

THE CHALLENGES OF LEARNING PROGRAMMING SUBJECT IN ONLINE DISTANCE LEARNING (ODL) ENVIRONMENT AT UiTM PAHANG

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Abstract

The outbreak of COVID-19 pandemic worldwide, including in Malaysia since early 2020 until now has shifted education activities from face-to-face to online environments. Teaching and learning programming subjects are also not exempted from using online distance learning (ODL) mode. Programming is challenging to learn in a face-to-face environment, and even more so in an ODL environment. This subject requires problem-solving skills, high motivation, and high self-directed learning to complete the programming tasks given by lecturers. This study aims to investigate the UiTM Pahang students' perception on the challenges of learning programming and their feelings (i.e., motivation and isolation) when learning programming in the ODL mode. In order to achieve the objectives of the study, a questionnaire was distributed to students undertaking three diploma courses at UiTM Pahang. The responses of 303 students who took programming in the ODL mode were analysed using SPSS statistical software. The findings show that 74.3% of the students perceive that it is more difficult to learn programming in the ODL mode than face-to-face. In terms of the students' feelings, 67% of the students feel demotivated, and 69% feel isolated when learning programming in the ODL mode. The output of this study is an indication for the programming educators to develop more effective teaching methods or techniques in teaching programming subjects in the ODL mode.

Keyword: challenges, online distance learning (ODL), programming

Introduction

The outbreak of COVID-19 pandemic in Malaysia starting from early 2020 has seen the cases keep increasing day by day (Allam, Hassan, Mohideen, Ramlan, & Kamal, 2020). This situation has affected Malaysia's education scenes whereby learning activities have shifted from face-to-face to online distance learning (ODL). In the ODL environment, students are required to learn from home and classes are conducted online via Webex, google meet, or other platforms. Online learning would also entail students watching teaching videos and doing exercises or assessments uploaded on the online platforms such as Google Classroom (GC) or YouTube. In the ODL environment, there is "no physical, social interaction with lecturer and groupmate to perform course assessment" (Allam et al., 2020). The programming subject, which is regarded as the "killer" subject and difficult to learn face-to-face (Cheah, 2020), is not exempted from being taught and learned using the ODL method during the pandemic.

In Malaysia, programming is a mandatory subject for Information Technology (IT)/Computers Science (CS) students (Cheah, 2020) and for some non-CS students. Universiti Teknologi MARA (UiTM) Pahang is one of the UiTM branches offering a

Diploma in CS that requires students to enroll in several programming subjects in order to fulfill the requirement for graduation. The subjects include Introductory of Programming and Algorithm, Object-Oriented Programming, and Data Structures that are offered to semester 1, 2 and 3 students respectively. A programming subject is also offered to non-CS students, namely, to Diploma in Statistics and Diploma in Civil Engineering students, who are required to enroll in an Introductory of Programming and Algorithm subject during their second semester.

The definition of programming is “the process of designing, writing, testing and debugging of computer programs using different programming languages” (Renumol, Jayaprakash, & Janakiram, 2009). This subject is difficult to learn because it requires students to “apply the programming concepts and algorithms” (Cheah, 2020). The most challenging factors in learning programming include problem-solving skills, the need for motivation, and engagement to learn programming. While the least challenges include remembering and understanding the programming language syntax (Medeiros, Ramalho, & Falcao, 2019).

Learning programming in the ODL mode is challenging since students will not be able to discuss with other students and consult the lecturers face-to-face. Students may experience low learning motivation and self-directed learning when studying in the ODL environment (Allam et al., 2020), which could be detrimental to their success as succeeding in the programming subjects would demand for high motivation and self-directed learning.

The objectives of this study are to investigate the students’ perception on the challenges of learning programming in the ODL mode compared to face-to-face mode and to find out the students’ feelings when learning programming in the ODL mode. This research is essential for designing better methods or techniques in teaching programming subjects. In order to achieve the objectives of this study, a survey was conducted on three undergraduate programs: Diploma in Computer Science, Diploma in Statistics, and Diploma in Civil Engineering.

Materials and Methods

The respondents of this study were 303 students from the Faculty of Computer and Mathematical Sciences (Diploma in Computer Science and Diploma in Statistics) and Faculty of Civil Engineering (Diploma in Civil Engineering), Universiti Teknologi MARA (UiTM), Pahang branch. These programs were chosen because they offer programming subjects in their study plans. All the students involved in this survey have taken programming subjects in the ODL environment.

An online questionnaire (google form) was used for data collection. The questionnaire uses the 5 level Likert scale: Strongly Disagree, Disagree, Undecided, Agree, and Strongly Agree. The questionnaire was distributed by the students’ programming lecturers. The questionnaire is divided into two parts. Part A gathers information on respondent's demographics such as age, gender, program, semester, computer use, and internet use. While, part B contains the items on the challenges in learning programming in an ODL environment with regard to aspects of motivation, opinion on online learning materials, and classes.

Data analysis was conducted using SPSS statistical software. Cronbach's Alpha reliability test was administered to determine the reliability of the questionnaire. A reliability value of above 0.7 was achieved, which renders the questionnaire reliable or had internal consistency. The value of Cronbach's Alpha is shown in **Table 1**.

Table 1 Cronbach's Alpha Value

Reliability Statistics	
Cronbach's Alpha	N of Items
.742	8

Result and Discussion

The results and discussion of the study have two focuses; 1) students' perception on the difficulty of learning programming in the ODL mode compared to face-to-face and 2) students' feelings when learning programming in the ODL mode (feel motivated/demotivated and feel isolated).

Students' Opinion on Learning Mode (Face to Face versus ODL) for Programming Subject

Table 2 shows that students felt that learning programming in the ODL mode is more challenging when compared to learning it face-to-face. The percentage of those who agree and strongly agree was 74.3%. Nevertheless, 6.3% disagreed that it is difficult to learn programming in the ODL mode.

Table 2 Learning Programming in ODL Mode Difficult Compare with Face-to-Face Mode

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	1.7	1.7	1.7
	Disagree	14	4.6	4.6	6.3
	Undecided	59	19.5	19.5	25.7
	Agree	100	33.0	33.0	58.7
	Strongly Agree	125	41.3	41.3	100.0
Total		303	100.0	100.0	

Programming classes when conducted face-to-face or in the ODL mode consist of a theory class (2 hours), a lab session (2 hours), and a tutorial (1 hour). Theory and tutorial classes are suitable to be conducted online using either an online meeting platform (such as Webex or google meet), teaching videos, or online quizzes. However, it is challenging for lab sessions to be conducted in an online environment because the students have to work independently without the opportunity for face-to-face discussion with their class members or lecturers.

Students' Feelings When Learning Programming Subject in the ODL mode

As mentioned in the introduction, based on the previous research, the students feel unmotivated during ODL classes. This section presents the results of students' 1) motivation and 2) feeling of isolation or out-of-the-way when learning programming subjects in the ODL mode.

Table 3 Feeling motivated when study programming in the ODL mode

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	99	32.7	32.7	32.7
	Disagree	106	35.0	35.0	67.7

Undecided	56	18.5	18.5	86.1
Agree	27	8.9	8.9	95.0
Strongly Agree	15	5.0	5.0	100.0
Total	303	100.0	100.0	

Table 3 shows that the students felt demotivated when learning programming subjects in the ODL mode. Only 13.9% agreed that they felt motivated, while 67.7% disagreed. Motivation is essential in learning programming because it will force the students to learn or understand the programming concept and perform programming tasks. It is difficult for the students to succeed in the subjects if they are demotivated and do not complete the programming tasks given by the lecturers.

As for the students' feelings, the research gathered and analyzed the data on the isolated issue when learning programming in an ODL environment. **Figure 1** shows that most of the students felt isolated when learning programming in an ODL environment; 43% strongly agreed and 26% agreed.

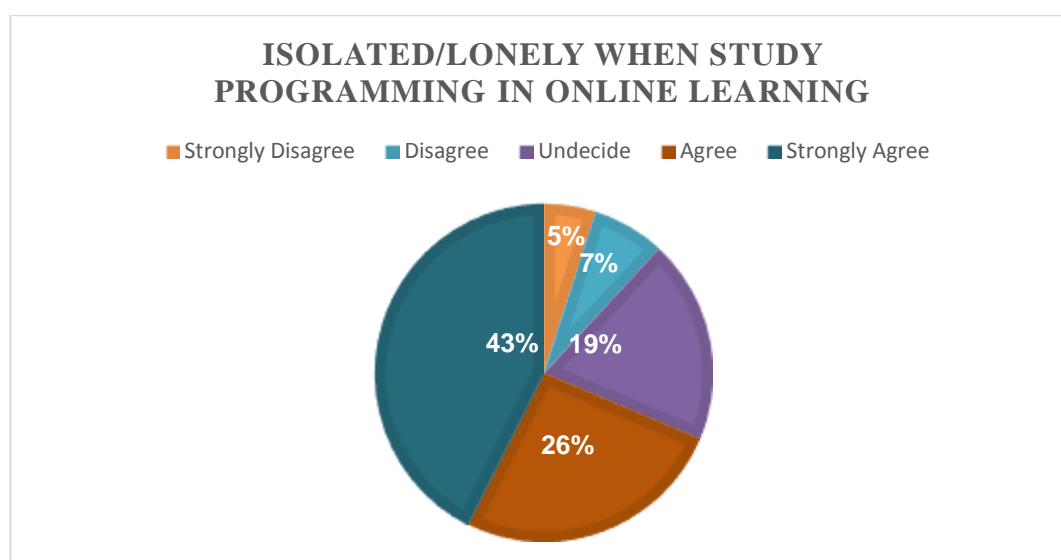


Figure 1 Feeling Isolated When Learning Programming in the ODL Mode

It is recommended for programming subjects to be learned in a collaborative learning environment which will involve learning either in pairs or teams as this will promote active learning that will boost students' motivation to learn.

Conclusion

The findings reported in this study show that students feel that it is more challenging to learn programming in the ODL mode than face-to-face. They also feel demotivated and isolated when learning programming subjects in the ODL mode. The output of the survey is worrying as the challenges that students have to face learning the subjects online and their lack of motivation and the feeling of isolation may negatively affect their academic achievement and performance. The findings can provide valuable information that can help educators develop more effective methods or techniques in teaching programming subjects in the ODL mode. As for suggestions for future studies, researchers should conduct a study on how to boost or sustain students' motivation to learn programming in the ODL mode.

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Conflict of interests

The authors declare that there are no conflicts of interests concerning the publication of this paper.

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