FACTORS AFFECTING DROPOUT INTENTION DUE TO ONLINE LEARNING TRANSITION AMONG ENGINEERING STUDENTS AT HIGHER LEARNING INSTITUTION

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Abstract:

Everyone witnesses the mushrooming of internet technology in a dynamic area, especially in the education sector that glows E-learning platform to be an essential method applied by educational institutions across the globe. Online modes glommed into higher education as the objective is to streamline students' learning as well as to equip students' skill set to meet with digitised world demands. This affects the entire academia, and to be specific engineering students are much more affected compared to the rest as it involves technical scope of studying. Thus, a descriptive research design was undertaken to focus on examining the factors that affect engineering student's dropout percentage due to online learning transitions at higher learning institutions. Three main dimensions were understudy namely, resilience, digital literacy and teaching competencies as the predictor of dropout intention. Correlation research design was applied, tested the named dimensions on samples of first-year students ($n=1100$). Further, data gathered are analyzed through Statistical Package for Social Science (SPSS) version 26. The results show three main predictors (resilience, digital literacy and teaching competencies) is a significant predictor of early dropout intention among students. The result's implication being spotlight and the possible intervention are suggested to reduce the rate of students' dropout intention.

Keywords:

Academic, Digital Literacy, Dropout Intention, Engineering, Resilience, Teaching Competencies

Introduction

Corona virus Disease 2019 (COVID-19) is no longer seen as an unfamiliar term to this planet and its people. The disease affected all sectors including social, political, technology and economy sectors. The global shutdown was putting everyone at stake, especially related to the economic system where interdependency is truly high across all borders and oceans. As of 18 March 2020, Malaysians experienced the first ever Movement Control Order (MCO) national quarantine ruled by former prime minister, YB Tan Sri Muhyiddin Yassin. Since then, Malaysians have witnessed holistic changes in daily routine, from business to households' activities, thus education has no exception including higher learning institutions that have been hit by COVID-19 global pandemic.

The transition from physical work environment to teleworking has been practised in the entire organization. Similarly, the education sector has been projecting and enhancing online learning platforms for students. Online modes glommed into higher education as the objective to streamline students' learning as well to equip students' skill set to meet with digitised world demands. Thus, in effort to help future generations on learning continuity on digitised medium is utilised. Moreover, there is always space developed by authorities to offer a better platform for young people to learn. No matter what, educating young people is always a priority thus measures taken to safeguard the delivery of programmes through online. However, the usage of technology among students is a hot topic to be discussed due to individual motivation and interest.

Hence, different interests on technology usage leads to high dropout rate among students. Abu (2016) coined initially, dropout might be caused due to diverse reasons varying on the nature of the study and the higher education provider such as, education interest, revision on courses, education performance, health issues, financial matters, personal reasons etc. In trend, reasons for dropout were slightly changed due to the global pandemic effects. According to EMIR Research's newest poll for the 3rd quarter of 2020, 80% of respondents are worried about the education quality received by their children due to the new norm of relying on online education. Moreover, it creates worry among the respondents due to lack of internet access and broadband facility at their home to enable their children to study during the pandemic. Even the government has taken the initiative on measures of Budget 2021 to help B40 communities to access telecommunication for education yet self-discipline becomes questionable when students utilize data connection for non-academic purposes instead of academics.

Besides, Cohen (2017) added during the learning process thru courses online (online education) highly met with increases on dropout cases. Further, the cruciality seen where Hanson (2021) stated in an article on the percentage of college dropout rate in the United States, 40% is the overall dropout rate for undergraduate college students and largest majority from the population, 38% dropout due to financial pressure. This affects the entire academia, and to be specific students from STEM (Science, Technology, Engineering and Mathematics) fields much more affected compared to the rest as it involves technical scope of studying. This enhanced according to a survey done by The American Society for Engineering Education (ASEE) found between 40% to 50% of engineering students drop out from the course or drastically change their majors, (Charbonneau, 2020). Additionally, another national survey on student engagement revealed that two out of five engineering students spent more than 20 hours per week to prepare for class, long out-studying their peers in other majors, (shown in Figure 1). This shows significant reasons for engineering students being hit with burnout and leads to

dropout intention. The retention rate among engineering students is among the lowest compared to all majors, and around 60% will dropout or change their majors and 40% of those students will do so in their first year, added Horbacewicz (2019).
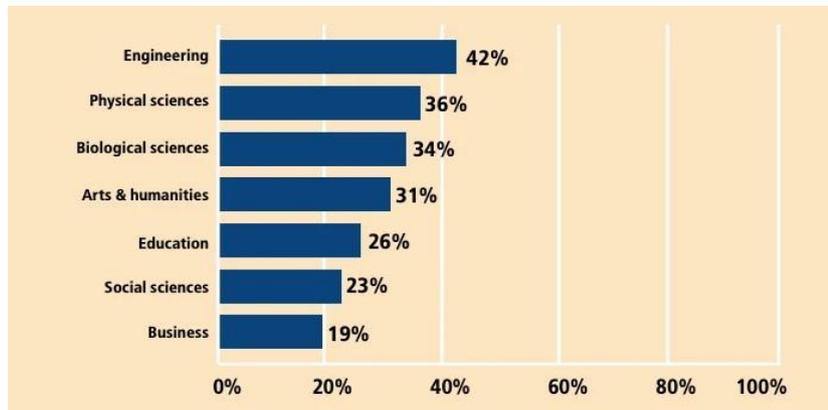
Figure 1: Graph of The Percentage Engineering Students Spent More Than 20 Hours Per Week Preparing For Class.

Literature Review

In aspect of students' dropout intention, many were due to financial pressure as mentioned by Hanson (2021), yet other dimensional playing vital role as well by leading to students' dropout intention such as students' resiliency, their digital literacy as well the teacher's teaching competencies that fits along with the Ministry's Malaysia Education Blueprint 2013-2025 which includes all the dimensions of 21st century learning and instruction. Furthermore, data availability is another concern particularly on students' dropout percentage which is lacking in any official website or portal, the data available was solely specified on students' intake, enrolment, and output (graduate) by Ministry of Higher Education (MoHE) as well the graduate statistic revealed by Department of Statistics Malaysia (DOSM). It might be due to the confidentiality and availability nevertheless this leads people to be unaware of the cruciality of the student's dropout intention issue and perhaps brought to different consequences if does not tackle this at earliest.

Besides being concerned about students' dropout issues, it's also highly related to the institution's reputation when the number of students enrolled is reduced, greatly impacting institutions' revenue. Thus, it is important to get the right study into the course learning and ensure they complete the study. Therefore, there is a need for this study to be executed in identifying the elements affects students' dropout issue due to online learning transition.

Dropout Intention

Dropout from universities or higher education is a continuous problem and reducing students' dropout rate is a major challenge for universities regardless of the nature. Anyhow, it's perceived as "unfortunate" because there is not a single reliable method to identify who and when dropping out of institution occurs, (Hupfeld, 2010). It's unpredictable, well the population of dropping out was commonly observed in undergraduate students due to the large number of students enrolled in a first-degree program. In Spain, Constante-Amores, et al., (2021) stated that the dropout rate of undergraduate students is much higher than students in

subsequent years. While, in Germany, Respondek, et al., (2017) found a related study which emphasized on first year study as an ultra-critical transition year. In the context of Malaysia, undergraduate students are in the range of the upper limit of prolonged adolescenceis 24 years, and it tally with students as regards studying undergraduate programs at that age time. Thus, the personality traits of undergraduate students in the period of age group have the characteristics of adolescence which are perceived as low self -control and high tendencyto have active social life (Dacey, et al., 2009), and added them the pressure of online learning concept that been implemented due to pandemic, thus it increases the possibility of dropping out from university studies. Hence, in this study researchers focus on first year students from engineering undergraduate programs.

In aspect of students' dropout intention, on the report of National Dropout Prevention Centre (2007) coined that there is no sole risk factor that determine accurately who is at the risk to drop out or having the intention to dropout from the course, alternatively it seems to be multiple factors across multiple area that influence on dropping out. Certainly, students decide to dropout due to multiple reasons that compound each other rather making a decisionto drop based on a single situation or reason. Furthermore, the National Dropout Prevention Centre concludes that forecasts who have the intention to dropout are more valid by considering multiple risk factors. In this study, researchers focus on students' resiliency, students' digital literacy as well teaching competencies by the teachers during the global catalyst in identifying whether these elements are significant in predicting students' dropout intention.

Resilience
Resilience is referring to the capacity or ability to recover promptly from difficulties or toughness. In this study context researchers discuss the concept of resilience among students in higher education with the confabulation focusing on students' who are resilient in managing their studies and graduated while others ended up dropping universities during the global pandemic of COVID-19. Generally, there are few categories of resilience, such as physical resilience, psychological resilience, emotional resilience, community resilience, etc.In this study, focus was given to students' psychological resilience in adapting to the adversity that occurs on changes of learning format, transition of physical to online assessments (Quizzes, assignments, class activities, and final examination). Researchers believe in the 21st century, online learning will never be an issue since most people are usingtechnological devices for academic and non-academic purposes.

However, the application of diverse platforms during teaching and learning such as Google Meet, Zoom, Microsoft team, Cisco webex and etc derives various problems especially considering internet accessibility, technical issues, digital literacy and teaching competencies. Thus, it is believed lifeline would assist students to be more resilient in managing online learning and secure students from dropping out of universities. A study done by Constante-Amores, et al., (2021) on the Spanish education system by testing the bridge of dropping out factors with students' background even before their admission to the university (Complutense University of Madrid). The authors tested the study on 12035 students and found students' dedication is the main factor that affects the dropout rate in the university andmost cases were from part-time students instead of students who enrolled full-time.

Another study on resilience that was conducted by Lessard, et al., (2014) on an issue to analyze the discourse of dropouts and resilient students in Canada. The study was tested on sixty resilient students and eighty dropouts from universities and results revealed that it could categorize four types of capacity that set up resilient students apart from dropouts (listed below) moreover resilient students may depend on carelines when they face difficulties.

     a. *Students use own resources (onto system)*
     b. *Students ask for help when needed*
     c. *Students establish and maintain positive relationship with teachers and friends whilesetting limits when necessary*
     d. *Students plan, make choices and follow through on decisions.*

On the other hand, Wayman (2002) mentioned that there are few studies focusing on dropout with or without degree which cause limitations in making policy and prevention comprehensive. Thus, the author came out with a study that examines dropout on students (Mexican American and non-Latino white) who return to gain diploma and General Educational Development certifications (GEDs). The author added that utilising educational resilience framework would improve knowledge on dropout students' degree attainment. The study found by viewing the returning dropouts as a resilient student that provides more usefulset factors linked with degree attainment. Tayebi, et al., (2020) executed a study regarding theanalysis on lack of motivation and dropout among engineering students in Spain. The authorsenhanced that numbers of factors that impact the degree of electrical and computer engineering students' motivation as well as the main reasons to dropout. The study examined624 students from eight different Spanish universities and found the major factor influence dropout was the motivation of students followed by self-reported possibilities, difficulties, low academic performance and negative relationship with teachers.

This emphasis on students' individuality which is referring to student resiliency in managing education. Hence, the changes of learning format to fully online during global pandemic is feasible to cater for students solely due to their resiliency attitude which prevent them from having the intention to dropout from university. Thus, researcher believe in this study context,engineering students is perceived to possess high resilience that potentially influence students' dropout intention and it hypothesized as;

    H1: Resilience significantly influence student's dropout intention.

Digital Literacy

Digital literacy is a must in the 21st century regardless of age group because nowadays all communication and transactions occur digitally, thus everyone needs to excel in handling digital medium. This being emphasized and the usage of digital was extended which increased tremendously during global pandemic, starting from online shopping to online learning. In the context of higher education, COVID-19 pandemic overall changes the formatof the learning delivery system forever and students start to adapt the reality of online learning transition as holding spans a range of formats. The current learning system comprises several areas that integrate complementary physical or "go live" (synchronous) and online (asynchronous) learning. Blended learning also known as hybrid and hyflex learning which refers to a learning

framework that combines physical and online learning context. Hybrid learning incorporates physical and online classes, while hyflex learning combines three modes, physical, online and offline learning.

As the technological possibilities continue to evolve, researcher observed that e-learning (online learning) go beyond time and place where it enables teaching and learning process to occur at any convenient time and location besides facilitate wider inclusion of students, such as the unemployed (Islam, Kunifuji, Hayama & Miura, 2011). Moreover, McGuinness and Fulton (2019) explained that e-learning are widely incorporated in higher education as well in public domain and coined the idea of digital literacy has been discussed and analysed by multiple authors since 1990s, that includes Ala-Mutka (2011), Bawden (2001; 2008), Gilster (1997), Lankshear and Knobel (2008) and Littlejohn, Beetham and McGill (2012).

Thus, the digital literacy idea it's not a whole new aspect to be discussed yet the adaptation and implementation takes time to apply in practice. Within the educational context, the global pandemic triggers the digital literacy focusing on students in higher education concerns on the adoption of digital learning modes that supports the development of digitally literate students, who are capable to operate smoothly operating technology-based learning. Although many learning concepts were implemented for students, the most important issue is the understanding of students' choice, the ability to use and the aspect of reusability and accessibility of content. A commercial definition of digital literacy well-explained by Martin & Grudziecki (2006);

> *Awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyze and synthesize the digital resources, construct new knowledge, create, media expressions, and communicate with others, in the context of specific life situation, in order to enable constructive social action; and to reflect upon this process, (p.255).*

There is a crucial need for some specific abilities especially on digital literacy on the side of students at all educational levels due to the sudden transition in order to facilitate optimal learning, besides the digital literacy development is vital for future engineers. A study done by Karagul, Seker and Aykut (2021) on investigating students' digital literacy levels during online learning due to COVID-19 pandemic applying students' demographic characteristics (age, gender and school degree) to identify the major influences on digital literacy. The study was tested on 510 students and results revealed that there is a statistically significant relationship between students' digital literacy and their school degree and gender while age group was not found to be statistically significant to digital literacy.

Mohan, et al., (2017) conducted a study in Kerala, India focuses on an analysis of school dropout and the impact on digital literacy in girls of Muthuvan tribal. Investigate the factors that contributes to high dropout rate and evaluate the success of a computer literacy intervention with tribal girls who had previously dropped out of education system. The study was tested on 31 sample and found the students' able to be computer literate after received the examination of digital literacy and computer concepts. In addition, Burmester, Metscher & Smith (2014) and Mayer (2015) coined digital literacy or technology is considered as the factor of dropout. Hence, researcher believe that digital literacy in current study context potentially linked with students' dropout intention. Thus, it hypothesized as

H2: Digital literacy significantly influence student's dropout intention.

Teaching Competencies

Competencies include a set of professional skills that enable a teacher or instructor to be successful, resolve teaching events appropriately, besides maximizing the entire teaching and learning process. Moreover, teachers' competencies are crucial to ensure the quality of education delivered as they must have the expertise in a wide range array. In this era of globalization, teaching and learning must evolve in order to meet global demands for graduates along with the fourth industrial revolution (IR4). Essentially teaching quality has effects on dropout risks, in the case of online learning transition during COVID-19 pandemic,teachers struggle a lot and hard to implement the new learning pattern and environment to students especially those in rural areas in concern with the internet accessibility and the understanding of learning platform. Authorities took many initiatives to overcome the barriers including providing training to teachers that are in need of new technologies updates,since technology skill is a must for teachers to meet the basic requirement of online learning.

There are few characteristics that are fundamental for a teacher in order to ease teaching and learning process, knowledge on curriculum delivery, easily available for students, involve encouragement and participation, professionalism, digital literacy (e-literacy), flexibility as well as resources to facilitate learning. All these skills are highly in demand to support and collaborate students to understand and perform better. In the context of engineering students in higher education potentially affected if the teachers do not digitally literate in operating technology mode devices as the nature of engineering involves lab tutorial and if the teacher were not able to replicate the physical content online possibly leads to negative consequences. However, digital learning enables teachers to diversify their teaching approaches and develop learning experiences that engage students through multiple technologies and platforms. Besides, it has opened up extensive opportunities for them to maintain high educational standards.

Gil, et al., (2018) examined a study on school dropout factors from a teacher and school manager perspectives. The authors usually coined many factors that tested the topic of dropout yet lack of teachers and school managers perspectives that were taken into account. Thus, the study focuses on the teacher and school managers perspective on student's dropout.

The study revealed that most cases of students' dropout was affected majorly from commitment and support for students. Furthermore, Raiziene, et al., (2017) conducted a study from a different angle which looks into teacher's feedback that influences students' dropout intention by mediating the role of basic psychological needs. It was tested on 682 students and found negative responses or feedback from teachers and the frustration of needs for relatedness predicting the intention to dropout. This is a significant result in the educational context whereby encouragement and positive words from teachers would motivate students to retain and perform better. In addition, Nagar, et al., (2017) came out with a study on teaching quality, it was tested on 2840 students. The study result revealed the quality of teaching plays a vital role in decreasing the risk of dropout. Thus, it can determine that teachers' competencies do predict the students' dropout intention.

It's understandable that a drastic shift to online learning might affect teachers' competencies during the global pandemic of COVID-19. Therefore, teachers in higher education appear to show some level of tension between the essential to adopt technology-enabled modes and support the development of students' digital literacy, and the connection of lacking in delivering transparent and consistent evidence concerning the effectiveness of learning methods and student engagement. The faculty, academics, administrative, librarians and other learning support specialists shared the common purpose of negotiating a tech-based learning environment that blend well with established approaches and maintains high pedagogical standards besides meet university students' expectations in regards the use of technology in learning and research, as well as for their future careers. Hence, researchers believe that teaching competencies of teachers in higher education in this study scope are potentially linked with students' dropout intention. Thus, it hypothesized as

H3: Teaching Competencies significantly influence student's dropout intention.

In a nutshell, through the discussion researchers believed there are few major elements that play a vital role in higher education dropout which ultimately impact many parties in the educational setting. Thus, researchers would intend to test the factors (resilience, digital literacy and teaching competencies) in affecting engineering students' dropout intention (*shown in Figure 2*).
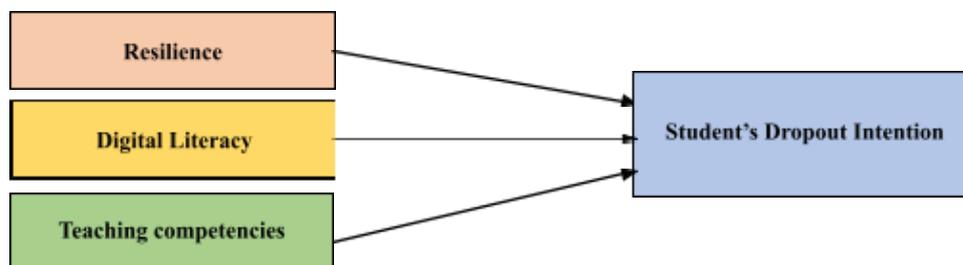
Figure 2: Research Framework

Methodology
The method executed in this study is comprehensive. Generally, this study is cross-sectional and quantitative in nature. It focuses on first-year engineering students from a higher learning institution in Malaysia due to the capability of explaining their intention to dropout by experiencing an extensive online platform of learning. The total population is 1100 engineering students. The selection of sample size, Roscoe's rule of thumb (1975) was applied and undertook the recommendation made by Hill (1998) whereby at least the 10% from total population should be tested to represent the whole study population. However, researchers determined to distribute about 165 questionnaires (15%) with intention to receive a high response rate. Further, this study's unit of analysis is at individual level as the main focus is on engineering students' dropout intention.

Potential respondents were selected through utilizing the technique of purposive sampling. There are few criteria set up to narrow down the scope which focus on receiving actual respondents directly who are capable of providing real time information by virtue of knowledge and entering study during the pandemic period. Survey data were collected using Google Form

and the responses were analysed through Statistical Package for the Social Science (SPSS) version 26 in order to test reliability analysis, descriptive statistics, Pearson correlation and multiple linear regression analysis.

Measurements

The list of measures items used in each variable are shown in Table 1. In total, 80 questions were adapted from past studies. Dropout intention (5-items), resilience (12-items), digital literacy (35-items) the original version has 38 items but items that are not related with the study context were eliminated. Reliability test was executed to ensure the reliability of items to measure variable names. Teaching competencies (28-items). All items were measured using a five-point Likert scale, ranging from 1 to 5, Strongly Disagree to Strongly Agree.

Table 1: Items Adapted from Literatures

| Variables	No. of Items	Author/ Developer	Remarks
Dropout Intention	5	Dresel & rassinger (2013)	-
Resilience	12	Nicholson McBride Resilience Questionnaire(NMRQ) (2010)	-
Digital Literacy	38	Shopova, T. (2014)	3-items were eliminatedas not applicable understudy context; (35-items)
Teaching Competencies	28	The Evaluation of Teaching Performance (CEID) (2015)	-

Results and Discussion

Sample Characteristics

There are 165 questionnaires distributed to first year engineering students in a higher learning institution and 120 questionnaires were returned which made up 72.73% of response rate. The demographic of the participating sample was explained in detail; the main respondents inthis study are male students, 60% that covers from the total sample, 84.2% was the main age group of respondents (20-24 years old) which significantly explain the intention to dropout. Further, out of 120 respondents, 25% respondent's family income is in the range of RM1001 to RM 2000.

In regard to students' internet accessibility at home, 90% of the 120 respondents have the internet connection at their home, 7.5% of students do not have internet accessibility while the remaining 3 students indicate others who are concerned of using outside Wi-Fi connection (*shown in Figure 3*). Moreover, more than half of 120 respondents, 51.7% participants, would prefer physical classes (*shown in Figure 4*) throughout their academic journey in the higher learning institution even if the majority of the respondents (90%) has internet accessibility.

This shows the global pandemic does affect the learning pattern in higher education, in trend online learning was taking place but for engineering students in this study scope would prefer physical classes that enable them to have deep understanding on the course delivered. In addition, 25.8% of respondents state their interest in the current program is at an average level yet 80% from the 120 respondents would not change their current program even if there is an opportunity.

Figure 3: Internet Accessibility at Home
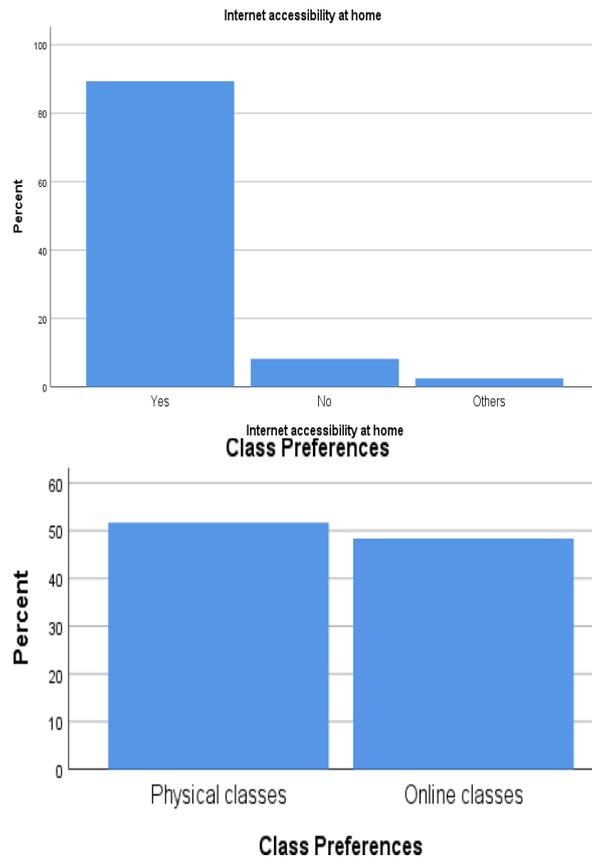
Figure 4: Class Preferences

Reliability Analysis

Reliability analysis was examined by the value of Cronbach alpha which indicates the internal consistency of measurement items used for the study. The value of Cronbach alpha for this study is shown in Table 2. Further, the level of reliability for variables understudy was identified based on Hinton, Brownlow, McMurray and Cozens (2004) suggestions and all variables understudy shows high and excellent level of reliability that leads to proceed with the study.

Table 2: Output of Reliability Analysis: Cronbach's Coefficient Alpha

Constructs	No. of Items	No. of Items Discarded	Cronbach'sAlpha	Level of Reliability
Dropout Intention	5	0	.798	High
Resilience	12	0	.837	High
Digital Literacy	38	3	.966	Excellent
Teaching Competencies	28	0	.979	Excellent

Descriptive Analysis

Descriptive analysis was executed. The target to identify mean and standard deviation is to acquire the 'central' scores of variables and spread the values approximately at central tendency. Thus, table 3 shows the overall mean of variable understudy. It ranges between 2.38 to 4.12, which indicates the score from disagree (2) to agree (4) on the 5-point Likert scale. The highest mean was achieved by teaching competencies and highest Standard Deviation (SD) was achieved by student's dropout intention. In stage, the low mean score draws by dropout intention and low SD was obtained for resilience and digital literacy at the same value (0.54).

Table 3: Output of Mean and Standard Deviation for Variables

Variables	Minimum	Maximum	Mean	SD
Dropout Intention (**DI**)	1	5	2.38	0.82
Resilience	2.33	5.00	3.63	0.54
Digital Literacy (**DL**)	3.00	5.00	4.02	0.54
Teaching Competencies (**TC**)	2.96	4.96	4.12	0.62

Hypothesis Testing

Tables below display the results of three direct hypotheses tested in this study scope by applying Pearson correlation analysis and multiple linear regression analysis. At first, Table 4 shows results derived by the execution of Pearson correlation analysis, Table 5 shows the result of multiple linear regression analysis and explains that none of the factors tested (resilience, digital literacy and teaching competencies) were significant in predicting students' dropout intention in this study scope. The reason behind the result obtained due to other possibilities that are discussed in the final part of this paper. Next, Table 6 shows the summary of hypotheses tested for the variable understudy by using analysis of multiple linear regression.

Table 4: Output of Pearson Correlation Analysis

Variable	Resilience	DL	TC	DI
Resilience	1			
Digital Literacy	0.554**	1		

Teaching Competencies	0.524**	0.594**	1	
Dropout Intention	-0.231*	-0.187	-0.213*	1

*N=120; *p < 0.05; **p < 0.01*

Table 5: Multiple Linear Regression Analysis

Hypotheses	Relation	Beta	T	Sig. (*p*)
H1	Resilience - DI	-0.174	-1.534	0.128
H2	DL - DI	-0.026	-0.213	0.831
H3	TC - DI	-0.109	-0.933	0.353

R^2 = 0.267   F Value = 2.912

Table 6: Summary of Hypotheses Testing of IVs with DV

Hypothesis	Statements	Results
H1	Resilience significantly influence student's dropout intention.	Rejected
H2	Digital literacy significantly influence student's dropout intention.	Rejected
H3	Teaching competencies significantly influence student's dropoutintention.	Rejected

Conclusion

The study focuses its findings on the factors that affect engineering students' dropout intention at Malaysia higher learning institutions. The multiple regression analysis results showed none of the independent variables understudy predicting students' dropout intention and rejected the hypotheses. The future suggestion is the parameter to many bodies such as the Ministry of Higher Education, Ministry of Human Resources, academic researcher and policy makers to have a gateway in reducing the dropout rate in higher education.

The finding is quite surprising yet justifiable during the pandemic time. Insignificant influence of resilience towards students' dropout intentions were seen through respondents' answers pattern, the questions reflecting resilience such as "I am calm in a crisis", "I managemy stress well" and I feel confident and secure in my position" were scored high (strongly agree). The possible explanation is significant with the result of the characteristics of students who participated in this study. Majority of respondents (84.4%) is in the age group of 20 to 24 years old which is generation Z (Gen Z). Gen Z possesses the traits of independence. Theyprefer to work independently and do not rely on others for their success besides they are skilled in multitasking. Thus, the finding well explained that engineering students in this study scope are highly resilient in handling challenges and issues by themselves including onthe transition of online learning environment.

Next, digital literacy was also found to be insignificant to predict a student's dropout intention. The set of questions accurately measure the intensity a student needs to manage online learning yet researchers believe it is fundamental digital skill measurement, such as the ability to work with ICT, basic internet skill, abilities to seek and retrieve data information, etc. It might be considered as uncomplicated by just following the instructions given to handle the online classes. This is well-defined with their generation characteristics, technology savvy. It's one of the most salient traits possessed by Gen Z, they are all about technology. Gen Z does a lot of research online to complete their duties either in education or work setting. Thus, the result is justified for this scope of study that engineering students are digitally literate and skilled in managing their online classes during pandemic and the dimension (digital literacy) does not influence dropout.

Last but not least, teaching competencies is another factor that is insignificant in predicting students' dropout intentions. One possible explanation could be teachers presenting professionalism as well as encouraging students to perform. The nature of academics' work is independent and has a clear set of Key Performance Indicators (KPI) to be achieved thus the level of competency is met with the university requirement and students don't consider their teacher's competency leads them to the intention to dropout. In summary, the transition of physical to online learning due to COVID-19 pandemic does not affect engineering students in this study context.

With focus analysis, researchers consider that in the aspect of students' dropout intention it should derive from multiple risk factors compared to a single factor. There are recommendations made by the National Dropout Prevention Centre (2007) for dropout prevention programs. First of all, programs should test multiple risk factors across domains and use multiple strategies in addressing risk factors. Make sure learning is implemented as designed and should evaluate the courses to ensure its effectiveness on end-result. Future research plans include investigating the relationship of personal reasons, students' personality traits (individual behaviour), classroom environment, relationship with coursemates and other possibilities that enable them to dropout from universities. Hence, the useful information provided based on the students' responses can be generated to assist institutions to focus on better strategy and policy in regards to planning and implementation of online educational programs thus the issue of student dropout is reduced effectively. The desirable outcome of studies should meet Malaysian Higher Education Framework 4.0 on engineering education in IR4.

Acknowledgements

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