

# Open & Distance Learning (ODL): Factors That Affect Mathematics Results from Undergraduate Students' Perspective

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**Abstract:** *Open and Distance Learning (ODL) is a learning mode in which learners and educators are separated by time and location. The new norm of the educational system that is being implemented provides students with significant opportunities to learn without boundaries. Nonetheless, the deployment of online and remote learning by higher education institutions has highlighted difficulties relating to academic achievement among students. Students enrolled with ODL have been reported to confront many individual, institutional, and instructional challenges. Therefore, this study investigated the factors that affect Mathematics results during ODL. This study used a quantitative approach and distributed online surveys to collect data from the respondents. Students from the Faculty of Education majoring in Mathematics were chosen as the population while only students who took Calculus 3 were chosen as the sample of the study. Frequency analysis and descriptive statistics were used to summarise and describe the demographic data. Besides, correlation analysis was used to determine the relationship between students' self-regulated learning, teachers' teaching practices,*

*and learning facilities toward Mathematics results. In addition, regression analysis was used to determine which factors affect Mathematics results the most. The findings showed that there is a significant relationship between students' self-regulated learning, teachers' teaching practices, and learning facilities toward Mathematics results. Furthermore, the results revealed that self-regulated learning is the factor that affects Mathematics results the most during Open and Distance Learning (ODL). Generally, the study presented that the major factor that affects students' academic achievement is their self-regulation followed by teachers' teaching style and learning facilities. Therefore, students, teachers, and educational institutions may utilize the findings of this study to improve students' academic performances in the future.*

**Keywords:** *Open and Distance Learning, Self-Regulated Learning, Teachers' Teaching Practices, Learning Facilities*

## **1.0 INTRODUCTION**

Open and Distance Learning (ODL) is a structured learning whereby students and instructors are separated by time and place. It has indeed been implemented around long before the COVID-19 pandemic and evolved over decades. Early formats used include Correspondence Courses which date back to the early 20th century when educational materials were mailed to students. The rise of the internet in the late 20th and early 21st centuries has led to the development of online courses and degree programs, making ODL more accessible and flexible and becoming a popular trend among university students. The pandemic accelerated the adoption of ODL as a necessity. In the year 2020, many more universities in Malaysia implement Open and Distance Learning (ODL) emphasising the online learning and Learning Management System (LMS) format to help students and teachers to continue the teaching and learning process even from their own homes. The shift during COVID-19 highlighted the importance of ODL in providing uninterrupted education, especially during crises. The new norm educational systems applied enable the students to receive substantial opportunities to learn without boundaries.

However, with the new norms in education, come new experiences and challenges. The implementation of online and distance learning by higher education institutions highlighted issues related to academic performance among students compared to conventional educational methods. Hence, many studies are interested in exploring the challenges of online and distance learning which may be the factors that affect students' academic performance. The concept of the Open and Distance Learning (ODL) system focuses on open access to education and training to unbind students from time and place constraints and to offer flexible learning opportunities for individuals and groups of students. Despite the broadening of ODL and its advantages, students enrolled with ODL have been shown to face many individual, institutional, and instructional challenges. Adult students are well established to enter higher education regardless of many risk factors such as age, full-time or part-time employment, dependents, and a lack of academic preparation. These aspects have been proven to be the obstacles for some adult learners to succeed in academics. It is a confusing phenomenon when there is a clear consensus in the literature regarding dropping out, especially in ODL. Institutions must be able to recognize the reasons for students dropping out of school, for example, some students find it hard to make friends, make it impossible to settle down at the beginning of their course, or are not pleased with the quality of teaching, not feeling contented with their timetables and finally precarious financial or family circumstances along with programme or course related reasons such as workload and difficulty (Mahlangu, 2017).

Besides, teachers' teaching practices can be one of the factors that influence students' achievement through ODL. According to Althause (2015), there have been very few studies showing a significant relationship between teacher efficacy and student performance. Althause (2015) also stated that when teachers who are rated with poor and moderate abilities teach the students, it shows that the students will produce the lowest achievement scores in Mathematics. Presence teaching is influenced by the quality of the courses. The behaviours of teaching presence in an online learning environment differ from the face-to-face classroom, as educators must communicate effectively when separated by time and place from the students. Efficient learning facilities in online courses require the teachers to engage in activities that help students build a better understanding during the course. The increment of online course delivery in higher education also

increases the burden on teachers to design and organize courses, facilitate learning, and provide direct instruction for students separated by time and place. Understanding the perceived teaching presence of educators and their associated behaviours is needed to address the best way to prepare the faculty for online teaching in higher education learning environments (Gurley, 2018).

Other than students' self-regulation and teachers' behaviour, learning facilities also have an impact on students' Mathematics achievement through Open and Distance Learning (ODL). According to Altameem (2013), the availability of the Internet and Wi-Fi facilities are important services in the form of basic amenities and there is a significant impact on the accessibility of learning material at a university. Research on online teaching and academic facilitation has been ongoing and shows fairly consistent results (Rajadurai, Alias, Jaaffar & Wan Hanafi 2018). Malay Mail (2020) established that one cannot assume that all tertiary students enjoy unlimited internet access or possess gadgets like desktops or laptops that freely allow them to attend online classes even though the students and lecturers can overcome the technical difficulties. Students who live in rural areas cannot enjoy good internet access as students who live in urban areas due to the speed and coverage of the Internet which mostly depends on the family's finances and home location. These will most probably have an impact not only on the quality of learning but also on the quality of teaching since there is a high risk for the students to be left behind if the classes are entirely conducted online. According to Varshneya (2017), learning technology that is installed by institutions does not review students' needs and content availability thus it becomes an obstacle to the students. Due to that, students have lacked interest in online learning and discontinued the course (Varshneya, 2017).

As a consequence of the issues, this research studied the Factors that Affect Students' Mathematics Results during Open and Distance Learning (ODL). Factors that were studied in the research were self-regulated learning, teacher's teaching practices, and learning facilities.

## **2.0 LITERATURE REVIEW**

Open and Distance Learning (ODL) is an educational approach that allows learners to access learning opportunities without being restricted by geographical location, time, or conventional classroom settings. While Open and Distance Learning (ODL) serves as a vital medium for education, especially in situations where face-to-face contact is not possible, several factors significantly influence its effectiveness and the overall quality of learning including self-regulated learning, teacher's teaching perspective, and learning facilities. How each of these components plays a role in the effectiveness of ODL related to Mathematics academic achievement is explained in the next subsection.

### **2.1 SELF-REGULATED LEARNING (SRL)**

Self-regulation is described as the capability to control one's thoughts, behaviours, or emotions, and it allows a person to adjust his or her behaviour to the demands of a scenario. Self-regulated learning (SRL) defines the ability to sustain attention and suppress extraneous information in a learning environment which lays the groundwork for successful academic outcomes. SRL also refers to the process where learners take control of their learning, including setting goals, monitoring their progress, and reflecting on their understanding. For example, students with superior self-regulation abilities evaluated by self-reports have been shown to answer faster in Mathematical problems which might be due to their exceptional potential to ignore distracting thoughts and focus on the subject. On the other hand, students without ample self-regulation in learning are more likely to struggle with Mathematics achievement (Nemati et al., 2020).

Based on the research of *The Role of Self-Regulated Learning in Students' Success in Flipped Undergraduate Math Courses*, the findings showed that self-efficacy on metacognitive and environment control strategies has a significant positive correlation with the mathematics achievement (Sun, Xie & Anderman, 2018). This indicates that the higher the level of students' self-regulation in learning, the higher the motivation of the students to complete Mathematics assessments online. Thus, the students produced higher grades in the online homework. Consequently, students will confidently take action in monitoring their understanding of the courses, reflect on their learning

strategies, and complete the learning goals successfully when they gain more confidence in their ability to learn Mathematics. Thus, based on the research it can be concluded that students' self-regulation does influence students' Mathematics achievement, especially in Calculus I and II.

Furthermore, Rameli and Kosnin (2016) studied the challenges experienced by students in Mathematics learning for the themes related to self-factors and found that there are two elements involved, which are students' negative perception of Mathematics and student's low self-regulation. The results of the study showed a high frequency of students' negative perceptions towards Mathematics and students' low-self regulation. This indicates that students with low self-regulation influenced mathematics achievement. The results from this study regarding the low self-regulation students faced challenges in Mathematics learning are equivalent to the findings from many other research where the authors reported that students faced a tough time in regulating their learning. As a result, the students received poor marks in their academics. Rameli and Kosnin (2016) also stated that it is extremely crucial to implement learning regulations during the transition of students from primary school to secondary school because it is one of the elements in higher-order thinking skills. It highlighted that students with high control in self-regulated learning can conquer higher-order thinking questions found in Mathematics.

In contrast with the study above, Cho and Heron (2015) have different results from their study. The respondents who participated in the research were enrolled in self-paced remedial online Mathematics courses. The findings from Pearson correlations showed that there is no correlation between students' final grades and students' motivation. In addition, the results indicate that students' final grades were not affected by intrinsic goal orientation, metacognitive self-regulation, and critical thinking. At the same time, other analyses of Pearson correlations proved that motivation, including intrinsic goal orientation, task value, self-efficacy for learning, and learning strategies such as metacognitive self-regulation, and critical thinking are found to have positive relationships with students' satisfaction and Mathematics online learning. Hence, it can be concluded that there is no significant relationship between self-regulation and students' final grades in Mathematics learning.

In conclusion, the self-regulated learning students are different among the students themselves where some researchers found that there is a significant correlation between students' self-regulation and Mathematics grades while other researchers discovered the contrary. Therefore, this study is conducted to investigate the relationship between students' self-regulation and their Mathematics results.

## **2.2 TEACHERS' TEACHING PRACTICES**

Teachers' teaching practices are teaching styles that are implemented by teachers in their lessons. Effective, nurturing, and responsive teaching practices and interactions are keys to all learning techniques. Teaching practices and interactions are responsive to students' learning development. Teaching practices involved lesson schedules, classroom routines, and instruction or communication styles of the teachers. Hence, teachers' teaching practices will influence the reactions of the students in the classrooms.

Bal-Taştan et al. (2018) discussed the impacts of teachers' efficacy and motivation on student's academic achievement in science education among secondary and high school students. The results showed that there is a moderately significant, positive, and linear relationship between teacher self-efficacy in teaching practices and students' academic achievement. Besides, it also revealed that there is a moderate, significant, and positive relation between each dimension of teacher self-efficacy with students' academic achievement where the instructional strategies dimension of teacher self-efficacy showed the highest correlation when analysed with academic achievement. It can be concluded that the research indicated that there is a relationship between teacher's teaching practices and students' academic achievement. Thus, professional and efficient classroom instructions by the teachers lead to a better academic result.

According to Khan et al. (2017), one of the teacher's teaching practices elements is having good communication. The findings of the study displayed that teacher's communication skills affect students' academic performance. The study also found that most students believed that they learn best from teachers who apply effective communication skills while giving instructions or having conversations with them. When teachers perform good teaching

practices during the lesson, it would be able to strengthen the relationship between the teachers and the students as it could improve the level of understanding among the students during the learning process. Once the teachers can tackle students' understanding, it will be easier to teach the students as well as maintain their academic results.

Meanwhile, a study by Ahmad et al. (2017) focused on the factors related to students' performance in Calculus. The research is about students' preference towards teachers' behaviour such as 'the lecturer that I prefer the most to teach Calculus is kind', 'the lecturer that I prefer the most to teach Calculus is fierce', and 'the lecturer that I prefer the most to teach Calculus is tolerance'. Based on the collected data of this study, showed that there is no significant relationship between students' preference for teachers' behaviours in Calculus class and students' Calculus achievement. To conclude, according to this study, teachers' behaviour in Calculus class does not influence students' Calculus final grades.

Furthermore, the research conducted by Mensah, Okyere, and Kuranchie (2013) is in line with Ahmad et.al (2017) in which one of the objectives of the study was to find the correlation between teachers' attitudes during the teaching process and students' Mathematics performance. The studies revealed an insignificant correlation between teachers' attitudes and students' Mathematics performance even though there is a positive correlation between them. At the beginning of the research, the researchers supported findings that showed students' Mathematics performance is influenced by teachers' attitudes during the teaching process. However, the results failed to prove a significant relationship between teacher's attitudes and students' achievement in Mathematics. The researchers also stated that students' performance not only depends on teachers' attitudes throughout the lesson session but also a combination of other factors. All in all, teachers' attitudes are said not to be the main factor that influences students' Mathematics achievement. It can be concluded that each teacher has their teaching practices which differ from one another. Therefore, some researchers found that teachers' teaching practices did have an impact on students' academic performance while others did not. Taking the findings as references, this study explored the relationship between teachers' teaching practices and students' Mathematics results.



## **2.3 LEARNING FACILITIES**

ODL at certain times is difficult to implement by all educational institutions considering their students' backgrounds. Lack of learning facilities among the students is one of the issues that have been discussed among the authorities in the education field. Learning facilities such as electronic devices, internet access, and educational platforms are examples of learning facilities that need to be considered during online learning. This might be a limitation for some students to attend online classes and may affect their academic performances.

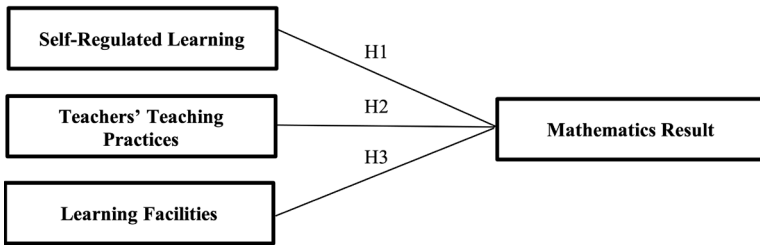
According to Altameem (2013), individuals' access to technology consistently impacts the use of online learning. Some students may depend on sharing gadgets such as computers or laptops at learning centers of the local community since not all students can access online classes with personal computers at their house compared to certain areas such as homes, cybercafes, training institutions, workplaces and institutions where users get the equal amount of internet coverage. Thus, it proves that there is a significant relationship between poor internet connection and challenges in ODL among students. Moreover, the user's ability to connect to the full range of learning content relies on the network coverage and bandwidth. To implement ODL, technology access is very important, and it was pointed out by many researchers. At the same time, this study revealed that poor internet connection is not the only problem but internet access too as it is very costly for certain students who come from families with unstable economies. Overall, this research also showed that environmental factors like poor network coverage have influenced students' academic achievement when they cannot attend online classes boundlessly.

Hargittai and Dobransky (2017) stated that socioeconomic status is one of the factors that impact ODL as well as academic achievement among adult learners. This is because students require a high payment to be able to obtain Wi-Fi or mobile data to access online learning. Unfortunately, students with economic issues can access online learning, thus leaving them behind in education compared to their peers.

Previous studies showed that a lack of learning facilities influenced the academic performance of students. Financial problems are a common issue among students who cannot afford to buy electronic devices and the Internet to join online classes. Other than that, internet accessibility is also deemed to be an issue for some students who live in rural areas. Poor network coverage makes the learning process more difficult and sometimes impossible. Even though they have gadgets and afford to buy the internet, network coverage is one of the factors that need to be considered during online and distance learning.

## 2.4 CONCEPTUAL FRAMEWORK

In this study, the three factors which are self-regulated learning, teachers' teaching practices, and learning facilities are incorporated into a conceptual framework to examine their relationship with improving Mathematics academic results. Figure 1 portrays the said conceptual framework applied in this research study.



**Figure 1:** Conceptual Framework

The summary of the hypotheses statements are as follows:

- H1: There is a significant relationship between self-regulated learning and Mathematics results during ODL.
- H2: There is a significant relationship between teachers' teaching practices and Mathematics results during ODL.
- H3: There is a significant relationship between learning facilities and Mathematics results during ODL.

### **3.0 METHODOLOGY**

This study was conducted through a survey using a questionnaire method to study the factors that affect Mathematics results from undergraduate students' perspectives during ODL. The study utilized descriptive, correlation, and regression analysis to meet the research objectives and to test the research hypothesis by using Google Forms for the data collection process and Statistical Package for Social Sciences (SPSS) for analysis.

#### **3.1 RESEARCH DESIGN**

This study applies quantitative research design while also using a descriptive research approach. The first section of the survey questionnaire consists of students' demographics such as gender, Calculus 3 results, mobile carrier, gadget used for ODL, and location during ODL. The second section focuses on students' self-regulated learning which contains six questions. Meanwhile, the third section addresses teachers' teaching practices, the fourth section emphasizes the effects of learning facilities, and the last section of the survey questionnaire highlights the values of Mathematics with each section containing six questions, respectively. The questionnaire uses the Likert Scale method with one (1) being strongly disagree, two (2) disagree, three (3) neutral, four (4) agree, and five (5) strongly agree.

#### **3.2 SAMPLING**

The population of this study involved students from the Bachelor of Science Education (Hons.) Mathematics from the Faculty of Education. This research employed a simple random sampling method using formulas by Krejcie and Morgan (1970) with data collected from 62 respondents from the Mathematics Education students at the Faculty of Education. A questionnaire along with a set of test papers was provided to respondents when conducting this quantitative study.

### 3.3 RELIABILITY TEST

This study utilized Cronbach’s alpha to investigate the internal consistency of the questionnaires collected from the respondents. All variables of the study displayed high internal reliability as shown in Table 1 below. This test allows for further analysis and discussion.

Variables	No of Items	Cronbach’s Alpha	Cronbach’s Alpha Item Deleted
Self-regulated learning	6	0.936	0
Teachers’ teaching practices	6	0.902	0
Learning facilities	6	0.837	0

**Table 1:** Reliability Test

Table above provides an overview of Cronbach alpha of the three variables. According to the data gathered, all variables are considered as reliable as the value ranges from 0.8 to 0.9. Self-regulated learning was calculated at 0.936, followed by teachers’ teaching practices at 0.902 and learning facilities at 0.837.

## 4.0 RESULTS AND DISCUSSIONS

### 4.1 DEMOGRAPHIC

Table 2 shows the summary of the questionnaire distributed and returned by the respondents through Google Forms. A total of 62 respondents, in which 100% of them answered and returned the questionnaire. In addition, based on Table 3, shows that most of the respondents were female students with 80.6% (n=50) compared to male students with 19.4% (n=12).

Number of Questionnaires Distributed	Number of Questionnaire Return	Percent Valid Questionnaire
62	62	100%

**Table 2:** Summary of the questionnaire that is distributed

Gender	Frequency	Percent
Male	12	19.4%
Female	50	80.6%
<b>Total</b>	<b>62</b>	<b>100%</b>

**Table 3:** Respondent's gender

## 4.2 DESCRIPTIVE STATISTICS

Table 4 below shows the means for each variable. Referring to descriptive statistics, the results exhibit that self-regulated learning is considered to be an important factor in influencing Mathematics results proven by its highest mean (mean=4.02), followed by teachers' teaching practices (mean=3.47) and learning facilities (mean=3.47).

Variables	Mean	Standard Deviation	Total Respondents
Self-regulated learning	4.02	0.932	62
Teachers' teaching practices	3.47	1.067	62
Learning facilities	3.47	1.051	62

**Table 4:** Mean for each group variable

## 4.3 CORRELATION ANALYSIS

Based on Table 5, all variables were found to have significant correlation and can be classified as follows:

- Self-regulated learning towards Mathematics results has a strong positive correlation.
- Teachers' teaching practices toward Mathematics results have a moderate positive correlation.
- Learning facilities towards Mathematics results have a moderate positive correlation.

		<b>Mean of Mathematics Result</b>
<b>Self-regulated learning</b>	Pearson Correlation	0.628**
	Sig. (2-tailed)	0.000
	N	62
<b>Teachers' teaching practices</b>	Pearson Correlation	0.487**
	Sig. (2-tailed)	0.000
	N	62
<b>Learning facilities</b>	Pearson Correlation	0.410**
	Sig. (2-tailed)	0.000
	N	62

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

**Table 5:** Correlations' result

#### 4.4 ANALYSIS OF VARIANCE

Table 6 shows the R2 value which indicates that 41.4% of the variance in the outcome of the factors that affected students' Mathematics results during ODL can be predicted from the variables of self-regulated learning, teachers' teaching practices, and learning facilities. However, the remaining 58.6% of the factors that affected students' Mathematics results during ODL cannot be explained by the research model but by other variables that are not included in this research.

<b>Model</b>	<b>R</b>	<b>R Squared</b>
1	0.643	0.414

**Table 6:** Model Summary

Table 7 displays an F-test value of 13.637 which is deemed significant. Based on the result, the regression model was found to be suitable where the independent variables were valuable in explaining the variance of the dependent variable.

Model	Sum of squares	df	F	Sig.
1	Regression	3	13.637	.000 <sup>b</sup>
	Residual	58		
	Total	61		

**Table 7: ANOVA<sup>a</sup>**

- a. Dependent Variable: Mathematics Result
- b. Predictors: (Constant), Self-regulated learning, Teachers' teaching practices, Learning facilities

According to Table 8 below, the coefficient for self-regulated learning was 0.385. Thus, for every unit increase in self-regulated learning, it is expected that a 0.385-point increase in the Mathematics result. Self-regulated learning is found to be statistically significant for the values of Mathematics ( $p=0.000$ ). It shows that the biggest factor that influences the Mathematics result is self-regulated learning since the significance was less than 0.05 and the unstandardized coefficient was the highest.

The main function of regression analysis is to determine whether the research hypotheses are confirmed or rejected. The analysis is defined as a model that gives a straight-line relationship between two or more independent variables and a dependent variable. Therefore, table 8 exhibits the three variables that were clarified through regression analysis which used multiple linear regression. Based on the table, the highest beta was found to be self-regulated learning at 0.385, followed by teachers' teaching practices at 0.148, and lastly learning facilities at -0.012. The lowest beta indicates the least important factor among the independent variables and dependent variables. Hence, the significant results show that only one independent variable which was self-regulated learning, is considered to be significant because it was identified to be less than 0.05. Therefore, the remaining independent variables (teachers' teaching practices and learning facilities) show that there was no relationship with the dependent variable.

The regression equation for the predicted Mathematics results is:  $=2.540 + 0.385$  (self-regulated learning)  $+ 0.148$  (teachers' teaching practices)  $- 0.012$  (learning facilities).

Model	Unstandardized Coefficients	Sig.
	B	
(Constant)	2.540	0.000
Self-regulated learning	0.385	0.000
Teachers' teaching practices	0.148	0.193
Learning facilities	-0.012	0.909

a. Dependent Variable: Mathematics Result

Table 8: Coefficientsa

## 5.0 CONCLUSION

Based on the findings, the results of this study can be concluded as follows:

	HYPOTHESES	ACCEPTED/ REJECTED
H1:	There is a significant relationship between self-regulated learning and Mathematics results during ODL.	ACCEPTED
H2:	There is a significant relationship between teachers' teaching practices and Mathematics results during ODL.	REJECTED
H3:	There is a significant relationship between learning facilities and Mathematics results during ODL.	REJECTED

The main factor that influences the mathematics results according to the independent variables was found to be self-regulated learning. This is supported by Nemati, Gawrilow, Nuerk, and Kühnhausen (2020), who found in their research that there was a relationship between self-regulation and Mathematics performance among German and Iranian college students. Apart from that, Fauzi and Widjajanti (2018) suggested that there is a positive relationship between self-regulated learning on student achievement. The authors also added that self-regulated learning



is necessary nowadays for all levels of education. Self-regulated learning may influence students' failure to attain learning success. Hence, in their study, the students became frustrated with their schoolwork which required additional self-directed learning. Nonetheless, self-regulated learning is a combination of academic learning and self-control skills that make learning easier, therefore students are more motivated.

The findings of this study are beneficial in providing early exposure to students to understand that academic achievement depends more on themselves compared to other factors. The outcome of the study also allows students to identify their level of self-regulation in learning. If the results show that their self-regulation level is weak, students may take measures to improve it. This is because individuals with low self-regulated learning are more likely to achieve lower academic results since they are unable to control their behaviour, emotions, or thoughts when they face difficulties in the learning process. Low self-regulated learning leads to a lack of motivation, stress, and laziness. As a result, it will affect academic performance. Therefore, this study is beneficial for students to recognize their self-regulated learning so that they can improve their weaknesses.

Besides that, the outcomes of this research are also useful to teachers. Teachers will be able to observe students' perceptions of their teaching practices. They could identify the suitability of teaching practices for students. Since each student has a different character and level of understanding, therefore suitable teaching styles that meet their nature should be considered. This study is helpful for teachers to recognise their students who need more attention in class. Essentially, low-performance students commonly seek more attention and at the same time feel less confident to ask questions to teachers. Generally, this study is advantageous to teachers as it assists teachers in identifying the effectiveness of their teaching practices to maintain or enhance students' academic performance.

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## 7.0 REFERENCES

- Ahmad, S.N., Mahadi, S., Yusri, M.Y., Yusop, H., Ali, M.N. & Chu H.H. (2017). *Factors Related to Students' Performance in Calculus. Journal of Applied Environmental and Biological Sciences*, 7(6S), 51-56
- Althausser, K. (2015). *Job-embedded professional development: its impact on teacher self-efficacy and student performance. Teacher Development*, 19(2), 210–225
- Altameem, A. (2013). *What Drives Successful E-Learning? An Empirical Investigation of the Key Technical Issues in Saudi Arabian Universities. Journal of Theoretical and Applied Information Technology*, 53(1)
- Bal-Taştan, S., Davoudi, S. M. M., Masalimova, A. R., Bersanov, A. S., Kurbanov, R. A., Boiarchuk, A. V., & Pavlushin, A. A. (2018). *The impacts of teacher's efficacy and motivation on student's academic achievement in science education among secondary and high school students. EURASIA Journal of Mathematics, Science and Technology Education*, 14(6), 2353-2366
- Cho, M. H., & Heron, M. L. (2015). *Self-regulated learning: The role of motivation, emotion, and use of learning strategies in students' learning experiences in a self-paced online mathematics course. Distance Education*, 36(1), 80-99
- Fauzi, A., & Widjajanti, D. B. (2018). *Self-regulated learning: the effect on student's mathematics achievement. In Journal of Physics: Conference Series (Vol. 1097, No. 1, p. 012139). IOP Publishing*
- Gurley, L.E. (2018). *Educators' preparation to teach, perceived teaching presence, and perceived teaching presence behaviours in blended and online learning environments. Online Learning*, 22(2), 197-220
- Hargittai, E., & Dobransky, K. (2017). *Old dogs, new clicks: Digital inequality in skills and uses among older adults. Canadian Journal of Communication*, 42(2), 195-212
- Krejcie, R. V., & Morgan, D. W. (1970). *Determining sample size for research activities. Educational and psychological measurement*, 30(3), 607-610
- Khan, A., Khan, S., Zia-Ul-Islam, S., & Khan, M. (2017). *Communication Skills of a Teacher and Its Role in the Development of the Students' Academic Success. Journal of Education and Practice*, 8(1), 18-21

- Mahlangu, V. P. (2017). *Professional Development of Adult Learners through Open and Distance Learning*. *Global Voices in Higher Education* Mensah, J. K., Okyere, M., & Kuranchie, A. (2013). *Student attitude towards mathematics and performance: Does the teacher's attitude matter?* *Journal of education and practice*, 4(3), 132-139
- Malay Mail (2020). *Think Tank: Serious Barriers to Online Learning Even at University Level*. Retrieved from <https://www.malaymail.com/news/malaysia/2020/05/09/think-tank-serious-barriers-to-online-learning-even-at-university-level/1864551>
- Nemati, P., Gawrilow, C., Nuerk, H. C., & Kühnhausen, J. (2020). *Self-Regulation and Mathematics Performance in German and Iranian Students of More and Less Math-Related Fields of Study*. *Frontiers in Psychology*, 11
- Rajadurai, J., Alias, N., Jaaffar, A. H. & Wan Hanafi, W. N. (2018). *Learners' Satisfaction and Academic Performance in Open and Distance Learning (ODL) Universities in Malaysia*. *Global Business and Management Research: An International Journal*, 10 (3)
- Rameli, M.R.M. & Kosnin, A.M. (2016). *Challenges in a Mathematics Learning: A Study from School Students' Perspective*. *Universiti Teknologi Malaysia* Sun, Z., Xie, K. & Anderman, L.H. (2018). *The Role of Self-Regulated Learning in Students' Success in Flipped Undergraduate Math Courses*. *The Internet and Higher Education* Volume 36, 41-53
- Varshneya, A. K. (2017). *Distance learning through ICT: Benefits and challenges*. *Journal of Advanced Research in Engineering & Education*, 2(3&4), 6-9