

## PERCEPTIONS OF STUDENTS IN LEARNING MATHEMATICS THROUGH OPEN AND DISTANCE LEARNING (ODL)

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### ABSTRACT

During times of crisis, such as the global spread of the Covid-19 epidemic, online education has seen exponential development when educators and students are forced to stay at home and resume their studies completely online. Students have no choice but to keep up with the Open and Distance Learning standards and difficulties (ODL). As online learning continues to grow, it is important to investigate students' overall experiences in online learning environments especially in learning Mathematics. Understanding students' experiences based on their perspectives on their online classes or programs goes beyond the simple question of student satisfaction to more nuanced questions about how factors inside and outside of the classroom impact the online classroom. The purpose of this study was to investigate the experience of students in learning mathematics through Open and Distance Learning (ODL) during the COVID-19 pandemic. This study uses a methodological approach in which a questionnaire was distributed to 202 respondents on their overall views on ODL. This survey shows ODL in learning Mathematics more favor among respondents based on their learning experienced, they still hope this subject is more suitable for the classroom learning environment.

**Keywords:** *Open and distance learning, perception, experience, Covid-19, pandemic*

## **Introduction**

The terms open and distance learning (ODL), as well as their definitions, are relatively new in education, having only gained popularity in the last 15 to 20 years. The vocabulary and terminology used to define distance learning activities can still be confusing, and geographical differences in usage. Correspondence education, home study, independent study, external studies, continuing education, distance teaching, self-instruction, adult education, technology-based or mediated education, learner-centred education, open learning, open accreditation are some of the more commonly used terms in open and distance learning. ODL is a broad term used to deliver or enhance learning through telecommunications. The university discovers and explores the internet, teleconferences, and similar techniques around the world to achieve an extensive classroom or learning experience. ODL is a learning distance that is open or available to anyone, regardless of age, qualification, or ethnic group. The distance is to study away from the institution or college, and the time of teaching and learning is separated. Online learning environments can provide learners with distinct opportunities for flexibility, interaction, and collaboration. It is different from face-to-face learning environments. The online mode of education thereby creates a platform where with the help of the latest technology and its tools, various subjects' theories are expressed by brainstorming, ideation, and discussion which makes the virtual classroom engaging. However, the integration of educational technologies raises questions and concerns about students' learning.

As the growth of online learning rises, it is necessary to investigate students' overall experiences in such situations. Understanding students' perceptions on their online classes or programmes requires answering more complex questions about how factors inside and outside the classroom influence the online classroom (Stephanie & Claire 2012). According to Stephanie and Claire, students' experiences with online learning were investigated in this qualitative study synthesis. For example, some students were satisfied with their online courses but still struggled with balancing online courses and work responsibilities. Other students found that enrolling in an online program related to their jobs was very beneficial.

Despite their network issues, students were able to participate in most of their online classes. However, students were discouraged from actively participating in online classrooms due to an unreliable Internet connection and personal concerns. Furthermore, even though the students thought they had enough time and feedback for their activities, they rated ODL as challenging since their workload was higher than conventional face-to-face learning, and they had a lot of distractions at home that interfered with their grasp of the material (Norazrina,2020). According to a 2015 study conducted by Vanderbilt University in the United States, nearly 92% of respondents from various fields and faculties agreed that online learning is more effective and efficient than traditional teaching and learning.

Jolene, Hassan, Neha, and Jane (2015) found out that the main positive attribute of online learning was the flexibility of the approach, both in terms of time and geographic location. As online learning generally does not require a one to be in class at a certain time, one can work from home at convenient times. This flexibility was also linked with a positive perception of self-reliance. Collins, 2010 found out that most students are satisfied with teaching and learning by distance and satisfied with support services provided by the host institute. However, respondents had concerns regarding the provision of prompt feedback on assignments by facilitators, lack of enough study facilities to help students with their program, the heavy workload in distance learning and had trouble with learning materials that were not self-explanatory. With distance learning opportunities growing at a high rate in many tertiary institutions, there is need to ensure that prompt feedback on assignments is integrated in the instructional design process of distance learning courses. The provision of study facilities (computers, internet and supplementary reading materials and reading rooms) and well written instructional materials (self-explanatory, full of local examples) in the distance mode will go a long way to enhance students learning by distance.

Therefore, this study investigates the perception of students in learning mathematics through Open and Distance Learning (ODL) during the COVID-19 pandemic. This study was guided by the following research questions:

- 1) What are the perceptions of undergraduate students in learning mathematics through ODL during the COVID-19 pandemic?
- 2) Are there any significant differences in undergraduate students' perceptions toward learning mathematics through ODL during the COVID-19 pandemic with regard to their age and education level?

## **Methodology**

Engineering students were selected as a sample since they take a Mathematic Course every semester, from semester 1 until semester 5. Sample was formed using cluster sampling where a few classes from the corresponding faculties were selected as a sample. Data was collected among the students using an online questionnaire, which was made based on instruments used in similar studies. They spent about 10 minutes to complete the survey. The self-administered questionnaire was adopted and adapted by the researchers. The demographic profile and students' perceptions of ODL in mathematics learning were separated into two sections of the questionnaire. Students' age, gender, faculty, and education level are among the demographic profile questions. The questionnaire rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

IBM SPSS Statistics version 20 was used to analyze the data. Cronbach's alpha was used as a measure of reliability in this study, which is a regularly applied measure in Likert scale survey questions. Cronbach's Alpha has a range of values from 0 to 1, with 0 indicating complete unreliability and 1 indicating perfect dependability (Field, 2009). Hinton (2004) give a good guide for reliability with Alpha score 0.90 and above indicate a scale of excellent reliability, 0.70 to 0.90 indicate high reliability, 0.50 to 0.70 indicate a moderately reliable scale and below 0.5 is generally indicates a scale of low reliability. The researcher applied descriptive statistics (frequency, percentage, means, and standard deviations) and an independent t test for the interactions among the variables.

The characteristics of the respondent and students' perceptions toward ODL in learning Mathematics are analyzed using descriptive statistics. This analysis summarizes in Table 1 and Table 2. Table 1 shows the demographics profile of respondents in terms of gender, age, education level, and field of study. Meanwhile, Table 2 shows students' perceptions toward ODL in learning Mathematics.

## Results and Discussion

The 202 respondents were UiTM Cawangan Pulau Pinang undergraduate engineering students. A majority of respondents were male (57.9%), and the rest were female. Most of the respondents were under 23 years old. Also, most of the respondents were from the faculty of Mechanical Engineering (42.1%), 32.2% were from the faculty of Civil Engineering, 20.3% were from the faculty of Electrical Engineering, and 5.4% reported were from the faculty of Chemical Engineering. Based on the level of education, the majority of the respondents were first-year students (72.3%), 23.8% were second-year students, and less than 5% were third-year students.

**Table 1: Demographic Profile of Respondents**

	Sample	Frequency	Percentage (%)
Gender	Male	117	57.9
	Female	85	42.1
Age	18-20	152	75.2
	21-23	49	24.3
	>23	1	0.5
Educational Level	1 <sup>st</sup> year	146	72.3
	2 <sup>nd</sup> year	48	23.8
	3 <sup>rd</sup> year	8	4
Programme	Faculty of Civil Engineering	65	32.2
	Faculty of Mechanical Engineering	85	42.1
	Faculty of Electrical Engineering	41	20.3
	Faculty of Chemical Engineering	11	5.4
Total (N)	202		

**Table 2: Students' perceptions toward ODL in learning mathematics**

Item	Mean	Standard Deviation
Mathematics subjects are suitable to be conducted online rather than face to face.	2.7	1.013
Online learning is easy to implement and easily achieved regardless of distance and learning takes place continuously.	3.26	0.883
My Mathematics exam results improved with the ODL method.	3.09	0.882
I think ODL is effective in helping me to understand Mathematics course content/materials.	3.10	0.841
TOTAL (Mean of mean)	3.037	

This survey study is to analyze the students' perceptions toward ODL in learning Mathematics. It shows that most of the respondents are preferred ODL in learning Mathematics (mean 3.04) after a year of learning experience in ODL since March 2020. The results show that online learning is easy to implement and achieved (mean 3.26), and the Mathematics exam results improved with the ODL approached (mean 3.09). Besides that, ODL in learning Mathematics is more effective in understanding subject material (mean 3.10). However, although this survey shows ODL in learning Mathematics more favour among respondents based on their learning experienced, they still hope this subject is more suitable for the classroom learning environment (mean 2.7).

**Table 3: Cronbach's Alpha for Perception of students toward ODL in learning mathematics**

Cronbach's Alpha	No of Items	Result
0.854	4	high reliability

Testing the reliability is an important step since it verifies the internal consistency of the measuring scale and examines its properties (Hair et al, 2006). Cronbach's coefficient alpha was computed to test the survey's reliability, and values above 0.70 were considered high reliability. Cronbach's alpha value is 0.854 and hence holds good internal consistency allowing for further analysis.

**Table 4: Independent t- test**

Variable	N	Mean	SD	t	Significant
Age	18 – 20	152	2.966	-2.311	0.022
	21 – 23	49	3.250		

Education Level	1 <sup>st</sup> Year	146	2.932	0.758	-2.757	0.006
	2 <sup>nd</sup> Year	48	3.271	0.680		

The following findings cover the second research question: Are there any significant differences in undergraduate students' perceptions toward learning mathematics through ODL during the COVID-19 pandemic with regard to their age and education level?

An independent t test was employed to answer these questions. According to the results of the independent-samples t test, there are significant differences in undergraduate students' perceptions of learning mathematics through ODL during the COVID-19 pandemic at  $t = -2.311$  with  $p = 0.022 < 0.05$  with respect to age, as shown in Table 4. The students under the age of 20 have slightly lower average than students above the age of 21. Table 4 also revealed that there are significant differences in undergraduate students' perception means toward ODL in learning mathematics between first year students and second year students with  $t = -2.757$ ,  $p < 0.05$ .

This result was in agreement with the previous findings by Djanette Blizak et al (2020) which found that older students were more optimistic than younger students. Students in the master's program were more interested about online learning than first-year students and bachelor's students. As they come closer to their graduate academic master's degree, master students aspire to end their academic year. With the COVID-19 pandemic's containment measures and social isolation, online learning becomes their only option for achieving their aim.

In relation to Olayemi et al (2021), respondents' age is one of the most crucial criteria in understanding their ideas and perceptions regarding a given subject; age, on the whole, represents an individual's level of maturity; therefore age becomes more important when examining a response.

## Conclusion

The present study contributes to understanding the perception of students in learning Mathematic thru ODL, especially after the government decided to do away with physical learning due to Covid-19 pandemic. Students must be given personal space and time to focus solely on online learning while also being tolerated by lecturers if they require additional time, materials, or guidance to complete their tasks. Students enjoy online learning because it is easy to implement and achieved and also Mathematics exam results improved with the ODL approached. Despite the fact that this survey shows that ODL in learning Mathematics is more popular among respondents based on their learning experiences, they still hope that this subject is more appropriate for the classroom learning environment.

## References

- Ag-Ahmad, N. (2020). Open dan Distance Learning (ODL): Preferences, Issues and Challenges amidst Covid-19 Pandemic. *Journal of Creative Practices in Language Learning and Teaching (CPLT)*, Volume 8, Number 2.
- Blizak, D., Blizak, S., Bouchenak, O., & Yahiaoui, K. (2020). Students Perceptions regarding the Abrupt Transition to Online Learning During the COVID-19 Pandemic : case of Faculty of Chemistry and hydrocarbons at the University of Boumerdes Algeria. *Journal of Chemical Education* , 97 (9), 2466-2471, DOI: 10.1021/acs.jchemed.0c00668.
- Collins, K. (2010). Perceptions of Students Towards Use of Distance Learning: The Case in an Executive Master Business Program in Ghana . *Online Journal of Distance Learning Administration*, Volume XIII, Number II.
- Field, A. P. (2009). *Discovering Statistics using SPSS*. SAGE, London, England.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data Snalysis*. Pearson Prentice Hall : Upper Saddle River , Vol.6. Nj, USA.
- Hairia'an, N. H., & Dzainudin, M. (2020). *Jurnal Pendidikan Awal Kanak-kanak Kebangsaan (Special Issue)*, Vol. 9, 2020 (18-28) (ISSN 2289-3032 / eISSN 2550-178X). Dimuat turun daripada <https://ejournal.upsi.edu.my/journal/JPAK>.
- Hinton, P. R., Brownlow, C., McMurray, I., & Cozens, B. (2004). *SPSS Explained*. Routledge Trydier & Francis Group London & Yew York, 363.
- Hussiin, D. H. (2020, September 2). Kesan Covid-19 Kepada Pelajar UMP : Satu Kajian Ringkas. Dimuat turun daripada <https://news.ump.edu.my/experts/kesan-covid-19-kepada-pelajar-ump-satu-kajian-ringkas>
- Krishnan, S. (2016). Student's Perceptions of Learning Mode In Mathematics. *The Malaysian Online Journal of Educational Sciences*, Volume 4 - Issue 2.
- Md razak, M. I. (2020, April 9). COVID 19: Pembelajaran Atas Talian Suatu Keperluan Ke Arah Menuju Malaysia Maju. Di muat turun daripada <https://www.astroawani.com/berita-malaysia/covid19-pembelajaran-atas-talian-suatu-keperluan-ke-arrah-menuju-malaysia-maju-237496>.
- Nguyen, T. (2015). The Effectiveness of Online Learning: Beyond No Significant Difference and Future Horizons. *MERLOT Journal of Online Learning and Teaching*, Vol.11, No. 2.
- Olayemi, O. M., Adamu, H., & Olayemi, K. J. (2021). Perception and Readiness of Students Towards Online Learning in Nigeria During Covid-19 Pandemic . *Library Philosophy and Practice (e-journal)* 5051. Di muat turun daripada <https://digitalcommons.unl.edu/libphilprac/5051>