance learning and explore their emotions while they were still experiencing the situation. The study is based on a survey of sports science students, who were asked how they felt about distance learning during COVID-19. The survey provided an opportunity to examine students' attitudes about distance learning and, in particular, the instruments used by HEIs in the process. If the COVID-19 scenario requires HEIs to continue operating online, this research will significantly contribute to policymaking.

~~Nonetheless, some limitations emerged regarding the findings of from the study. The specific sample of the study is one of the limitations; thus, respondents from across fields of study should be considered. The current study do not provide other types of demographic information except the area of the respondents, therefore, Comparative studies-analyses on other demographic information like genders and years in university are also recommended to understand COVID-19's influence on HEIs better. The article includes a quick analysis of the condition of Indonesian HEIs distance learning due to COVID-19. The article does not provide a complete picture of what is happening in higher education. However, we believe that sharing experience is vital in the current circumstances and that each HEI contributes significantly to the worldwide fight with similar situations in the future. It is also suggested to undertake further in-depth analysis on the experiences of educational institutions, analyzing more examples and using different methods such as observation, interview, and experimentation for future research.~~

**Funding:** This research was co-funded by Universitas Negeri Makassar, LPDP Indonesia, and Research and Innovation Management Centre (RIMC) of Universiti Utara Malaysia.

**Institutional Review Board Statement:** The study was conducted according to the guidelines of Declaration of Helsinki, and approved by *Lembaga Pengabdian dan Penelitian*, Universitas Negeri Makassar on July 7 2021

**Informed Consent Statement:** Informed consent was obtained from all respondents involved in the study.

**Data Availability Statement:** Data is available upon request through contact with the corresponding author.

**Acknowledgments:** We thank all support from all related Indonesia HEIs involved in this study. We also address our gratitude to all respondents of the study.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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Editor and Reviewer comments:

Editor's Comments:

1- assign a section to discuss the study research method in details, what, and why this research method, discuss the benefits and negatives

Response

We extended the methods section

*"Research Method*

This research was conducted using an online survey from March 2021 to June 2021 in five Indonesian HEIs, after the Indonesian government announced school closures on May 20, 2020. Surveys offer a high level of general capabilities when it comes to representing a wide group of people. Because of the large number of people that respond to surveys, the information acquired provides a more accurate picture of the broader population's relative qualities. Aside from low-cost research, surveys can be sent to participants in a variety of ways, including e-mail, print, and the internet. Due to the survey method's high representativeness, finding statistically significant results is often easier than with other data collection methods. As a result, the data gathered may be measured with better precision (Evans and Mathur, 2005). However, there are a few survey flaws that can be problematic. The survey cannot be altered at any point throughout the data collection procedure. Participants may not be able to give precise answers to controversies-related questions due to the difficulties of recalling relevant facts. Before the primary data collection, a survey instrument was developed and validated to assess variables that predict the usage of e-learning by Indonesian sport science students during Covid-19. The model measurement and evaluation were carried out using SmartPLS 3.3, through PLS-SEM procedures (Yusop *et al.*, 2021)".

2- rewrite the research question 2 once again, by using What or How, as the current answer of question 2 is Yes or No

Response

We revised and changed the research question

How are all paths in the structural model different based on respondents' geographical areas?

3- justify if the research questions are answered or not

Response

We made the justifications for the research questions

The significance revealed by this study could be a guide for all Indonesian stakeholders to face challenges during future pandemics, especially for sports science students. The introduction to distance learning should be supported by appropriate policies in improving perceived usefulness, perceived ease of use, attitude, and intention to use distance learning technology (Sukendro *et al.*, 2020b; Zardari *et al.*, 2021). (Sukendro *et al.*, 2020b). The study results can be justified to confirm the first research questions in which most relationships are supported based on the analysis of the data. The proper and appropriate infrastructure, training, seminar, curriculum, and quality tutors should support the system. Specific sports-based instructional activities should always be improved during distance learning (Sukendro *et al.*, 2020b).

The computation of MGA in the smartPLS 3.3. revealed that most paths have no differences regarding geographical areas; only a few significant differences are reported to confirm the second research question. The findings might refer to the slight differences in internet access infrastructure, where most rural areas have lower connection speed than urban areas

4- discuss the research limitations and future research

Response

We discussed limitations and future research in the conclusion part of the study.

“Nonetheless, some limitations emerged from the study. The specific sample of the study is one of the limitations; thus, respondents from across fields of study should be considered. The current study do not provide other types of demographic information except the area of the respondents, therefore, comparative analyses on other demographic information like genders and years in university are also recommended to understand COVID-19’s influence on HEIs. The article includes a quick analysis of the condition of Indonesian HEIs distance learning due to COVID-19. The article does not provide a complete picture of what is happening in higher education. However, we believe that sharing experience is vital in the current circumstances and that each HEI contributes significantly to the worldwide fight with similar situations in the future. It is also suggested to undertake further in-depth analysis on the experiences of educational institutions, analyzing more examples and using different methods such as observation, interview, and experimentation for future research”

Editor and Reviewer comments:

Editor's Comments:

- 1- assign a section to discuss the study research method in details, what, and why this research method, discuss the benefits and negatives
- 2- rewrite the research question 2 once again, by using What or How, as the current answer of question 2 is Yes or No
- 3- justify if the research questions are answered or not
- 4- discuss the research limitations and future research

Reviewer #2: I thoroughly reviewed the revised version and found that reviewer's suggestions has been addressed satisfactory. I would like to recommend this work for publication now and accept it.

Editor and Reviewer comments:

1) Please remove "Institutional Review Board Statement" and "Informed Consent Statement" from the end of the manuscript and integrate these information in method section as "Ethical Statement" and delete the ethical statement in supplementary material.

"Institutional Review Board Statement" and "Informed Consent Statement" were removed

2) Please remove "Funding" and "Conflicts of Interest" from the end of the manuscript as these information will be handled separately.

"Funding" and "Conflicts of Interest" were removed

3) Please provide a title and legend at the end of your manuscript for the questionnaire. Please also ensure that these are labelled as the file is referenced in-text.

We store the data on Mendeley's website

The complete instrument and raw data of the current study are accessible on <https://data.mendeley.com/v1/datasets/publish-confirmation/r8dj8hcgjf/1>.

4) The level of English throughout your manuscript does not meet the journal's required standard and it will need to be improved before submitting a revised manuscript. For help with English language usage and quality, we strongly recommend that you either consult with a colleague whose native language is English or use a professional language editing service. For more information on Elsevier's language editing services, please visit our Customer Services site (<http://webshop.elsevier.com/languageservices/>).

We were helped by a native speaker in improving the language.

# Students' acceptance to distance learning during Covid-19: The role of geographical areas among Indonesian sports science students

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**Abstract:** This study was conducted to investigate the perspectives of sports science students on factors affecting distance learning in the setting of Indonesian higher education institutions (HEIs). This study proposed an extended technology acceptance model (TAM) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual use. An online survey was used to collect data from 1291 respondents. The structural model was examined through the partial least squares structural equation modeling (PLS-SEM). The multi-group analysis (MGA) was conducted to understand the role of geographical areas in moderating all hypothetical relationships. The findings show that the respondents were not excited about online learning due to weak means (below 3) for most items of five variables; enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use. All relationships were supported except the relationship between experience and perceived usefulness. The strongest significant relationship emerged between intention to use and actual use. Meanwhile, the least significant relationship was found between self-efficacy and perceived usefulness. Three out of 12 hypotheses were confirmed regarding the differences of geographical areas (rural and urban) regarding all relationship paths. The findings add to a deeper understanding of the acceptability of distance learning during pandemics like COVID-19.

**Keywords:** Sports science students; distance learning; higher education; COVID-19; pandemic.

## 1. Introduction

The world health organization (WHO) declared COVID-19 as a global pandemic in March 2020. The last report on June 23, 2021 (the writing of this manuscript) showed that the overall number of cases exceeded 177 million globally. Mortality remained high, with over 9000 deaths recorded each day; however, all areas except two (Eastern Mediterranean and Africa) reported decreased new deaths. Compared to the previous week of May 2021, the global number of cases and fatalities dropped by 6% and 12%, respectively, with slightly more than 2.5 million cases and over 64,000 deaths (WHO, 2021). In education, one of the efforts to decrease the pandemic spread was to close schools at all levels. The distance learning policy was issued with the help of the available technologies in facilitating teaching and learning activities, replacing face-to-face instruction.

Educational Researchers worldwide have already conducted extensive studies on the global pandemic in education (Abbas *et al.*, 2021; Andersson and Grönlund, 2009; Watermeyer *et al.*, 2021). In Indonesia, like in other countries, COVID-19 also has had a significant impacts on education. Higher education institutions (HEIs) have maximized their efforts to substitute face-to-face traditional learning with distance learning (Watermeyer *et al.*, 2021). Courses, persons, and technology were all challenges in

distance education; ~~t~~ These issues affect both developed and developing countries; ~~but~~. Access to technology is more pronounced in developing countries (Andersson and Grönlund, 2009). To go deeper into the challenges of distance learning during the pandemic, academics are recommended to understand factors affecting the acceptance as a new pedagogical approach (Rizun and Strzelecki, 2020), especially in a specific study context and among ~~is new pedagogical approach (Rizun and Strzelecki, 2020), especially in a specific study context and among~~ others particular objects. Therefore, this study aims to disclose factors affecting distance learning in the context of Indonesian HEIs; it is conducted to understand the perceptions of sports science students. Besides, differences were also elaborated regarding all paths in the structural model based on respondents' geographical areas (urban and rural). Two research questions were established regarding the aims of the study:

1. What factors affecting distance learning among Indonesian sports science students during COVID-19?
2. How are all paths in the structural model different based on respondents' geographical areas?

## 2. Review of Literature

### 2.1. Distance learning during COVID-19 pandemic

Distance learning has been around for a long time in higher education. ~~When there is a physical distance between students and their instructors, the situation refers to learning mediated through technology equipment.~~ Distance learning is far from a new phenomenon. Tracing its history, it began in the early 18th century as a correspondence study to allow learners outside of the city to continue their education without having to be on-site. Since then, it has progressed and grown in popularity, especially with the ~~rapid~~ quick expansion of technological innovation (Kentnor, 2015). Other modules in distance education, such as blended learning (or hybrid learning), have also emerged, defining a combination of face-to-face and technology-mediated instructions that provides a resilient and accessible learning experience. In the current condition, many educational institutions have been forced to adopt distance learning to keep up with the ~~present~~ current pandemic, the COVID-19 (Alqurshi, 2020; Kawaguchi-Suzuki *et al.*, 2020).

~~Nations~~ are ~~were~~ forced to implement preventive measures ~~to stem the~~ of the spread of COVID-19 ~~spread~~, including suspending schools' face-to-face learning. Specifically, HEIs ~~quickly~~ responded to this massive transition by launching distance learning, utilizing existing learning support systems like social media and learning management systems (Aristovnik *et al.*, 2020; Coman *et al.*, 2020). Although this shift ~~offerse~~ cont continuity to the learning process, it also exacerbates ~~educational gaps among students, particularly those who reside in rural regions or low-income areas and~~ in rural regions or low-income areas with a lack of fundamental basic information and technology skills. Such qualities ~~might be ay~~ make it more challenging to access ~~contemporary~~ of technological resources needed to support the distance learning trend. Considering that the current scenario may endure longer, a long-term move to online learning is suggested. The condition requires HEIs to prepare and equip themselves with the instruments needed to facilitate the acceptance of such a trend, especially among users (Shawaqfeh *et al.*, 2020). ~~Therefore~~, this study explores factors affecting students' acceptance of distance learning and whether or not the paths differ based on geographical areas, rural and urban.

### 2.2. Teaching methods in Indonesian HEIs during the COVID-19

Due to the COVID-19 pandemic, many schools and colleges around the world have been closed. Many universities in Indonesia also carry out similar policies, for example, the Universitas Indonesia, Universitas Gajah Madha, and Universitas Negeri Makassar. This policy ~~that~~ whose aims is none other than to prevent the spread of COVID-19 infection; is in line aligns with WHO's call that all elements of society need to ~~prevent~~ stop and minimize the impact of the disease. This policy encourages HEIs to conduct distance learning methods. Guided by the ministry of education and culture, Indonesian HEIs use various tools in delivering their teaching and learning process during the closure. Social media like Facebook, Youtube, and WhatsApp are integrated during instructional activities (Chan *et al.*, 2020; Sobaih *et al.*, 2020). Learning management systems, such as Edmodo, Moodle, Atutor, and Olat, have also been options for lecturers in teaching their students (Cavus *et al.*, 2021; Raza *et al.*, 2021). Some universities have established ~~build~~ their own learning management

systems LMS facilities to facilitate the teaching (Universitas Indonesia with EMAS, Universitas Gajah Madha with eLisa, and Universitas Negeri Makassar with SYAM OK UNM). However, most HEIs lecturers rely on video conferencing applications to meet the needs of virtual meetings conducted mainly through two tools; Zoom and Google meet (Yudha *et al.*, 2021).

### 2.3. Proposed model

This study applied an extended technology acceptance model (TAM) from Davis (1989) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual use. Geographical area was also included to understand differences regarding demographic information between the paths. For the structural model and difference tests, twelve hypotheses were included, respectively; ~~similarly, twelve hypotheses were also proposed to test of differences.~~ We discussed the proposed model with two statisticians and one educational expert; the model in Figure 1 is elaborated in detail.

### 2.4. TAM variables: perceived ease of use, perceived usefulness, attitude, intention to use, and actual use

In the field of social science, TAM is a common modelly ~~adapted-adopted model~~ by many educational researchers. The model states that people's feelings about behavioral intention toward adopting a system, which in this study is in the setting of distance learning, is predicted by their perceived usefulness and perceived ease of use (Davis, 1989). TAM's original premise is that perceived ease of use is claimed to predict perceived usefulness. Furthermore, the system's attitudes and perceived usefulness impact behavioral intention (the degree to which people perform or do not perform for a given future activity). Finally, behavioral intention predicts the actual use of a system (Davis, 1989). Besides the original constructs, some external factors were ~~reported to be associated with the first TAM constructs~~ (Rejón-Guardia *et al.*, 2020; Venkatesh *et al.*, 2003).

One of the most significant components in TAM is the perceived usefulness. Perceived usefulness is defined as the degree to which system users feel that the system will increase their performance (Davis, 1989); in this study, we determined the system as distance learning. Further, users' attitude toward ~~and intention to use a system is influenced by their perceived usefulness (Davis, 1989).~~ ~~Perceived~~ The perceived usefulness of a system is also expected to influence the user's decision to accept or reject it. The degree to which a person believes that using any system is straightforward and friendly is described as perceived ease of use (Iqbal and Bhatti, 2017). From the TAM concept, perceived ease of use is one of the drivers that can affect perceived usefulness and attitude toward a system. Users are more willing to adopt a new approach if they believe it is simple to use (Mukminin *et al.*, 2020).

Attitude is defined as users' certain behavior linked with the use of a system (Davis, 1989). In the original TAM model, attitude is hypothesized to influence intention to use. Further, intention to use in this study is described as students' desire to utilize technologies for the distance learning setting; the intention is expected to significantly influence actual use (Zardari *et al.*, 2021). The final part of the TAM is the actual use, or the act of applying a system, which expresses the reality of users to utilize or not to utilize technology. In this study, the actual use is the implementation of technology for distance learning (Davis, 1989). In the proposed model of this study, actual use has no impact on the other components since it is the final stage of the ~~technological~~ technology acceptance model.

Table 1. Some recent TAM-related studies in the educational context

No	Sources	Method	Results
1	(Scherer <i>et al.</i> , 2019)	Meta-analysis	TAM explained technology acceptance <del>properly</del> <u>adequately</u> ; yet, the role of certain key constructs and the importance of external variables contrasted some existing beliefs about the TAM.
2	(Mutambar a and Bayaga, 2021)	A survey involved 550 high school students, and the data were analyzed using PLS-SEM.	The original TAM variables (perceived attitude, perceived usefulness, and perceived ease of use) had direct correlations with behavioral intention and played mediating roles between the external variables and behavioral intention



3	(Baber, 2021)	The study was conducted on the 375 students in universities of South Korea during Covid-19.	The results suggested that all factors in TAM positively influenced the behavioral intention to use and accept the e-learning system by the learners during this pandemic.
4	(Rizun and Strzelecki, 2020)	PLS-SEM was employed to test the proposed research model. The survey gathered data from 1692 Polish students.	The strongest exogenous variable of student's acceptance of education shift to distance learning was enjoyment. Perceived ease of use and perceived usefulness were also reported to be significant in affecting attitude towards and intention to use
5	(Hanham <i>et al.</i> , 2021)	An online survey was completed by 365 undergraduate students from a university in Sydney, Australia. Confirmatory factor analysis, SEM, and MGA analyses were used to analyze the data.	Facilitating conditions were positively associated with the perceived usefulness, which was positively associated with academic self-efficacy. Surprisingly, perceived ease of use did not have a statistically significant association with perceived usefulness. Academic self-efficacy was positively related to academic achievement.
6	(Racero <i>et al.</i> , 2020)	The suggested structural model was tested using Lisrel software with a total of 352 valid replies.	The results confirmed the positive influence of the intrinsic motivations, autonomy, and relatedness, to improve perceptions regarding the usefulness and ease of use of open-source software, and; therefore, on behavioral intention to use the software.
7	(Zardari <i>et al.</i> , 2021)	The information was gathered from 650 university students. After data filtering, structural equation modeling was used to evaluate 513 valid replies.	Satisfaction, perceived ease of use, perceived usefulness, information quality, self-efficacy, social influence, and benefits were reported to be significant in predicting behavioral intention regarding e-learning portal acceptance. Perceived ease of use significantly predicted perceived usefulness and pleasure. The appeal had a significant effect on pleasure and satisfaction. Enjoyment is significantly correlated with satisfaction
8	(Sukendro <i>et al.</i> , 2020)	The research was conducted through a survey of 974 students analyzed with PLS-SEM of expanded TAM with enabling conditions as the external component.	The findings of Significant relationships between facilitating condition and perceived ease of use and between facilitating condition and perceived usefulness were reported, and t. The significant relationships among core components of TAM were found except for one, the relationship between perceived usefulness and attitude.

## 2.2. External variables; Experience, enjoyment, and self-efficacy

This study suggested extended factors such as enjoyment, self-efficacy, and experience to predict perceived ease of use and usefulness (Rizun and Strzelecki, 2020). In this study, experience is defined as the amount and type of technical abilities for distance learning that a person has acquired through time (Abdullah and Ward, 2016). One of the most significant external variables is experience. Individuals with more advanced technological abilities are more likely to be enthusiastic about using any online/distance learning instrument (Rizun and Strzelecki, 2020). ~~In this study, we expect that~~ This study expects the experience of distance learning ~~distance learning experience~~ during COVID-19 influences perceived ease of use and ~~perceived~~ usefulness.

Furthermore, enjoyment or pleasure is defined to be the degree to which the action of implementing any system is seen to become pleasurable, independent of the results. A pleasant system seems to be viewed as simple to use and beneficial in which users' desire can increase. Many studies have shown that users' perceptions of ease of use are influenced by how much fun they have when using a system. In addition, researchers have discovered a substantial positive relationship between enjoyment and perceived usefulness, which boosts students' actual use (Rizun and Strzelecki, 2020). Self-efficacy in this study is described as the confidence to complete a task using technology for distance learning during COVID-19. Students with stronger e-learning self-efficacy are more inclined to employ e-learning and computer-supported education. Self-efficacy is thought to impact perceived ease of use and perceived usefulness. All hypotheses included in this study are performed in Figure 1, and prior

studies related to TAM application in recent years within the educational environment are shown in Table 1.

## 2.2. Geographical areas in moderating hypothetical relationships

In addition to the structural assessment, geographical areas (rural and urban) were included to understand how all hypothetical relationships are different. Prior studies have focused on the differences in technology integration based on demographic information (Aslan and Zhu, 2017; Habibi *et al.*, 2021; Ramírez-Correa *et al.*, 2015; Ullah *et al.*, 2021; Yang and Hsieh, 2013). For example, genders were significantly different regarding multimedia utilization for learning (Ramírez-Correa *et al.*, 2015). Based on the geographical areas, rural and urban, learning behavioral patterns and access to technology were revealed to be significantly different (Habibi *et al.*, 2021; Yang and Hsieh, 2013). Therefore, besides hypotheses for the structural model, twelve hypotheses (H13-H24) were included regarding the differences between geographical areas concerning regarding all paths (Fig.1), for example, there is a significant difference regarding the relationship between experience and perceived usefulness based on respondents' geographical areas (H13), and there is a significant difference regarding the relationship between intention to use and actual use based on respondents' geographical areas (H24)

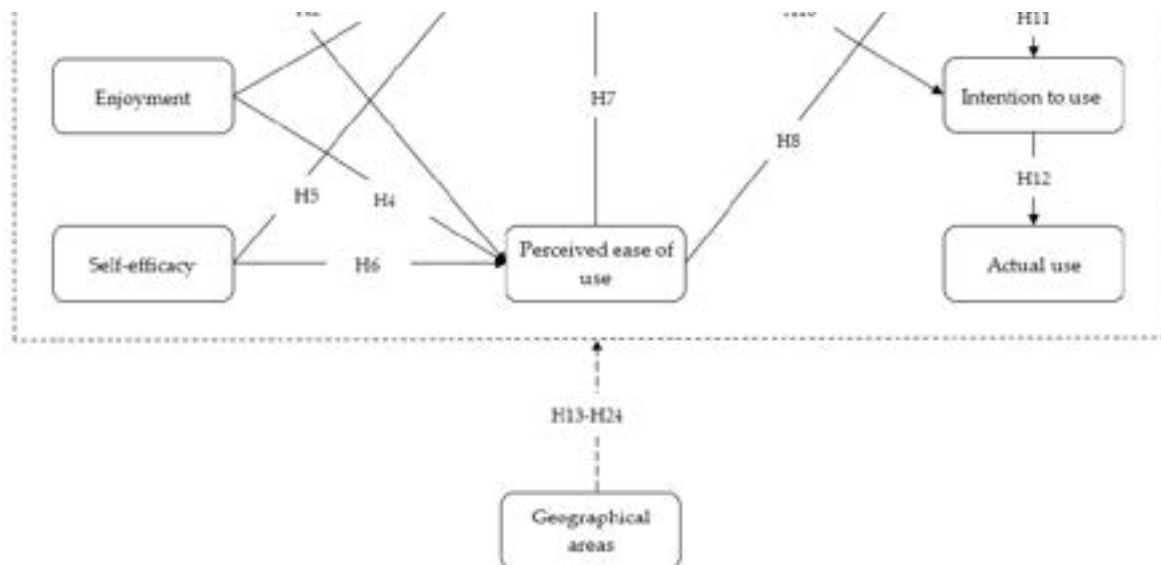


Figure 1. A proposed model-

## 3. Materials and Methods

### 3.1. Research Method

This research was conducted using an online survey from March 2021 to June 2021 in five Indonesian HEIs, after the Indonesian government announced school closures on May 20, 2020. Surveys offer a high level of general capabilities when it comes to representing a wide-broad group of people. Because of the large number of people that respond to surveys, the information acquired provides a more accurate picture of the broader population's relative qualities. Aside from low-cost research, surveys can be sent to participants in a variety of various ways, including e-mail, print, and the internet. Due to the survey method's high representativeness, finding statistically significant results are often easier than with other data collection methods. As a result, the data gathered may be measured with better precision (Evans and Mathur, 2005). However, there are a few survey weaknesses that can be

problematic. The survey cannot be altered at any point throughout the data collection procedure. Participants may not be able to give precise answers to controversies-related questions due to the difficulties of recalling relevant facts. Before the primary data collection, the survey instrument was developed and validated to assess variables that predict the distance learning by Indonesian sports science students during Covid-19. The model measurement and evaluation were carried out using SmartPLS 3.3; through PLS-SEM procedures (Mukminin *et al.*, 2020; Yusop *et al.*, 2021).

### 3.2. Instrumentation

Review of literature can help researchers in defining and analyzing ideas and concepts related to the theoretical research framework and instrumentation. The instrument is designed to meet the research goals (Habibi *et al.*, 2020). This study used an adapted survey to assess the elements that influence students' acceptance of distance learning (Rizun and Strzelecki, 2020; Sabah, 2016; Venkatesh *et al.*, 2003, 2008). The new instrument for the current study was produced based on the adaptation process; the indicators differed and were developed to meet COVID-19 and distance learning settings. Twenty-nine indicators were modified for the instrument during the initial set-up procedures. The indicators were addressed with three educational technology specialists from Malaysia and Indonesia via video conferences as part of the content validity process to ensure that the instrument was appropriate for the context and setting (Halek *et al.*, 2017). Ten indicators were updated after the video call meetings. In contrast, three others were deleted as suggested by the experts. The complete instrument and raw data of the current study are accessible on <https://data.mendeley.com/v1/datasets/publish-confirmation/r8dj8hcgjf/1>.

### 3.3. Population, Sample, and Data Collection

The population of the current study covers all sports science students in Indonesian HEIs. Sports science students were selected as the survey respondents since not many studies were conducted within the area. Meanwhile, the target population of the study includes sports science students in four Indonesian cities. We distributed the survey through Google Forms with a random sampling technique to collect data for the study analysis. The questionnaire (n. 26) was piloted on a small group of students to examine reliability; the Cronbach alpha test was conducted. All variables were reliable, with alphas values of  $> .70$ . The final set of questions was improved after the pilot study, and the questionnaire was disseminated. The survey was distributed on June 1, 2021, and was open until June 15, 2021; the majority of answers, though, came in the first week. Active students from three institutions were asked to take part in the study via an electronic invitation. The survey received 1472 responses; 1291 data were measurable. One hundred and eighty-one responses were dropped because missing values appeared or the same answers for every question were identified. Nine hundred and ninety-four are male students; meanwhile, 296 female respondents are females. Eight hundred respondents are from rural areas, and 489 are from urban areas.

### 3.4. Data Analysis

Three phases are involved in evaluating PLS-SEM findings. The first phase is a review of the measurement model. This is an essential component of the evaluation since it ensures that the measurement quality is maintained. The measurement model was **done to examine the reliability and validity of the variables. There are four assessments for the measurement models; we assessed and reported the computation of reflective indicator loadings, internal consistency reliability, convergent validity, and discriminant validity**. Secondly, the examination of the structural model was carried out after the measurement model process. The structural model examines the structural theory, which entails considering the given hypotheses and addressing the connections among the latent variables (Hair *et al.*, 2019). To assess the structural model, some

measures were reported, namely **Coefficient of determination ( $R^2$ )**, effect sizes ( $f^2$ ), predictive relevance ( $Q^2$ ), model fit, and statistical significances. Finally, multi-group analysis (MGA) was done to understand the moderating roles of geographical areas, urban and rural, to determine the difference between all paths of the structural model (Carranza *et al.*, 2020; Matthews, 2017).

## 4. Results

### 4.1. Preliminary Findings

The percentage of missing data in the present study ranged from 0% to .5 percent for each item. The missing data was utterly random (MCAR) (Kline, 2005). Table 1 displays the means, standard deviations, correlation matrices, skewness, and kurtosis for all variables; univariate normality was found for experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual usage (skewness and kurtosis values in the range of the cut-off values). The Likert scale went from 1 to 5, with 5 being the highest score. Most items achieved means of below three: enjoyment, perceived ease of use, usefulness, attitude, and intention to use. The findings show that users were not excited; these feelings suggest that distance learning could have a lesser potential than face-to-face learning.

### 4.2. Measurement Model

The examination of the measurement model in this study includes reflective metrics. We began by looking at the indicator loadings. Loadings greater than .50 show that the construct accounts for more than half of the variation in the indicator (Noor *et al.*, 2019). The internal consistency dependability of the constructions was tested. Better numbers imply higher levels of dependability for the composite reliability criteria. Reliability ratings of .70 to .95 are considered “acceptable to good” (Hair *et al.*, 2019). Internal consistency dependability is measured using Cronbach’s alpha, which assumes the same criteria. Reliability ratings of .70 to .95 are considered appropriate (Shmueli *et al.*, 2019). The convergent validity, or the amount to which a construct converges in its indicators by explaining the variance of the items, was then computed. The items’ average variance extracted (AVE) linked with a specific construct is used to measure convergent validity. The AVE must be .500 or greater to be considered acceptable (Ogbeibu *et al.*, 2021), accounting for (more than) 50% of the variation in its components on average. Discriminant validity is the final stage (Palos-Sanchez *et al.*, 2019) that demonstrates how empirically different a concept is from others. In PLS-SEM, discriminant validity is determined by examining heterotrait–monotrait ratio of correlations. If the route model includes variables defined as conceptually and extremely similar, a value of .900 is proposed as a threshold. In PLS-SEM, the heterotrait–monotrait ratio criterion is a novel requirement for assessing discriminant validity that outperforms the Fornell–Larcker criterion and cross-loading assessments (Hair *et al.*, 2019). Table 2 and 3 inform the results of the measurement model; all computations were reported to meet the criteria in the examination.

Table 2. Normality, descriptive statistics, and measurement model criteria.

Construct	Items	Mean	SD	Kurt.	Skew.	Mark	Load	$\alpha$	rho_A	CR	AVE
Perceived usefulness	PU1	2.5630	1.2910	-.8110	.4240		.9150	.8960	.8970	.9350	.8280
	PU2	2.5480	1.2540	-.7240	.4430		.9260				
	PU3	2.6070	1.2310	-.7420	.3720	Drop ped, CR <.9500					
	PU4	2.7750	1.2840	-.9300	.2390		.8890				
Perceived ease of use	PEOU 1	3.0300	1.2860	-.9920	-.0020		.8210	.8900	.8940	.9240	.7520
	PEOU 2	2.6890	1.2330	-.7850	.2930		.8890				
	PEOU 3	2.5770	1.1970	-.6250	.4080		.8810				

	PEOU4	2.8200	1.2470	-.8520	.1920		.8760					
	ATU1	2.7520	1.2850	-.9650	-.1670	Drop ped, low load						
Attitude	ATU2	3.2830	1.1560	-.6170	-.1650		.8330	.7200	.7940	.8730	.7760	
	ATU3	2.8610	1.1850	-.7080	.1080		.9260					
	ATU4	2.7040	1.3270	-	-.2230	Drop ped, low load						
				1.0180								
Intention to use	ITU1	2.6050	1.2730	-.8670	.3060		.9030	.9090	.9100	.9430	.8460	
	ITU2	2.4950	1.2030	-.6630	.4060		.9300					
	ITU3	2.5390	1.2220	-.7150	.3910		.9260					
Actual use	AU1	3.0810	1.2430	-.8340	-.0730		1.0000	1.0000	1.0000	1.0000	1.0000	
Experience	EXP1	3.3990	1.2330	-.7870	-.2810		.7890	.8590	.8870	.9030	.7000	
	EXP2	3.6540	1.2200	-.6230	-.5400		.8060					
	EXP3	3.3780	1.2170	-.7950	-.2520		.8880					
	EXP4	3.1390	1.2330	-.8420	-.0640		.8600					
Enjoyment	EJ1	2.6940	1.2300	-.7550	.2630		.9490	.9410	.9420	.9620	.8950	
	EJ2	2.8060	1.2210	-.7620	.2070		.9430					
	EJ3	2.7000	1.2350	-.7690	.2530		.9470					
Self- efficacy	SE1	3.0910	1.1630	-.5850	-.0040		.8950	.8870	.8880	.9300	.8160	
	SE2	3.0990	1.1520	-.5390	.0100		.9130					
	SE3	3.0550	1.1340	-.4590	.0040		.9010					

Table 3. Heterotrait–monotrait ratio for discriminant validity (< .900) (Hair *et al.*, 2019)

	Actual use	Attitude	Enjoyment	Experience	Intention to use	Perceived ease of use	Perceived usefulness
Attitude	.6180						
Enjoyment	.5940	.7770					
Experience	.4700	.6700	.6660				
Intention to use	.6220	.7570	.8180	.5430			
Perceived ease of use	.5820	.8530	.7730	.6190	.7590		
Perceived usefulness	.5340	.8190	.7630	.5540	.8010	.8300	
Self-efficacy	.5260	.7260	.6920	.6100	.6380	.6440	.6180

#### 4.3. Structural Model

Researchers (Henseler *et al.*, 2014; Ringle *et al.*, 2020) recommend looking at measures like  $R^2$ ,  $f^2$ ,  $Q^2$ , model fit, and statistical significances to assess the structural model. We followed (Hair *et al.*, 2019) recommendation regarding  $R^2$  values; the values of .670, .330, and .190, respectively, indicate strong, moderate, and weak. The  $f^2$  values of .020, .150, and .350, according to (Ringle *et al.*, 2020), suggest small, medium, and large effects, respectively. Furthermore, for a given endogenous component,  $Q^2$  values larger than zero indicate a reasonable degree of prediction accuracy (Hair *et al.*, 2014; Ringle *et al.*, 2020). Based on the recommended assessment standards, the  $Q^2$  findings indicate sufficient prediction accuracy for exogenous variables (Hair *et al.*, 2014; Ringle *et al.*, 2020). According to Henseler (Henseler *et al.*, 2016), the SRMR is the only approximate model fit criteria for evaluating PLS modeling, consistent with prior research (Sarstedt *et al.*, 2016). The bootstrap-based test was also used to calculate values for the discrepancy measures, which include the squared euclidean distance (d\_ULS) and the geodesic distance (d\_G) (Henseler *et al.*, 2016). Table 3 compares the values of the

SRMR, d\_ULS, and d\_G discrepancy measures; SRMR below .08 shows a valid and reliable model. To test for statistical significance, Hair et al. (2019) recommend a minimum t value of 1.65 at  $p < .05$ . The structural model was estimated using the consistent PLS bootstrapping option with 5,000 subsamples in this investigation (Lowry and Gaskin, 2014). All hypotheses were supported but H1 (the relationship between experience and perceived usefulness,  $t = .1900$ ;  $p = .8500$ ). The strongest correlation emerged between intention to use and actual use, supporting the last hypothesis (H12) with a t value of 26.6890. In contrast, the lowest correlation was reported between self-efficacy and perceived usefulness with a t value of 3.050.

Table 4. The results of the structural model,  $f^2$ , SRMR, d\_ULS, and d\_G (Henseler *et al.*, 2014; Ringle *et al.*, 2020).

H	Path	$\beta$	t values	p values	Sig	$f^2$	Items	Value
H1	Experience -> Perceived usefulness	.0050	.1900	.8500	No	.0000	SRMR	.053
H2	Experience -> Perceived ease of use	.1440	5.0700	.0000	Yes	.0260	d <sub>U</sub> LS	.762
H3	Enjoyment -> Perceived usefulness	.3110	9.2350	.0000	Yes	.0970	d <sub>G</sub>	.334
H4	Enjoyment -> Perceived ease of use	.5110	16.8430	.0000	Yes	.2800		
H5	Self-efficacy -> Perceived usefulness	.0800	3.0500	.0020	Yes	.0090		
H6	Self-efficacy -> Perceived ease of use	.1710	6.0150	.0000	Yes	.0360		
H7	Perceived ease of use -> Perceived usefulness	.4750	13.4150	.0000	Yes	.2720		
H8	Perceived ease of use -> Attitude	.4280	11.5280	.0000	Yes	.1790		
H9	Perceived usefulness -> Attitude	.3620	9.9690	.0000	Yes	.1280		
H10	Perceived usefulness -> Intention to use	.5410	18.6240	.0000	Yes	.3590		
H11	Attitude -> Intention to use	.2670	8.8150	.0000	Yes	.0870		
H12	Intention to use -> Actual use	.5930	26.6890	.0000	Yes	.5410		

Table 5. The results of  $R^2$  and  $Q^2$ .

Path	$R^2$	$Q^2$
Received usefulness	.618	.508
Perceived ease of use	.540	.402
Attitudes	.544	.408
Intention to use	.561	.471
Actual use	.351	.349

#### 4.3. MGA results

As previously informed, eight hundred respondents of this study lived in rural areas; while, 489 stayed in urban areas. The moderating roles of geographical areas, urban and rural, were examined through MGA computation for H13 to ,H14, H15, H16, H17, H18, H19, H20, H21, H22, H23, and H24. The MGA results revealed that respondents' geographical areas do not significantly moderate the impact of most predictors on their exogenous constructs; thus, the results show that the MGA process rejects nine hypotheses out (H13, H14, H16, and H17, H18, H20, H22, H23, H24) of twelve hypotheses. For example, the p-value of the difference regarding the relationship between experience and perceived usefulness was insignificant ( $\beta = 0.227$ ;  $p = 0.0840$ ) that rejects H13. Another example is the difference regarding the path coefficient between intention to use and actual use that was also insignificant ( $\beta = 0.0140$ ;  $p = .7770$ ), rejecting hypothesis 24. Three hypotheses were reported to be accepted: H15, H19, and H21. Geographical areas, urban and rural, were significantly different regarding the relationships between enjoyment and perceived usefulness ( $\beta = 10.2470$ ;  $p < .001$ ), supporting H15. Similarly, the path differences between perceived ease of use and perceived



usefulness ( $\beta = 0.2320$ ;  $p < .01$ ) and between perceived usefulness and attitude ( $\beta = -0.1540$ ;  $p < .05$ ) were also reported to be significant. All information about the detail of the computational results on the MGA approach is informed in Table 6.

Table 6. MGA results regarding all paths based on respondents' geographical areas, rural and urban.

H	Path	$\beta$ rural	$\beta$ urban	p value rural	p value urban	$\beta$ rural-urban	p value rural-urban
H13	Experience -> Perceived usefulness	0.0360	-0.0480	0.2240	0.2330	0.0840	0.0940
H14	Experience -> Perceived ease of use	0.1710	0.0870	0.0000	0.0450	0.0840	0.1310
H15	Enjoyment -> Perceived usefulness	0.2170	0.4640	0.0000	0.0000	-0.2470	0.0000
H16	Enjoyment -> Perceived ease of use	0.5010	0.5290	0.0000	0.0000	-0.0280	0.6490
H17	Self-efficacy -> Perceived usefulness	0.0630	0.1070	0.0490	0.0110	-0.0450	0.4020
H18	Self-efficacy -> Perceived ease of use	0.1720	0.1730	0.0000	0.0010	-0.0010	0.9950
H19	Perceived ease of use -> Perceived usefulness	0.5640	0.3320	0.0000	0.0000	0.2320	0.0010
H20	Perceived ease of use -> Attitude	0.4760	0.3620	0.0000	0.0000	0.1130	0.1400
H21	Perceived usefulness -> Attitude	0.2980	0.4510	0.0000	0.0000	-0.1540	0.0490
H22	Perceived usefulness -> Intention to use	0.5420	0.5380	0.0000	0.0000	0.0040	0.9570
H23	Attitude -> Intention to use	0.2700	0.2640	0.0000	0.0000	0.0060	0.9210
H24	Intention to use -> Actual use	0.5970	0.5830	0.0000	0.0000	0.0140	0.7770

## 5. Discussion

Consistent with prior studies (Racero *et al.*, 2020; Rizun and Strzelecki, 2020; Zardari *et al.*, 2021), the extended TAM used in this study was successful in explaining the distance learning process of adoption, as seen by Indonesian sports science students. The specific major, sports science, involved in this study helps us focus on a certain field of study. Other researchers can conduct studies in other areas or all fields regarding the implementation of technology into teaching. Based on the findings, the scale can be studied and adopted in the future by other academics interested in performing studies in the relevant field, especially during pandemics like Covid-19. The instrument contributes significantly to the advancement of academic approaches for structural equation research. The model is reported to be valid and reliable based on the content validity and measurement model processes. From the descriptive statical findings, it could be discussed that the students of the current study have a low perception (means below three or disagree) on enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use regarding distance learning due to the COVID-19. From the results, only items from three variables, namely experience, enjoyment, and actual use, gained mean values of slightly above 3. The previous study also reported these low and medium means of items (Rizun and Strzelecki, 2020); the location of the study was categorized as a developing country, similar to this study setting.

Through bootstrapping process with 5,000 sub-samples, the findings revealed that all hypotheses were supported for the non-original TAM variables; however, one correlation between experience and perceived usefulness was insignificant. The insignificant relationship might appear because the sports science students involved in this study perceived the first experience of attending online learning due to pandemics like COVID-19. In other words, they have no experience in doing online learning before. This research took place during the COVID-19 epidemic, which has affected every country on the planet and has left no country unaffected. All educational stakeholders, including sports science students, should adjust to the new reality and condition as fast as possible. The survey could be a reference to refer to the respondents' perception regarding teaching and learning processes during the COVID-19 distance learning phase, during which they were all required to switch from face-to-face to online instruction (Rizun and Strzelecki, 2020). In addition, the experience was reported to significantly perceived ease of use. Enjoyment is significantly related to perceived usefulness and perceived ease of use. Besides, self-efficacy was a significant predictor of perceived usefulness and

perceived ease of use, similar to previous studies (Mutambara and Bayaga, 2021; Rizun and Strzelecki, 2020; Sukendro *et al.*, 2020; Zardari *et al.*, 2021).

For TAM, all exogenous variables were significantly related to the endogenous variables. Perceived ease of use was a significant predictor of perceived usefulness and attitude, and perceived usefulness gained significant relationships with attitude and intention to use. Besides, the attitude was reported to be significant in predicting intention to use. Finally, the relationship between intention to use and actual use was informed to be the strongest. The significance revealed by this study could be a guide for all Indonesian stakeholders to face challenges during future pandemics, especially for sports science students. The introduction to distance learning should be supported by appropriate policies in improving perceived usefulness, perceived ease of use, attitude, and intention to use distance learning technology (Sukendro *et al.*, 2020; Zardari *et al.*, 2021). (Sukendro *et al.*, 2020b) The study results can be justified to confirm the first research questions in which most relationships are supported based on the analysis of the data data analysis. The proper and appropriate infrastructure, training, seminar, curriculum, and quality tutors should support the system. Specific sports-based instructional activities should always be improved during distance learning (Sukendro *et al.*, 2020).

Besides the structural model, the current study also investigated the role of geographical areas in moderating the relationships of all paths. The effects of the endogenous constructs on the exogenous constructs are not significantly moderated by the geographical areas of the sports science students involved in this study. Only three relationships are significantly different; enjoyment -> perceived usefulness, perceived ease of use -> perceived usefulness; and perceived usefulness -> attitude. The equality of students' perception could trigger the dominance of the insignificances, knowledge, skills, and information regarding the use of technology in education (Habibi *et al.*, 2021; Yang and Hsieh, 2013). More studies should be conducted regarding demographic information towards technology integration, especially during pandemics like COVID-19. Even though most paths are not significantly different, respondents living in urban areas have higher perceptions of all items and constructs than those who live in rural areas. [NO-PRINTED-FORM] The computation of MGA in the smartPLS 3.3. revealed that most paths have no differences regarding geographical areas; only a few significant differences are reported to confirm the second research question. The findings might refer to the slight differences in internet access infrastructure, where most rural areas have lower connection speeds than urban areas

## 6. Conclusions

The current study took place during the COVID-19 pandemic, which has left no country unaffected. Most HEIs should focus on distance learning as an effort to replace face-to-face instruction. This scheduling allowed students to provide the most up-to-date feedback on the approaches and devices utilized within the distance learning and explore their emotions while they were still experiencing the situation. The study is based on a survey of sports science students; who were asked how they felt about distance learning during COVID-19. The survey provided an opportunity to examine students' attitudes about distance learning and, in particular, the instruments used by HEIs in the process. If the COVID-19 scenario requires HEIs to continue operating online, this research will significantly contribute to policymaking.

Nonetheless, some limitations emerged from the study. The specific sample of the study is one of the limitations; thus, respondents from across fields of study should be considered. The current study does not provide other types of demographic information except the area of the respondents. Therefore, comparative analyses on other demographic information like genders and years in university are also recommended to understand COVID-19's influence on HEIs. The article includes a quick analysis of the condition of Indonesian HEIs distance learning due to COVID-19. The article does not provide a complete picture of what is happening in higher education. However, we believe that sharing experience is vital in the current circumstances and that each HEI contributes significantly to the worldwide fight with similar situations in the future. It is also suggested to undertake further in-depth analysis on the experiences of educational institutions, analyzing more examples and using different methods such as observation, interview, and experimentation for future research.



**Data Availability Statement:** Data is available upon request through contact with the corresponding author on <https://data.mendeley.com/v1/datasets/publish-confirmation/r8dj8hcgjf/1>.

**Acknowledgments:** We thank all support from all related Indonesia HEIs involved in this study. We also address our gratitude to all respondents of the [study survey](#).

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# Students' acceptance to distance learning during Covid-19: The role of geographical areas among Indonesian sports science students

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**Abstract:** This study was conducted to investigate the perspectives of sports science students on factors affecting distance learning in the setting of Indonesian higher education institutions (HEIs). This study proposed an extended technology acceptance model (TAM) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual use. An online survey was used to collect data from 1291 respondents. The structural model was examined through the partial least square structural equation modeling (PLS-SEM). The multi-group analysis (MGA) was conducted to understand the role of geographical areas in moderating all hypothetical relationships. The findings show that the respondents were not excited about online learning due to weak means (below 3) for most items of five variables; enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use. All relationships were supported except the relationship between experience and perceived usefulness. The strongest significant relationship emerged between intention to use and actual use. Meanwhile, the least significant relationship was found between self-efficacy and perceived usefulness. Three out of 12 hypotheses were confirmed regarding the differences of geographical areas (rural and urban) regarding all relationship paths. The findings add to a deeper understanding of the acceptability of distance learning during pandemics like COVID-19.

**Keywords:** Sports science students; distance learning; higher education; COVID-19; pandemic.

## 1. Introduction

The world health organization (WHO) declared COVID-19 as a global pandemic in March 2020. The last report on June 23, 2021 (the writing of this manuscript) showed that the overall number of cases exceeded 177 million globally. Mortality remained high, with over 9000 deaths recorded each day; however, all areas except two (Eastern Mediterranean and Africa) reported decreased new deaths. Compared to the previous week of May 2021, the global number of cases and fatalities dropped by 6% and 12%, respectively, with slightly more than 2.5 million cases and over 64,000 deaths (WHO, 2021). In education, one of the efforts to decrease the pandemic spread was to close schools at all levels. The distance learning policy was issued with the help of the available technologies in facilitating teaching and learning activities, replacing face-to-face instruction.

Educational researchers have already conducted extensive studies on the global pandemic (Abbas *et al.*, 2021; Andersson and Grönlund, 2009; Watermeyer *et al.*, 2021). In Indonesia, like in other countries, COVID-19 also has significant impacts on education. Higher education institutions (HEIs) have maximized their efforts to substitute face-to-face learning with distance learning (Watermeyer *et al.*, 2021). Courses, persons, and technology were all challenges in distance education; these issues affect both



developed and developing countries. Access to technology is more pronounced in developing countries (Andersson and Grönlund, 2009). To go deeper into the challenges of distance learning during the pandemic, academics are recommended to understand factors affecting this new pedagogical approach (Rizun and Strzelecki, 2020), especially in a specific study context and among others particular objects. Therefore, this study aims to disclose factors affecting distance learning in the context of Indonesian HEIs; it is conducted to understand the perceptions of sports science students. Besides, differences were also elaborated regarding all paths in the structural model based on respondents' geographical areas (urban and rural). Two research questions were established regarding the aims of the study:

1. What factors affecting distance learning among Indonesian sports science students during COVID-19[
2. How are all paths in the structural model different based on respondents' geographical areas[

## 2. Review of Literature

### 2.1. Distance learning during COVID-19 pandemic

Distance learning has been around for a long time in higher education. Distance learning is far from a new phenomenon. Tracing its history, it began in the early 18th century as a correspondence study to allow learners outside of the city to continue their education without having to be on-site. Since then, it has progressed and grown in popularity, especially with the rapid expansion of technological innovation (Kentnor, 2015). Other modules in distance education, such as blended learning (or hybrid learning), have also emerged, defining a combination of face-to-face and technology-mediated instructions that provides a resilient and accessible learning experience. In the current condition, many educational institutions have been forced to adopt distance learning to keep up with the current pandemic, the COVID-19 (Alqurshi, 2020; Kawaguchi-Suzuki *et al.*, 2020). Nations are forced to implement preventive measures of the COVID-19 spread, including suspending face-to-face learning. Specifically, HEIs responded to this massive transition by launching distance learning, utilizing existing learning support systems like social media and learning management systems (Aristovnik *et al.*, 2020; Coman *et al.*, 2020). Although this shift offers continuity to the learning process, it also exacerbates educational gaps among students, particularly those in rural regions or low-income areas with a lack of basic information and technology skills. Such qualities might be challenging to access of technological resources needed to support the distance learning trend. Considering that the current scenario may endure longer, a long-term move to online learning is suggested. The condition requires HEIs to prepare and equip themselves with the instruments needed to facilitate acceptance, especially among users (Shawaqfeh *et al.*, 2020). Therefore, this study explores factors affecting students' acceptance of distance learning and whether or not the paths differ based on geographical areas, rural and urban.

### 2.2. Teaching methods in Indonesian HEIs during the COVID-19

Due to the COVID-19 pandemic, many schools and colleges around the world have been closed. Many universities in Indonesia also carry out similar policies, for example, the Universitas Indonesia, Universitas Gajah Madha, and Universitas Negeri Makassar. This policy that aims to prevent the spread of COVID-19 infection aligns with WHO's call that all elements of society need to stop and minimize the impact of the disease. This policy encourages HEIs to conduct distance learning methods. Guided by the ministry of education and culture, Indonesian HEIs use various tools in delivering their teaching and learning process during the closure. Social media like Facebook, YouTube, and WhatsApp are integrated during instructional activities (Chan *et al.*, 2020; Sobaih *et al.*, 2020). Learning management systems, such as Edmodo, Moodle, Atutor, and Olat, have also been options for lecturers in teaching their students (Cavus *et al.*, 2021; Raza *et al.*, 2021). Some universities have established their learning management systems facilities to facilitate the teaching (Universitas Indonesia with EMAS, Universitas Gajah Madha with eLisa, and Universitas Negeri Makassar with S] AM OK UNM). However, most HEIs lecturers rely on video conferencing applications to meet the needs of virtual meetings conducted mainly through two tools; Zoom and Google meet (J udha *et al.*, 2021).

### 2.3. Proposed model

This study applied an extended technology acceptance model (TAM) from Davis (1989) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude,

intention to use, and actual use. Geographical area was also included to understand differences regarding demographic information between the paths. For the structural model and difference tests, twelve hypotheses were included, respectively. We discussed the proposed model with two statisticians and one educational expert; the model in Figure 1 is elaborated in detail.

#### 2.4. TAM variables: perceived ease of use, perceived usefulness, attitude, intention to use, and actual use

In the field of social science, TAM is a common model adopted by many educational researchers. The model states that people's feelings about behavioral intention toward adopting a system, which in this study is in the setting of distance learning, is predicted by their perceived usefulness and perceived ease of use (Davis, 1989). TAM's original premise is that perceived ease of use is claimed to predict perceived usefulness. Furthermore, the system's attitudes and perceived usefulness impact behavioral intention (the degree to which people perform or do not perform for a given future activity). Finally, behavioral intention predicts the actual use of a system (Davis, 1989). Besides the original constructs, some external factors were associated with the first TAM constructs (Rejón-Guardia *et al.*, 2020; Venkatesh *et al.*, 2003).

One of the most significant components in TAM is the perceived usefulness. Perceived usefulness is defined as the degree to which system users feel that the system will increase their performance (Davis, 1989); in this study, we determined the system as distance learning. Further, users' attitude and intention to use a system is influenced by their perceived usefulness (Davis, 1989). The perceived usefulness of a system is also expected to influence the user's decision to accept or reject it. The degree to which a person believes that using any system is straightforward and friendly is described as perceived ease of use (Iqbal and Bhatti, 2017). From the TAM concept, perceived ease of use is one of the drivers that can affect perceived usefulness and attitude toward a system. Users are more willing to adopt a new approach if they believe it is simple to use (Mukminin *et al.*, 2020).

Attitude is defined as users' certain behavior linked with the use of a system (Davis, 1989). In the original TAM model, attitude is hypothesized to influence intention to use. Further, intention to use in this study is described as students' desire to utilize technologies for the distance learning setting; the intention is expected to significantly influence actual use (Irdari *et al.*, 2021). The final part of the TAM is the actual use, or the act of applying a system, which expresses the reality of users to utilize or not to utilize technology. In this study, the actual use is the implementation of technology for distance learning (Davis, 1989). In the proposed model of this study, actual use has no impact on the other components since it is the final stage of the technology acceptance model.

Table 1. Some recent TAM-related studies in the educational context

No	Sources	Method	Results
1	(Scherer <i>et al.</i> , 2019)	Meta-analysis	TAM explained technology acceptance adequately; yet, the role of certain key constructs and the importance of external variables contrasted some existing beliefs about the TAM.
2	(Mutambar a and Bayaga, 2021)	A survey involved 550 high school students, and the data were analyzed using PLS-SEM.	The original TAM variables (perceived attitude, perceived usefulness, and perceived ease of use) had direct correlations with behavioral intention and played mediating roles between the external variables and behavioral intention
3	(Baber, 2021)	The study was conducted on the 375 students in universities of South Korea during Covid-19.	The results suggested that all factors in TAM positively influenced the behavioral intention to use and accept the e-learning system by the learners during this pandemic.
4	(Rizun and Strzelecki, 2020)	PLS-SEM was employed to test the proposed research model. The survey gathered data from 1692 Polish students.	The strongest exogenous variable of student's acceptance of education shift to distance learning was enjoyment. Perceived ease of use and perceived usefulness were also reported to be significant in affecting attitude towards and intention to use
5	(Hanham <i>et al.</i> , 2021)	An online survey was completed by 365 undergraduate students from a university in Sydney,	Facilitating conditions were positively associated with the perceived usefulness, which was positively associated with academic self-efficacy. Surprisingly, perceived ease of use did not have a statistically significant association with

		Australia. Confirmatory factor analysis, SEM, and MGA analyses were used to analyze the data.	perceived usefulness. Academic self-efficacy was positively related to academic achievement.
6	(Racero <i>et al.</i> , 2020)	The suggested structural model was tested using Lisrel software with a total of 352 valid replies.	The results confirmed the positive influence of the intrinsic motivations, autonomy, and relatedness, to improve perceptions regarding the usefulness and ease of use of open-source software, and; therefore, on behavioral intention to use the software.
7	(/ardari <i>et al.</i> , 2021)	The information was gathered from 650 university students. After data filtering, structural equation modeling was used to evaluate 513 valid replies.	Satisfaction, perceived ease of use, perceived usefulness, information quality, self-efficacy, social influence, and benefits were reported to be significant in predicting behavioral intention regarding e-learning portal acceptance. Perceived ease of use significantly predicted perceived usefulness and pleasure. The appeal had a significant effect on pleasure and satisfaction. Enjoyment is significantly correlated with satisfaction
8	(Sukendro <i>et al.</i> , 2020)	The research was conducted through a survey of 974 students analyzed with PLS-SEM of expanded TAM with enabling conditions as the external component.	Significant relationships between facilitating condition and perceived ease of use and between facilitating condition and perceived usefulness were reported. The significant relationships among core components of TAM were found except for one, the relationship between perceived usefulness and attitude.

## 2.2. External variables; Experience, enjoyment, and self-efficacy

This study suggested extended factors such as enjoyment, self-efficacy, and experience to predict perceived ease of use and usefulness (Rizun and Strzelecki, 2020). In this study, experience is defined as the amount and type of technical abilities for distance learning that a person has acquired through time (Abdullah and Ward, 2016). One of the most significant external variables is experience. Individuals with more advanced technological abilities are more likely to be enthusiastic about using any online/distance learning instrument (Rizun and Strzelecki, 2020). This study expects the distance learning experience during COVID-19 influences perceived ease of use and usefulness.

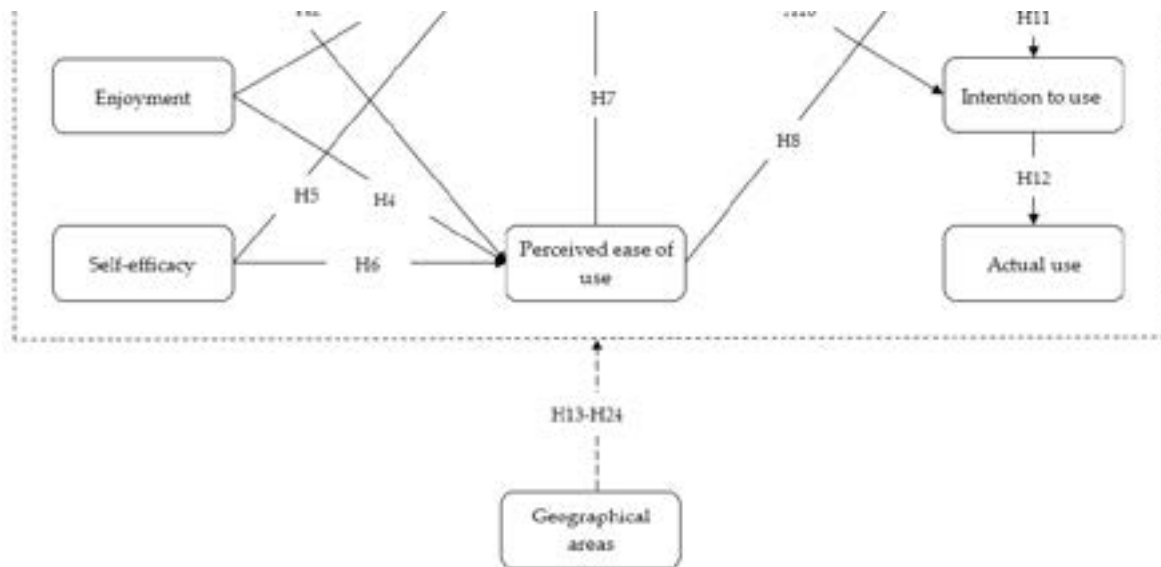
Furthermore, enjoyment or pleasure is defined to be the degree to which the action of implementing any system is seen to become pleasurable, independent of the results. A pleasant system seems to be viewed as simple to use and beneficial in which users' desire can increase. Many studies have shown that users' perceptions of ease of use are influenced by how much fun they have when using a system. In addition, researchers have discovered a substantial positive relationship between enjoyment and perceived usefulness, which boosts students' actual use (Rizun and Strzelecki, 2020). Self-efficacy in this study is described as the confidence to complete a task using technology for distance learning during COVID-19. Students with stronger e-learning self-efficacy are more inclined to employ e-learning and computer-supported education. Self-efficacy is thought to impact perceived ease of use and perceived usefulness. All hypotheses included in this study are performed in Figure 1, and prior studies related to TAM application in recent years within the educational environment are shown in Table 1.

## 2.2. Geographical areas in moderating hypothetical relationships

In addition to the structural assessment, geographical areas (rural and urban) were included to understand how all hypothetical relationships are different. Prior studies have focused on the differences in technology integration based on demographic information (Aslan and /hu, 2017; Habibi *et al.*, 2021; Ramírez-Correa *et al.*, 2015; Ullah *et al.*, 2021; ]ang and Hsieh, 2013). For example, genders were significantly different regarding multimedia utilization for learning (Ramírez-Correa *et al.*, 2015). Based on the geographical areas, rural and urban, learning behavioral patterns and access to technology were revealed to be significantly different (Habibi *et al.*, 2021; ]ang and Hsieh, 2013). Therefore, besides hypotheses for the structural model, twelve hypotheses (H13-H24) were included regarding the differences between geographical areas regarding all paths (Fig.1), for example, there is a significant difference regarding the relationship between experience and perceived usefulness based on respondents'



geographical areas (H13), and there is a significant difference regarding the relationship between intention to use and actual use based on respondents' geographical areas (H24)



**Figure 1.** A proposed model

### 3. Materials and Methods

#### 3.1. Research Method

This research was conducted using an online survey from March 2021 to June 2021 in five Indonesian HEIs, after the Indonesian government announced school closures on May 20, 2020. Surveys offer a high level of general capabilities when it comes to representing a broad group of people. Because of the large number of people that respond to surveys, the information acquired provides a more accurate picture of the broader population's relative qualities. Aside from low-cost research, surveys can be sent to participants in various ways, including e-mail, print, and the internet. Due to the survey method's high representativeness, statistically significant results are often easier than other data collection methods. As a result, the data gathered may be measured with better precision (Evans and Mathur, 2005). However, there are a few survey weaknesses that can be problematic. The survey cannot be altered at any point throughout the data collection procedure. Participants may not be able to give precise answers to controversies-related questions due to difficulties recalling relevant facts. Before the primary data collection, the survey instrument was developed and validated to assess variables that predict the distance learning by Indonesian sports science students during Covid-19. The model measurement and evaluation were carried out using SmartPLS 3.3 through PLS-SEM procedures (Mukminin *et al.*, 2020; ] usop *et al.*, 2021).

#### 3.2. Instrumentation

Review of literature can help researchers in defining and analyzing ideas and concepts related to the theoretical research framework and instrumentation. The instrument is designed to meet the research goals (Habibi *et al.*, 2020). This study used an adapted survey to assess the elements that influence students' acceptance of distance learning (Rizun and Strzelecki, 2020; Sabah, 2016; Venkatesh *et al.*, 2003,

2008). The new instrument for the current study was produced based on the adaptation process; the indicators differed and were developed to meet COVID-19 and distance learning settings. Twenty-nine indicators were modified for the instrument during the initial set-up procedures. The indicators were addressed with three educational technology specialists from Malaysia and Indonesia via video conferences as part of the content validity process to ensure that the instrument was appropriate for the context and setting (Halek *et al.*, 2017). Ten indicators were updated after the video call meetings. In contrast, three others were deleted as suggested by the experts. The complete instrument and raw data of the current study are accessible on <https://data.mendeley.com/v1/datasets/publish-confirmation/r8dj8hcgjf/1>.

### 3.3. Population, Sample, and Data Collection

The population of the current study covers all sports science students in Indonesian HEIs. Sports science students were selected as the survey respondents since not many studies were conducted within the area. The target population includes sports science students in four Indonesian cities. We distributed the survey through Google Forms with a random sampling technique to collect data for the analysis. The questionnaire (n. 26) was piloted on a small group of students to examine reliability; the Cronbach alpha test was conducted. All variables were reliable, with alphas values of  $> .70$ . The final set of questions was improved after the pilot study, and the questionnaire was disseminated. The survey was distributed on June 1, 2021, and was open until June 15, 2021; the majority of answers came in the first week. Active students from three institutions were asked to take part in the study via an electronic invitation. The survey received 1472 responses; 1291 data were measurable. One hundred and eighty-one responses were dropped because missing values appeared or the same answers for every question were identified. Nine hundred and ninety-four are male students; meanwhile, 296 female respondents are females. Eight hundred respondents are from rural areas, and 489 are from urban areas. The study and data collection were conducted according to the guidelines of Declaration of Helsinki, and approved by *Lembaga Pengabdian dan Penelitian*, Universitas Negeri Makassar on July 7 2021

### 3.4. Data Analysis

Three phases are involved in evaluating PLS-SEM findings. The first phase is a review of the measurement model. This is an essential component of the evaluation since it ensures that the measurement quality is maintained. The measurement model was done to examine the reliability and validity of the variables. There are four assessments for the measurement models; we assessed and reported the computation of reflective indicator loadings, internal consistency reliability, convergent validity, and discriminant validity). Secondly, the examination of the structural model was carried out after the measurement model process. The structural model examines the structural theory, which entails considering the given hypotheses and addressing the connections among the latent variables (Hair *et al.*, 2019). To assess the structural model, some measures were reported, namely Coefficient of determination ( $R^2$ ), effect sizes ( $f^2$ ), predictive relevance ( $Q^2$ ), model fit, and statistical significances. Finally, multi-group analysis (MGA) was done to understand the moderating roles of geographical areas, urban and rural, to determine the difference between all paths of the structural model (Carranza *et al.*, 2020; Matthews, 2017).

## 4. Results

### 4.1. Preliminary Findings

The percentage of missing data in the present study ranged from 0% to .5 percent for each item. The missing data was utterly random (MCAR) (Kline, 2005). Table 1 displays the means, standard deviations, correlation matrices, skewness, and kurtosis for all variables; univariate normality was found for experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual usage (skewness and kurtosis values in the range of the cut-off values). The Likert scale went

from 1 to 5, with 5 being the highest score. Most items achieved means of below three: enjoyment, perceived ease of use, usefulness, attitude, and intention to use. The findings show that users were not excited; these feelings suggest that distance learning could have a lesser potential than face-to-face learning.

#### 4.2. Measurement Model

The examination of the measurement model in this study includes reflective metrics. We began by looking at the indicator loadings. Loadings greater than .50 show that the construct accounts for more than half of the variation in the indicator (Noor et al., 2019). The internal consistency dependability of the constructions was tested. Better numbers imply higher levels of dependability for the composite reliability criteria. Reliability ratings of .70 to .95 are considered “acceptable to good” (Hair et al., 2019). Internal consistency dependability is measured using Cronbach’s alpha, which assumes the same criteria. Reliability ratings of .70 to .95 are considered appropriate (Shmueli et al., 2019). The convergent validity, or the amount to which a construct converges in its indicators by explaining the variance of the items, was then computed. The items’ average variance extracted (AVE) linked with a specific construct is used to measure convergent validity. The AVE must be .500 or greater to be considered acceptable (Ogbeibu et al., 2021), accounting for (more than) 50% of the variation in its components on average. Discriminant validity is the final stage (Palos-Sanchez et al., 2019) that demonstrates how empirically different a concept is from others. In PLS-SEM, discriminant validity is determined by examining heterotrait-monotrait ratio of correlations. If the route model includes variables defined as conceptually and extremely similar, a value of .900 is proposed as a threshold. In PLS-SEM, the heterotrait-monotrait ratio criterion is a novel requirement for assessing discriminant validity that outperforms the Fornell-Larcker criterion and cross-loading assessments (Hair et al., 2019). Table 2 and 3 inform the results of the measurement model; all computations were reported to meet the criteria in the examination.

**Table 2.** Normality, descriptive statistics, and measurement model criteria.

Construct	Items	Mean	SD	Kurt.	Skew.	Mark	Load	$\alpha$	rho_A	CR	AVE
Perceived usefulness	PU1	2.5630	1.2910	-.8110	.4240		.9150	.8960	.8970	.9350	.8280
	PU2	2.5480	1.2540	-.7240	.4430		.9260				
	PU3	2.6070	1.2310	-.7420	.3720	Dropped					
	PU4	2.7750	1.2840	-.9300	.2390	CR < .9500	.8890				
Perceived ease of use	PEOU1	3.0300	1.2860	-.9920	-.0020		.8210	.8900	.8940	.9240	.7520
	PEOU2	2.6890	1.2330	-.7850	.2930		.8890				
	PEOU3	2.5770	1.1970	-.6250	.4080		.8810				
	PEOU4	2.8200	1.2470	-.8520	.1920		.8760				
	ATU1	2.7520	1.2850	-.9650	-.1670	Dropped					
Attitude	ATU2	3.2830	1.1560	-.6170	-.1650		.8330	.7200	.7940	.8730	.7760
	ATU3	2.8610	1.1850	-.7080	.1080		.9260				
	ATU4	2.7040	1.3270	-1.0180	-.2230	Dropped					
Intention to use	ITU1	2.6050	1.2730	-.8670	.3060		.9030	.9090	.9100	.9430	.8460
	ITU2	2.4950	1.2030	-.6630	.4060		.9300				

	ITU3	2.5390	1.2220	-.7150	.3910	.9260				
Actual use	AU1	3.0810	1.2430	-.8340	-.0730	1.0000	1.0000	1.0000	1.0000	1.0000
Experience	EXP1	3.3990	1.2330	-.7870	-.2810	.7890	.8590	.8870	.9030	.7000
	EXP2	3.6540	1.2200	-.6230	-.5400	.8060				
	EXP3	3.3780	1.2170	-.7950	-.2520	.8880				
	EXP4	3.1390	1.2330	-.8420	-.0640	.8600				
Enjoyment	EJ1	2.6940	1.2300	-.7550	.2630	.9490	.9410	.9420	.9620	.8950
	EJ2	2.8060	1.2210	-.7620	.2070	.9430				
	EJ3	2.7000	1.2350	-.7690	.2530	.9470				
Self-efficacy	SE1	3.0910	1.1630	-.5850	-.0040	.8950	.8870	.8880	.9300	.8160
	SE2	3.0990	1.1520	-.5390	.0100	.9130				
	SE3	3.0550	1.1340	-.4590	.0040	.9010				

**Table 3.** Heterotrait–monotrait ratio for discriminant validity (< .900) (Hair *et al.*, 2019)

	Actual use	Attitude	Enjoyment	Experience	Intention to use	Perceived ease of use	Perceived usefulness
Attitude	.6180						
Enjoyment	.5940	.7770					
Experience	.4700	.6700	.6660				
Intention to use	.6220	.7570	.8180	.5430			
Perceived ease of use	.5820	.8530	.7730	.6190	.7590		
Perceived usefulness	.5340	.8190	.7630	.5540	.8010	.8300	
Self-efficacy	.5260	.7260	.6920	.6100	.6380	.6440	.6180

#### 4.3. Structural Model

Researchers (Henseler *et al.*, 2014; Ringle *et al.*, 2020) recommend looking at measures like  $R^2$ ,  $f^2$ ,  $Q^2$ , model fit, and statistical significances to assess the structural model. We followed (Hair *et al.*, 2019) recommendation regarding  $R^2$  values; the values of .670, .330, and .190, respectively, indicate strong, moderate, and weak. The  $f^2$  values of .020, .150, and .350, according to (Ringle *et al.*, 2020), suggest small, medium, and large effects, respectively. Furthermore, for a given endogenous component,  $Q^2$  values larger than zero indicate a reasonable degree of prediction accuracy (Hair *et al.*, 2014; Ringle *et al.*, 2020). Based on the recommended assessment standards, the  $Q^2$  findings indicate sufficient prediction accuracy for exogenous variables (Hair *et al.*, 2014; Ringle *et al.*, 2020). According to Henseler (Henseler *et al.*, 2016), the SRMR is the only approximate model fit criteria for evaluating PLS modeling, consistent with prior research (Sarstedt *et al.*, 2016). The bootstrap-based test was also used to calculate values for the discrepancy measures, which include the squared euclidean distance (d\_ULS) and the geodesic distance (d\_G) (Henseler *et al.*, 2016). Table 3 compares the values of the SRMR, d\_ULS, and d\_G discrepancy measures; SRMR below .08 shows a valid and reliable model. To test for statistical significance, Hair *et al.* (2019) recommend a minimum t value of 1.65 at  $p < .05$ . The structural model was estimated using the consistent PLS bootstrapping option with 5,000 subsamples in this investigation (Lowry and Gaskin, 2014). All hypotheses were supported but H1 (the relationship between experience and perceived usefulness,  $t = .1900$ ;  $p = .8500$ ). The strongest correlation emerged between intention to use and actual use, supporting the last hypothesis (H12) with a t value of 26.6890. In contrast, the lowest correlation was reported between self-efficacy and perceived usefulness with a t value of 3.050.

**Table 4.** The results of the structural model,  $f^2$ , SRMR, d\_ULS, and d\_G (Henseler *et al.*, 2014; Ringle *et al.*, 2020).

H	Path	$\beta$	t values	p values	Sig	$f^2$	Items	Value
H1	Experience -> Perceived usefulness	.0050	.1900	.8500	No	.0000	SRMR	.053
H2	Experience -> Perceived ease of use	.1440	5.0700	.0000	] es	.0260	d_ULS	.762
H3	Enjoyment -> Perceived usefulness	.3110	9.2350	.0000	] es	.0970	d_G	.334

H4	Enjoyment -> Perceived ease of use	.5110	16.8430	.0000	] es	.2800
H5	Self-efficacy -> Perceived usefulness	.0800	3.0500	.0020	] es	.0090
H6	Self-efficacy -> Perceived ease of use	.1710	6.0150	.0000	] es	.0360
H7	Perceived ease of use -> Perceived usefulness	.4750	13.4150	.0000	] es	.2720
H8	Perceived ease of use -> Attitude	.4280	11.5280	.0000	] es	.1790
H9	Perceived usefulness -> Attitude	.3620	9.9690	.0000	] es	.1280
H10	Perceived usefulness -> Intention to use	.5410	18.6240	.0000	] es	.3590
H11	Attitude -> Intention to use	.2670	8.8150	.0000	] es	.0870
H12	Intention to use -> Actual use	.5930	26.6890	.0000	] es	.5410

**Table 5.** The results of R<sup>2</sup> and Q<sup>2</sup>.

Path	R <sup>2</sup>	Q <sup>2</sup>
Received usefulness	.618	.508
Perceived ease of use	.540	.402
Attitudes	.544	.408
Intention to use	.561	.471
Actual use	.351	.349

#### 4.3. MGA results

As previously informed, eight hundred respondents of this study lived in rural areas; while, 489 stayed in urban areas. The moderating roles of geographical areas, urban and rural, were examined through MGA computation for H13 to H24. The MGA results revealed that respondents' geographical areas do not significantly moderate the impact of most predictors on their exogenous constructs; thus, the results show that the MGA process rejects nine hypotheses out (H13, H14, H16, and H17, H18, H20, H22, H23, H24) of twelve hypotheses. For example, the p-value of the difference regarding the relationship between experience and perceived usefulness was insignificant ( $\beta = 0.227$ ;  $p = 0.0840$ ) that rejects H13. Another example is the difference regarding the path coefficient between intention to use and actual use that was also insignificant ( $\beta = 0.0140$ ;  $p = .7770$ ), rejecting hypothesis 24. Three hypotheses were reported to be accepted: H15, H19, and H21. Geographical areas, urban and rural, were significantly different regarding the relationships between enjoyment and perceived usefulness ( $\beta = 10.2470$ ;  $p < .001$ ), supporting H15. Similarly, the path differences between perceived ease of use and perceived usefulness ( $\beta = 0.2320$ ;  $p < .01$ ) and between perceived usefulness and attitude ( $\beta = -0.1540$ ;  $p < .05$ ) were also reported to be significant. All information about the detail of the computational results on the MGA approach is informed in Table 6.

**Table 6.** MGA results regarding all paths based on respondents' geographical areas, rural and urban.

H	Path	$\beta$ rural	$\beta$ urban	p value rural	p value urban	$\beta$ rural-urban	p value rural-urban
H13	Experience -> Perceived usefulness	0.0360	-0.0480	0.2240	0.2330	0.0840	0.0940
H14	Experience -> Perceived ease of use	0.1710	0.0870	0.0000	0.0450	0.0840	0.1310
H15	Enjoyment -> Perceived usefulness	0.2170	0.4640	0.0000	0.0000	-0.2470	0.0000
H16	Enjoyment -> Perceived ease of use	0.5010	0.5290	0.0000	0.0000	-0.0280	0.6490
H17	Self-efficacy -> Perceived usefulness	0.0630	0.1070	0.0490	0.0110	-0.0450	0.4020
H18	Self-efficacy -> Perceived ease of use	0.1720	0.1730	0.0000	0.0010	-0.0010	0.9950
H19	Perceived ease of use -> Perceived usefulness	0.5640	0.3320	0.0000	0.0000	0.2320	0.0010
H20	Perceived ease of use -> Attitude	0.4760	0.3620	0.0000	0.0000	0.1130	0.1400

H21	Perceived usefulness -> Attitude	0.2980	0.4510	0.0000	0.0000	-0.1540	0.0490
H22	Perceived usefulness -> Intention to use	0.5420	0.5380	0.0000	0.0000	0.0040	0.9570
H23	Attitude -> Intention to use	0.2700	0.2640	0.0000	0.0000	0.0060	0.9210
H24	Intention to use -> Actual use	0.5970	0.5830	0.0000	0.0000	0.0140	0.7770

## 5. Discussion

Consistent with prior studies (Racero *et al.*, 2020; Rizun and Strzelecki, 2020; /ardari *et al.*, 2021), the extended TAM used in this study successfully explained the distance learning process of adoption, as seen by Indonesian sports science students. The specific major, sports science, involved in this study helps us focus on a certain field of study. Other researchers can conduct studies in other areas or all fields regarding the implementation of technology into teaching. Based on the findings, the scale can be studied and adopted in the future by other academics interested in performing studies in the relevant field, especially during pandemics like Covid-19. The instrument contributes significantly to the advancement of academic approaches for structural equation research. The model is reported to be valid and reliable based on the content validity and measurement model processes. From the descriptive statical findings, it could be discussed that the students of the current study have a low perception (means below three or disagree) on enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use regarding distance learning due to the COVID-19. From the results, only items from three variables, namely experience, enjoyment, and actual use, gained mean values of slightly above 3. The previous study also reported these low and medium means of items (Rizun and Strzelecki, 2020); the location of the study was categorized as a developing country, similar to this study setting.

Through bootstrapping process with 5,000 sub-samples, the findings revealed that all hypotheses were supported for the non-original TAM variables; however, one correlation between experience and perceived usefulness was insignificant. The insignificant relationship might appear because the sports science students involved in this study perceived the first experience of attending online learning due to pandemics like COVID-19. In other words, they have no experience in doing online learning before. This research took place during the COVID-19 epidemic, which has affected every country on the planet and has left no country unaffected. All educational stakeholders, including sports science students, should adjust to the new reality and condition as fast as possible. The survey could refer to the respondents' perception regarding teaching and learning processes during the COVID-19 distance learning phase, during which they were all required to switch from face-to-face to online instruction (Rizun and Strzelecki, 2020). In addition, the experience was reported to significantly perceived ease of use. Enjoyment is significantly related to perceived usefulness and perceived ease of use. Besides, self-efficacy was a significant predictor of perceived usefulness and perceived ease of use, similar to previous studies (Mutambara and Bayaga, 2021; Rizun and Strzelecki, 2020; Sukendro *et al.*, 2020; /ardari *et al.*, 2021).

For TAM, all exogenous variables were significantly related to the endogenous variables. Perceived ease of use was a significant predictor of perceived usefulness and attitude, and perceived usefulness gained significant relationships with attitude and intention to use. Besides, the attitude was reported to be significant in predicting intention to use. Finally, the relationship between intention to use and actual use was informed to be the strongest. The significance revealed by this study could be a guide for all Indonesian stakeholders to face challenges during future pandemics, especially for sports science students. The introduction to distance learning should be supported by appropriate policies in improving perceived usefulness, perceived ease of use, attitude, and intention to use distance learning technology (Sukendro *et al.*, 2020; /ardari *et al.*, 2021). The study results can be justified to confirm the first research questions in which most relationships are supported based on the data analysis. The proper and appropriate infrastructure, training, seminar, curriculum, and quality tutors should support the system. Specific sports-based instructional activities should always be improved during distance learning (Sukendro *et al.*, 2020).

Besides the structural model, the current study also investigated the role of geographical areas in moderating the relationships of all paths. The effects of the endogenous constructs on the exogenous constructs are not significantly moderated by the geographical areas of the sports science students involved in this study. Only three relationships are significantly different; enjoyment -> perceived

usefulness, perceived ease of use -> perceived usefulness; and perceived usefulness -> attitude. The equality of students' perception could trigger the dominance of the insignificances, knowledge, skills, and information regarding the use of technology in education (Habibi *et al.*, 2021; J ang and Hsieh, 2013). More studies should be conducted regarding demographic information towards technology integration, especially during pandemics like COVID-19. Even though most paths are not significantly different, respondents living in urban areas have higher perceptions of all items and constructs than those in rural areas. The computation of MGA in the smartPLS revealed that most paths have no differences regarding geographical areas; only a few significant differences are reported to confirm the second research question. The findings might refer to the slight differences in internet access infrastructure, where most rural areas have lower connection speeds than urban areas

## 6. Conclusions

The current study took place during the COVID-19 pandemic, which has left no country unaffected. Most HEIs should focus on distance learning as an effort to replace face-to-face instruction. This scheduling allowed students to provide the most up-to-date feedback on the approaches and devices utilized within the distance learning and explore their emotions while still experiencing the situation. The study is based on a survey of sports science students who were asked how they felt about distance learning during COVID-19. The survey provided an opportunity to examine students' attitudes about distance learning and, in particular, the instruments used by HEIs in the process. If the COVID-19 scenario requires HEIs to continue operating online, this research will significantly contribute to policymaking.

Nonetheless, some limitations emerged from the study. The specific sample of the study is one of the limitations; thus, respondents from across fields of study should be considered. The current study does not provide other types of demographic information except the area of the respondents. Therefore, comparative analyses on other demographic information like genders and years in university are also recommended to understand COVID-19's influence on HEIs. The article includes a quick analysis of the condition of Indonesian HEIs distance learning due to COVID-19. The article does not provide a complete picture of what is happening in higher education. However, we believe that sharing experience is vital in the current circumstances and that each HEI contributes significantly to the worldwide fight with similar situations in the future. It is also suggested to undertake further in-depth analysis on the experiences of educational institutions, analyzing more examples and using different methods such as observation, interview, and experimentation for future research.

**Data Availability Statement:** Data is available on <https://data.mendeley.com/v1/datasets/publish-confirmation/r8dj8hcgjf/1>.

**Acknowledgments:** We thank all support from all related Indonesia HEIs involved in this study. We also address our gratitude to all respondents of the survey.

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Editorial office comments:

Please remove the ethical statement file from the supplementary material and integrate it into the method section (add a sentence to specify the title of the ethical approval committee).

Response

We revised as suggested

“The study and data collection were conducted according to the guidelines of Declaration of Helsinki, and approved by *Lembaga Pengabdian dan Penelitian*, Universitas Negeri Makassar on July 7 2021”

# Students' acceptance to distance learning during Covid-19: The role of geographical areas among Indonesian sports science students

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**Abstract:** This study was conducted to investigate the perspectives of sports science students on factors affecting distance learning in the setting of Indonesian higher education institutions (HEIs). This study proposed an extended technology acceptance model (TAM) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual use. An online survey was used to collect data from 1291 respondents. The structural model was examined through the partial least square structural equation modeling (PLS-SEM). The multi-group analysis (MGA) was conducted to understand the role of geographical areas in moderating all hypothetical relationships. The findings show that the respondents were not excited about online learning due to weak means (below 3) for most items of five variables; enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use. All relationships were supported except the relationship between experience and perceived usefulness. The strongest significant relationship emerged between intention to use and actual use. Meanwhile, the least significant relationship was found between self-efficacy and perceived usefulness. Three out of 12 hypotheses were confirmed regarding the differences of geographical areas (rural and urban) regarding all relationship paths. The findings add to a deeper understanding of the acceptability of distance learning during pandemics like COVID-19.

**Keywords:** Sports science students; distance learning; higher education; COVID-19; pandemic.

## 1. Introduction

The world health organization (WHO) declared COVID-19 as a global pandemic in March 2020. The last report on June 23, 2021 (the writing of this manuscript) showed that the overall number of cases exceeded 177 million globally. Mortality remained high, with over 9000 deaths recorded each day; however, all areas except two (Eastern Mediterranean and Africa) reported decreased new deaths. Compared to the previous week of May 2021, the global number of cases and fatalities dropped by 6% and 12%, respectively, with slightly more than 2.5 million cases and over 64,000 deaths (WHO, 2021). In education, one of the efforts to decrease the pandemic spread was to close schools at all levels. The distance learning policy was issued with the help of the available technologies in facilitating teaching and learning activities, replacing face-to-face instruction.

Educational researchers have already conducted extensive studies on the global pandemic (Abbas *et al.*, 2021; Andersson and Grönlund, 2009; Watermeyer *et al.*, 2021). In Indonesia, like in other countries, COVID-19 also has significant impacts on education. Higher education institutions (HEIs) have maximized their efforts to substitute face-to-face learning with distance learning (Watermeyer *et al.*, 2021). Courses, persons, and technology were all challenges in distance education; these issues affect both

developed and developing countries. Access to technology is more pronounced in developing countries (Andersson and Grönlund, 2009). To go deeper into the challenges of distance learning during the pandemic, academics are recommended to understand factors affecting this new pedagogical approach (Rizun and Strzelecki, 2020), especially in a specific study context and among others particular objects. Therefore, this study aims to disclose factors affecting distance learning in the context of Indonesian HEIs; it is conducted to understand the perceptions of sports science students. Besides, differences were also elaborated regarding all paths in the structural model based on respondents' geographical areas (urban and rural). Two research questions were established regarding the aims of the study:

1. What factors affecting distance learning among Indonesian sports science students during COVID-19?
2. How are all paths in the structural model different based on respondents' geographical areas?

## 2. Review of Literature

### 2.1. Distance learning during COVID-19 pandemic

Distance learning has been around for a long time in higher education. Distance learning is far from a new phenomenon. Tracing its history, it began in the early 18th century as a correspondence study to allow learners outside of the city to continue their education without having to be on-site. Since then, it has progressed and grown in popularity, especially with the rapid expansion of technological innovation (Kentnor, 2015). Other modules in distance education, such as blended learning (or hybrid learning), have also emerged, defining a combination of face-to-face and technology-mediated instructions that provides a resilient and accessible learning experience. In the current condition, many educational institutions have been forced to adopt distance learning to keep up with the current pandemic, the COVID-19 (Alqurshi, 2020; Kawaguchi-Suzuki *et al.*, 2020). Nations are forced to implement preventive measures of the COVID-19 spread, including suspending face-to-face learning. Specifically, HEIs responded to this massive transition by launching distance learning, utilizing existing learning support systems like social media and learning management systems (Aristovnik *et al.*, 2020; Coman *et al.*, 2020). Although this shift offers continuity to the learning process, it also exacerbates educational gaps among students, particularly those in rural regions or low-income areas with a lack of basic information and technology skills. Such qualities might be challenging to access of technological resources needed to support the distance learning trend. Considering that the current scenario may endure longer, a long-term move to online learning is suggested. The condition requires HEIs to prepare and equip themselves with the instruments needed to facilitate acceptance, especially among users (Shawaqfeh *et al.*, 2020). Therefore, this study explores factors affecting students' acceptance of distance learning and whether or not the paths differ based on geographical areas, rural and urban.

### 2.2. Teaching methods in Indonesian HEIs during the COVID-19

Due to the COVID-19 pandemic, many schools and colleges around the world have been closed. Many universities in Indonesia also carry out similar policies, for example, the Universitas Indonesia, Universitas Gajah Madha, and Universitas Negeri Makassar. This policy that aims to prevent the spread of COVID-19 infection aligns with WHO's call that all elements of society need to stop and minimize the impact of the disease. This policy encourages HEIs to conduct distance learning methods. Guided by the ministry of education and culture, Indonesian HEIs use various tools in delivering their teaching and learning process during the closure. Social media like Facebook, Youtube, and WhatsApp are integrated during instructional activities (Chan *et al.*, 2020; Sobaih *et al.*, 2020). Learning management systems, such as Edmodo, Moodle, Atutor, and Olat, have also been options for lecturers in teaching their students (Cavus *et al.*, 2021; Raza *et al.*, 2021). Some universities have established their learning management systems facilities to facilitate the teaching (Universitas Indonesia with EMAS, Universitas Gajah Madha with eLisa, and Universitas Negeri Makassar with SYAM OK UNM). However, most HEIs lecturers rely on video conferencing applications to meet the needs of virtual meetings conducted mainly through two tools; Zoom and Google meet (Yudha *et al.*, 2021).

### 2.3. Proposed model

This study applied an extended technology acceptance model (TAM) from Davis (1989) with eight variables; experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude,

intention to use, and actual use. Geographical area was also included to understand differences regarding demographic information between the paths. For the structural model and difference tests, twelve hypotheses were included, respectively. We discussed the proposed model with two statisticians and one educational expert; the model in Figure 1 is elaborated in detail.

#### 2.4. TAM variables: perceived ease of use, perceived usefulness, attitude, intention to use, and actual use

In the field of social science, TAM is a common model adopted by many educational researchers. The model states that people’s feelings about behavioral intention toward adopting a system, which in this study is in the setting of distance learning, is predicted by their perceived usefulness and perceived ease of use (Davis, 1989). TAM’s original premise is that perceived ease of use is claimed to predict perceived usefulness. Furthermore, the system’s attitudes and perceived usefulness impact behavioral intention (the degree to which people perform or do not perform for a given future activity). Finally, behavioral intention predicts the actual use of a system (Davis, 1989). Besides the original constructs, some external factors were associated with the first TAM constructs (Rejón-Guardia *et al.*, 2020; Venkatesh *et al.*, 2003).

One of the most significant components in TAM is the perceived usefulness. Perceived usefulness is defined as the degree to which system users feel that the system will increase their performance (Davis, 1989); in this study, we determined the system as distance learning. Further, users’ attitude and intention to use a system is influenced by their perceived usefulness (Davis, 1989). The perceived usefulness of a system is also expected to influence the user’s decision to accept or reject it. The degree to which a person believes that using any system is straightforward and friendly is described as perceived ease of use (Iqbal and Bhatti, 2017). From the TAM concept, perceived ease of use is one of the drivers that can affect perceived usefulness and attitude toward a system. Users are more willing to adopt a new approach if they believe it is simple to use (Mukminin *et al.*, 2020).

Attitude is defined as users’ certain behavior linked with the use of a system (Davis, 1989). In the original TAM model, attitude is hypothesized to influence intention to use. Further, intention to use in this study is described as students’ desire to utilize technologies for the distance learning setting; the intention is expected to significantly influence actual use (Zardari *et al.*, 2021). The final part of the TAM is the actual use, or the act of applying a system, which expresses the reality of users to utilize or not to utilize technology. In this study, the actual use is the implementation of technology for distance learning (Davis, 1989). In the proposed model of this study, actual use has no impact on the other components since it is the final stage of the technology acceptance model.

Table 1. Some recent TAM-related studies in the educational context

No	Sources	Method	Results
1	(Scherer <i>et al.</i> , 2019)	Meta-analysis	TAM explained technology acceptance adequately; yet, the role of certain key constructs and the importance of external variables contrasted some existing beliefs about the TAM.
2	(Mutambar a and Bayaga, 2021)	A survey involved 550 high school students, and the data were analyzed using PLS-SEM.	The original TAM variables (perceived attitude, perceived usefulness, and perceived ease of use) had direct correlations with behavioral intention and played mediating roles between the external variables and behavioral intention
3	(Baber, 2021)	The study was conducted on the 375 students in universities of South Korea during Covid-19.	The results suggested that all factors in TAM positively influenced the behavioral intention to use and accept the e-learning system by the learners during this pandemic.
4	(Rizun and Strzelecki, 2020)	PLS-SEM was employed to test the proposed research model. The survey gathered data from 1692 Polish students.	The strongest exogenous variable of student’s acceptance of education shift to distance learning was enjoyment. Perceived ease of use and perceived usefulness were also reported to be significant in affecting attitude towards and intention to use
5	(Hanham <i>et al.</i> , 2021)	An online survey was completed by 365 undergraduate students from a university in Sydney,	Facilitating conditions were positively associated with the perceived usefulness, which was positively associated with academic self-efficacy. Surprisingly, perceived ease of use did not have a statistically significant association with

		Australia. Confirmatory factor analysis, SEM, and MGA analyses were used to analyze the data.	perceived usefulness. Academic self-efficacy was positively related to academic achievement.
6	(Racero <i>et al.</i> , 2020)	The suggested structural model was tested using Lisrel software with a total of 352 valid replies.	The results confirmed the positive influence of the intrinsic motivations, autonomy, and relatedness, to improve perceptions regarding the usefulness and ease of use of open-source software, and; therefore, on behavioral intention to use the software.
7	(Zardari <i>et al.</i> , 2021)	The information was gathered from 650 university students. After data filtering, structural equation modeling was used to evaluate 513 valid replies.	Satisfaction, perceived ease of use, perceived usefulness, information quality, self-efficacy, social influence, and benefits were reported to be significant in predicting behavioral intention regarding e-learning portal acceptance. Perceived ease of use significantly predicted perceived usefulness and pleasure. The appeal had a significant effect on pleasure and satisfaction. Enjoyment is significantly correlated with satisfaction
8	(Sukendro <i>et al.</i> , 2020)	The research was conducted through a survey of 974 students analyzed with PLS-SEM of expanded TAM with enabling conditions as the external component.	Significant relationships between facilitating condition and perceived ease of use and between facilitating condition and perceived usefulness were reported. The significant relationships among core components of TAM were found except for one, the relationship between perceived usefulness and attitude.

## 2.2. External variables; Experience, enjoyment, and self-efficacy

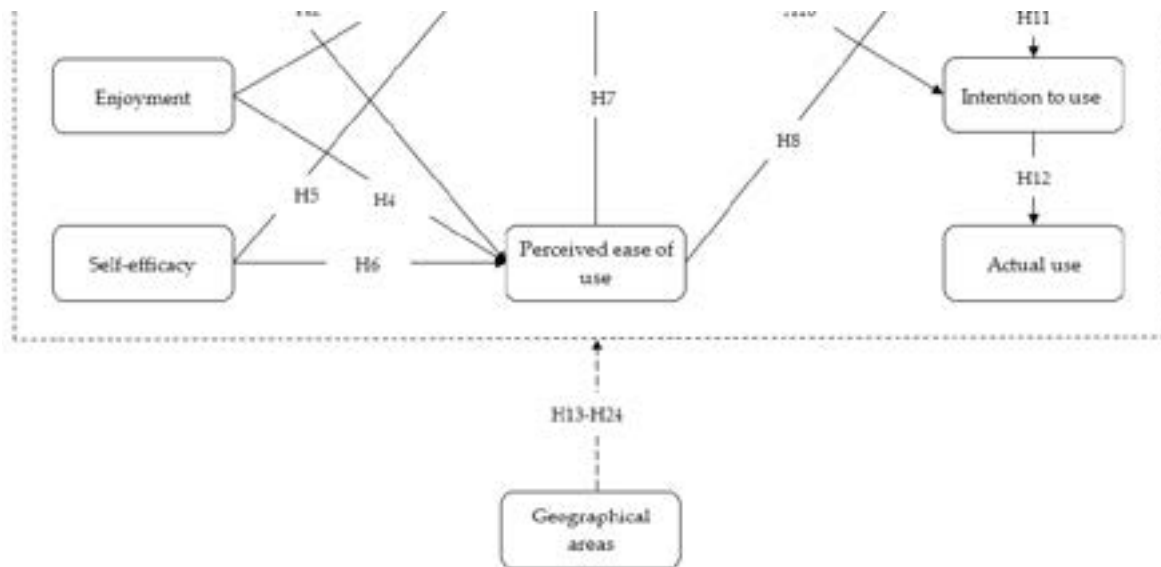
This study suggested extended factors such as enjoyment, self-efficacy, and experience to predict perceived ease of use and usefulness (Rizun and Strzelecki, 2020). In this study, experience is defined as the amount and type of technical abilities for distance learning that a person has acquired through time (Abdullah and Ward, 2016). One of the most significant external variables is experience. Individuals with more advanced technological abilities are more likely to be enthusiastic about using any online/distance learning instrument (Rizun and Strzelecki, 2020). This study expects the distance learning experience during COVID-19 influences perceived ease of use and usefulness.

Furthermore, enjoyment or pleasure is defined to be the degree to which the action of implementing any system is seen to become pleasurable, independent of the results. A pleasant system seems to be viewed as simple to use and beneficial in which users' desire can increase. Many studies have shown that users' perceptions of ease of use are influenced by how much fun they have when using a system. In addition, researchers have discovered a substantial positive relationship between enjoyment and perceived usefulness, which boosts students' actual use (Rizun and Strzelecki, 2020). Self-efficacy in this study is described as the confidence to complete a task using technology for distance learning during COVID-19. Students with stronger e-learning self-efficacy are more inclined to employ e-learning and computer-supported education. Self-efficacy is thought to impact perceived ease of use and perceived usefulness. All hypotheses included in this study are performed in Figure 1, and prior studies related to TAM application in recent years within the educational environment are shown in Table 1.

## 2.2. Geographical areas in moderating hypothetical relationships

In addition to the structural assessment, geographical areas (rural and urban) were included to understand how all hypothetical relationships are different. Prior studies have focused on the differences in technology integration based on demographic information (Aslan and Zhu, 2017; Habibi *et al.*, 2021; Ramírez-Correa *et al.*, 2015; Ullah *et al.*, 2021; Yang and Hsieh, 2013). For example, genders were significantly different regarding multimedia utilization for learning (Ramírez-Correa *et al.*, 2015). Based on the geographical areas, rural and urban, learning behavioral patterns and access to technology were revealed to be significantly different (Habibi *et al.*, 2021; Yang and Hsieh, 2013). Therefore, besides hypotheses for the structural model, twelve hypotheses (H13-H24) were included regarding the differences between geographical areas regarding all paths (Fig.1), for example, there is a significant difference regarding the relationship between experience and perceived usefulness based on respondents'

geographical areas (H13), and there is a significant difference regarding the relationship between intention to use and actual use based on respondents' geographical areas (H24)



**Figure 1.** A proposed model

### 3. Materials and Methods

#### 3.1. Research Method

This research was conducted using an online survey from March 2021 to June 2021 in five Indonesian HEIs, after the Indonesian government announced school closures on May 20, 2020. Surveys offer a high level of general capabilities when it comes to representing a broad group of people. Because of the large number of people that respond to surveys, the information acquired provides a more accurate picture of the broader population's relative qualities. Aside from low-cost research, surveys can be sent to participants in various ways, including e-mail, print, and the internet. Due to the survey method's high representativeness, statistically significant results are often easier than other data collection methods. As a result, the data gathered may be measured with better precision (Evans and Mathur, 2005). However, there are a few survey weaknesses that can be problematic. The survey cannot be altered at any point throughout the data collection procedure. Participants may not be able to give precise answers to controversies-related questions due to difficulties recalling relevant facts. Before the primary data collection, the survey instrument was developed and validated to assess variables that predict the distance learning by Indonesian sports science students during Covid-19. The model measurement and evaluation were carried out using SmartPLS 3.3 through PLS-SEM procedures (Mukminin *et al.*, 2020; Yusop *et al.*, 2021).

#### 3.2. Instrumentation

Review of literature can help researchers in defining and analyzing ideas and concepts related to the theoretical research framework and instrumentation. The instrument is designed to meet the research goals (Habibi *et al.*, 2020). This study used an adapted survey to assess the elements that influence students' acceptance of distance learning (Rizun and Strzelecki, 2020; Sabah, 2016; Venkatesh *et al.*, 2003,



2008). The new instrument for the current study was produced based on the adaptation process; the indicators differed and were developed to meet COVID-19 and distance learning settings. Twenty-nine indicators were modified for the instrument during the initial set-up procedures. The indicators were addressed with three educational technology specialists from Malaysia and Indonesia via video conferences as part of the content validity process to ensure that the instrument was appropriate for the context and setting (Halek *et al.*, 2017). Ten indicators were updated after the video call meetings. In contrast, three others were deleted as suggested by the experts. The complete instrument and raw data of the current study are accessible on <https://data.mendeley.com/v1/datasets/publish-confirmation/r8dj8hcgjf/1>.

### 3.3. Population, Sample, and Data Collection

The population of the current study covers all sports science students in Indonesian HEIs. Sports science students were selected as the survey respondents since not many studies were conducted within the area. The target population includes sports science students in four Indonesian cities. We distributed the survey through Google Forms with a random sampling technique to collect data for the analysis. The questionnaire (n. 26) was piloted on a small group of students to examine reliability; the Cronbach alpha test was conducted. All variables were reliable, with alphas values of  $> .70$ . The final set of questions was improved after the pilot study, and the questionnaire was disseminated. The survey was distributed on June 1, 2021, and was open until June 15, 2021; the majority of answers came in the first week. Active students from three institutions were asked to take part in the study via an electronic invitation. The survey received 1472 responses; 1291 data were measurable. One hundred and eighty-one responses were dropped because missing values appeared or the same answers for every question were identified. Nine hundred and ninety-four are male students; meanwhile, 296 female respondents are females. Eight hundred respondents are from rural areas, and 489 are from urban areas. [The study and data collection were conducted according to the guidelines of Declaration of Helsinki, and approved by Lembaga Pengabdian dan Penelitian, Universitas Negeri Makassar on July 7 2021.](#)

### 3.4. Data Analysis

Three phases are involved in evaluating PLS-SEM findings. The first phase is a review of the measurement model. This is an essential component of the evaluation since it ensures that the measurement quality is maintained. The measurement model was done to examine the reliability and validity of the variables. There are four assessments for the measurement models; we assessed and reported the computation of reflective indicator loadings, internal consistency reliability, convergent validity, and discriminant validity). Secondly, the examination of the structural model was carried out after the measurement model process. The structural model examines the structural theory, which entails considering the given hypotheses and addressing the connections among the latent variables (Hair *et al.*, 2019). To assess the structural model, some measures were reported, namely –Coefficient of determination ( $R^2$ ), effect sizes ( $f^2$ ), predictive relevance ( $Q^2$ ), model fit, and statistical significances. Finally, multi-group analysis (MGA) was done to understand the moderating roles of geographical areas, urban and rural, to determine the difference between all paths of the structural model (Carranza *et al.*, 2020; Matthews, 2017).

## 4. Results

### 4.1. Preliminary Findings

The percentage of missing data in the present study ranged from 0% to .5 percent for each item. The missing data was utterly random (MCAR) (Kline, 2005). Table 1 displays the means, standard deviations, correlation matrices, skewness, and kurtosis for all variables; univariate normality was found for experience, enjoyment, self-efficacy, perceived ease of use, perceived usefulness, attitude, intention to use, and actual usage (skewness and kurtosis values in the range of the cut-off values). The Likert scale went

from 1 to 5, with 5 being the highest score. Most items achieved means of below three: enjoyment, perceived ease of use, usefulness, attitude, and intention to use. The findings show that users were not excited; these feelings suggest that distance learning could have a lesser potential than face-to-face learning.

#### 4.2. Measurement Model

The examination of the measurement model in this study includes reflective metrics. We began by looking at the indicator loadings. Loadings greater than .50 show that the construct accounts for more than half of the variation in the indicator (Noor et al., 2019). The internal consistency dependability of the constructions was tested. Better numbers imply higher levels of dependability for the composite reliability criteria. Reliability ratings of .70 to .95 are considered “acceptable to good” (Hair et al., 2019). Internal consistency dependability is measured using Cronbach’s alpha, which assumes the same criteria. Reliability ratings of .70 to .95 are considered appropriate (Shmueli et al., 2019). The convergent validity, or the amount to which a construct converges in its indicators by explaining the variance of the items, was then computed. The items’ average variance extracted (AVE) linked with a specific construct is used to measure convergent validity. The AVE must be .500 or greater to be considered acceptable (Ogbeibu et al., 2021), accounting for (more than) 50% of the variation in its components on average. Discriminant validity is the final stage (Palos-Sanchez et al., 2019) that demonstrates how empirically different a concept is from others. In PLS-SEM, discriminant validity is determined by examining heterotrait-monotrait ratio of correlations. If the route model includes variables defined as conceptually and extremely similar, a value of .900 is proposed as a threshold. In PLS-SEM, the heterotrait-monotrait ratio criterion is a novel requirement for assessing discriminant validity that outperforms the Fornell-Larcker criterion and cross-loading assessments (Hair et al., 2019). Table 2 and 3 inform the results of the measurement model; all computations were reported to meet the criteria in the examination.

**Table 2.** Normality, descriptive statistics, and measurement model criteria.

Construct	Items	Mean	SD	Kurt.	Skew.	Mark	Load	$\alpha$	rho_A	CR	AVE
Perceived usefulness	PU1	2.5630	1.2910	-.8110	.4240		.9150	.8960	.8970	.9350	.8280
	PU2	2.5480	1.2540	-.7240	.4430		.9260				
	PU3	2.6070	1.2310	-.7420	.3720	Dropped CR <.9500					
	PU4	2.7750	1.2840	-.9300	.2390		.8890				
Perceived ease of use	PEOU1	3.0300	1.2860	-.9920	-.0020		.8210	.8900	.8940	.9240	.7520
	PEOU2	2.6890	1.2330	-.7850	.2930		.8890				
	PEOU3	2.5770	1.1970	-.6250	.4080		.8810				
	PEOU4	2.8200	1.2470	-.8520	.1920		.8760				
	ATU1	2.7520	1.2850	-.9650	-.1670	Dropped low load					
Attitude	ATU2	3.2830	1.1560	-.6170	-.1650		.8330	.7200	.7940	.8730	.7760
	ATU3	2.8610	1.1850	-.7080	.1080		.9260				
	ATU4	2.7040	1.3270	-1.0180	-.2230	Dropped low load					
Intention to use	ITU1	2.6050	1.2730	-.8670	.3060		.9030	.9090	.9100	.9430	.8460
	ITU2	2.4950	1.2030	-.6630	.4060		.9300				

	ITU3	2.5390	1.2220	-.7150	.3910	.9260				
Actual use	AU1	3.0810	1.2430	-.8340	-.0730	1.0000	1.0000	1.0000	1.0000	1.0000
Experience	EXP1	3.3990	1.2330	-.7870	-.2810	.7890	.8590	.8870	.9030	.7000
	EXP2	3.6540	1.2200	-.6230	-.5400	.8060				
	EXP3	3.3780	1.2170	-.7950	-.2520	.8880				
	EXP4	3.1390	1.2330	-.8420	-.0640	.8600				
Enjoyment	EJ1	2.6940	1.2300	-.7550	.2630	.9490	.9410	.9420	.9620	.8950
	EJ2	2.8060	1.2210	-.7620	.2070	.9430				
	EJ3	2.7000	1.2350	-.7690	.2530	.9470				
Self-efficacy	SE1	3.0910	1.1630	-.5850	-.0040	.8950	.8870	.8880	.9300	.8160
	SE2	3.0990	1.1520	-.5390	.0100	.9130				
	SE3	3.0550	1.1340	-.4590	.0040	.9010				

**Table 3.** Heterotrait–monotrait ratio for discriminant validity (< .900) (Hair *et al.*, 2019)

	Actual use	Attitude	Enjoyment	Experience	Intention to use	Perceived ease of use	Perceived usefulness
Attitude	.6180						
Enjoyment	.5940	.7770					
Experience	.4700	.6700	.6660				
Intention to use	.6220	.7570	.8180	.5430			
Perceived ease of use	.5820	.8530	.7730	.6190	.7590		
Perceived usefulness	.5340	.8190	.7630	.5540	.8010	.8300	
Self-efficacy	.5260	.7260	.6920	.6100	.6380	.6440	.6180

#### 4.3. Structural Model

Researchers (Henseler *et al.*, 2014; Ringle *et al.*, 2020) recommend looking at measures like  $R^2$ ,  $f^2$ ,  $Q^2$ , model fit, and statistical significances to assess the structural model. We followed (Hair *et al.*, 2019) recommendation regarding  $R^2$  values; the values of .670, .330, and .190, respectively, indicate strong, moderate, and weak. The  $f^2$  values of .020, .150, and .350, according to (Ringle *et al.*, 2020), suggest small, medium, and large effects, respectively. Furthermore, for a given endogenous component,  $Q^2$  values larger than zero indicate a reasonable degree of prediction accuracy (Hair *et al.*, 2014; Ringle *et al.*, 2020). Based on the recommended assessment standards, the  $Q^2$  findings indicate sufficient prediction accuracy for exogenous variables (Hair *et al.*, 2014; Ringle *et al.*, 2020). According to Henseler (Henseler *et al.*, 2016), the SRMR is the only approximate model fit criteria for evaluating PLS modeling, consistent with prior research (Sarstedt *et al.*, 2016). The bootstrap-based test was also used to calculate values for the discrepancy measures, which include the squared euclidean distance ( $d_{ULS}$ ) and the geodesic distance ( $d_G$ ) (Henseler *et al.*, 2016). Table 3 compares the values of the SRMR,  $d_{ULS}$ , and  $d_G$  discrepancy measures; SRMR below .08 shows a valid and reliable model. To test for statistical significance, Hair *et al.* (2019) recommend a minimum t value of 1.65 at  $p < .05$ . The structural model was estimated using the consistent PLS bootstrapping option with 5,000 subsamples in this investigation (Lowry and Gaskin, 2014). All hypotheses were supported but H1 (the relationship between experience and perceived usefulness,  $t = .1900$ ;  $p = .8500$ ). The strongest correlation emerged between intention to use and actual use, supporting the last hypothesis (H12) with a t value of 26.6890. In contrast, the lowest correlation was reported between self-efficacy and perceived usefulness with a t value of 3.050.

**Table 4.** The results of the structural model,  $f^2$ , SRMR,  $d_{ULS}$ , and  $d_G$  (Henseler *et al.*, 2014; Ringle *et al.*, 2020).

H	Path	$\beta$	t values	p values	Sig	$f^2$	Items	Value
H1	Experience -> Perceived usefulness	.0050	.1900	.8500	No	.0000	SRMR	.053
H2	Experience -> Perceived ease of use	.1440	5.0700	.0000	Yes	.0260	$d_{ULS}$	.762
H3	Enjoyment -> Perceived usefulness	.3110	9.2350	.0000	Yes	.0970	$d_G$	.334

H4	Enjoyment -> Perceived ease of use	.5110	16.8430	.0000	Yes	.2800
H5	Self-efficacy -> Perceived usefulness	.0800	3.0500	.0020	Yes	.0090
H6	Self-efficacy -> Perceived ease of use	.1710	6.0150	.0000	Yes	.0360
H7	Perceived ease of use -> Perceived usefulness	.4750	13.4150	.0000	Yes	.2720
H8	Perceived ease of use -> Attitude	.4280	11.5280	.0000	Yes	.1790
H9	Perceived usefulness -> Attitude	.3620	9.9690	.0000	Yes	.1280
H10	Perceived usefulness -> Intention to use	.5410	18.6240	.0000	Yes	.3590
H11	Attitude -> Intention to use	.2670	8.8150	.0000	Yes	.0870
H12	Intention to use -> Actual use	.5930	26.6890	.0000	Yes	.5410

**Table 5.** The results of R<sup>2</sup> and Q<sup>2</sup>.

Path	R <sup>2</sup>	Q <sup>2</sup>
Received usefulness	.618	.508
Perceived ease of use	.540	.402
Attitudes	.544	.408
Intention to use	.561	.471
Actual use	.351	.349

#### 4.3. MGA results

As previously informed, eight hundred respondents of this study lived in rural areas; while, 489 stayed in urban areas. The moderating roles of geographical areas, urban and rural, were examined through MGA computation for H13 to H24. The MGA results revealed that respondents' geographical areas do not significantly moderate the impact of most predictors on their exogenous constructs; thus, the results show that the MGA process rejects nine hypotheses out (H13, H14, H16, and H17, H18, H20, H22, H23, H24) of twelve hypotheses. For example, the p-value of the difference regarding the relationship between experience and perceived usefulness was insignificant ( $\beta = 0.227$ ;  $p = 0.0840$ ) that rejects H13. Another example is the difference regarding the path coefficient between intention to use and actual use that was also insignificant ( $\beta = 0.0140$ ;  $p = .7770$ ), rejecting hypothesis 24. Three hypotheses were reported to be accepted: H15, H19, and H21. Geographical areas, urban and rural, were significantly different regarding the relationships between enjoyment and perceived usefulness ( $\beta = 10.2470$ ;  $p < .001$ ), supporting H15. Similarly, the path differences between perceived ease of use and perceived usefulness ( $\beta = 0.2320$ ;  $p < .01$ ) and between perceived usefulness and attitude ( $\beta = -0.1540$ ;  $p < .05$ ) were also reported to be significant. All information about the detail of the computational results on the MGA approach is informed in Table 6.

**Table 6.** MGA results regarding all paths based on respondents' geographical areas, rural and urban.

H	Path	$\beta$ rural	$\beta$ urban	p value rural	p value urban	$\beta$ rural-urban	p value rural-urban
H13	Experience -> Perceived usefulness	0.0360	-0.0480	0.2240	0.2330	0.0840	0.0940
H14	Experience -> Perceived ease of use	0.1710	0.0870	0.0000	0.0450	0.0840	0.1310
H15	Enjoyment -> Perceived usefulness	0.2170	0.4640	0.0000	0.0000	-0.2470	0.0000
H16	Enjoyment -> Perceived ease of use	0.5010	0.5290	0.0000	0.0000	-0.0280	0.6490
H17	Self-efficacy -> Perceived usefulness	0.0630	0.1070	0.0490	0.0110	-0.0450	0.4020
H18	Self-efficacy -> Perceived ease of use	0.1720	0.1730	0.0000	0.0010	-0.0010	0.9950
H19	Perceived ease of use -> Perceived usefulness	0.5640	0.3320	0.0000	0.0000	0.2320	0.0010
H20	Perceived ease of use -> Attitude	0.4760	0.3620	0.0000	0.0000	0.1130	0.1400

H21	Perceived usefulness -> Attitude	0.2980	0.4510	0.0000	0.0000	-0.1540	0.0490
H22	Perceived usefulness -> Intention to use	0.5420	0.5380	0.0000	0.0000	0.0040	0.9570
H23	Attitude -> Intention to use	0.2700	0.2640	0.0000	0.0000	0.0060	0.9210
H24	Intention to use -> Actual use	0.5970	0.5830	0.0000	0.0000	0.0140	0.7770

## 5. Discussion

Consistent with prior studies (Racero *et al.*, 2020; Rizun and Strzelecki, 2020; Zardari *et al.*, 2021), the extended TAM used in this study successfully explained the distance learning process of adoption, as seen by Indonesian sports science students. The specific major, sports science, involved in this study helps us focus on a certain field of study. Other researchers can conduct studies in other areas or all fields regarding the implementation of technology into teaching. Based on the findings, the scale can be studied and adopted in the future by other academics interested in performing studies in the relevant field, especially during pandemics like Covid-19. The instrument contributes significantly to the advancement of academic approaches for structural equation research. The model is reported to be valid and reliable based on the content validity and measurement model processes. From the descriptive statical findings, it could be discussed that the students of the current study have a low perception (means below three or disagree) on enjoyment, perceived ease of use, perceived usefulness, attitude, and intention to use regarding distance learning due to the COVID-19. From the results, only items from three variables, namely experience, enjoyment, and actual use, gained mean values of slightly above 3. The previous study also reported these low and medium means of items (Rizun and Strzelecki, 2020); the location of the study was categorized as a developing country, similar to this study setting.

Through bootstrapping process with 5,000 sub-samples, the findings revealed that all hypotheses were supported for the non-original TAM variables; however, one correlation between experience and perceived usefulness was insignificant. The insignificant relationship might appear because the sports science students involved in this study perceived the first experience of attending online learning due to pandemics like COVID-19. In other words, they have no experience in doing online learning before. This research took place during the COVID-19 epidemic, which has affected every country on the planet and has left no country unaffected. All educational stakeholders, including sports science students, should adjust to the new reality and condition as fast as possible. The survey could refer to the respondents' perception regarding teaching and learning processes during the COVID-19 distance learning phase, during which they were all required to switch from face-to-face to online instruction (Rizun and Strzelecki, 2020). In addition, the experience was reported to significantly perceived ease of use. Enjoyment is significantly related to perceived usefulness and perceived ease of use. Besides, self-efficacy was a significant predictor of perceived usefulness and perceived ease of use, similar to previous studies (Mutambara and Bayaga, 2021; Rizun and Strzelecki, 2020; Sukendro *et al.*, 2020; Zardari *et al.*, 2021).

For TAM, all exogenous variables were significantly related to the endogenous variables. Perceived ease of use was a significant predictor of perceived usefulness and attitude, and perceived usefulness gained significant relationships with attitude and intention to use. Besides, the attitude was reported to be significant in predicting intention to use. Finally, the relationship between intention to use and actual use was informed to be the strongest. The significance revealed by this study could be a guide for all Indonesian stakeholders to face challenges during future pandemics, especially for sports science students. The introduction to distance learning should be supported by appropriate policies in improving perceived usefulness, perceived ease of use, attitude, and intention to use distance learning technology (Sukendro *et al.*, 2020; Zardari *et al.*, 2021). The study results can be justified to confirm the first research questions in which most relationships are supported based on the data analysis. The proper and appropriate infrastructure, training, seminar, curriculum, and quality tutors should support the system. Specific sports-based instructional activities should always be improved during distance learning (Sukendro *et al.*, 2020).

Besides the structural model, the current study also investigated the role of geographical areas in moderating the relationships of all paths. The effects of the endogenous constructs on the exogenous constructs are not significantly moderated by the geographical areas of the sports science students involved in this study. Only three relationships are significantly different; enjoyment -> perceived

usefulness, perceived ease of use -> perceived usefulness; and perceived usefulness -> attitude. The equality of students' perception could trigger the dominance of the insignificances, knowledge, skills, and information regarding the use of technology in education (Habibi *et al.*, 2021; Yang and Hsieh, 2013). More studies should be conducted regarding demographic information towards technology integration, especially during pandemics like COVID-19. Even though most paths are not significantly different, respondents living in urban areas have higher perceptions of all items and constructs than those in rural areas. The computation of MGA in the smartPLS revealed that most paths have no differences regarding geographical areas; only a few significant differences are reported to confirm the second research question. The findings might refer to the slight differences in internet access infrastructure, where most rural areas have lower connection speeds than urban areas

## 6. Conclusions

The current study took place during the COVID-19 pandemic, which has left no country unaffected. Most HEIs should focus on distance learning as an effort to replace face-to-face instruction. This scheduling allowed students to provide the most up-to-date feedback on the approaches and devices utilized within the distance learning and explore their emotions while still experiencing the situation. The study is based on a survey of sports science students who were asked how they felt about distance learning during COVID-19. The survey provided an opportunity to examine students' attitudes about distance learning and, in particular, the instruments used by HEIs in the process. If the COVID-19 scenario requires HEIs to continue operating online, this research will significantly contribute to policymaking.

Nonetheless, some limitations emerged from the study. The specific sample of the study is one of the limitations; thus, respondents from across fields of study should be considered. The current study does not provide other types of demographic information except the area of the respondents. Therefore, comparative analyses on other demographic information like genders and years in university are also recommended to understand COVID-19's influence on HEIs. The article includes a quick analysis of the condition of Indonesian HEIs distance learning due to COVID-19. The article does not provide a complete picture of what is happening in higher education. However, we believe that sharing experience is vital in the current circumstances and that each HEI contributes significantly to the worldwide fight with similar situations in the future. It is also suggested to undertake further in-depth analysis on the experiences of educational institutions, analyzing more examples and using different methods such as observation, interview, and experimentation for future research.

**Data Availability Statement:** Data is available on <https://data.mendeley.com/v1/datasets/publish-confirmation/r8dj8hcgjf/1>.

**Acknowledgments:** We thank all support from all related Indonesia HEIs involved in this study and to all respondents of the survey. We also address our gratitude to Universitas Negeri Makassar, LPDP Indonesia, and Research and Innovation Management Centre, Universiti Utara Malaysia [RIMC-UUM]

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Article Title: Students' acceptance to Covid-19 distance learning: The role of geographical areas in Indonesian higher education  
Corresponding Author: Mr syahrudin syahrudin syahrudin

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Thank you for submitting your work to the journal, and if you have any questions, please do not hesitate to contact me.

Yours sincerely,