Factors Influencing Teachers' Acceptance of Using Google Classroom in Mathematics Blended Learning

Faktor-Faktor Yang Mempengaruhi Penerimaan Guru Menggunakan 'Google Classroom' dalam Pembelajaran Teradun Matematik

Nazri Sedi[1] & Mohammad Nur Azhar Mazlan[2*]
[1, 2]Fakulti Sains Kognitif & Pembangunan Manusia, Universiti Malaysia Sarawak,
94300 Kota Samarahan, Sarawak, Malaysia

*Corresponding author: nazrisedi@gmail.com

Published: 16 May 2023

To cite this article (APA): Sedi, N., & Mazlan, M. N. A. (2023). Factors Influencing Teachers' Acceptance of Using Google Classroom in Mathematics Blended Learning: Faktor-Faktor Yang Mempengaruhi Penerimaan Guru Menggunakan 'Google Classroom' dalam Pembelajaran Teradun Matematik. *Jurnal Pendidikan Sains Dan Matematik Malaysia, 13*(1), 10–21. https://doi.org/10.37134/jpsmm.vol13.1.2.2023

To link to this article: https://doi.org/10.37134/jpsmm.vol13.1.2.2023

ABSTRACT

This concept paper will discuss the definition and concept of Blended learning in Mathematics as well as the factors of teachers' acceptance of using Google Classroom in Mathematics Blended Learning based on previous technology acceptance models. The factors of teachers' acceptance of using Google Classroom in Mathematics Blended Learning have been identified through the extensive analysis of the previous literature review. The purpose of this concept paper is to discuss in detail the design and selection of the acceptance factors of teachers using Google Classroom in Mathematics Blended Learning. This concept paper is expected to give a complete picture related to the factors that influence teachers' acceptance of using Google Classroom, especially in Mathematics Blended Learning and serve as a guide to stakeholders and policy implementers to take the initiative to use Google Classroom in the field of Mathematics education in Malaysia a success.

Keywords: Blended learning; Google Classroom; Mathematics

ABSTRAK

Kertas konsep ini akan mengupas tentang definisi dan konsep Pembelajaran Teradun dalam matematik, faktor-faktor penerimaan guru menggunakan Google Classroom dalam Pembelajaran Teradun matematik berdasarkan model atau teori penerimaan teknologi yang terdahulu. Faktor-faktor penerimaan guru menggunakan Google Classroom dalam Pembelajaran Teradun matematik telah dikenal pasti melalui analisis secara ekstensif tinjauan literatur yang lepas. Tujuan penulisan kertas konsep ini adalah untuk membincangkan secara terperinci pembentukan dan penetapan faktor-faktor penerimaan guru menggunakan Google Classroom dalam Pembelajaran Teradun matematik. Hasil penulisan ini diharap dapat memberi gambaran lengkap berkaitan dengan faktor-faktor yang mempengaruhi penerimaan guru menggunakan Google Classroom khususnya dalam Pembelajaran Teradun matematik dan menjadi panduan kepada pemegang taruh dan pelaksana polisi bagi menjayakan inisiatif penggunaan Google Classroom dalam bidang pendidikan matematik di Malaysia.

Kata Kunci: *Pembelajaran Teradun, Google Classroom, Matematik.*

INTRODUCTION

The learning process in the field of education across all branches of knowledge proves the demand of technology integration which forms a learning approach known as Blended Learning (BL). In Blended Learning (BL), the learning environment combines e-learning and face-to-face teaching methods and provides space and opportunities for students to learn at their flexibility (Prasad et al., 2018).

Lopes and Soares (2018) claim that BL has a very exclusive and sometimes confusing definition as the term has almost the same meaning with the other terms and they are used interchangeably. Therefore, it is quite difficult to distinguish BL with other terms such as "Virtual Learning", "Hybrid Learning", "Distance Learning", "Network Learning", "Online Learning", "Web-enhanced Learning", "Internet -enabled Learning" and so on.

Graham (2006) defines Blended Learning as a combination of face-to-face instruction and computer-mediated instruction. Similarly, Garrison & Kanuka (2004) defines Blended Learning as "thoughtful integration of classroom face-to-face learning experiences with online learning". In the context of this article, the Mathematics Blended Learning approach refers to the combination or integration of face-to-face teaching and the use of the Google Classroom learning platform in learning Mathematics. Research by Ab Hajis et al. (2022) found that the integration of Google Classroom in mathematics learning helps teachers greatly to ensure the effectiveness of the implementation Home-Based Teaching and Learning (PDPR) implementation.

In order to ensure the success of Blended Learning approach in mathematics, teachers should plan the teaching and learning process by using Google Classroom as; (1) a support tool for the sharing of mathematics learning materials, (2) a virtual medium of interaction, communication and collaboration between teachers, students and parents or guardians and (3) a tool to assess the students' level of mastery and learning performance in mathematics.

LITERATURE REVIEW

There are a number of factors that have been outlined in evaluating the acceptance and use of technology such as *Perceived Usefulness, Perceived Ease of Use, Social Influence, Facilitating Conditions, Attitude, Subjective Norm, Perceived Behavioural Control* and so on. These factors have been developed from several theories or models such as Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), Technology Acceptance Model (TAM) (Davis, 1986), Technology Acceptance Model 2 (TAM 2) (Venkatesh & Davis, 2000), Technology Acceptance Model 3 (TAM 3) (Venkatesh & Bala, 2008), Theory of Planned Behaviour (TPB) (Ajzen, 1991), Innovation Diffusion Theory (IDT) or Diffusion of Innovation (DOI) (Rogers, 1983), Social Cognitive Theory (SCT) (Bandura, 1989), Model of PC Utilization (MPCU) (Thompson et al., 1991), Motivational Model (MM) (Davis et al., 1992), C-TAM-TPB (Taylor & Todd, 1995), Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) and Unified Theory of Acceptance and Use of Technology 2 (UTAUT 2) (Venkatesh et al., 2012).

These models have been used as a basic theoretical framework in various fields of study to measure and predict factors of acceptance and use of technology through feedback such as perceptions, beliefs, attitudes and so on. Examples of past studies that use the theory or model mentioned are such as Diffusion of Innovation Theory (DOI) (Bokolo et al., 2019; Porter et al., 2016), Social Cognitive Theory (SCT) (San Pedro et al., 2017), Technology Acceptance Model (TAM) (Deepak, 2017; Adukaite et al., 2017; Stockless, 2018; Bazelais et al., 2018; Al-Rahmi et al., 2018; Mailizar et al., 2021) and Unified Theory of Acceptance and Use of Technology (UTAUT) (Sesma, 2020; Raman & Rathakrishnan, 2018; Alabi & Mutula, 2020;

Alshammari, 2021; Sultana, 2020; Alasmari & Zhang, 2019; Eutsler & Antonenko, 2018; Shukla, 2021). There are also past studies that combine technology acceptance models or theories in their studies such as Al-Harbi (2011) (TPB & TAM), Hussein et al. (2020) (TAM & ISSM), Buabeng-Andoh & Baah (2020) (TAM & UTAUT), Zhang et al. (2020) (UTAUT & IS), Bardakcı & Alkan (2019) (UTAUT & TPACK), Eutsler & Antonenko (2018) (UTAUT & TAM), Radovan & Kristl (2017) (UTAUT & CoI). Previous studies reveal that technology acceptance studies used UTAUT, UTAUT 2 and extended models with a wide range of variables in order to determine the user acceptance or adoption of technology in education field. All of the studies showed varying results. Thus, it is imperative to engage the UTAUT, UTAUT 2 or their extended models by combining the variables appropriately to achieve the best results (Yee & Abdullah, 2021).

The UTAUT model integrates eight technology acceptance models (TRA, TPB, TAM, IDT, SCT, MPCU, MM and C-TAM-TPB) by producing four predictors (*Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions*) for *Behavioural Intention* and *Use Behaviour* as well as four moderators namely *Gender, Age, Experience* and *Voluntariness of Use*. The integration of all these theories or models is due to the fact that researchers in the field of Information Systems and Technology face the constraints of various model choices, bound in the selection and design of the entire model or part of the preferred model as well as ignoring the contribution of other alternative models. Besides, there is a lot of debate about the functions of the variables that are almost the same in all such theories or models. The UTAUT model is more suitable for explaining the acceptance of technology in the context of an organization (Venkatesh et al., 2003).

On the other hand, the UTAUT 2 model is an extended model of UTAUT which focuses more on technology acceptance from an individual perspective. There are three new constructs that have been added to the UTAUT 2 model, namely *Hedonic Motivation, Habit* and *Price Value* (Venkatesh et al., 2012). The UTAUT 2 model is capable of explaining 74% of users' *Behavioural Intention* (BI) towards technology acceptance (Venkatesh et al., 2012; Venkatesh et al., 2016). In addition, it is a better model in the exploration of *Behavioural Intention* (BI) of technology use (Abbad, 2021; Tamilmani et al., 2021; Amadin et al., 2018; Jakkaew & Hemrungrote, 2017). The UTAUT 2 model is less tested and empirically proven through studies related to the acceptance and use of technology in the context of education in Malaysia (Sharifi fard et al., 2016; Raman & Don, 2013). Therefore, the validity and reliability of the UTAUT 2 model requires further study (Marchewka et al., 2007; Alshahrani & Walker, 2017).

There are several previous studies that use the UTAUT 2 model in measuring the acceptance and use of technology in various fields of education around the world. The UTAUT 2 model has been used to study the factors that motivate individuals to accept or use technology in the US and Europe (Venkatesh et al., 2012; Nikolopoulou et al., 2020), Asia (Samsudeen & Mohamed, 2019; Mohan et al. ., 2020; Hu et al., 2020; Tseng et al., 2019; Jakkaew & Hemrungrote, 2017; Kado et al., 2020), the Middle East and Africa (Azizi et al., 2020; Ameri et al., 2020 ; Mtebe et al., 2016; A. Khan & Qudrat-Ullah, 2021; Dajani & Abu Hegleh, 2019), South America (Dakduk et al., 2018), Australia (Bower et al., 2020), Malaysia (Kumar & Bervell, 2019; Abdul Rabu et al., 2019) and a combination of three countries namely Korea, Japan and the US (Jung & Lee, 2020).

A study conducted by Tseng et al. (2019), Hu et al. (2020), Bower et al. (2020), Azizi et al. (2020), Nikolopoulou et al. (2020) and Dakduk et al. (2018) use the original UTAUT 2 model completely without any addition of other external variables. However, a study by Mtebe et al. (2016) and Ameri et al. (2020) omit some of the original variables and moderators in the UTAUT Model 2. Mtebe et al. (2016) dismiss all the original moderators in the UTAUT 2 model, while Ameri et al. (2020) also omit *Hedonic Motivation, Price Value* and *Voluntariness of Use* as moderator variable.

Nevertheless, there are also some past studies that have added or included some external variables or new moderators into the UTAUT 2 model (A. Khan & Qudrat-Ullah, 2021; Jung & Lee, 2020; Dajani & Abu Hegleh, 2019; Samsudeen & Mohamed, 2019; Mohan et al., 2020). A. Khan & Qudrat-Ullah (2021) drop the *Price Value* variable but include new moderator variables namely *Technology Awareness, Power Distance, Uncertainty Avoidance, Individualism* and *Masculinity*. In another studies, other variables or new moderators are included such as *Culture* (Jung & Lee, 2020), *Learning Value* and *Students' Innovativeness* (Dajani & Abu Hegleh, 2019), *Work Life Quality* and *Internet Experience* (Samsudeen & Mohamed, 2019) and *Contents of Platform* and *Gender* (Mohan et al., 2020).

In general, there are several past studies conducted locally and abroad utilizing Google Classroom in the field of education studying the acceptance and its uses (Alotumi, 2022; Saidu & Al Mamun, 2022; Melvina, 2022; Huang et al., 2021; Zakaria et al., 2021; Zulherman et al., 2021; Md Yunus et al., 2021; Pratama, 2021; Mansor & Megat Zakaria, 2021; Hussein et al., 2020; Syed Ahmad et al., 2020; Abd Manan & Hanafi, 2019; Al-Maroof & Al-Emran , 2018). However, there are little research carried out in Malaysia to identify the factors that influence teachers' acceptance of using Google Classroom, especially in Mathematics Blended Learning.

METHODOLOGY

This article examines previous studies that focused on Blended Learning and Google Classroom. In order to find relevant research articles, the author searched several databases such as Scopus, ERIC, ProQuest and Google Scholar Journal using the keywords "Google Classroom" and "Blended Learning." However, the search results were very broad, so the author narrowed down the selection by applying specific criteria: (1) research that clearly uses Google Classroom in the field of education, (2) research that employs the technology acceptance model or theory, (3) research that evaluates the factors of student or teacher adoption or acceptance of Google Classroom in education, (4) research that specifies the educational institution (school, college, university, or other private educational institution), and (5) research that was published between 2017 and 2022. Based on these criteria, only 18 articles were selected. Therefore, the following discussion focuses on the factors that influence the acceptance of Google Classroom by mathematics teachers.

FACTORS THAT INFLUENCE TEACHERS' ACCEPTANCE OF USING GOOGLE CLASSROOM IN MATHEMATICS BLENDED LEARNING

Performance Expectancy

The *Performance Expectancy* (PE) is defined as an individual's degree of trust in using technology system that can help to achieve goals or improve individual performance or work performance (Venkatesh et al., 2003). *Performance* PE have been extracted and set based on Blended Learning attributes and the five previous technology acceptance model variables namely; *Perceived Usefulness* (TAM), *Extrinsic Motivation* (MM*), Job-fit* (MPCU), *Relative Advantage* (IDT) and *Outcome Expectation* (SCT).

Davis (1989) states that the *Perceived Usefulness* variable is the most frequently used predictor factor in determining the level of acceptance and use of technology among individuals, while PE is the most influential predictor of the *Behavioural Intention* (BI) among technology users (Venkatesh et al., 2003, 2012). In addition, previous studies (Md Yunus et al., 2021; Zulherman et al., 2021; Saragih et al., 2019; Buabeng-Andoh & Baah, 2020; Kumar & Bervell, 2019; Gross, 2019; Sesma, 2020; Radovan & Kristl,

2017) have proven that PE is a main predictor to the individual's desire or intention to use technology in the learning process.

Effort Expectancy

Effort Expectancy (EE) refers to individual's degree of trust of technology system which is deemed as easy to use or user-friendly (Venkatesh et al., 2012). EE is a research variable that corresponds to the previous technology acceptance models such as *Perceived Ease of Use* (TAM), *Ease of Use* (IDT/DOI) and *Complexity* (MPCU).

In TAM model, *Perceived Ease of Use* is one of the variables that drives an individual's desire, preference or intention to use a technology system (Davis, 1989). Rogers (1983) in the DOI model finds that there is a significant relationship between *Complexity* and the rate of use of new technology. Next, Moore and Benbasat (1991) expands the DOI model and find that *Ease of Use* also is one of the factors or variables that influence individual's readiness to accept and use technology.

The findings of previous studies show that EE is a significant predictor that determines individual's behavioural intention to use technology (Md Yunus et al., 2021; Zulherman et al., 2021; Sesma, 2020; Padhi, 2018; Gunasinghe et al., 2019; Raman & Rathakrishnan, 2018; Nizar et al., 2019; A. Khan & Qudrat-Ullah, 2021; Azizi et al., 2020; Thongsri et al., 2019; Shukla, 2021; Yakubu et al., 2020; Jakkaew & Hemrungrote, 2017; Al-Maroof & Al-Emran, 2018). In addition, the frequency of use or testing of EE or its equivalent variable (*Perceived Ease of Use*) shows that Effort Expectancy (EE) is one of the significant predicting factors in explaining the acceptance and use of technology among users. In a situation where technology is seen as easy to use and user-friendly, it can indirectly influence the individual's intention to use it continuously.

Social Influencing

Social Influencing (SI) refers to the degree of individual belief on the importance of other people's views which explains either they should or should not use a technology system (Venkatesh et al., 2012). Social influence also refers to social relationships between family members, colleagues and the closest individuals who are able to influence individual's practices and beliefs in order to accept and use a technology. SI corresponds to the variables of *Subjective Norm* (TAM 2, TRA and C-TAM/TPB), *Social Factor* (MPCU) and *Image* (DOI). Rogers (1983) explains that the success of individuals in using a new innovation or technology also motivates and influences their friends to continue using the technology. Meanwhile, Bandura (1989) suggests that environmental factors such as social interaction and culture differences greatly influence the formation of individual behaviour.

Past scholars concludes that SI is a predicting factor that influences the acceptance and use of technology among individuals (Thompson et al., 1991; Venkatesh & Morris, 2000; Venkatesh & Davis, 2000; Venkatesh et al. al., 2003; Venkatesh et al., 2012). In addition, most previous research findings show that SI has a significant impact and influence on *Behavioural Intention* (BI) and *Use Behavioural* (UB) among technology users (Md Yunus et al., 2021; Zulherman et al., 2021; Yeop et al., 2019; Tseng et al., 2019; Raman & Rathakrishnan, 2018; Herting et al., 2020; Gharrah & Aljaafreh, 2021; A. Khan & Qudrat-Ullah, 2021; Bower et al., 2020; Buabeng-Andoh & Baah, 2020; Azizi et al., 2020; Jakkaew & Hemrungrote, 2017; Al-Maroof & Al-Emran, 2018, Alshehri et al., 2019; Thongsri et al., 2019).

Facilitating Condition

Facilitating Conditions (FC) refers to the degree of belief or perception of individuals on the existence of an efficient infrastructure in supporting the use of a technology system (Venkatesh et al., 2003). FC is extracted based on Blended Learning attributes which is equivalent to several variables such as *Perceived Behavioural Control* (C-TAM-TPB), *Compatibility* (IDT) and *Perceived Control* (TPB).

The findings of studies conducted by Venkatesh et al. (2003), Padhi (2018), Alshehri et al. (2019), Sultana (2020), Saragih et al. (2019), Alshammari (2021) and Alotumi (2022) show that FC do not have a significant relationship with *Behavioural Intention* (BI) but there is a direct positive relationship with *Behavioural Use* (BU). On the other hand, Thompson et al. (1991) in the Model of PC Utilization (MPCU) show that FC have a significant effect on the *Behavioural Intention* (BI) and *Behavioural Use* (BU) of technology users. These findings are in line with the results of the other study by Md Yunus et al. (2021), Zulherman et al., 2021; Yeop et al. (2019), Radovan & Kristl, (2017), Tseng et al. (2019), Gunasinghe et al. (2019), Raman & Rathakrishnan (2018), A. Khan & Qudrat-Ullah (2021), Azizi et al. (2020), Z. Zhang et al. (2020), Shukla (2021), Khechine et al. (2020), Thomas et al. (2020) and Saragih et al. (2019).

Therefore, FC is identified as one of the predicting factors that influence teachers' acceptance to use Google Classroom. This is explained in the findings of previous studies that show the influence of FC which are inconsistent with the *Behavioural Intention* (BI) and *Behavioural Use* (BU) of technology users in different research contexts.

Attitude

When a new technology or innovation is introduced, the first matter to be considered by the stakeholders is the attitude of a particular group, either to accept and use it or otherwise. Ajzen (1991) in the Theory of Planned Behaviour (TPB) emphasizes factors or obstacles that influence individual's intention to change, namely *Attitude* and *Perception*. *Attitude* is defined as an individual's evaluation of an object, individual or situation which tend to be good or bad (Sherbib Asiri et al., 2012; Fishbein & Ajzen, 1975).

There is a need to test the influence of certain variables on the relationship between the independent variable and the dependent variable if the case of any theory happened to suggest it (Hayes, 2013; Hayes & Preacher, 2013). The TAM model which is introduced by Davis (1989) finds that *Attitude* is a mediator variable that links the main variable between beliefs and technology use behavior. In this model, two variables or factors (beliefs) namely *Perceived Usefulness* (PU) and *Perceived Ease of Use* (PEOU) are deemed to influence the *Behavioral Intention* (BI) and *Behavioral Use* (BU) of technology users (Davis, 1986,1989).

Previous research findings demonstrate that *Attitude* is the main variable that affects *Behavioural Intention* and *Behavioural Use* of technology users (Mohan et al., 2020; Eutsler & Antonenko, 2018; Bervell & Umar, 2018; Nicholas-Omoregbe et al., 2017; Mtebe et al., 2016; Bervell et al., 2020). In addition, in a study by Altalhi (2020), *Attitude* has a critical role in validating the UTAUT model which is used in his research framework. Mailizar et al. (2021) also justifies that *Attitude* is the most prominent variable to predict university students' *Behavioural Intention* to use e-learning during the recent pandemic. Since the *Attitude* shows an inconsistent role in the TRA, TPB and TAM models, the researcher believes that the *Attitude* is one of the factors that influence teachers' acceptance to use Google Classroom in Mathematics Blended Learning.

CONCLUSION

There are various technology acceptance models or theories that can be used as a basic framework in building a research model. However, the selection of a technology acceptance model or theory depends on the objective and context of the particular study. The suitability of the selected model will help to produce more specific and solid research findings in explaining the factors that influence the technology acceptance among individuals. In addition, there are some aspects to be considered before choosing a variable or predictor to be tested in the studying a model such as convincing empirical evidence of past studies, relevance previous technology acceptance theories or models and practical contributions in related research fields.

In summary, this article has discussed the design and selection of teacher acceptance factors in using Google Classroom in Mathematics Blended Learning. These acceptance factors are summarized based on the extensive analysis of past studies and previous acceptance models or theories. Therefore, as mentioned above, there are five variables that have been listed as independent variables or factors that influence teachers' acceptance of using Google Classroom in Mathematics Blended Learning, namely *Performance Expectations* (PE), *Effort Expectations* (EE), *Social Influence* (SI), *Facilitating Conditions* (FC). and *Attitude*. These factors are believed to be the main predictors that influence the *Behavioral Intention* of teachers using Google Classroom in Mathematics Blended Learning.

REFERENCES

A. Khan, R., & Qudrat-Ullah, H. (2021). Adoption of LMS in the Higher Educational Institutions of the Middle East. In *Advances in Science, Technology and Innovation*. https://doi.org/10.1007/978-3-030-50112-9_1

Ab Hajis, N. A., Rosli, P., Mahmud, M. S., Halim, L., & Abdul Karim, A. (2022). Technology integration among mathematics teachers during Home-Based Teaching and Learning. *Jurnal Pendidikan Sains Dan Matematik Malaysia*, *12*(2), 39–53.

Abbad, M. M. M. (2021). Using the UTAUT model to understand students' usage of e-learning systems in developing countries. *Education and Information Technologies*, *0123456789*. https://doi.org/10.1007/s10639-021-10573-5

Abdul Rabu, S. N., Hussin, H., & Bervell, B. (2019). QR code utilization in a large classroom: Higher education students' initial perceptions. *Education and Information Technologies*, *24*(1), 359–384. https://doi.org/10.1007/s10639-018-9779-2

Abd Manan, N. Z., & Hanafi, H. F. (2019). Google Classroom : Student's acceptance using UTAUT model. *Journal of Applied Arts*, *1*(1), 64–72.

Adukaite, A., van Zyl, I., Er, Ş., & Cantoni, L. (2017). Teacher perceptions on the use of digital gamified learning in tourism education: The case of South African secondary schools. *Computers and Education*, *111*, 172–190. https://doi.org/10.1016/j.compedu.2017.04.008

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.4135/9781446249215.n22

Al-Harbi, K. A. S. (2011). e-Learning in the Saudi tertiary education: Potential and challenges. *Applied Computing and Informatics*, *9*, 31–46. https://doi.org/10.1016/j.aci.2010.03.002

Al-Maroof, R. A. S., & Al-Emran, M. (2018). Students acceptance of Google Classroom: An exploratory study using PLS-SEM approach. *International Journal of Emerging Technologies in Learning*, *13*(6), 112–123. https://doi.org/10.3991/ijet.v13i06.8275

Al-Rahmi, W. M., Alias, N., Othman, M. S., Alzahrani, A. I., Alfarraj, O., Saged, A. A., & Abdul Rahman, N. S. (2018). Use of e-learning by university students in Malaysian Higher Educational Institutions: A case in Universiti Teknologi Malaysia. *IEEE Access*, *6*, 14268–14276. https://doi.org/10.1109/ACCESS.2018.2802325

Alabi, A. O., & Mutula, S. (2020). Information and communication technologies: Use and factors for success amongst academics in private and public universities in Nigeria. *South African Journal of Information Management*, *22*(1), 1–8. https://doi.org/10.4102/sajim.v22i1.1129

Alasmari, T., & Zhang, K. (2019). Mobile learning technology acceptance in Saudi Arabian higher education: An extended framework and a mixed-method study. *Education and Information Technologies*, *24*(3), 2127–2144. https://doi.org/10.1007/s10639-019-09865-8

Alotumi, M. (2022). Factors influencing graduate students' behavioral intention to use Google Classroom: Case study-mixed methods research. *Education and Information Technologies*, *27*, 10035–10063. https://doi.org/10.1007/s10639-022-11051-2

Alshahrani, H., & Walker, D. (2017). Validity, Reliability, Predictors, Moderation: The UTAUT Model Revisited. *General Linear Model Journal*, *43*(2), 23–34. https://doi.org/10.31523/glmj.043002.003

Alshammari, S. H. (2021). Determining the factors that affect the use of virtual classrooms: A modification of the UTAUT model. *Journal of Information Technology Education: Research*, *20*, 117–135.

Alshehri, A., Rutter, M. J., & Smith, S. (2019). An implementation of the UTAUT model for understanding students' perceptions of Learning Management Systems: A study within tertiary institutions in Saudi Arabia. *International Journal of Distance Education Technologies*, *17*(3), 1–24. https://doi.org/10.4018/IJDET.2019070101

Altalhi, M. (2020). Toward a model for acceptance of MOOCs in higher education: the modified UTAUT model for Saudi Arabia. *Education and Information Technologies*, 17. https://doi.org/10.1007/s10639-020-10317-x

Amadin, F. I., Obienu, A. C., & Osaseri, R. O. (2018). Main barriers and possible enablers of Google apps for education adoption among university staff members. *Nigerian Journal of Technology*, *37*(2), 432. https://doi.org/10.4314/njt.v37i2.18

Ameri, A., Khajouei, R., Ameri, A., & Jahani, Y. (2020). Acceptance of a mobile-based educational application (LabSafety) by pharmacy students: An application of the UTAUT2 model. *Education and Information Technologies*, *25*(1), 419–435. https://doi.org/10.1007/s10639-019-09965-5

Azizi, S. M., Roozbahani, N., & Khatony, A. (2020). Factors affecting the acceptance of blended learning in medical education: application of UTAUT2 model. *BMC Medical Education*, *20*(1), 1–9. https://doi.org/10.1186/s12909-020-02302-2

Bandura, A. (1989). Human Agency in Social Cognitive Theory. *American Psychologist*, *44*(9), 1175–1184. https://doi.org/10.1037/0003-066X.44.9.1175

Bardakcı, S., & Alkan, M. F. (2019). Investigation of Turkish preservice teachers' intentions to use IWB in terms of technological and pedagogical aspects. *Education and Information Technologies*, *24*(5), 2887–2907. https://doi.org/10.1007/s10639-019-09904-4

Bazelais, P., Doleck, T., & Lemay, D. J. (2018). Investigating the predictive power of TAM: A case study of CEGEP students' intentions to use online learning technologies. *Education and Information Technologies*, *23*(1), 93–111. https://doi.org/10.1007/s10639-017-9587-0

Bervell, B., Nyagorme, P., & Arkorful, V. (2020). Lms-enabled blended learning use intentions among distance education tutors: Examining the mediation role of attitude based on technology-related stimulus-response theoretical framework. *Contemporary Educational Technology*, *12*(2), 1–21. https://doi.org/10.30935/cedtech/8317

Bervell, B., & Umar, I. N. (2018). Utilization decision towards LMS for blended learning in distance education: Modeling the effects of personality factors in exclusivity. *Knowledge Management and E-Learning*, *10*(3), 309–333. https://doi.org/10.34105/j.kmel.2018.10.018

Bokolo, A., Kamaludin, A., Romli, A., Mat Raffei, A. F., A/L Eh Phon, D. N., Abdullah, A., Leong Ming, G., A. Shukor, N., Shukri Nordin, M., & Baba, S. (2019). A managerial perspective on institutions' administration readiness to diffuse blended learning in higher education: Concept and evidence. *Journal of Research on Technology in Education*, *52*(1), 37–64. https://doi.org/10.1080/15391523.2019.1675203

Bower, M., DeWitt, D., & Lai, J. W. M. (2020). Reasons associated with preservice teachers' intention to use immersive virtual reality in education. *British Journal of Educational Technology*, *51*(6), 2214–2232. https://doi.org/10.1111/bjet.13009

Buabeng-Andoh, C., & Baah, C. (2020). Pre-service teachers' intention to use learning management system: an integration of UTAUT and TAM. *Interactive Technology and Smart Education*, *17*(4), 455–474. https://doi.org/10.1108/ITSE-02-2020-0028

Dajani, D., & Abu Hegleh, A. S. (2019). Behavior intention of animation usage among university students. *Heliyon*, *5*, 10. https://doi.org/10.1016/j.heliyon.2019.e02536

Dakduk, S., Santalla-Banderali, Z., & van der Woude, D. (2018). Acceptance of blended learning in executive education. *SAGE Open*, *8*(3). https://doi.org/10.1177/2158244018800647

Davis, F. D. (1986). A technology acceptance empirically testing new models for end-user information systems: Theory and results. Management, PhD. *Science*, *146*(3652), 1648–1655.

https://doi.org/10.1126/science.146.3652.1648

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly: Management Information Systems*, *13*(3), 319–339. https://doi.org/10.2307/249008

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and Intrinsic Motivation to Use Computers in the Workplace. *Journal of Applied Social Psychology*, *22*(14), 1111–1132. https://doi.org/10.1111/j.1559-1816.1992.tb00945.x

Deepak, K. C. (2017). Evaluation of Moodle Features at Kajaani University of Applied Sciences-Case Study. *Procedia Computer Science*, *116*, 121–128. https://doi.org/10.1016/j.procs.2017.10.021

Eutsler, L., & Antonenko, P. (2018). Predictors of portable technology adoption intentions to support elementary children reading. *Education and Information Technologies*, *23*(5), 1971–1994. https://doi.org/10.1007/s10639-018-9700-z

Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention and behavior: An introduction to theory and research. *Contemporary Sociology*, *6*(2), 244. https://doi.org/10.2307/2065853

Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *Internet and Higher Education*, *7*(2), 95–105. https://doi.org/10.1016/j.iheduc.2004.02.001

Gharrah, A. salameh, & Aljaafreh, A. (2021). Why students use social networks for education: Extension of UTAUT2. *Journal of Technology and Science Education*, *11*(1), 53–66. https://doi.org/https://doi.org/10.3926/jotse.1081

Gross, S. J. (2019). *The effectiveness of Google Classroom in the self-contained chemistry classroom*. Rowan University May.

Gunasinghe, A., Abd Hamid, J., Khatibi, A., & Ferdous Azam, S. . (2019). Does anxiety impede VLE adoption intentions of State University lecturers? - A study based on Modified UTAUT Framework. *European Journal of Social Sciences Studies*, *4*(4), 46–71. https://doi.org/10.5281/zenodo.3358154

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis.* New York: The Guilford Press.

Hayes, A. F., & Preacher, K. J. (2013). Statistical mediation analysis with a multicategorical independent variable. *British Journal of Mathematical and Statistical Psychology*, *67*(3), 451–470. https://doi.org/10.1111/bmsp.12028

Herting, D. C., Cladellas Pros, R., & Castelló Tarrida, A. (2020). Habit and social influence as determinants of PowerPoint use in higher education: A study from a technology acceptance approach. *Interactive Learning Environments*, *0*(0), 1–17. https://doi.org/10.1080/10494820.2020.1799021

Hu, S., Laxman, K., & Lee, K. (2020). Exploring factors affecting academics' adoption of emerging mobile technologies-an extended UTAUT perspective. *Education and Information Technologies*, 4615–4635. https://doi.org/10.1007/s10639-020-10171-x

Hussein, M. H., Ow, S. H., Ibrahim, I., & Mahmoud, M. A. (2020). Measuring instructors continued intention to reuse Google Classroom in Iraq: A mixed-method study during Covid-19. *Interactive Technology and Smart Education*, 23. https://doi.org/10.1108/ITSE-06-2020-0095

Jakkaew, P., & Hemrungrote, S. (2017). The use of UTAUT2 model for understanding student perceptions using Google Classroom: A case study of introduction to information technology course. *2nd Joint International Conference on Digital Arts, Media and Technology 2017: Digital Economy for Sustainable Growth, ICDAMT 2017*, 205–209. https://doi.org/10.1109/ICDAMT.2017.7904962

Jung, I., & Lee, J. (2020). A cross-cultural approach to the adoption of open educational resources in higher education. *British Journal of Educational Technology*, *51*(1), 263–280. https://doi.org/10.1111/bjet.12820

Kado, K., Dem, N., & Yonten, S. (2020). Effectiveness of Google Classroom as an online Learning Management System in the wake up of Covid-19 in Bhutan: Students' perceptions. In *Educational Practices during the COVID-19 Viral Outbreak: International Perspectives* (Vol. 51, Issue 1, pp. 121–138). ISTES Organization. https://files.eric.ed.gov/fulltext/ED608253.pdf

Khechine, H., Raymond, B., & Augier, M. (2020). The adoption of a social learning system: Intrinsic value in the UTAUT model. *British Journal of Educational Technology*, *51*(6), 2306–2325. https://doi.org/10.1111/bjet.12905

Kumar, J. A., & Bervell, B. (2019). Google Classroom for mobile learning in higher education: Modelling the initial perceptions of students. *Education and Information Technologies*, *24*(2), 1793–1817. https://doi.org/10.1007/s10639-018-09858-z

Lopes, A. P., & Soares, F. (2018). Flipping a mathematics course, a blended learning approach. *Proceedings of INTED2018 Conference*, *March*, 3844–3853. https://doi.org/10.21125/inted.2018.0749

Mailizar, M., Burg, D., & Maulina, S. (2021). Examining university students' behavioural intention to use e-learning

during the COVID-19 pandemic: An extended TAM model. *Education and Information Technologies*. https://doi.org/10.1007/s10639-021-10557-5

Mansor, M. S., & Megat Zakaria, M. A. Z. (2021). *Penerimaan guru terhadap penggunaan Google Classroom semasa proses PdP secara dalam talian menggunakan model TAM*. *March*, 14.

Marchewka, J., Liu, C., & Kostiwa, K. (2007). An Application of the UTAUT Model for Understanding Student Perceptions Using Course Management Software. *Communications of the IIMA*, *7*(2), 93.

Md Yunus, M., Shin Ang, W., & Hashim, H. (2021). Factors affecting teaching english as a second language (TESL) postgraduate students' behavioural intention for online learning during the COVID-19 pandemic. *Sustainability (Switzerland)*, *13*(6), 14. https://doi.org/10.3390/su13063524

Melvina, C. H. C. (2022). Google Classroom sebagai salah satu platform dalam penyampaian pengajaran dan pembelajaran: Satu Kajian Tinjauan. *Jurnal Kurikulum & Pengajaran Asia Pasifik*, *10*(1), 1–9. https://ejournal.um.edu.my/index.php/JUKU/article/view/35298/14333

Mohan, M. M., Upadhyaya, P., & Pillai, K. R. (2020). Intention and barriers to use MOOCs: An investigation among the post graduate students in India. *Education and Information Technologies*, *25*(6), 5017–5031. https://doi.org/10.1007/s10639-020-10215-2

Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, *2*(3), 192–222. https://doi.org/10.1287/isre.2.3.192

Mtebe, J. S., Mbwilo, B., & Kissaka, M. M. (2016). Factors influencing teachers' use of multimedia enhanced content in secondary schools in Tanzania. *International Review of Research in Open and Distributed Learning*, *17*(2), 65–84. https://doi.org/10.19173/irrodl.v17i2.2280

Nicholas-Omoregbe, O. S., Azeta, A. A., Chiazor, I. A., & Omoregbe, N. (2017). E-learning management system : A case of selected private universities in OmoregbeNigeria. *Turkish Online Journal of Distance Education*, *18*(2), 106–121.

Nikolopoulou, K., Gialamas, V., & Lavidas, K. (2020). Acceptance of mobile phone by university students for their studies: an investigation applying UTAUT2 model. *Education and Information Technologies*, 4139–4155. https://doi.org/10.1007/s10639-020-10157-9

Nizar, N. N. M., Rahmat, M. K., Maaruf, S. Z., & Damio, S. M. (2019). Examining the use behaviour of augmented reality technology through Marlcardio: Adapting the UTAUT model. *Asian Journal of University Education*, *15*(3), 198–210. https://doi.org/10.24191/ajue.v15i3.7799

Padhi, N. (2018). Acceptance and usability of OER in India: An investigation using UTAUT model. *Open Praxis*, *10*(1), 55–65. https://doi.org/10.5944/openpraxis.10.1.623

Porter, W. W., Graham, C. R., Bodily, R. G., & Sandberg, D. S. (2016). A qualitative analysis of institutional drivers and barriers to blended learning adoption in higher education. *Internet and Higher Education*, *28*, 17–27. https://doi.org/10.1016/j.iheduc.2015.08.003

Prasad, P. W. C., Maag, A., Redestowicz, M., & Hoe, L. S. (2018). Unfamiliar technology: Reaction of international students to blended learning. *Computers and Education*. https://doi.org/10.1016/j.compedu.2018.03.016

Pratama, A. (2021). Modification of the technology acceptance model in the use of Google Classroom in the COVID-19 Era: A case studies in junior high schools. *Cypriot Journal of Educational Sciences*, *16*(5), 2598–2608. https://doi.org/10.18844/cjes.v16i5.6336

Radovan, M., & Kristl, N. (2017). Acceptance of technology and its impact on teacher's activities in virtual classroom: Integrating UTAUT and CoI into a combined model. *The Turkish Online Journal of Educational Technology*, *16*(3), 11–22.

Raman, A., & Don, Y. (2013). Preservice teachers' acceptance of learning management software: An application of the UTAUT2 model. *International Education Studies*, *6*(7), 157–164. https://doi.org/10.5539/ies.v6n7p157

Raman, A., & Rathakrishnan, M. (2018). FROG VLE: Teachers' technology acceptance using UTAUT model. *International Journal of Mechanical Engineering and Technology*, *9*(3), 529–538.

Rogers, E. M. (1983). Diffusion of innovations. In *Diffusion of Innovations* (3rd ed.). Newyork Free Press . https://doi.org/10.4324/9780203710753-35

Samsudeen, S. N., & Mohamed, R. (2019). University students' intention to use e-learning systems: A study of higher educational institutions in Sri Lanka. *Interactive Technology and Smart Education*, *16*(3), 219–238. https://doi.org/10.1108/ITSE-11-2018-0092

Saragih, A. H., Setyowati, M. S., Hendrawan, A., & Lutfi, A. (2019). Student perception of Student Centered e-Learning Environment (SCeLE) as media to support teaching and learning activities at the University of Indonesia. *IOP Conference Series: Earth and Environmental Science*, *248*(1), 1–10. https://doi.org/10.1088/1755-1315/248/1/012001

Saidu, M. K., & Al Mamun, M. A. (2022). Exploring the factors affecting behavioural intention to use Google Classroom: University teachers' perspectives in Bangladesh and Nigeria. *TechTrends*. https://doi.org/10.1007/s11528-022-00704-1

Sesma, M. G. F. (2020). Blended learning: An examination of EFL teachers and students' use, continuance intention to use, and attitudes towards Information and Communication Technologies. In *Thesis*. University of Southampton.

Sharifi fard, S., Tamam, E., Hj Hassan, M. S., Waheed, M., & Zaremohzzabieh, Z. (2016). Factors affecting Malaysian university students' purchase intention in social networking sites. *Cogent Business and Management*, *3*(1). https://doi.org/10.1080/23311975.2016.1182612

Sherbib Asiri, M. J., Mahmud, R., Abu Bakar, K., & Mohd Ayub, A. F. (2012). Factors influencing the use of learning management system in Saudi Arabian Higher Education: A theoretical framework. *Higher Education Studies*, *2*(2), 125–137. https://doi.org/10.5539/hes.v2n2p125

Shukla, S. (2021). M-learning adoption of management students': A case of India. In *Education and Information Technologies* (Vol. 26, Issue 1). Education and Information Technologies. https://doi.org/10.1007/s10639-020-10271-8

Stockless, A. (2018). Acceptance of learning management system: The case of secondary school teachers. *Education and Information Technologies*, *23*(3), 1101–1121. https://doi.org/10.1007/s10639-017-9654-6

Sultana, J. (2020). Determining the factors that affect the uses of Mobile Cloud Learning (MCL) platform Blackboard-a modification of the UTAUT model. *Education and Information Technologies*, *25*(1), 223–238. https://doi.org/10.1007/s10639-019-09969-1

Syed Ahmad, T. S. A., Ramlan, Z. S., & Kumar Krishnan, S. (2020). Acceptance of Google Classroom for learning English Exit Test. *International Journal of Modern Languages And Applied Linguistics*, *4*(1), 67–76. https://doi.org/10.24191/ijmal.v4i1.9504

Tamilmani, K., Rana, N. P., Wamba, S. F., & Dwivedi, R. (2021). The extended Unified Theory of Acceptance and Use of Technology (UTAUT2): A systematic literature review and theory evaluation. *International Journal of Information Management*, *57*(November 2020). https://doi.org/10.1016/j.ijinfomgt.2020.102269

Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, *6*(2), 144–176. https://doi.org/10.1287/isre.6.2.144

Thomas, T., Singh, L., & Renville, D. (2020). The Utility of the UTAUT: An Application to Mobile Learning Adoption in the Caribbean. *International Journal of Education and Development Using Information and Communication Technology*, *16*(2), 122–143.

Thompson, R. L., Higgins, C. A., & Howell, J. M. (1991). Personal computing: Toward a conceptual model of utilization. *MIS Quarterly: Management Information Systems*, *15*(1), 125–142. https://doi.org/10.2307/249443

Thongsri, N., Shen, L., & Bao, Y. (2019). Investigating factors affecting learner's perception toward online learning: evidence from ClassStart application in Thailand. *Behaviour and Information Technology*, *38*(12), 1243–1258. https://doi.org/10.1080/0144929X.2019.1581259

Tseng, T. H., Lin, S., Wang, Y. S., & Liu, H. X. (2019). Investigating teachers' adoption of MOOCs: the perspective of UTAUT2. *Interactive Learning Environments*, *0*(0), 1–16. https://doi.org/10.1080/10494820.2019.1674888

Venkatesh, V., & Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions Subject Areas: Design Characteristics, Interventions. *Decision Sciences*, *39*(2), 273–315. http://www.vvenkatesh.com/wp-content/uploads/2015/11/Venkatesh_Bala_DS_2008.pdf

Venkatesh, V., & Davis, F. D. (2000). Theoretical extension of the Technology Acceptance Model: Four longitudinal field studies. *Management Science*, *46*(2), 186–204. https://doi.org/10.1287/mnsc.46.2.186.11926

Venkatesh, V., & Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly: Management Information Systems*, *24*(1), 115–136. https://doi.org/10.2307/3250981

Venkatesh, V., Morris, M. G., Davis, G., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarter Management Information Systems*, *27*(3), 425–478.

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly: Management Information Systems*, *36*(1), 157–178. https://doi.org/10.2307/41410412

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2016). Unified theory of acceptance and use of technology: A synthesis and the road ahead. *Journal of the Association for Information Systems*, *17*(5), 328–376.

Yakubu, M. N., Dasuki, S. I., Abubakar, A. M., & Kah, M. M. O. (2020). Determinants of learning management

systems adoption in Nigeria: A hybrid SEM and artificial neural network approach. In *Education and Information Technologies*. https://doi.org/10.1007/s10639-020-10110-w

Yee, M. L. S., & Abdullah, M. S. (2021). A review of UTAUT and extended model as a conceptual framework in education research. *Jurnal Pendidikan Sains Dan Matematik Malaysia*, *11*(February), 1–20.

Yeop, M. A., Mohd Yaakob, M. F., Kung Teck, W., Don, Y., & Mohamad Zain, F. (2019). Implementation of ICT Policy (Blended Learning Approach): Investigating factors of Behavioural Intention and Use Behaviour. *International Journal of Instruction*, *12*(1), 767–782. https://doi.org/10.29333/iji.2019.12149a

Zakaria, M., Ahmad, J. H., Bahari, R., Hasan, S. J., & Zolkaflil, S. (2021). Benefits and challenges of adopting Google Classroom in Malaysian University: Educators' perspectives. *İlköğretim Online - Elementary Education Online*, *20*(1), 1296–1304. https://doi.org/10.17051/ilkonline.2021.01.123

Zhang, Z., Cao, T., Shu, J., & Liu, H. (2020). Identifying key factors affecting college students' adoption of the e-learning system in mandatory blended learning environments. *Interactive Learning Environments*, 1–14. https://doi.org/10.1080/10494820.2020.1723113

Zulherman, Mohamas Zain, F., Napitupulu, D., Sailin, S. N., & Roza, L. (2021). Analyzing Indonesian students' Google Classroom scceptance during COVID-19 outbreak: Applying an Extended Unified Theory of Acceptance and Use of Technology Model. *European Journal of Educational Research*, *10*(4), 1697–1710. https://eric.ed.gov/?id=EJ1250404