EXAMINING THE ONLINE LEARNING CHALLENGES AND ITS RELATIONSHIP ON LEARNING PERFORMANCE: CASE AT SELECTED SCHOOLS

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Abstract:

This study aims to investigate the challenges derived from implementing online learning and its effect on students' learning performances. The key challenges mentioned in this study were the learning resources, learning environment, self-discipline and technological sufficiency. In specific, it is to assess the relationship between the selected independent variables i.e. the key challenges with the dependent variable (learning performances). Research suggests that online learning has been shown to increase retention of information among students and consume less time. It is the objective of the researcher in this study to illustrate and present the effectiveness, relevancy and applicability of online learning as an alternative to sustainable education in government schools. Although quite a number of studies have been performed and some researchers have delved deep into their interest in investigating these issues, however, researchers still found limited information from online learning specifically on the challenges which crucially affect students' learning performance. To achieve this goal, a total of 210 samples of students from two government secondary schools have been taken into consideration, and (from SMK Baru Bintulu and SMK Bintulu). The data collection technique was carried out by distributing questionnaires and all data were gathered, processed and analyzed using statistical technique SPSS version 26. The descriptive analysis was used to gauge various responses across various dimensions such as in the respondent's demographic information, additionally, inferential analysis was mainly for examining the relationship between the challenges (learning resources, learning environment, self-discipline and technological sufficiency) and student's learning performance. The results revealed learning environment challenge is the strongest predictor in influencing student's learning performance with unstandardized coefficients, $\beta = .356$, $t = 4.726$ $p < .05$, followed by self-regulation challenge with $\beta = .316$, $t = 4.182$, $p < .05$. The most significant contribution of this study is that it explores for the first time the investigation of challenges and effect of online learning on students'

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learning performance among students at government schools, this has brought a crucial impact and pushed to the government to take immediate action regarding the matter.

Keywords: learning resources, learning environment, self-regulation, technological sufficiency, students' learning performance

1. Introduction

The impact of technology has grown steadily during the 1990s. Simultaneously, it has altered the educational scene. As a result, online learning and classes are becoming a more significant element of the education system worldwide. The acceptance of online learning across many learning contexts, whether formal or informal, academic or non-academic, domestic or remote, is one such development. The COVID-19 pandemic has shaken the foundations of the education system in recent years, causing an unparalleled health disaster. According to the article by Jason and John (2020), the COVID-19 pandemic has spread over the world. A majority of countries have announced temporary school closures, affecting more than 91% of students globally, or 1.6 billion children and young teenagers. Thus, various governments worldwide have undertaken a crisis response to counteract the pandemic's negative impact on schooling. As a result, whether in a primary, secondary school or a higher education institution, it is necessary to change the previous teaching mode, re-evaluate the class mode, examination mode, progress, etc. In addition, these advancements pushed educational institutions to complete online learning until face-to-face instruction was permitted. Online learning poses many challenges for schools, teachers, parents, and especially students. However, in Malaysia, which has few resources, including technological and human resources, the problems posed by the adoption of online learning have been significant, particularly in outlying areas. This research will examine online learning challenges and effects towards students' learning performances at selected government secondary schools in Bintulu.

1.1 Rationale for the Study
Sukhbir (2020) recently discovered that up to 40 percent of Malaysian students do not have access to e-learning gadgets. The researcher also shows that there are only 6% of the population has access to computers. Some students have had little trouble adjusting to an online learning environment; others cannot participate in online sessions due to a lack of smart devices and internet connectivity. According to Elly (2020), some of the children will have to share their parents' smartphones to attend online classes. With the slow and low capacity of the internet acquired, online access becoming limited, a challenge for parents and their children without electronic devices. It is learnt that the slow speed of internet coverage frequently causes disconnection and interruption mostly when too many users are online. This also has caused many students to lose their concentration in school due to constantly switching between network data and Wi-Fi. It's essential to mention that this issue impacts a diverse group of pupils, including those from low-

income metropolitan areas and rural areas. This is very unfair to the rural areas. Their network technology is already inferior, and the Wi-fi are not as good as those in cities. This will affect the rural student's learning progress and status.

According to Sabah News (2020), a 15-year-old Kadazandusun students from SMK Keningau say that he can't open a Google connection in his house because of the internet is like a snail. In addition to this, students' discipline and motivation were also constituting the challenges of learning online where it may appear to be riddled with temptations to lose one's devotion and motivation. As we realized, most students already have access to many online distractions such as social networking, YouTube, and breaking news reports. The more time students spend online, the less time they have to focus on their studies especially if students have previously spent the entire day in front of a computer screen at work, online learning's abstract character can decrease motivation as they need to struggle to adapt to the online environment. It's unusual to think that a complete secondary school experience might be compressed into a portable electronic gadget. It might be unsettling for pupils who have only encountered regular school settings. Traditionally, during lectures, a degree of passivity is anticipated, particularly when taking notes and listening, and conversation with tutors is permitted for a limited time. Online learning necessitates a quick response, adopting course information in various multimedia formats and participating in online discussions that can last for days. Lastly, students need to manage their time well. While learning online gives students the most flexibility in scheduling their studies around their personal and professional obligations, it can also lead to complacency and a false sense of security if students don't devote enough time and effort to serious study. This study viewed online learning challenges (learning resources, learning environment, self-regulation and technological sufficiency) as critical antecedents of students' learning performance which emerged into a modern way of learning that demands strong responsibility and control from the schools and universities. It will also provide researchers with transcending knowledge and a deeper understanding of their relationships and gain more impactful outcomes from newly developed models in flipped learning contexts. Our findings could encourage scholars, practitioners, industries and government to focus more on how to deal with online learning challenges which could affect students' learning performance.

2. Literature Review

2.1 Learning Performance
Bruce and Flynn (2013) defined learning performance as how a student gains specific knowledge, abilities, or inclinations after participating in learning or training in a particular field for a set length of time. Tam (2001) reviewed that educational curriculum learner development can be referred to as growth or effect. Education causes good changes in both cognitive and non-cognitive aspects of learners. The changes could be in the form of a test score or observed behavioral changes.

Learning performance was further defined by Shieh and Yu (2016), who divided it into two concepts: learning achievement and learning retention. While learning attainment is concerned with the outcome of learning in general, learning retention is concerned with remembering what has been known. Online learning took a huge inclination and has become a need nowadays. In the context of education, performance is the result of the efforts of students and lecturers in the learning process and students' interest in learning (Mensink and King, 2020).

The essence of education is students' academic achievement; therefore, student achievement is considered the success of the entire education system. As stated by Narad and Abdullah (2016) student academic achievement determines the success and failure of academic institutions. With rapidly changing in technology and new systems, it is vital to explore any problems associated with online learning systems in higher education to improve the student experience in learning. All institutions such as universities must have the ability to transcend an effective online learning which could impact both the university performance and student performance. Noted that the failure of online learning design and technology could frustrate learners and lead to negative perceptions (Gopal *et al.*, 2021).

2.2 Learning Resources Challenge

Online learning content is accessible through different kinds (text, images, sounds, and artefacts) (Moore & Kearsley, 2012) and forms of media (adaptive, interactive, narrative, productive) (Laurillard, 2002). The users can employ various online learning resources to create a learning environment that suits their personal learning needs (e.g. learning styles, individual accessibility needs, motivation, etc.). Generally, students use online resources to look for information, search learning topics or for general inquiry (Conole *et al.*, 2008; Sedek, Mahmud, Jalil, & Daud, 2012; Thompson, 2013). This may include watching educational videos and video lectures, reading e-books, online articles, slides, online text and documents, and blogs, and listening to podcasts, etc. Levy (2008) labelled listening, watching and reading of online learning content as passive learning activities. Adeogun (2001) discovered a strong positive significant relationship between instructional resources and academic performance.

According to Adeogun, schools endowed with more materials performed better than schools that are less endowed. This corroborated the research by Babayomi (1999) that private schools performed better than public schools because of the availability and adequacy of teaching and learning materials. While Mwiria (1985) also supports that students' performance is affected by the quality and quantity of teaching and learning resources. The researcher confirmed that institutions with adequate facilities such as textbooks stand a better chance of performing well in examinations than poorly equipped ones. Therefore, poor performance could be attributed to inadequate teaching and learning resources and equipment. Therefore, learning resources are essential and critical to students for overcoming their learning challenges. Schools equipped with the best learning resources could improve the effectiveness and efficiency of learning objectives

and can optimize student's learning performance. With the above exploration, we formed the first hypothesis as follows:

H1: There is a significant strong relationship between learning resources and students' learning performances.

2.3 Learning Environment Challenge

Beckton (2017) emphasized productive learning environments are important to student's academic, emotional and social success in school. He observed a conducive learning environment doesn't just happen on their own or by chance. The learning environment should be created through conscious procedures such as teachers interacting with students positively, exhibiting positive behaviors, exchanging thoughts and ideas etc. that would promote learning activities in the learning environments. The learning environment is composed of some components which can influence a student's learning curve. As cited by Balog (2018), these components could include; people, teaching materials, technical tools, and learning resources; curriculum, training, and instruction, and physical environment/learning space. In a separate study, Mondal (2012) identified some factors that may affect the learning process including intellectual factors which refer to the individual mental level and physical factors which include health, physical development, visual and physical defects etc. For this, the teacher is an important factor in the learning environment because they can create a favorable teaching-learning atmosphere that will make the instructional process easy, adaptable and useful (Usman, 2016). In addition, the way the teacher interacts with the personalities of the students could help to determine the kind of behavior produced in the learning process.

Another study by Closs, Mahat & Imms (2022) found that learning environments such as physical environments and psychosocial environments can influence student learning experiences and performances. Besides that, Wilkinson *et al.* (2013) found there is an effect of a change in the learning environment on the performance of medical students. In addition to this, Waldman (2016) observed that before students can succeed academically, they must feel safe, both physically and mentally, and to have a safe learning environment, Waldman said students must feel welcomed, supported, and respected. Based on the discussions above, we can develop a hypothesis as:

H2: Learning environment is positively and significantly associated with students' learning performance.

2.4 Self-Regulation Challenge

Sletten (2017) and Sun *et al.* (2018) in their studies described any learning conducted outside the classroom in the flipped learning process are known as self-regulated learning. Zimmerman (1989) added that self-regulation in the learning process includes using appropriate cognitive strategies (e.g. organization and demonstration) to efficiently understand learning content and using diverse behavioral strategies at one's understanding and meta-cognitive thinking levels. Williamson (2015) viewed students with strong self-regulated learning can manage their time well, they tend to establish

their own learning objectives, evaluate their learning outcomes, and seek help for better learning and understanding. Many researchers, for instance, Greene *et al.*, (2012) and Zheng *et al.*, (2020) have found significant outcomes on students' self-regulation affect learning performances in both traditional classrooms and online learning environments. Moreover, in the flipped learning process, self-regulation is vital because it requires online pre-learning outside of class and offline learning in class. For instance, a study by Zheng *et al.* (2020) signalized that students who lack self-regulation strategies may fail to comprehend or connect ideas in their pre-class learning, which could lead to ineffective learning outcomes during in-class activities. The reason is that students' meaningful learning experience in flipped learning depends on how well prepared they are for learning before class (Sun *et al.*, 2016).

Another study confirmed that in a flipped learning environment, highly self-regulated students had higher academic performance levels than those who had lower self-regulation levels in both elementary schools and the university (Lai and Hwang, 2016; Sun *et al.*, 2018). The more university students regularly engage with the pre-class assignments and activities throughout the flipped course, the higher their performance in the final exam is likely to be (Jovanovic *et al.*, 2019). Most findings showed that self-regulation affected students' performance in the flipped learning course. Before adopting flipped learning, universities or learning institutions should critically consider the role of self-regulation by offering learning guides through the learning management system and strategies and these could improve students' self-regulation (Hao, 2016; Park and Kim, (2020). Based on the literature review, we established the third hypothesis as follows:

H3: Self-regulation is positively and significantly associated with students' learning performance.

2.5 Technological Sufficiency

Alenezi *et al.* (2011) have emphasized technological sufficiency as a core institutional factor in implementing online learning. Jessie, Ian & Leo (2021) explain technological sufficiency is a set of difficulties that students face when using available online learning technologies. Because online learning relies on reliable internet access, thus some students are expected to receive poorer grades due to bad connectivity. Almaiah *et al.* (2020) viewed the educational system as being drastically transformed by technological advancements and technological sufficiency was pivotal for the universities in providing students with access to online learning resources. Sun *et al.* (2008) confirmed that poor technology with frequent technical problems and slow response time discourage students from participating in online learning. The quality of technology and the information forms system characteristics play an important role in the adoption and usage of technology for online learning (Zhang *et al.*, 2020). In addition, the quality of technology could influence the engagement and performances of students and instructors in online learning (Motaghian *et al.*, 2013 and Nambiar, 2020). Technological sufficiency influences the feasibility of online learning for students' performance and affects digital literacy, technical assistance, and instructor efficiency. For instance,

customized math learning software will aid instructors in communicating with students in online classes. Lack of technological sufficiency may lead to perceived difficulty of use and may negatively impact the acceptance of the new technology. With technological sufficiency, it is critical for many students to successfully participate in online classes. As the exploration of this study, it was noted that high-speed internet access disproportionately affects Native Sarawak and rural students and families, creating an achievement gap as online education continues. A study by Mendoza (2020) found that there's a cost to remote learning. Students require technology to learn effectively. The achievement gap may have a long-term impact on underprivileged students, who may rush through tasks hoping that their internet connection will not survive long enough to assess their work thoroughly. Hence, the final hypotheses derived as follows:

H4: Technological sufficiency is positively and significantly associated with students' learning performance

3. Material and Methods

3.1 Research Design

The study employed an analytical observational descriptive survey research design. The reason is that the nature of this study seeks to gather data from a group of subjects at only one point in time. Moreover, the main purpose of the study is to measure the association between variables i.e. online learning challenges towards students' learning performance in the proposed conceptual model below:
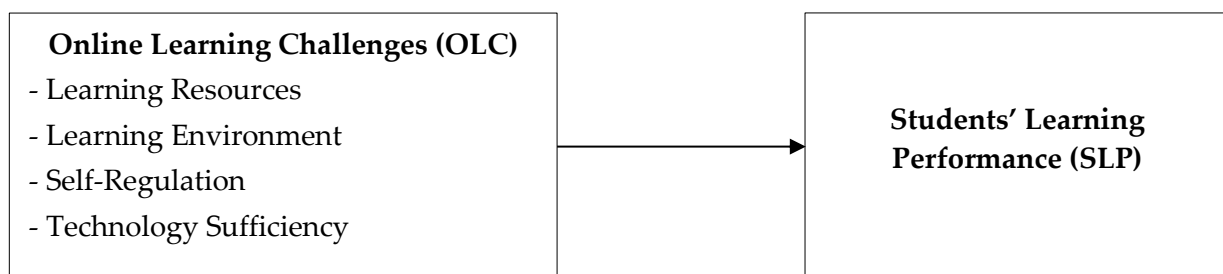
Online Learning Challenges (OLC)
- Learning Resources
- Learning Environment
- Self-Regulation
- Technology Sufficiency

→ **Students' Learning Performance (SLP)**

Figure 1: Online learning challenge Model: Examining the online learning challenges and their relationship on students' learning performance

3.1 Population and Sample

This study involved a total of 210 students from two government secondary schools in Bintulu Sarawak. These schools were SMK Baru Bintulu and SMK Bintulu and the students were in form four and five from two different streams i.e. Art and Science stream whose ages ranged from 16 to 17. These students have been engaged in online learning for at least one year. Upon verifying, the students belonged to low- and middle-income groups and they were equipped with the basic online learning equipment necessary for them to participate in online classes. For this study, the researcher gained permission and support from the schools for data collection. Not only that, an informed consent was also

sought from the students before their involvement. The sample size for the study was determined using Mugenda & Mugenda's 30% rule for sample size determination. By applying the rule to the total population of around 700 students in those two streams, we arrived at a sample size of 210 respondents. The questionnaires were administered professionally and conscientiousness due to the data collected were subject to the privacy of the students. Of these, 210 respondents finally were considered for analysis, ignoring some non-responses. This sample size of 210 was selected to represent the total population found to be adequate.

3.2 Measurement Instrument

The study employed descriptive survey research with a quantitative approach and assisted with SPSS version 26. A structured questionnaire was designed to elicit all responses to perceived different aspects of online learning challenges on students' learning performance. In this model, independent variables used in the extant literature on the association of learning performance were from valuable, reliable latest insights. All of these online learning challenges variables were well reviewed and accepted by the school management at the first round of discussion due to the significance and logical association with the other variables (i.e. learning performance) used in this study. All data obtained were analyzed and a reliability test was carried out. The internal consistency found from the reliability test was high. The questionnaire consists of 5 questions for students learning performance and 4 questions respectively for each independent variable. *(Learning resources, Learning environment, Self-regulation, Technological sufficiency)*. The variables items were measured using a five-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree)* instead of another scale to achieve a higher percentage of answers (Babakus *et al.*, 2003). Notably, this method can be employed for model-based inference with the assumption that the regression model is exactly specified (Fricker, 2006). As a result, the proposed conceptual model in this study is based on important variables for a regression model which is considered specific.

4. Results and Discussion

4.1 Reliability Analysis

Table 1 shows the results of reliability statistically which was assessed by conducting reliability analysis and evaluating the Cronbach's coefficient α. As pointed out by Hair *et al.* (1998), the value of Cronbach's α should be above 0.7. Three determinants representing online learning challenges have minimum acceptable α, which were learning resources with $\alpha = 0.604$; self-regulation with $\alpha = 0.617$; technological sufficiency with $\alpha = 0.688$ and students' learning performance with $\alpha = 0.780$. Only one determinant i.e. learning environment with $\alpha = 0.560$ indicates poor association with learning performance. However, the overall Cronbach's α for all variables with 21 items assessed in this study were still accepted due to the responses of the various items matching well and

correlated. Hence, it is concluded that all five variables have reliability and are acceptable for further analysis.

Table 1: Reliability statistics of the leadership challenges

No	Variable	Cronbach's Alpha (α)	Items
1	Learning Resources	.604	4
2	Learning Environment	.560	4
3	Self-Regulation	.671	4
4	Technological Sufficiency	.688	4
5	Students' Learning Performance	.780	5

Source: Author.

4.2 Validity Test

In this validity test of the calculation of the correlation table below, the question items to variables that have values greater than the critical value as per the r-table (0.1388) show that the question items are valid in explaining the variables. Table 2 to Table 6 below shows that all the 21 question items used in the variables are valid. The calculation data for the correlation tables of question items to variables that have values greater than critical value as presented in the r-table indicated that all question items are valid in explaining the student learning performances.

Table 2: Validity Test for Learning Resources (LR)

Items	r-item	Criteria 1 (>0.3)	r-table	Criteria 2 (>r-table value)	Criteria 3 (Sig at 0.05/0.01)	Result
LR 1	.668**	Yes	0.1388	Yes	Yes	Valid
LR 2	.699**	Yes	0.1388	Yes	Yes	Valid
LR 3	.702**	Yes	0.1388	Yes	Yes	Valid
LR 4	.642**	Yes	0.1388	Yes	Yes	Valid

Table 3: Validity Test for Learning Environment (LE)

Items	r-item	Criteria 1 (>0.3)	r-table	Criteria 2 (>r-table value)	Criteria 3 (Sig at 0.05/0.01)	Result
LE 1	.635**	Yes	0.1388	Yes	Yes	Valid
LE 2	.720**	Yes	0.1388	Yes	Yes	Valid
LE 3	.677**	Yes	0.1388	Yes	Yes	Valid
LE 4	.601**	Yes	0.1388	Yes	Yes	Valid

Table 4: Validity Test for Self-Regulation (SR)

Items	r-item	Criteria 1 (>0.3)	r-table	Criteria 2 (>r-table value)	Criteria 3 (Sig at 0.05/0.01)	Result
SR 1	.703**	Yes	0.1388	Yes	Yes	Valid
SR 2	.695**	Yes	0.1388	Yes	Yes	Valid
SR 3	.735**	Yes	0.1388	Yes	Yes	Valid
SR 4	.706**	Yes	0.1388	Yes	Yes	Valid

Table 5: Validity Test for Technological Sufficiency (TS)

Items	r-item	Criteria 1 (>0.3)	r-table	Criteria 2 (>r-table value)	Criteria 3 (Sig at 0.05/0.01)	Result
TS 1	.720 **	Yes	0.1388	Yes	Yes	Valid
TS 2	.710 **	Yes	0.1388	Yes	Yes	Valid
TS 3	.690 **	Yes	0.1388	Yes	Yes	Valid
TS 4	.754 **	Yes	0.1388	Yes	Yes	Valid

Table 6: Validity Test for Student Learning Performances (SLP)

Items	r-item	Criteria 1 (>0.3)	r-table	Criteria 2 (>r-table value)	Criteria 3 (Sig at 0.05/0.01)	Result
SLP 1	.704 **	Yes	0.1388	Yes	Yes	Valid
SLP 2	.735 **	Yes	0.1388	Yes	Yes	Valid
SLP 3	.735 **	Yes	0.1388	Yes	Yes	Valid
SLP 4	.691 **	Yes	0.1388	Yes	Yes	Valid
SLP 5	.783 **	Yes	0.1388	Yes	Yes	Valid

4.2 Frequency Analysis

The study findings indicate that most of the respondents 114 (54.3%) were male students while 96 (45.7%) were female. All respondents came from the two schools which were SMK Baru Bintulu with 120 (57.1%) and SMK Bintulu with 90 (42.9%) respectively. In terms of educational level and stream, all of the respondents involved from these two schools were students in form 4 with 102 (48.6%) and form 5 with 108 (51.4%). While, 125 (59.5%) of them were from the Science stream and 85 (40.5%) were from the Art stream. On ethnicity, there were eight different ethnic groups found in this study. Of the eight ethnic groups, the highest were represented by Chinese ethnicity with 68 (32.4%) followed by Iban ethnic and Malay ethnicity with frequency of 64 (30.5%) and 57 (27.1%) respectively. Melanau ethnic consists of 10 (4.8%) percent of the total population. The remaining 11 (5.2%) were those students with the ethnicity of Kenyah, Bidayuh, Tetau and Kayan.

Table 7: Summary of the respondent according to their profile (N=210)

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	114	54.3
	Female	96	45.7
Ethnicity	Malay	57	27.1
	Chinese	68	32.4
	Iban	64	30.5
	Melanau	10	4.8
	Kenya	3	1.4
	Bidayuh	3	1.4
	Tetau	2	1.0
	Kayan	3	1.4
School	SMK Baru Bintulu	120	57.1
	SMK Bintulu	90	42.9
Educational Level	Form 4	102	48.6
	Form 5	108	51.4

Class (stream)	Science	125	59.5
	Art	85	40.5

4.3 Pearson Correlation

Table 8 below highlights the relationship between the independent variables represented by online learning challenges with the dependent variable of students' learning performance. The study measured by Pearson product-moment correlation coefficient. It's agreed that a correlation of 1.0 means that there is a perfect relationship between the variables regardless of the direction of the relationship. The closer the *r* value to 1.0 indicates that students agreed and perceived positively the online learning challenges on their learning performance. The *r* value ranged from (0.306-0.547 $p < .05$) representing a moderate relationship (Evans, 1996) and hence, the results show that the independent variables were statistically significantly correlated with students' learning performance. Those hypotheses accepted were: learning resources challenge, $r = .306$, learning environment challenge, $r = .547$, self-regulation challenge, $r = .524$ and technological sufficiency, $r = .323$. From Table 4, it is evident that the learning environment challenge is most significant and highly correlated to students' learning performance.

Table 8: Pearson correlation analysis between variables studied

Variable	1 (LR)	2 (LE)	3 (SR)	4 (TS)	5 (SLP)
R					
1 (LR)	1	.477*	.511*	.653*	.306*
2 (LE)	.477*	1	.604*	.452*	.547*
3 (SR)	.511*	.604*	1	.403*	.524*
4 (TS)	.653*	.452*	.403*	1	.323*
5 (SLP)	.306*	**.547***	**.524***	.323*	1

Note: 1 = Learning Resources Challenge, 2 = Learning Environment Challenge, 3 = Self-Regulation Challenge, 4 = Technological Sufficiency Challenge, 5= Students' Learning Performance

4.4 Multiple Regression Analysis

A multiple regression analysis was also conducted in addition to the Pearson correlation analysis above to predict students' learning performance based on the online learning challenges as determinants. This is to support and strengthen the result of Pearson Correlation analysis on the relationship between the predictors and dependent variable. A significance value of 0.000 indicates there is a significant difference among the mean scores of the dependent variable because the score is less than 0.05 (Pallant, 2007). On the overall regression summary, Table 9 exposes the prevalence of substantial relationships of all variables. It displayed that the learning environment challenge and self-regulation challenge demonstrated to be the most associated with students' learning performance (learning environment challenge, $\beta = .388$, $t = 4.726$, $p < 0.05$ and self-regulation challenge, $\beta = .338$, $t = 4.182$, $p < 0.05$), while technological sufficiency challenge was moderately associated and with $\beta = .093$, $t = 1.149$. The Standardized Coefficients (β) show that the learning environment challenge has the largest absolute value, 0.356, followed by the self-regulation challenge, 0.316 and the technological sufficiency challenge, = 0.089. This

suggests that learning environment challenge is the strongest predictor of students' learning performance.

Table 9: Relatives Contribution of online learning challenges
(*Learning resources, Learning environment, Self-regulation, Technological sufficiency*)
as independent variables and students' learning performance as dependent variable

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta (β)		
1	(Constant)	1.058	.230		4.591	.000
	Learning Resources	-.087	.085	-.083	-1.023	.307
	Learning Environment	.388	.082	.356	4.726	.000*
	Self-Regulation	.338	.081	.316	4.182	.000*
	Technological Sufficiency	.093	.081	.089	1.149	.252

*significant level is at .05 ($p < .05$).

4.5 Discussion

In this study, it explores the challenges that the students experienced in online learning. It examined how learning resources, learning environment, self-regulation and technology sufficiency affected students' learning performance. The analysis revealed several crucial new insights compared to previous studies. These findings described the challenges that the students faced now were varied in terms of types and situations.

First, students' learning environment positively affects their learning performance. The learning environment turns out to be the greatest challenge affecting students' learning performance. When the statistical significance of the path coefficient between the variables was examined, the direct effects of the learning environment on students' learning performance were found with statistically significant ($β$ = .356, t = 4.726, p <0.05). In other words, students' learning performance was more likely to improve when they had a productive and conducive learning environment. This finding confirms the findings of previous studies (Closs, Mahat & Imms, 2022; Becton, 2017; Waldman, 2016). In the online learning environment, most students are often concerned about peers students in their groups who do not prepare for class in advance. To succeed academically, students must feel safe both physically, and mentally and safe learning environment. Moreover, they must also feel supported by all those connected such as their teachers, classmates, schools, family and community members (Waldman, 2016).

Second, self-regulation positively affected students' learning performance. When examined, the direct effects on students' learning performance were found with statistically significant ($β$ = .338, t = 4.182, p <0.05). This clearly indicated that students with a high level of self-regulation were more likely to demonstrate higher engagement and interest towards their studies. Moreover, highly self-regulated students would also be quick to respond and interact socially when comes to group work or doing

assignments. They also often share their thoughts with other students and teachers, work in a team and are actively involved in problem-solving which sometimes may require strategic solutions. This finding was consistent with the findings of previous researchers (DiDonato, 2013; Travers and Sheckley, 2000). The learning resources and technological sufficiency challenge were found to be not associated with student's learning performance as with reported significant value (sig = .307) on learning resources, while (sig = .252) for technological sufficiency. Additionally, the finding for technological sufficiency seems to be inconsistent while most studies revealed that the technological sufficiency challenge was the most common challenge the students face during online class. This shows that this study has its own unique points and is impactful as it would consider other factors to be explored and researched.

5. Conclusion and Recommendations

It is undeniable that online learning has been on the rise for the last two decades, as more and more people undertake all or part of their training via learning, online classes or virtual classes. Most universities today have some kind of learning management system (LMS) such as Moodle-which could allow lecturers and teachers to make use of digital tools. Online learning in Malaysia became an essential tool for keeping the nation's students educated during a period of uncertainty. This study reviewed all possible noteworthy correlations between the online learning challenges and students' learning performance in the two government schools in Sarawak. Based on the findings, this study has significant implications for secondary schools and higher education.

First, it is believed that learning environment challenges with accessible, comfortable and utilizable facilities will promote and encourage effective learning processes which could improve students' learning performance such as academic achievements and results. As the findings have shown, the learning environment is the greatest challenge that students must overcome, for example dealing with distractions at home and some limitations of learning facilities. As referring to Student Voice Matter Survey Project (2021), shows that 70% of students indicate that they need more fun and engaging activities to improve their online learning experience. This is higher than in the previous year's survey, where only ~37% of students reported the same. Students also expect clearer and more consistent learning structures to continue to be a major need. The survey also highlights Google Meet as students' most preferred online learning platform, followed by WhatsApp, Telegram and Zoom. Students who are more comfortable with virtual platforms tend to have a better online learning experience. Realizing this, the government, schools and other stakeholders in the education sector should intensify more efforts towards uplifting and creating a more friendly learning environment such as by constructing a more mobilized model where all the fundamental components such as the learners, teachers or instructors and the assessments were performed to the highest level. As mentioned by Duruji (2014), the state of the learning environment and quality of infrastructure together with the extent to which they are being maintained have a

strong impact on students' academic performance. Having said that schools with adequate learning environments contribute to stirring up expected learning outcomes that could facilitate good academic performance by encouraging effective teaching and learning. In doing so, the government or schools could carry out a regular monitoring, supervising and evaluation of its activities and programs to access participation, engagement and understanding of the students and other support to those instructors who may be lacking of competencies required to improve the learning environment. As part of that, the government or schools should appropriately look into the funding to ensure that the sector acquires the necessary facilities to make the online learning environment more adaptable and viable to meet education objectives in the state. Finally, this study provides an inspirational approach and crucial insights into self-regulation challenges in the aspects of students' motivational, behavioural and cognitive aspects that influence their learning performance. Students' self-regulation plays important roles in online learning and the roles must be critically considered and assessed before any schools or universities planning to adopt online learning courses. As referring again to Student Voice Matter Survey Project (2021), Students want more engagement and structure in their online lessons. They ask for more ways to interact and engage with their teachers and peers. The majority of students say they need medium to high levels of support from their teachers when learning a new topic, citing a preference for guided individual revisions. This statement clearly shows that students need systematic guidance on their self-regulation, if they have a lower self-regulation, they may face challenges in monitoring and handling their understanding of the content or lesson they learnt. Thus, it is important for teachers or instructors to provide appropriate guidelines and strategies to help to improve students' self-regulation level, be flexible and adjust strategies to maximize the benefits students could gain, enhance students' active engagement and know how rewarding students are for active involvement.

Finally, as education systems are becoming more complex with technologically oriented. Understanding how to use technology for online learning from digital to analog helps prepare students for the future. Early learning of technology skills can help students to grow and beneficial for students to be up-to-date with the latest educational methods. Government will continue to explore the possibility of adopting an online learning curriculum, it is crucial to actively address the need and stability and sustainability of the government agencies nationally working closely with institutional policies, procedures and guidelines in order to ensure this kind of approach would be implemented successfully and gain support from the public, private and public academic institution.

5.1 Future Research Direction

There are several limitations to this study. The first limitation is on the method used is that this study is based on 210 respondents collected through convenience sampling on form 4 and form 5 for two government secondary schools. Therefore, the findings cannot be generalised for instance, one finding (learning environment as a critical antecedent of

students' learning performance) could be generalised based on previous studies and current studies. However, the relationships between learning resources, self-regulation and technological sufficiency could be explored further in different contexts and methods used. Secondly, although, this study focused on four factors, other factors that could affect students' learning performance were not considered, which means diverse factors influencing students' learning performance could be examined. Future studies may also widen the sample by including all other targeted groups taking part in the online learning process such as by investigating and taking teachers/instructors' views and experience. By doing so, it would have a complete view of the situation and how different elements interact between them and affect the others. In addition, participants in this study were limited to form 4 and 5 students from government secondary schools and to increase the robustness of the findings, future studies on students from several higher education institutions across the regions could be considered. As a final note, online learning has undoubtedly reshaped and modernised the method of learning among students and pushed the education system nowadays to its limits in becoming stronger and more sustainable.

Conflict of Interest Statement

The author can assure, and confidently express that no conflicts of interest possibly linked with this research, and there has been no significant financial aid received for this study, authorship and publication that could have influenced the study's outcome. The author affirms that this research is original and has not been published in the past or elsewhere.

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