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Exploring Digital Learning Orientation, E-Learning Self-Efficacy and Support System on Student's Innovative Behaviour

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Abstract
Purpose: To examine how digital learning orientation, e-learning self-efficacy, and support systems affect innovative behaviour among undergraduate students. Innovative behaviour is the academics' challenge in which previous research found that students' creativity in constructing sustainable institutions is affected by their digital learning orientation, self-efficacy, and support system.
Design/methodology/approach: Respondents were selected using stratified and purposive sampling in order to get as diverse respondents to match the complexity.
Findings: A total of 362 questionnaires were collected from the respondents and were usable for further analysis. The findings showed a significant influence of digital learning orientation, self-efficacy, and support system on behavioural intention.
Research limitations/implications: This study involved only one undergraduate program. It is recommended that future research could employ other programs and at the different educational levels. Besides, it is also crucial to investigate the other individual and environmental mechanisms that act as antecedents of innovative behaviour, particularly in the educational sector.
Practical implications: This study can be served as a guideline for the management of higher education in designing strategies and policies for the implementation of online distance learning.
Originality/value: Higher education has changed significantly due to COVID-19. Academicians and students are experiencing difficulties with the sudden switch from physical learning to online distance learning. The studies exploring the associations between digital learning orientation, e-learning self-efficacy, support systems and innovative behaviour are limited.

Keywords: Innovative Behaviour, Digital Learning Orientation, Self-Efficacy, Support System, Undergraduate Students

Introduction

As the COVID-19 pandemic spikes, there is a huge trend toward online learning education as a result of the unspecified closure of schools, colleges, and universities as the only alternative left (Martinez, 2020; Gewin 2020). The National Panel Study of Coronavirus pandemic (NPSC-19) found that 51% of the children in the household struggle with their schoolwork via distance learning. This showed that at least one of the students in the household was struggling with distance learning (Davis, Grooms et al. 2021).

In universities and colleges, the unexpected consequence of the Covid-19 epidemic had a major influence on academic personnel (Chung, Mohamed Noor et al. 2020). Online distance learning has been used by many prominent colleges across the world as a method of maintaining educational uniformity. Institution of Cambridge was the first university in the United Kingdom to transfer all teaching and learning to online for the whole academic year 2020/2021 in an effort to decrease the risk of transmission of Covid-19 (Europe News, 2020). As in many other nations, the Movement Control Order (MCO) was imposed to restrict the spread of Covid-19. According to the Ministry of Higher Education, all educational institutions in Malaysia shall perform educational activities via remote learning until the end of December 2020 (Malaysian Ministry of Higher Education, 2020). Digital and traditional teaching methods are blended in online education. Despite the fact that this curriculum is meant to prepare students for autonomous learning, overall satisfaction with the theory and real-world applications is low (Sharidatul Akma, Maryam Jameelah et al. 2019).

When it comes to fostering an environment where students are encouraged to engage in extra-role behaviours such as innovative work behaviour (IWB), educators confront a challenge (Kampylis, Punie et al. 2015; Gupta & Acharya 2018). IWB and readiness for change are affected by individual and organisational factors such as leadership style and supervisory support (Choi & Ruona 2011, Srivastava & Dhar 2017, Tayal, Kumar Upadhya et al. 2018).

To be competitive, a company's capacity to innovate is closely tied to its internal work procedures and structures that foster it. (Shanker et al., 2017). Students' digital orientation may not necessarily transfer into learning and improved job outcomes. Instead, it may have a peripheral effect, such as being used to complete academic tasks (Denovan & Macaskill 2013, Henderson & Trede 2017, Kondakci, Kurtay et al. 2019). Psychological processes behind digital learning's influence on learning outcomes are mostly unknown (Bayerlein & Jeske 2018, Dhawan 2020). Concerning to Benner and Tushman, (2015) in which agreed that future studies should examine how digitalization affects the innovation process within a business, therefore, it is also very crucial to examine further the impact on students' innovation behaviour perspective.

Due to the shift from classroom instruction to online delivery, assessments and evaluation have been severely impacted (Sahu 2020). Those who do not have access to the Internet, for example, will be at a distinct disadvantage while participating in the assessment process, which will negatively impact their grade point averages (GPAs) (Alruwais, Wills et al. 2018). In addition, the university fraternity, including students, has been put under a great deal of pressure (Sahu 2020). As a result of this stress, students' learning may be negatively affected (Alexander 2020). Ultimately, it can lead to emotional and motivational issues (Tannert & Gröschner 2021). According to Pajares (2003) and Schunk (1985), self-efficacy determines strong learning motivation and has been linked to improved educational results in earlier studies. Only a small number of research. There are very limited number of studies focusing on general self-efficacies and learning dimensions in online learning settings (Alqurashi 2016). A large number of students enrolling in a higher education institution do not obtain the necessary academic and social assistance that might have a beneficial influence on their college success (Pascarella & Terenzini, 1991; Hurtado & Carter, 1997). An example of less social

support such as Students who struggle with poor internet connectivity, lack of time owing to other family obligations, and a lack of working space at home as obstacles to online learning (Roman & Plopeanu, 2021). Further, the online instructors or lecturers have the most critical role in designing digital learning orientation thus making it the most important factor in student's innovative behaviour (Yengin, Karahoca, & Karahoca, 2011).

Given the above scenarios, it is a warning sign to further investigate the influence of digital learning orientation, self-efficacy, and support system in fostering student's innovative behaviour. Therefore, "studying what drives or allows individuals to innovate is important" for high performance (Scott & Bruce 1994). In addition, Qi, Liu, Wei, and Hu, (2019); Riaz, Xu, and Hussain (2018); Ul Haq, Usman, and Hussain (2017) stated a study in understanding the process that can enhance the individual innovative behaviour is deficiency that requires extensive investigation.

Besides, this current study has identified a knowledge gap related to student's innovative behaviour and it needs to be addressed accordingly. To cover this information gap and add to the expanding body of research on improving student performance and educational institutions' production, this study was undertaken in an attempt to address this knowledge gap.

Literature Review

Transactional Distance Theory

Digital technologies are transforming the world of education and with the outbreak of Covid-19, it has accelerated this transformation. Several major distance learning theories now exist to prove this. The most discussed seem to be Peter's (1993) industrial model, Holmberg's (1989) theory of distance education, Keegan's (1993) theory of reintegration of teaching acts, Verduin and Clark's (1991) three-dimensional theory, and Moore's (1993) transactional distance theory. The transactional distance hypothesis has acquired significant momentum over the others throughout time. Moore (1993) is a discourse on "transactional distance," or the alienation that develops between teacher and learner when they are separated by space and time. In addition, Moore (1989) posits that the physical distance between the teacher and the students in e-learning courses may result in a psychological and communicational gap between them. The ability of the teacher and the students to achieve the desired level of mutual understanding will be frequently impeded due to this gap (Mbwesa, 2014). As a result, teachers and students participating in distance-learning courses will need "special" behavioural patterns to bridge the communication gaps caused by transactional distance (Mbwesa, 2014). This study examined digital learning orientation, self-efficacy, and support system to identify the knowledge gap related to student's innovative behaviours.

Innovative Behaviour

When it comes to the definition of innovative behaviour, it's "all individual activities focused towards the development, processing and application/implementation of new ideas regarding methods of doing things" (Yuan & Woodman, 2010; Aboobaker & Zakkariya, 2021). Further, Scott and Bruce (1994) and Janssen (2000) conceptualized innovative behaviour as a complex behaviour involving activities relating to idea generation and introduction, and the realization or implementation of new ideas. In this context of this study, students may have an opportunity in responding to new ideas, be able to express different perspectives and views, feel free to demonstrate, practice, and experiment with new learning concepts, and be able to adopt new ways of doing things in their online learning journey.

Digital Learning Orientation and Innovative Behaviour

As new technologies and digital material become more prevalent, institutions are constantly re-evaluating and re-engineering their organisational strategies to encourage their use. This knowledge might be used to build pedagogies that are "technology-driven, spontaneous, and multi-sensory," according to research on students' digital learning qualities (Lai & Hong, 2015). Learning orientation refers to a concern for and devotion to enhancing one's skills in the job. Learning orientation in the field of digital literacy is focused with establishing competence across various domains, including digital literacy and connectivity; multitasking; preference for experiential learning; and images over text (Bullen et al., 2011).

Digital learning orientation has been found to enhance both motivation and efficacy (Hawk & Shah, 2007; Erhel & Jamet, 2013). In accordance with Clark et al. (2016) and Lin et al. (2017), digital learning has a beneficial impact on students' motivation, intellectual openness, work ethic, conscientiousness, positive core self-evaluation, cognitive processes and methods and knowledge, as well as their creativity. Although it may seem counter to popular belief, digital familiarity is more closely tied to achieving logistical and other extrinsic goals, and hence acts as a functional support for students rather than enhancing their learning results (Henderson et al., 2017). As a result of knowing how students learn, teachers may design teaching techniques that fit students' "more technology-driven, spontaneous, and multimodal" learning styles (Bullen et al., 2011). Considering the above-mentioned researches, the following hypothesis is developed:

H1: Digital learning orientation is positively associated with innovative behaviour

Self-Efficacy and Innovative Behaviour

As a result of self-efficacy, an individual perceives or believes that they are capable of completing a certain job (Luthans 2011). People's self-efficacy, according to Fiernaningsih and Pudji Herijanto (2021), is their belief in their capacity to achieve a certain degree of performance that impacts events in their lives. "Self-efficacy," according to Tannert and Gröschner (2021), is the conviction in one's own abilities within a certain area of competency to solve issues and master obstacles. According to these criteria, increasing people' ideas about how effectively they will carry out the actions they need to conduct in order to achieve a specific goal may also impact their performances in the long run. In the context of this study, self-efficacy is referring to student's view of his/her capacity to investigate and imagine the creation of ideas to solve issues, and to adopt and adapt acceptable techniques when making judgments (Roffeei, Kamarulzaman et al. 2017). As a result, self-efficacy is future-focused and task-focused (Bong & Skaalvik 2003). You learn it through repeating successful behaviours, as well as by subjectively experiencing others' confidence in your skills (Tannert & Gröschner 2021). The authors of Alivernini and Lucidi (2011) claim that self-efficacy is a good predictor of academic achievement, and that it also helps students adapt effectively to different learning settings A lot of research has shown that students' self-efficacy is one of the most critical psychological characteristics that might affect how they perceive their learning settings (Pajares 1996). Self-efficacy, then, will also have an impact on student achievement in online learning contexts.

According to prior research, self-efficacy has a significant role in self-regulation and academic performance (Bandura 1977, Ryan & Deci 2000, Pekrun & Perry 2014). Zimmerman (1995) stresses that self-efficacy entails an individual's evaluations about his or her capacity to carry out and succeed in an activity. Student views of online technologies, according to Horzum and Cakir (2009), may have an impact on students' interactions with their classmates and teachers, as well as their technology use behaviours. To be sure, self-efficacy is seen as crucial in the execution of difficult activities that individuals have never completed before (Bandura 1977).

Self-efficacy is related to relational trust and innovative behaviour (Fiernaningsih & Pudji Herijanto 2021). Employees with a high level of self-efficacy will be more inventive (Fiernaningsih & Pudji Herijanto 2021). Furthermore, a study conducted by Noreña-Chavez and Guevara (2020) suggested that self-efficacy is significantly related to innovative behaviour. An earlier study by Chen and Zhou (2017) revealed that self-efficacy and creative behaviour had a negative connection. In other studies, self-efficacy was found to have a positive influence on creative behaviour (Hsu, Hou et al. 2011, Anderson, Potocnik et al. 2014, Cardon and Kirk 2015, Chen and Zhou 2017, Schjoedt and Craig 2017, Spagnoli, Santos et al. 2017, Miao, Newman et al. 2018, Prihatsanti 2018). Therefore, the following hypothesis is developed:
H2: Self-efficacy is positively associated with innovative behaviour.

Support System and Innovative Behaviour
Psychological or emotional support and academic topic knowledge assistance were recognised by Nora and Crisp (2007) as the two primary types of help. Immediate response and two-way interactions among students and lecturers positively influence students' sense of community (Luo, Zhang, & Qi, 2017). Madsen, Miller et al. (2005), Henderson and Trede (2017), Holt, Armenakis et al. (2007) and (Wardley, Bélanger et al. 2017) individuals' willingness for change may be influenced by teacher-student interactions and peer support. People who benefit from the organisational learning culture supported by the organisation, such as IWB students, become more open-minded about the need for change and engage in extra-role behaviours (Aboobaker & Zakkariya 2021). The researchers also discovered that interaction between the students and the curriculum as well as students and instructors as well as between students and each other enhances a student's sense of belonging and influence, which, in turn, encourages them to stay on the e-learning platform. Therefore, availability of friends and lecturers for assistance, as well as friendly interpersonal ties among members (Yahyagil, 2004), help in establishing a supportive innovation culture among students.
Technical support also is an important variable to the perceived usefulness among students in using e-learning thus encourage their innovative behaviour through intention to continually use the platform (Obidat, Alquraan, & Obeidat, 2020). Instructional support in using digital learning orientation should be personalized, hence, different kinds of design for instructional support are needed and should be adapted to the different needs and characteristics of the students (Vovides, Sanchez-Alonso, Mitropoulou, & Nickmans, 2007). Referring to the previous discussion, the following hypothesis is presented:
H3: Support system is positively associated with innovative behaviour.

Method
A total of 362 undergraduate students participated in a questionnaire survey. Respondents were selected using stratified and purposive sampling to get as diverse respondents to match the complexity. The 10 items questionnaire used to measure innovative behaviour and the 11 items to assess digital learning orientation were developed by Aboobaker & Zakkariya (2021). For self-efficacy, a five items questionnaire developed by Baskaran and Rajarathinam (2017), meanwhile another five items for support system from Sun, Tsai, Finger, Chen, and Yeh, (2008) was used. On a Likert scale from 1 (strongly disagree) to 5 (strongly agree), the respondents were asked to express their degree of agreement. The demographic section was collected student's demographic data including, age, semester, and asking on how frequently they use technology gadgets for academic purposes as well as for social/personal purposes. A Structural Equation Modelling – Partial Least Square was conducted to examine the influence of the research model.

The total population of this study is 614. Based on the table in determining sample size by Krejcie and Morgan (1970), a population of 614 needs 234 sample. The formula of calculation in determining the total sample sized required for each semester is as follows:

$$\frac{\text{Population of Students in Semester}}{\text{Population of Total Students}} \times \text{Minimum Sample Size}$$

For example: $\frac{093}{614} \times 234$

$= 35$

Table 1: Sample size of the Study

Semester	Population	Total Sample Size Needed	Sample Collected
One	34	13	21
Two	93	35	72
Three	84	32	48
Four	112	43	66
Five	126	48	90
Six	165	63	29
TOTAL	**614**	**234**	**326**

This study employed two types of sampling techniques. In the first phase, stratified random sampling was applied as a means of sample selection (according to the semester). SRS is a process of stratification or segregation, which is followed by a random selection of subjects form each stratum (Sekaran & Bougie, 2016). At the second phase, a purposive sampling method was used to examining the entire that have a particular set of characteristics. (Sekaran & Bougie, 2013). According to Malhotra, Agarwal, and Peterson (1996) purposive sampling is defined as "a form of convenience sampling in which the population elements are purposely selected based on the judgement of the researcher".

The majority of the respondents are female which represents 288 (88%) and 38 (12%) are male. From the responses, 303 (93%) of the respondents are at 21 to 25 years old. The data also showed that 90 (28%) of the respondents are in semester five, followed by 72 (22%) in semester two and 66 (20%) in the semester four. Exploring the sampling distribution based on the use of technology gadgets for academic purposes, 275 (84%) of the respondents spend more than ten hours per week and 51 (15%) spend less than ten hours a week.

Findings

When examining measurement and structural model, this study employed partial least squares (PLS) modelling using the SmartPLS 3.2.8 version (Ringle et al., 2015) since this method does not need normality assumption because survey research is typically not normal distributed (Chin et al., 2003). For the Common Method Bias, Kock and Lynn (2012), and Kock (2015) recommended testing for complete collinearity. Using this approach, all variables are regressed on a single common variable, and if the VIF is less than 3.3, there is no bias from the single-source data source. According to the analysis, the single-source bias is not a major issue with our data because the VIF was less than 3.

Table 2: Full Collinearity Testing

Digital Learning Orientation	Innovative Behaviour	Self-Efficacy	Support System
2.105	2.036	2.081	1.999

Measurement Model

As per Anderson and Gerbing's (1988) recommendations, the model should be tested in two steps. Following the instructions of Hair et al. (2019) and Ramayah et al. (2018), this study evaluated the measurement model to determine the validity and reliability of the instruments employed, and then ran the structural model to test the hypothesis established.

As part of the measurement model, we evaluated the loadings, the average variance extracted (AVE), and the overall dependability (CR). The values of loadings should be ≥0.5, the AVE should be ≥ 0.5 and the CR should be ≥ 0.7. As shown in Table 3, the AVEs are all higher than 0.5 and the CRs are all higher than 0.7. The loadings were also acceptable with only eight loadings less than 0.708 (Hair et el., 2019).

Table 3: Measurement Model for the First Order Constructs

Construct	Item	Loading	CR	AVE
Digital Learning Orientation	DL1	0.728	0.877	0.505
	DL2	0.718		
	DL3	0.680		
	DL4	0.743		
	DL5	0.618		
	DL10	0.707		
	DL11	0.769		
Innovative Behaviour	IB1	0.796	0.953	0.672
	IB2	0.804		
	IB3	0.730		
	IB4	0.803		
	IB5	0.855		
	IB6	0.821		
	IB7	0.835		
	IB8	0.819		
	IB9	0.882		
	IB10	0.842		
Self-Efficacy	SE1	0.680	0.875	0.501
	SE2	0.795		
	SE3	0.728		
	SE4	0.754		
	SE5	0.701		
	SE6	0.644		
	SE7	0.637		
Support System	SS2	0.581	0.915	0.575
	SS4	0.773		
	SS5	0.748		
	SS6	0.778		
	SS7	0.855		
	SS8	0.799		
	SS9	0.750		
	SS10	0.757		

Note: DL6, DL7, DL8, DL9, SS1, SS3 were deleted due low loadings.

When it came to the second phase, the discriminant validity was tested using the newer HTMT criterion proposed by Franke and Sarstedt (2019). The HTMT values should be ≤ 0.85 the stricter criterion and the mode lenient criterion is it should be ≤ 0.90. As shown in Table 4, the values of HTMT were all lower than the stricter criterion of ≤ 0.85 as such it can conclude that the respondents understood that the 4 constructs are distinct and the measurement items are both valid and reliable.

Table 4: Discriminant Validity (HTMT)

Construct	1	2	3	4
1. Digital Learning Orientation (DLO)				
2. Innovative Behaviour (IB)	0.680			
3. Self-Efficacy (SE)	0.790	0.773		
4. Support System (SS)	0.756	0.652	0.742	

Structural Model

As suggested by Hair et al. (2017) and Cain et al. (2016), the multivariate skewness and kurtosis was assessed. The results showed that the data we have collected was not multivariate normal, Mardia's multivariate skewness (β = 1.729, p< 0.01) and Mardia's multivariate kurtosis (β = 29.719, p< 0.01), thus following the suggestions of Hair et al. (2019) it also reported the path coefficients, the standard errors, t-values and p-values for the structural model using a 5,000-sample re-sample bootstrapping procedure (Ramayah et al. 2018). Also based on the criticism of Hahn and Ang (2017) that p-values are not good criterion for testing the significance of hypothesis and suggested to use a combination of criterions such as p-values, confidence intervals and effect sizes. Table 5 shows the summary of the criterions we have used to test the hypotheses developed.

First, we tested the effect of the 3 predictors on Innovative Behaviour, the R2 was 0.535 (Q2 = 0.354) which shows that all the 3 predictors explained 53% of the variance in Innovative Behaviour. Digital Learning Orientation (t = 3.137, p< 0.01), Self-Efficacy (t = 7.439, p< 0.01) and Support System (t = 0.3.026, p< 0.01) were all positively related to Innovative Behaviour, thus H1, H2 and H3 were supported.

Table 5: Hypothesis Testing Direct Effects

HT	Relation-ship	Std Beta	Std Error	T Values	P Values	LL	UP	f^2	R^2	Q^2
H1	DLO --> IB	0.197	0.063	3.137	0.001	0.090	0.295	0.040	0.535	0.354
H2	SE --> IB	0.429	0.058	7.439	0.000	0.333	0.524	0.190		
H3	SS --> IB	0.199	0.066	3.026	0.001	0.084	0.302	0.043		

Note: Use 95% confidence interval with a bootstrapping of 5,000

Further to that as suggested by Shmueli et al. (2019) proposed PLS predict, a holdout sample-based procedure that generates case-level predictions on an item or a construct level using the PLS-Predict with a 10-fold procedure to check for predictive relevance. Shmueli et al. (2019) suggested that if all the item differences (PLS-LM) were lower than there is strong predictive power, if all are higher than predictive relevance is not confirmed while if the majority is lower than there is moderate predictive power and if minority then there is low predictive power. Based on Table 6, all the errors of the PLS model were lower than the LM model thus we can conclude that our model has strong predictive power.

Table 6: *PLS* Predict

Construct	Q^2_predict
IB	0.517

Item	PLS RMSE	LM RMSE	PLS-LM	Q^2_predict
IB1	0.616	0.645	-0.029	0.332
IB2	0.605	0.624	-0.019	0.326
IB3	0.633	0.641	-0.008	0.327
IB4	0.642	0.655	-0.013	0.302
IB5	0.694	0.725	-0.031	0.305
IB6	0.624	0.656	-0.032	0.353
IB7	0.636	0.676	-0.040	0.351
IB8	0.615	0.636	-0.021	0.382
1B9	0.571	0.591	-0.020	0.399
1B10	0.620	0.656	-0.036	0.372

Discussion and Conclusion

The empirical results provide evidence that digital learning orientation, self-efficacy, and support system are significant in fostering students' innovative behaviour. Often, scholars make a distinction between a person's capacity and willingness to engage in certain types of conduct (e.g., De Massis, Kotlar et al. (2014) Martin et al. (1990); Minbaeva & Michailova, (2004). When it comes to innovation, employee learning is a key motivator, according to Kensbock and Stöckmann (2020). Even though their study was focus on employees' context, this is consistent with the findings of this study in which digital learning orientation influences the innovation behaviour of the students. In addition, the finding of this study is consistent with (Yoo et al. 2012), this is because the digital transformation is a discontinuous learning event and employees will be required to learn to combine complicated and varied knowledge to generate new ideas. The results are also in line with research conducted by Gong et al., (2009) gaining domain-relevant skills and information is crucial for engaging in creative and innovative thinking. In addition, the findings of Fiernaningsih and Pudji Herijanto (2021) was consistent with the findings of this study in which good self-efficacy will increase the innovative behaviour of employees. Earlier studies also shows that self-efficacy is significantly related to innovative behaviour (Hsu, Hou et al. 2011, Anderson, Potocnik et al. 2014, Cardon & Kirk 2015, Chen & Zhou 2017, Schjoedt & Craig 2017, Spagnoli, Santos et al. 2017, Miao, Newman et al. 2018, Prihatsanti 2018, Noreña-Chavez & Guevara 2020). Moreover, availability of support from friends and lecturers (Yahyagil 2004), technical support (Obidat, Alquraan, & Obeidat, 2020), and instructional support (Vovides, Sanchez-Alonso, Mitropoulou, & Nickmans, 2007) help in establishing a supportive innovation culture among students.

Therefore, this implies that students feel comfortable using digital learning orientation including computers, the internet, and other communication technologies will improve their innovative behaviour in the learning process. Besides, students with high self-confidence also are innovative in their online distance learning journey. Furthermore, a strong support system from lecturers and friends in discussion and learning activities will boost students' motivation and this, in turn, will improve their academic performance.

The implication of this study is important to the Higher Education Institutions in analyzing the determinants of innovative behaviours of university students. This study also will serve as a guideline for Malaysian university policymakers in designing policies and programs on online

distance learning in enhancing the students' innovative behaviour. Furthermore, it is also important to understand the influential factors that can stimulate the level of innovative behaviour among students as well as for better strategies in improving students' performance. The limitation of this study was involved only one undergraduate program. Further research could employ other programs and at the different educational levels. Besides, it is also crucial to investigate the other individual and environmental mechanisms that act as antecedents of innovative behaviour, particularly in the educational sector.

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