
Innovation Diffusion Impact on Students' Online Platform Participation

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Abstract – Technology and innovation offer excellent opportunities for educational institutions, particularly Higher Education Institutions (HEIs), to provide high-quality education services in the industry 4.0 era. Most classes are conducted online during the pandemic, whereby students fully participate in online learning activities and processes. Thus, the study aims to examine the influence of relative advantage, complexity, and observability on students' online platform participation. The study employed a cross-sectional research design and collected quantitative data from 384 students using a purposive sampling technique. Additionally, a questionnaire was distributed through WhatsApp and Facebook to collect data and analysed using the statistical package for social sciences (SPSS) version 21. The findings revealed that relative advantage, complexity, and observability significantly affect students' online platform participation. Furthermore, the study provided several insights into students' online participation.

Keywords: Relative Advantage; Complexity; Observability; Students' Online Participation

1. Introduction

Technological advancement has transformed and revolutionised education to technology integration and innovation that heavily relies on technology, particularly online learning. Furthermore, 21st-century job requirements highlight online skills, including problem-solving, collaboration, critical thinking, and creativity. Innovation diffusion disseminates new ideas and products, whereby society and higher education institutions have become

more susceptible to issues of spreading creativity (Cholifah, Oktaviani, Nuraini, Meidina, Wanongdyaningtiyas, & Yafie, 2019). Therefore, universities should adopt relevant information on technology and innovation, specifically during the pandemic that has caused all activities to be conducted online. Previous researchers highlighted the online approach to enhance learning and teaching (Singh & Thurman, 2019). Although academicians play a vital role in effective online learning, students' participation in online learning has declined due to coverage, location, skills, and knowledge that stunts their progress in education (Al-Rahmi, Yahaya, Alamri, Alyousseff, Al-Rahmi, & Kamin, 2019; Kane, Shaw, Pang, Salley, & Snider, 2016). Moreover, lacking digital knowledge and skills causes difficulty to face the real world in future.

Although online databases are commonly used among faculty members and students, the level of willingness to accept and use other forms of information is low (Raman, Vachharajani, & Achuthan, 2018). According to Rogers (1986), innovation attributes are critical in its adoption. Unfortunately, society is not ready to accept innovation in the same order and rate due to inadequate infrastructures, high costs, social and political factors, and language barriers. Thus, certain technologies are easily deployed and utilised than others. Therefore, the study aims to determine the influence of relative advantage, complexity, and observability on students' online platform participation in HEIs.

2. Literature Review

The Organisation for Economic Co-operation and Development (2019) defined online platforms as a digital service that facilitates interactions between two or more distinct but interdependent users (firms or individuals) that interact through the Internet. Ying-Ju Chen et al. (2018) elaborated that online platforms share key characteristics: 1) using information and communication technologies to facilitate transactions between user groups; 2) collecting and using data on related transactions, and 3) network effects that make using the platforms with most users most valuable to others.

The online platform covers a range of services on the Internet, including marketplaces, search engines, social media, creative content outlets, app stores, communication services, payment systems, services comprising "collaborative" or "gig" economy and more. Thus, the relationships influencing student online platform participation is determined based on three characteristics from the innovation diffusion theoretical framework (Rogers, 2003 & Coleman-Prisco, 2017).

2.1. Students' Participation in Online Platform

Burchfield and Sappington (1999) described student participation as "the voluntary number of active responses". Participation can also be defined as taking part and joining in a dialogue for engaged and active learning. Observably, online platforms have become crucial for many people, including students (Jamalpur, Kafila, Chythanya, & Kumar, 2021; Jomezai et al., 2021 & Tang et al., 2021). Students fall under three distinct groups of online platform participation: active participants, lurkers (those who read messages but do not post messages), and those who do not participate (Selma, 2005). Additionally, students'

online platform participation is in numerous forms, including asking questions, remarks (Fassinger, 2000), and self-disclosures (Goldstein & Benassi, 1994).

Student participation is an essential element for active and engaged learning (Tang et al., 2021). Furthermore, the benefits of student engagement in higher education settings have been emphasised by several reports (Weaver & Qi, 2005; Hofer, Nistor, & Scheibenzuber, 2021). Students engage in higher-level analytical thought, including interpretation and synthesis, contributing to class discussions (Smith, 1977). Student participation also leads to developed communication skills (Dancer & Kamvounias, 2005; Hofer, Nistor, & Scheibenzuber, 2021), higher grades (Handelsman, Briggs, Sullivan, & Towler, 2005), and mastering the target language (Abebe & Deneke, 2015; Dancer & Kamvounias, 2005).

Studies mentioned that some factors attract active student participation in online platforms. Selma and Sajit (2005) suggested that the following factors impact online learner participation and participation patterns: technology and interface characteristics, content area experience, student roles and instructional tasks, and information overload. Meanwhile, Nick (2009) identified that online environment learning opportunities and the pedagogical changes entail quality learning, whereas instructional practices encourage students' online platform participation. Shin Yi Lin On (2011) elaborated the main factors that influence online learning participation: the sense of community, instructor involvement, life characteristics and prior experiences, interaction, learning styles, and motivation. Jamalpur, Kafila, Chythanya, & Kumar's (2021) study stated that student engagement in online learning has increased during the coronavirus disease (COVID-19) outbreak compared to the past.

Several studies also found declining student participation in online learning due to coverage, location, skills, and knowledge that stunts their progress in education (Al-Rahmi, Yahaya, Alamri, Alyousseff, Al-Rahmi, & Kamin, 2019; Kane, Shaw, Pang, Salley, & Snider, 2016). Additionally, lacking digital knowledge and skills causes difficulty in handling tasks in the real world in future. Therefore, the study analyses the three variables mentioned below and identify how the variables contribute to student online platform participation.

2.2. Relative Advantage

Relative advantage is: "People think that innovation is better than the concept it replaces" (Rogers, 2003). For instance, Casmar (2001) highlighted that when the faculty and staff that face new requirements will adopt the technology due to its relevance. Particularly, middle school teachers are aware of the value of technology in teaching and adopt the technology (Arlene Hazel Parisot, 1995). The pandemic has caused teachers and students to seek for alternative technologies and methods in online learning, as mentioned in Konig, Jager-Biela, & Glutsch (2020) and Hofer, Nistor, & Scheibenzuber (2021). Therefore, the study suggested the following hypothesis:

H¹: Relative advantage has a significant positive relationship with student participation in online platforms.

2.3. Complexity

The second attribute is complexity, which is “the degree of innovation considered relatively difficult to understand and use” (Rogers, 2003).) Technological innovation might create challenges for teachers, changing the teaching methods to integrate technological innovation into teaching, causing different complexities (Parisot, 1995), particularly during the pandemic (Scherer, Howard, Tondeur, & Siddiq, 2021; Jomezai et al., 2021; Tang et al., 2021). Martin (2003) added that user-friendly hardware and software could successfully provide course materials. Moreover, the time element of synchronous or asynchronous affects innovation acceptance in online learning (Singh & Thurman, 2019). Hence the following hypothesis is proposed:

H²: Complexity has a significant positive relationship with student participation in online platforms.

2.4. Observability

Observability is “the degree of visibility of innovation results to others” (Rogers, 2003), as verified by Pennings (2015). For example, Parisot (1997) revealed that character modelling (or peer observation) is a crucial driving force for technology adoption and spread. Hence, the benefits of innovation will circulate more quickly throughout society, specifically during the pandemic (Konig, Jager-Biela, & Glutsch, 2020; Hofer, Nistor, & Scheibenzuber, 2021). Therefore, the following hypothesis is presented:

H³: Observability has a significant positive relationship with student participation in online platforms.

2.5. Innovation Diffusion

Innovation diffusion is the process that occurs when people adopt a new idea, product, practice, philosophy, and new things. Rogers (2003) identified five adopters of innovation, a five-stage adoption process, and five innovation characteristics affecting diffusion. Rogers (2003) also discovered five characteristics that influence the acceptance or adoption of innovation: relative advantage, compatibility, complexity, trialability, and observability by people in the social system. Meanwhile, Coleman-Prisco (2017) applied innovation diffusion in open educational resources. Moreover, Almohtadi & Aldarabah (2021) stated that students positively perceive Facebook in teaching using the five innovation characteristics, revealing a 46% variance in regression analysis for the linear relationship with the five independent variables. Past studies have also demonstrated the three most significant features of the five innovation characteristics towards online learning engagement: relative advantage, complexity, and observability (Almohtadi & Aldarabah, 2021; Coleman-Prisco, 2021). Therefore, the study focused on the relationship of the three characteristics of students' learning engagement in using online platforms.

2.6 Teaching Theories 1, 2 and 3

University teaching is a demanding and challenging job. Although good teaching requires many years of practice, most have not been teaching long enough. Therefore, instead of learning and keeping up with issues in the field, teachers should focus on the difficulties in class, what causes the issues, and produce a comprehensive action plan. Theory One states that content knowledge and fluent presentation are sufficient for good teaching, whereas Theory Two complements the picture with additional skills focused principally on student activities and acquiring extra teaching techniques. Finally, Theory Three confirms all the abilities and extends the understanding of teaching to ingrain in the subject knowledge and the nature of how it is learned (Ramsden, 2003).

Present cutting-edge technology has significantly impacted education. Therefore, academic preparation is crucial to establish a new and improved approach to deal with teaching and learning efficiently. Furthermore, social media platforms and tools such as Web 2.0 have provided teachers with new advantage in their teaching and learning. Consequently, students' online platform participation is a critical subject to investigate so that educators can gain more authentic information regarding students' learning behaviour and provide feedback to achieve learning goals.

3. Study Methodology

3.1. Research Approach and Study Design

The study employed cross-sectional design research and collected data from 384 students. The convenience sampling technique was used to select students from HEIs. Meanwhile, the data was collected using a Google form link through various social media platforms such as Facebook, WhatsApp, and Telegrams. The method was chosen for convenience as the online survey was conducted from March 2021 to April 2021 during the COVID-19 lockdown. The study also employed the SPSS version 21 to analyse the research data using Pearson's correlation analysis to examine the relationship between relative advantage, complexity, and observability towards students' online platform participation.

3.2. Population and Sample Size

The study focused on various student backgrounds from different programmes in public and private universities. As the COVID-19 pandemic has disrupted the education system, classes were conducted virtually at the university level. Thus, the study population includes students from Malaysian universities. According to Krejcie and Morgan (1970), a sample size of 384 respondents is needed to represent a cross-section of the population. Hence, the study sample size is sufficient.

3.3. Research Instrument

The main data collection instrument was distributing the questionnaires adopted from previous studies with minor modification. The four items were measured for relative advantage, four items for observability, six items for complexity, and five items for the intention adopted from McCann (2007). Furthermore, the questionnaires were divided into two parts: 1) demographic profiles (gender, age, race, religion, state, and level of education) and 2) items related to the research variables to measure students' participation

in online learning. The variables of interest were rated on a five-point Likert scale: 1 denoting low agreement and 5 denoting high agreement.

4. Findings and Discussion

4.1. Demographic Profile

Table 1 displays the demographic profile of the study. Most respondents were female, 55.21% (N = 212) while the minority were male, 44.79% (N = 172). Next, most respondents were under 25 years old, 95.31% (N = 366), whereas the minority group was 25-34 years old, with 4.69% (N = 18). The respondents' race were mainly Chinese, 54.95% (N = 211), the second-highest were Malay, 39.32% (N = 151), and the remaining were Indian, 5.73% (N = 22). The most common religion was Buddhism, 51.04% (N = 196), the second-highest was Islam, 39.32% (N = 151), followed by Hinduism, 4.95% (N = 19), and others, 4.69% (N = 18).

Most respondents were from Kelantan, 26.30% (N = 101), Johor 10.42% (N = 40), Pahang 9.38% (N = 36), Selangor 8.33% (N = 32), Negeri Sembilan 7.55% (N = 29), Penang 6.77% (N = 26), Kedah 6.25% (N = 24), and others were from Malacca, Perak, Perlis, Sarawak, Sabah, and Terengganu, 5.99% (N = 23), 4.95% (N = 19), 4.69% (N = 18), 3.65% (N = 14), 3.39% (N = 13), and 2.34% (N = 9), respectively. The highest level of education of the respondents was Bachelor's Degree, 96.1% (N = 369), diploma 1.6% (N = 6), followed by others 2.3% (N = 9).

Table 1: Demographic Profile

	n	%		n	%
Gender			State		
Female	212	55.21	Johor	40	10.4
Male	172	44.79	Kedah	24	6.25
Total	384	100	Kelantan	101	26.30
			Melaka	23	5.99
Age			Negeri Sembilan	29	7.55
Below than 25 years	366	95.31	Pahang	36	9.38
25 – 35 years	18	4.69	Penang	26	6.77
Total	384	100	Perak	19	4.95
			Perlis	18	4.69
Race			Selangor	32	8.33
Malay	151	39.32	Terengganu	9	2.34
Chinese	211	54.95	Sabah	13	3.39
Indian	22	5.73	Sarawak	14	3.64
Total	384	100			
Religion			Level of Education		
Islam	151	39.32	Diploma	6	1.6
Buddhism	196	51.04	Degree	369	96.1

Hinduism	19	4.95	Others	9	2.3
Others	18	4.69			
Total	384	100			

4.2. Reliability test

Table 2 shows the results of the indicator reliability, assessed in terms of Cronbach's Alpha that must be higher than 0.7. The results revealed that relative advantage had the highest value of Cronbach's Alpha (0.771), compared to complexity (0.725) and observability (0.704). The results indicated that all study items were acceptable and positively correlated due to the Cronbach's Alpha being more than 0.70 (Hair et al., 2019).

Table 2: Reliability Analysis

Variables	No. items	Cronbach's Alpha
Relative Advantage	4	0.771
Complexity	4	0.725
Observability	6	0.704
Student Participation	5	0.781

4.3. Normality Analysis

Two types of tests were used to run the normality test: Kolmogorov-Smirnov and Shapiro-Wilk. The significance value known as the p-value must be less than 0.05, indicated as normal data. Table 3 shows that the p-value stated in each variable is 0.000, less than 0.05, indicating a normal distribution. Meanwhile, Figure 1 shows no outlier in the normal P-P Plot of regression standardised residential for the dependent variable, denoting relatively normally distributed data.

Table 3: Summary of data normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Relative Advantage	.115	384	.000	.973	384	.000
Observability	.087	384	.000	.976	384	.000
Students Partipation	.070	384	.000	.984	384	.000
Complexity	.113	384	.000	.976	384	.000

a. Lilliefors Significance Correction

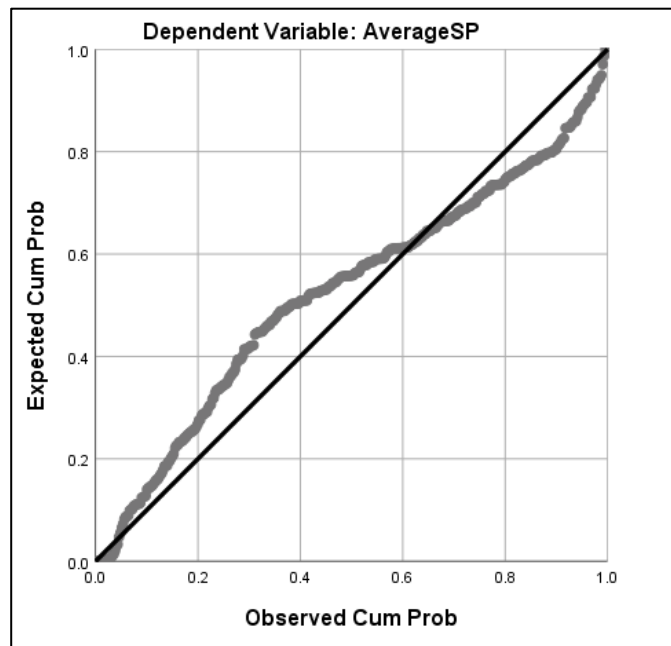


Figure 1: Normal P-P Plot of Regression Standardised Residential

4.4 Pearson's Correlation Analysis

Table 4 indicates the value falls in the range of “moderate positive (negative)” and “high positive (negative)” correlation with student participation. The results suggested that factors (relative advantage, complexity, and observability) correlate with student participation. Observably, all variable values were between 0.599 to 0.859, whereby the correlation coefficient value of relative advantage was 0.859 ($p = 0.01$); complexity was 0.648 ($p = 0.01$), and observability was 0.599 ($p = 0.01$). Hence, all independent variables were acceptable, and the relative advantage interpretation had a high positive correlation. Additionally, complexity and observability interpretation had a moderate positive correlation.

Table 4: Pearson's Correlation Analysis

		Relative Advantage	Observability	Complexity	Student Participation
Relative Advantage	Pearson's Correlation	1	.605**	.577**	.859**
	Sig. (2-tailed)		.000	.000	.000
	N	384	384	384	384
Observability	Pearson's Correlation	.605**	1	.500**	.648**
	Sig. (2-tailed)	.000		.000	.000
	N	384	384	384	384

Complexity	Pearson's Correlation	.577**	.500**	1	.599**
	Sig. (2-tailed)	.000	.000		.000
	N	384	384	384	384
Students Participation	Pearson's Correlation	.859**	.648**	.599**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	384	384	384	384

** . Correlation is significant at the 0.01 level (2-tailed).

4.5. Hypothesis Testing

Based on Table 5, Pearson's correlation analysis was used to test the hypotheses on significant relationships between the factor influence model comprised relative advantage, complexity, and observability with student participation. Summarily, all study hypotheses were accepted at a 0.01 significant level.

Table 5: Summary for hypothesis testing

Hypothesis		Pearson's correlation results	
H ₁	Relative advantage has a significant positive relationship with student participation in online platforms.	r = 0.859, p < 0.01	Supported
H ₂	Complexity has a significant positive relationship with student participation in online platforms.	r = 0.648, p < 0.01	Supported
H ₃	Observability has a significant positive relationship with student participation in online platforms.	r = 0.599, p < 0.01	Supported

The relationships between the single dependent variable Y (student participant) and one more predictor (relative advantage, complexity, and observability) were analysed using multiple linear regression analyses. Before conducting the analysis, the study performed a check of the assumptions. The value of the Durbin Watson test was 1.792, suggesting no autocorrelation problem as the value was close to 2. Besides, multicollinearity was checked based on variance inflation factors (VIF) and tolerance. Table 7 demonstrates that the value of VIF was 1.585, 1.668 and 1.877. Significantly, Hair et al. (2010) stated that values between 1 and 10 denote no multicollinearity problem. The tolerance value was also more than 0.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.879 ^a	.772	.770	.36209	1.792
a. Predictors: (Constant), AverageC, AverageO, AverageRA					
b. Dependent Variable: AverageSP					

Table 6 also illustrated that the multiple linear regression analysis results demonstrated that the three predictor variables (relative advantage, complexity, and observability) explained 77.2% of the variance in accountability, $R^2 = 0.772$, and adjusted $R^2 = 0.770$. Hence, a value greater than 0.5 suggests that the model is effective enough to determine the relationship.

Table 7: Multiple regression analyses results

Model	Unstandardised Coefficients		Standardised Coefficients	T	Sig.	95.0% Confidence Interval for B		Collinearity Statistics		
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF	
1	(Constant)	-.298	.122		-2.447	.015	-.537	-.058		
	AverageRA	.723	.035	.688	20.487	.000	.654	.793	.533	1.877
	AverageO	.175	.032	.174	5.502	.000	.112	.237	.599	1.668
	AverageC	.151	.041	.114	3.708	.000	.071	.231	.631	1.585
a. Dependent Variable: AverageSP										

The multiple regression analyses results also showed that relative advantage ($B = 0.723$, $p < 0.01$), observability ($B = 0.175$, $p < 0.01$) and complexity ($B = 0.151$, $p < 0.05$) had a significant and positive relationship with student participation. Therefore, all hypotheses were supported as shown in Table 5 and Table 7.

5. Discussion and Recommendation

In addressing the research questions, the researcher identified a relationship between the relative advantage and students' online platform participation. Notably, the relative advantage of using an online platform affected student participation in a university campus, with the results indicating that the p-value was 0.00, and the beta value was 0.723. The researcher also found a relationship between complexity and students' online participation. The complexity of using an online platform affected student participation, whereby the results showed that the p-value was 0.00, and the beta value was 0.151. Finally, the results proved a relationship between observability and student participation. Observability on online platform usage affected student participation, whereby the results revealed that the p-value was 0.00, and the beta value was 0.175. Besides,

regression analysis showed that 77.2% of the variance of the student participation in the online platform could be due to the linear relationship with the three independent variables: relative advantage, complexity and observability.

Based on the findings, relative advantage, complexity, and observation significantly impacted student participation, consistent with Almohtadi and Aldarabah (2021) and Coleman-Prisco (2021). Additionally, the students had a positive response to technology, in line with Casmar (2001). The findings suggested that humans will adopt technology because it is relevant. Nowadays, the pandemic has caused teachers and students to apply technology in education, which is the most convenient delivery method (Scherer, Howard, Tondeur, & Siddiq, 2021; Hofer, Nistor, & Scheibenzuber, 2021; Tang et al., 2021). Conversely, technological adoption in education creates more challenges for the users to apply advanced technology in their practice, as confirmed by Parisot (1995). Additionally, the study revealed that student participation appears in numerous forms, including questions from pupils, remarks (Fassinger, 2000), and self-disclosures (Goldstein & Benassi, 1994).

Online platform learning is based on users, convenience and pace, a continuous process. Besides, student participation might be affected by teachers' competence (Fritschner, 2000) and self-disclosure (Ebersole, McFall, & Brandt, 1977). The findings confirmed that online platforms influenced the significant relationship between all the variables and student participation. The findings also verified that online learner participation and participation patterns are influenced by technology and interface characteristics, content area experience, student roles and instructional tasks, and information overload, as stated by Selma & Sajit (2005). Lastly, complexity significantly influenced student participation based on the user-friendly factor, in line with Martin (2003), Konig, Jager-Biela, & Glutsch (2020) and Hofer, Nistor, & Scheibenzuber (2021). The findings strengthened the notion that adopting innovation is an active process whereby users change or modify the innovation as it is adopted and implemented.

In terms of the learning theory, the findings proved that educators play an essential role in enhancing students' learning participation, as elaborated in theory 3 (Ramsden, 2003). Besides transmitting knowledge and organising various activities, an educator must know the students well to produce effective and lifelong learning. Hence, online platform education programmes play a crucial role in today's society (Almohtadi & Aldarabah, 2021; Coleman-Prisco, 2021). Moreover, the programmes could significantly impact and provide additional knowledge for society in the future. Thus, HEIs should employ online learning platforms for students and ensure that technological advancements are user-friendly. University students should also learn how to use online platforms to enhance the learning process. Due to the flexibility and self-paced learning, students could learn in any place, at any time, based on their learning abilities. Besides, online platform learning promotes self-directed learning, an important learning skill needed in the 21st century, specifically in accomplishing all the learning tasks during the pandemic season.

Finally, the study provides several recommendations to improve the research. Firstly, a qualitative method such as an interview and observation should be used in future research. Additionally, further explanations of the questions should be asked to

provide a clearer picture of what the students face during online activities and prevent misinterpretation of different outcomes. Furthermore, observation is a systematic method of research whereby researchers in their typical environment examine the activities of the subjects, providing direct and authentic data. Secondly, future studies should gather more respondents to answer the questionnaire for more accurate results. Finally, the study also recommends that studies be conducted on other subjects such as government employees or private workers who also use online platforms for collaboration, meetings, and research. The study involved a large number of respondents. Hence, the larger the number of respondents, the more accurate the survey-derived information.

6. Conclusion

The study discussed the factors regarding innovation diffusion impact on student participation at HEIs. The results proved that the three independent variables, relative advantage, complexity and observability, were significantly related to student participation at HEIs. In the future, other factors influencing student participation should be further studied to improve educators' teaching abilities, particularly when delivering instruction online.

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References

- Abebe, D. T., & Deneke, D. (2015). Causes of students' limited participation in EFL classroom: Ethiopian public universities in focus. *International Journal of Educational Research and Technology*, 6(1), 74-89.
- Almohtadi, R. M & Aldarabah. (2021). University Students' Attitudes toward the Formal Integration of Facebook in their Education: Investigation Guided by Rogers' Attributes of Innovation. *World Journal of Education*, 11(1), 20-28.
- Al-Rahmi, W. M., Yahaya, N., Alamri, M. M., Alyoussef, I. Y., Al-Rahmi, A. M., & Kamin, Y. B. (2019). Integrating innovation diffusion theory with technology acceptance model: Supporting students' attitude towards using a massive open online courses (MOOCs) systems. *Interactive Learning Environments*, 1-13.
- Burchfield, C. M., & Sappington, J. (1999). Participation in classroom discussion. *Teaching of Psychology*.

- Casmar, S. P. (2001). The adoption of computer technology by faculty in a college of education: an analysis of administrative planning issues. *Retrieved from ProQuest Dissertations and Theses (AN 304734123)*.
- Cholifah, P. S., Oktaviani, H. I., Nuraini, N. L. S., Meidina, A. M., Wanodyaningtiyas, R. F., & Yafie, E. (2019, October). Online Project-Based Learning for Improving the Innovative Initiation during Diffusion and Innovation Course. In 2019 5th International Conference on Education and Technology (ICET) (pp. 55-60). IEEE.
- Coleman-Prisco, V. A. (2017). Factors influencing faculty innovation and adoption of open educational resources in United States higher education. *International Journal of Education and Human Developments* 3(4).
- Cornelius, N., Wallace, J., & Tassabehji, R. (2007). An analysis of corporate social responsibility, corporate identity and ethics teaching in business schools. *Journal of Business Ethics*, 76(1), 117-135.
- Dancer, D., & Kamvounias, P. (2005). Student involvement in assessment: A project designed to assess class participation fairly and reliably. *Assessment & Evaluation in Higher Education*, 30(4), 445-454.
- Ebersole, P., McFall, M., & Brandt, C. (1977). Imitation and prior classroom contact as determinants of reciprocal self-disclosure. *Psychological reports*, 41(1), 87-91.
- Fassinger, P. A. (2000). How classes influence students' participation in college classrooms. *The Journal of Classroom Interaction*, 38-47.
- Ferrer-Balas, D., Buckland, H., & de Mingo, M. (2009). Explorations on the university's role in society for sustainable development through a systems transition approach. Case-study of the Technical University of Catalonia (UPC). *Journal of cleaner production*, 17(12), 1075-1085.
- Fritschner, L. M. (2000). Inside the undergraduate college classroom: Faculty and students differ on the meaning of student participation. *The Journal of Higher Education*, 71(3), 342-362.
- Goldstein, G. S., & Benassi, V. A. (1994). The relation between teacher self-disclosure and student classroom participation. *Teaching of Psychology*, 21(4), 212-217.
- Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010) *Multivariate Data Analysis*. 7th Edition, Pearson, New York.
- Handelsman, M. M., Briggs, W. L., Sullivan, N., & Towler, A. (2005). A measure of college student course engagement. *The Journal of Educational Research*, 98(3), 184-192.
- Hofer, S. I., Nistor, N., & Scheibenzuber, C. (2021). Online teaching and learning in higher education: Lessons learned in crisis situations. *Computers in Human Behavior*.
- Jamalpur, B., Kafila, Chythanya, K. R., & Kumar, K. S. (2021). A comprehensive overview of online education – Impact on engineering students during COVID-19. *Materials Today: Proceedings*, (xxxx), 1–4.
- Jogezai, N. A., Baloch, F. A., Jaffar, M., Shah, T., Khilji, G. K., & Bashir, S. (2021). Teachers' attitudes towards social media (SM) use in online learning amid the COVID-19 pandemic: the effects of SM use by teachers and religious scholars during physical distancing. *Heliyon* 7(4).

- Kane, R. T., Shaw, M., Pang, S., Salley, W., & Snider, J. B. (2016). Faculty professional development and student satisfaction in online higher education. *Online Journal Distance Learning Administration*, 19(2), 105-15.
- Konig, J., Jager-Biela, D. J., & Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: teacher education and teacher competence effects among early career teachers in Germany. *European Journal of Teacher Education* 43(4).608-622.
- Kothari, C. R. (2004). *Research methodology: Methods and techniques*: New Age International.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, 30(3), 607-610.
- Lavrakas, P. J. (2008). *Encyclopedia of survey research methods*: Sage Publications.
- Martin, M. H. (2003). *Factors influencing faculty adoption of web-based courses in teacher education programs within the State University of New York*. Virginia Tech,
- Lin, S., & Chiu, C. (2011). Factors Affecting Participation in Online Learning : Evidences from Andragogy.
- Nick Z. Z. (2009) Fostering Students' Participation in Online Environments: Focus on Interaction, Communication and Problem Solving. *Journal of College Teaching and Learning*, 6 (2), 25-34.
- OECD (2019) An Introduction to Online Platforms and their Role in the Digital Transformation. Paris: OECD Publishing
- Parisot, A. H. (1995). *Technology and teaching: The adoption and diffusion of technological innovations by a community college faculty*. Doctoral thesis. Montana State University-Bozeman, College of Education, Health & Human.
- Parisot, A. H. (1997). Distance education as a catalyst for changing teaching in the community college: Implications for institutional policy. *New directions for community colleges*, 1997(99), 5-13.
- Pennings, A. (2015). Diffusion and the Five Characteristics of Innovation Adoption. In
- Raman, R., Sairam, B., Veena, G., Vachharajani, H., & Nedungadi, P. (2021). Adoption of online proctored examinations by university students during COVID-19: Innovation diffusion study. *Education and Information Technologies*, 1-20.
- Raman, R., Vachharajani, H., & Achuthan, K. (2018). Students motivation for adopting programming contests: Innovation-diffusion perspective. *Education and Information Technologies*, 23(5), 1919-1932.
- Ramsden, P. (2003). *Learning to Teach in Higher Education* 2nd edition (2nd Editio). London and New York: Routledge, Taylor& Francis Group
- Rogers, E. M. (2003). Elements of diffusion. *Diffusion of innovations*, 5(1.38).
- Rogers, E. M. (1986). The role of the research university in the spin-off of high-technology companies. *Technovation*, 4(3), 169-181.
- Scherer, R., Howard, S. K., Tondeur, J., & Siddiq, F. (2021). Profiling teachers' readiness for online teaching and learning in higher education: Who's ready? *Computers in Human Behavior*, 118
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*: John Wiley & Sons.

- Selma, V. & Sajit, Z (2005) Factors that Influence Participation In Online Learning, *Journal of Research on Technology in Education*, 38:2, 213-230.
- Singh, V., & Thurman, A. (2019). How Many Ways Can We Define Online Learning? A Systematic Literature Review of Definitions of Online Learning (1988-2018). *American Journal of Distance Education* 33(4).289-306
- Tang, Y. M., Chen, P. C., Law, K. M. Y., Wu, C. H., Lau, Y. yip, Guan, J., & Ho, G. T. S. (2021). Comparative analysis of Student's live online learning readiness during the coronavirus (COVID-19) pandemic in the higher education sector. *Computers and Education*, 168.
- Smith, D. G. (1977). College classroom interactions and critical thinking. *Journal of Educational Psychology*, 69(2), 180.
- Weaver, R. R., & Qi, J. (2005). Classroom organisation and participation: College students' perceptions. *The Journal of Higher Education*, 76(5), 570-601.
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