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AN EXPLORATORY SEQUENTIAL SENTIMENT ANALYSIS OF ONLINE LEARNING DURING THE MOVEMENT CONTROL ORDER IN MALAYSIA

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ABSTRACT

Purpose - Online learning is an essential platform to support varying learning conditions, anytime and anywhere. It helps connect online communities regardless of one's geographical location and time zone. During the COVID-19 outbreak in Malaysia, the use of online learning platforms has become a crucial option for accomplishing learning objectives. During this challenging time, universities have been looking for suitable solutions to address issues regarding the online learning process. This paper discusses the challenges in online learning, as well as the importance of collaborative learning activities during the Movement Control Order (MCO). Challenges in emotion and changes of routine among students have been detected during the MCO imposed by the government of Malaysia.

Methodology - An exploratory sequential approach was carried out in this study to obtain students' feedback in terms of their emotions and routine changes during the outbreak of COVID-19 and the subsequent implementation of the MCO. Convenience sampling was used for this research, and in order to obtain feedback on online learning during the MCO an online interview was conducted with 42 students from the Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA branch in the state of Kelantan. The feedback items were recorded and transcribed in Excel format. Next, sentiment analysis was carried out using Rapidminer software.

Findings - The results showed that higher education institutions or universities had to play their part in providing a virtual learning environment as convenient as possible during the Movement Control Order period. The results also showed that educators had to ensure the success of online learning by maintaining the motivation of their students

Significance - The findings in this study can also benefit educators and higher education institutions or universities in executing suitable teaching and learning plans during the COVID-19 outbreak.

Keywords: COVID-19, MCO, exploratory sequential, higher education institutions, online learning, sentiment.

INTRODUCTION

Today, online learning is considered as compulsory for students around the globe. Massive resources can be found to help students to progress in their virtual learning (Lee et al., 2019). Online resources such as courses, quizzes, project examples, and references are readily available to be used by the students. All they need to have is the learning infrastructure such as gadgets and internet connectivity. Online learning is an activity that has been described students' virtual participation without having to be present in a physical classroom (Sahni, 2019; Salloum et al., 2019; Serban, 2019). Online learning required active participation, good content, and social presence elements (Rahman et al., 2019; Rahman & Sahibuddin, 2017). Effective online learning is achieved through effective collaboration among the group members involved. However, according to Lin and Lin (2019) effective collaboration in learning would result in the best outcome through face-to-face discussions.

Issues related to online learning practices have also been discussed in the context of collaborative learning. They included issues related to course preparation (Jung et al., 2019), creation of good environment among online communities (Bashir et al., 2018), instructor tasks, promotion of collaborative methods in online distance learning, and effective use of technology. Studies have shown that learners' instructional needs and motivational preparation were prerequisites needed to sustain interactivity in an online learning environment (Whitaker & Valtierra, 2018; Yilmaz, 2017). Other studies have also highlighted the importance of learners' characteristics and learning context in supporting collaborative activities during online learning (Freeze et al., 2019; Ibáñez, & Delgado-Kloos, 2018). Learning context involves course preparation for learner-content interaction. The COVID-19 outbreak has dramatically changed the traditional learning methods for all students. Higher education institutions or universities in Malaysia had to ensure that their students adhere to the Movement Control Order (MCO) (Malaysia, 2020), whereby everyone, students not exempted, had to practice social distancing and limit their social movement. This has critically impacted the delivery of learning traditionally carried out in the face-to-face classroom environment. Concerted actions related to enforcing the new norms in teaching and learning in Malaysia have been thoroughly reviewed by the Ministry of Education to support remote learning continuity. New ways of learning during the pandemic have utilised various online learning features such as e-learning, instant messaging, video sharing, online discussion, and social media (Verawardina et al., 2020). This situation has also encouraged students to be more active and to continue to sustain their engagement with the lessons provided by their instructors. However, there were still challenges in conducting online learning for all students, especially those with poor network coverage or lacked a reliable mobile data plan (Alvi & Gupta, 2020).

This study was aimed at investigating students' emotions and how the COVID-19 pandemic has changed their routines as students. Emotions were observed throughout the period when students were engaged in online interaction with the virtual learning materials and environment. In addressing their problem-based learning, students needed to collaborate with other members in their group in order to complete their project tasks. A critical emotion involved in such a virtual learning process was a sense of connectedness while engaged in online interaction. This was because it was assumed that the higher the degree of interaction during the students' learning

process, the higher the level of social presence reached would be able to help them achieve their learning goal.

The section on ‘Related Works’ below will review previous studies about online learning and collaborative participation, and the importance of effective collaboration in a virtual learning setting. It will provide a more detailed discussion of issues on collaborative learning among online learners. The section on ‘Research Methodology’ will explain the rationale for the use of the exploratory sequential approach as the backbone of the research methodology. The next section discusses the findings of the present study, especially how the COVID-19 pandemic outbreak has affected educators in terms of teaching, technology, and content. Results on how the outbreak has affected students in terms of emotions and routine, especially during the MCO which has entered its third phase in Malaysia, will be the focus of the discussions in this section. Sentiment analysis visualises the emotions of students in the new normal of online studying and learning from home. The last section summarises the paper.

RELATED WORKS

The issues and challenges of online learning will be discussed in a few subsections. Conceptual and literature analysis has been reported in this paper to further understand the online learning scenario. It will consist of an overview of online learning, collaborative participation, and online learning reality during the COVID-19 outbreak.

Overview of Online Learning

Online learning is an application that can be used to obtain and share information via the internet. Online learning users may consist of students, teachers, employees within an organisation, instructors at a training centre, and any individual or organisation using the virtual platform. Online learning can be understood through various terms which have been introduced in the field of virtual learning, depending on its objectives and roles. Issues about social interaction during online learning activities have been observed, such as user behaviour in e-learning (Chu et al., 2019), how online communities react virtually, various scenarios of online education according to different learning and teaching styles (Yilmaz, 2017), how users collaborate virtually (H.-C. Lee & Blanchard, 2019), motivation issues (Aouid et al., 2019), as well as students’ sense of togetherness in online learning

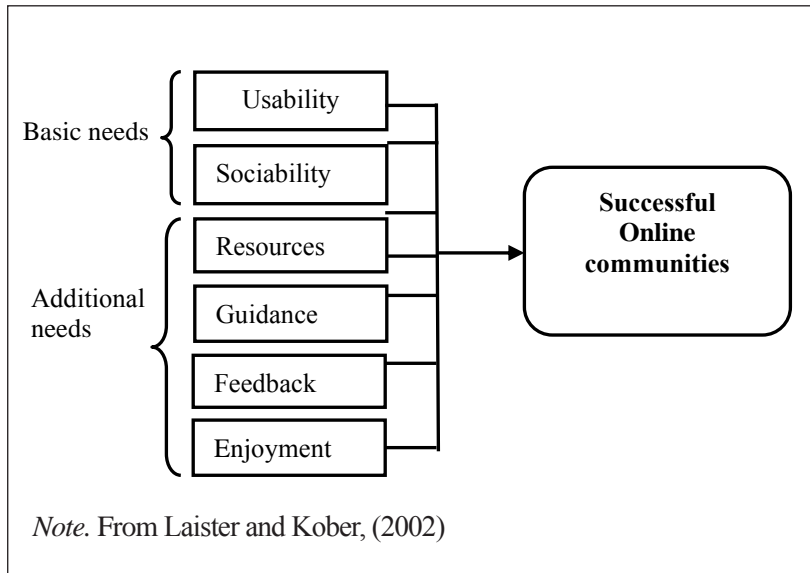
platforms in their respective groups. These issues have highlighted the importance of understanding collaborative participation among online learners.

Collaborative Participation: Lessons Learned

According to the study by Yücel and Usluel (2016), an effective outcome from collaborative participation would produce a good impact on students' online learning experience. Students would be able to understand their lesson as well as being encouraged to participate in a more self-directed learning manner. It would be beneficial and practical if this element has become an online learning feature. Time constraints should be taken into consideration as different geographical locations can have different time zones. With online learning, learners are able to have effective, albeit virtual face-to-face interactive discussions regardless of their geographical location (Chary, 2016; Suciü et al., 2018). Other limitations can be overcome by having different features such as allowing the learners to catch up when they have missed a previous discussion session. Some additional examples of collaborative activities include symposia, debates, role playing, case studies, discussion groups, brainstorming, and project groups (Son, 2019). The issue in collaborative learning is how to ensure that members of the group can engage in effective collaboration when working on tasks. Effective collaboration will result in the best outcome through face-to-face discussions. Elements such as good preparation of software and other materials can stimulate collaborative learning in a virtual environment (Ameen et al., 2019). For instance, a good atmosphere of collaborative learning experience will encourage question and answer sessions among students and this in turn will enable them to challenge one another to answer questions in e-learning. Collaboration needs support from effective groupware applications to encourage users to access the online environment (Hans & Chakraverty, 2017). In order to have effective groupware, developers should identify the factors that can lead to the creation of successful online communities. Laister and Kober (2002) identified the basic needs as well as other additional needs to prepare for the formation of successful online communities and to strengthen collaborative activities among members. Figure 1 illustrates those needs. There have also been issues encountered in promoting effective social interaction in online learning (Hwang & Song, 2018). In implementing mobile learning for instance, in order to make it usable, content creation and user interface should be taken into consideration, because users need to understand the content objectives as well as the process flow in the application.

Figure 1

Factors that Contribute to Successful Online Communities



From Figure 1, it is clear that usability focuses on the software design. The basic requirements prioritize user interaction and allow users to perform their tasks easily and intuitively. Software with good usability supports low error rates, high productivity, rapid learning, and efficient use. Some common features in support of usability are navigation, interaction dialogue, feedback, registration, support tools, help functions, archives, representation of users, and others.

Sociability is congruent with planning and developing appropriate policies. The latter should be understandable and acceptable to the members and should support the goals of the online communities. Examples of such policies include membership, privacy, copyright, security, free speech, codes of behaviour, and roles such as moderator, student, and administrator. Sociability caters to the basic need of online communities in that it helps to create a comfortable and conducive environment for the learners. This will help to promote interaction and also to sustain social interaction among learners especially during problem solving tasks which they need to accomplish (Weidlich & Bastiaens, 2019).

Thus, usability and sociability as well as their interrelations are based on community needs and will support the community's evolution. In addition

to these basic needs, Wen (2019) suggested that successful learning communities would have to be able to support the additional needs of the students and tutors with resources such as guidance, feedback, and enjoyment. Hence, another four factors, namely resources, guidance, feedback, and enjoyment are considered as additional needs to help establish successful online communities.

Resources can be used by all group members, within small groups, one-on-one, or with instructors, to access resources and search the Web, collaborate in projects, and share work. Meanwhile, teachers and/or professors can guide students effectively by challenging them to use the internet creatively and ensuring that students are rewarded for their efforts. These include filtering information, validating the accuracy, and viewing communication flows. Another element in establishing a successful online community is feedback. It can be given in several forms in the learning process. It can come from the tutor, from peers, or from both. Automatic feedback functions can be implemented in the system. The last factor is enjoyment because learning is more meaningful when it is fun. Features such as encouraging sharing, empathy, trust, support, and collaboration, while discouraging negative things such as aggression and self-centred behaviour, help to make learning enjoyable. The researchers believe that with the existence of social presence elements in these six factors, successful online communities can be achieved.

Designers should understand the business process of online applications, user profiles, and backgrounds as different users might have different abilities and interests in handling mobile applications (Lapointe et al., 2017). The designer should also understand the community that is anticipating the application and tools to be used in mobile learning technology. Therefore, many aspects needed to be investigated in order to prepare the community with good interaction tools for online learning (Eraslan Yalcin & Kutlu, 2019). There was also a study done by Eraslan which stated that student behaviour could be affected by the user interface design. It is crucial to design an interface that can best fit the participants of the learning management system to ensure that the learning objectives can be achieved by the learners.

Social Presence in Problem-based E-learning

Problem-based learning (PBL) is an approach in the learning process which could promote a problem solving process among students because it involved solving real problems through learning activities (Merritt et al., 2017). Learners learn by becoming actively involved in the problem-solving process, and by anticipating collaborative learning. Learning

activities may include defining problems, clarifying problems, managing information, and identifying problem-solving content to reach the learning objective. PBL empowered learners to practise self-learning activities, that is, by doing their own research, collaborating, and applying knowledge which would result in the best solution for the defined problem (H.-C. Lee & Blanchard, 2019). PBL is used in education to allow students to assume responsibility in task resolutions, solving task problems given to them by their instructors. Usually, this technique is applied in groups of students in which each individual in the group has their own ideas and roles to play in order to produce the best solution. The PBL technique has shaped the learning process in such a way that students need to cooperate, discuss results, and produce an agreement towards a particular issue that needs to be solved. The instructor or lecturer for a particular course acts as an expert to guide and share knowledge in that field with the students. No right answer would be expected from them in a PBL context (Saleh, 2019).

The PBL technique permits the learner to experience an active learning environment when figuring out solutions. In order to stimulate a discussion among the members, e-learning must be designed to allow its users to interact throughout the learning process. Effective social interaction is generated by effective collaboration among members. Unlike face-to-face interaction, online communication needs to be developed based on how comfortable it can make users feel about using the application in the future. Users tend to become involved more frequently and feel motivated to use the application when they feel secure within their group. Hence, social presence would increase in the environment due to a sense of trust, as well as enabling lively discussions just as was the case in the actual classroom environment (Jasmis et al., 2017). Effective online learning among users can be achieved if universities and stakeholders make an effort to further identify specific online learning requirements which may increase social presence and enhance the learning process in the PBL technique. In order to ensure social presence in using e-learning, the e-learning project should be effectively designed to meet the requirement for social presence. This objective can be achieved by providing an online platform which can facilitate the creation of a PBL environment during teaching and learning sessions in e-learning. A suitable online platform for supporting online activities can improve collaborative tasks in problem solving and hence increase the vital ingredient of social presence among learners and instructors in the virtual environment.

In short, collaborative activities are crucial in the PBL method. By having e-learning as an alternative method to face-to-face communication, it must also provide PBL activities to encourage learners' participation and motivation. This research emphasizes social presence in online collaborative

activities by looking at the online interaction and its learners' emotions. The importance of social presence is clearly reflected in the display of learners' emotions during the MCO and this has been the focus of concern in this research. The next subsection will discuss the reality of online learning during the MCO. Higher education institutions or universities in Malaysia have no choice but to continue to sustain the learning process for achieving effective teaching, learning and other related activities during the MCO.

The Reality of Online Learning during the MCO

As the pandemic is not over yet, higher education institutions or universities in Malaysia have been working hard to find the best solution for their students to continue learning as usual under the MCO. The new virtual learning process can be challenging for all students as their routines might have to change as they now need to have access to knowledge mainly through online learning. The online learning process greatly depends on the anticipation through collaboration among online communities which consists of learners, instructors, content, and technology. Most learning and teaching are held by using blended learning or face-to-face classroom sessions. The COVID-19 outbreak and in turn, the resulting MCO has changed the students' routines. Therefore, they need to prepare physically and mentally to anticipate full scale online classes through out the semester. The main challenge in establishing online learning is determining how to disseminate information effectively. The objective of having online learning can only be justified if that information can be conveyed clearly by the platform administrator working closely together with the course instructor. In addition, online learning applications must also adapt to the different student learning styles and user profiles, and current situation of COVID-19. Quality online learning must always take into account the needs of its users so as to be able to meet the learning objectives. Although tools are provided in online learning, there is still a number of challenges involved in encapsulating the social connection opportunities within the virtual environment. The emotions of learners could also affect their learning responses during collaborative participation in online learning. Overcoming this challenge might help to improve social presence by increasing student engagement and motivation in using e-learning (Rahman & Sahibuddin, 2017). Schools, colleges, higher education institutions, and universities in Malaysia have been urged to use full scale online learning in order to contain the COVID-19 spread during the MCO. As a result of the emergency pandemic situation all over the world, higher education institutions or universities need to take part in controlling the movement of learners. Therefore, the use of online learning is very crucial in sustaining knowledge transfers and sharing between educators and learners.

Underpinning Theories

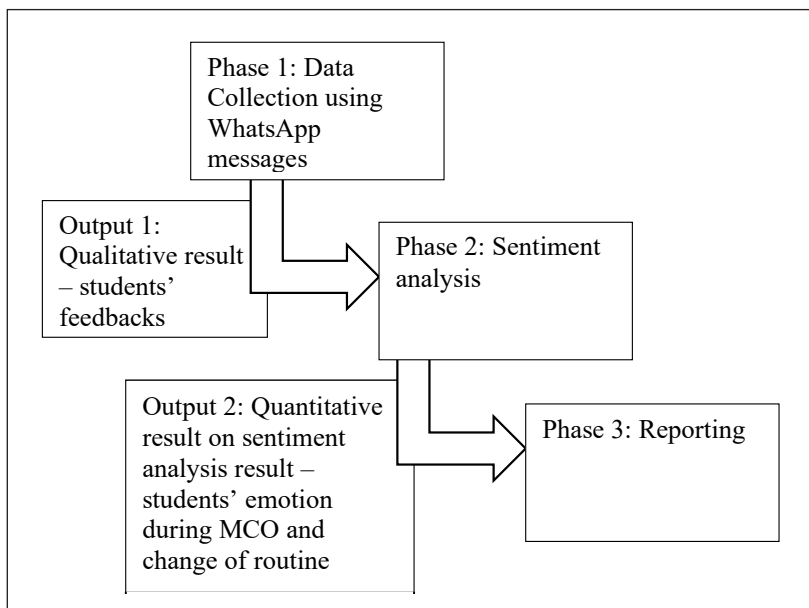
In an online learning environment, each learner may experience a feeling of connectedness, even engaged in various levels of perception and reaction with another person. In MCO circumstances, online learning is not an option, but has become a necessity and as a viable alternative learning environment anytime, anywhere (Dhawan, 2020). Therefore, the sense of connectedness, although virtual, among learners can be a source of motivation for the online learners to sustain their participation. The theory of social presence has become an important conceptual basis to deploy social presence technology as an alternative to face to face interaction among individuals (Andel et al., 2020; Dahlstrom-Hakki et al., 2020; Kóvári & Bak, 2020). The theory of social presence has gained traction especially during Covid-19 triggered MCO. as this theory has helped to explain how related pedagogical elements can be used to support online learners using different technological tools. Thus, the various available technological tools may allow learners to socially interact in an online community.

RESEARCH METHODOLOGY

This study used an exploratory sequential approach (Ecker, 2017; Kumar et al., 2019). The exploratory sequential design is such that the qualitative and quantitative phases follow each other sequentially. During the first phase of such a research design, data collection and analysis of the qualitative data was conducted to obtain the qualitative results. In the exploratory design, the quantitative study would be used to support sentiment analysis results previously obtained from the qualitative phase. The quantitative phase was an opportunity to test or generalise the initial findings from the qualitative results (Creswell & Clark, 2011).

Figure 2

Exploratory Sequential Research Method to Obtain Student Feedback during the MCO



This research utilized a machine learning application which has been adopted by several authors (Babić, 2017; Khanal et al., 2019). The Cross-Industry Standard Process for Data Mining (CRISP-DM) methodology (Martínez-Plumed et al., 2019) was used to produce the sentiment analysis results. The CRISP-DM methodology was designed to look into the following areas of concern: business understanding, data understanding, modelling, evaluation, and deployment. The present study was carried out in two phases, Phase 1 and Phase 2. Phase 1 involved CRISP-DM tasks on business understanding, data understanding, and data preparation. As for Phase 2, the study identified CRISP-DM tasks such as modelling and evaluation.

Phase 1 of this study dealt with business understanding tasks as it examined the current situation under the MCO restrictions enforced in Malaysia. As part of the effort to unpack the notion of business understanding, the impact on higher institutions in terms of the new norms in the learning process was investigated and reported as a literature analysis in the 'Related Works' section.

WhatsApp has become a popular student interaction tool and in the present study it was used as a data collection medium. The study selected 42 students from the Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA Kelantan as the target group. Convenience sampling (Fuller et al., 2020; Jin et al., 2019) of the target population, namely students who were involved with group projects in a PBL environment was used in this research. The data collected, which comprised 150 comments from the 42 students who were using WhatsApp messages was used to perform the sentiment analysis. The qualitative data is helpful in generating decision in investigating students' emotion in changes of normal routine during Covid-19 outbreak.

Twelve boys and twelve girls were engaged as media users and they answered two open-ended questions via WhatsApp. Those students who responded to the questions own a smartphone and were connected to the Internet or Wi-Fi. The open-ended questions were given during online interviews via WhatsApp. The purpose of the interview was to elicit feedback on emotions and routine changes among students during the MCO period. The questions posed were as follows:

<p><i>'What is your feeling towards your change of routine as a student at this moment (MCO)?'</i></p>

<p><i>'What is your feeling at this moment (MCO) towards staying at home?'</i></p>

In this study, the WhatsApp features enabled the tracking of whether a message was received, and if a new message was being typed. These features of the application were useful as it helped the researchers to decide on when to proceed with a conversation and how to align it with the questions which will be asked. Next, in the data understanding process, the researchers discovered insights from the hidden information obtained from the qualitative feedback obtained through the WhatsApp interviews. The qualitative results containing the students' feedback from WhatsApp interviews were then recorded and transcribed in Excel format. Then, the available facts and sources from students' feedback were examined. The feedback items available in the Excel datasheet were prepared by performing data cleansing using the Rapidminer software (Anandarajan et al., 2019). This stage was important as it helped to assist in reveal hidden data which then became more meaningful and insightful patterns.

Next, modelling and evaluation of the results were carried out in Phase 2. The modelling phase was used in this study to search for patterns in data, whereas the evaluation phase was necessary to validate the model created. Initially, the qualitative results from the students' feedback were quantitatively analysed. The sentiment analysis process was then started using the Rapidminer software. This study used the RapidMiner software (Dwivedi et al., 2016) as a tool for analysing students' emotions or sentiments and their routine changes during the MCO. Sentiment analysis was used in this research to substantiate qualitative data which consists of students' opinion in WhatsApp messages. By using the Rapidminer, the student WhatsApp messages which were tracked were then analysed and categorized in order to yield quantitative sentiment results.

The WhatsApp platform was chosen primarily as a medium for collecting the students' qualitative responses and then these responses were analysed using text analysis and a classification process in order to obtain quantitative data. The quantitative data was then presented in Excel format, whereby the data has been pre-processed and cleansed in order to remove unnecessary text from the dataset. This was done by conducting tokenization, stemming, lemmatization and removing stop words, punctuations and any duplicate data, as well as emoji and numbers.

In the data pre-processing steps, unnecessary words, such as pronouns, articles, and prepositions, namely 'the', 'a', 'about', 'we', 'our', noises such as punctuation, special characters and slang words were eliminated from the text to improve data quality. Next, in the sentiment analysis process, tokenization and normalization techniques were applied to process the text. Tokenization has been described as the process of breaking down a stream of texts into words, phrases, and symbols which came to be known as tokens (Verma et al., 2014). Tokenization has become very important for text analysis since computational results depended on tokens which consisted of text components. For example, Table 1 shows an example of the transformation of qualitative data into quantitative results in the sentiment analysis process. Normalization transformed words into a common form that would allow the computer to identify the duplicate words with a similar meaning and then removed one of words (Zhang & Guo, 2020). This process will help to yield a number of tokens for each sentence.

The RapidMiner is an open source software used for data analysis, especially in analysing unstructured data such as comments and

reviews (Alsaqer & Sasi, 2017). The software is able to analyse trends and patterns. This study used the ‘Sentiment Analysis’ operator produced by the MeaningCloud (Halimi & Seridi-Bouchelaghem, 2019) platform. The ‘Sentiment Analysis’ operator is able to process text and determine if it expresses a positive, negative, or neutral sentiment by identifying the polarity of sentences (Rosenthal et al., 2019). This study has been able to visualise the students’ feedback by using graphs from the Rapidminer.

Table 1

An Example of Students’ Opinion after Going through Tokenization

A sentence:	‘Not too much change in my lifestyle’						
Number of token (after tokenization)	not	to	much	change	in	my	lifestyle
	1	1	1	1	1	1	1
No of tokens	7						
Bag of words (frequency)	1	1	1	1	1	1	1

FINDINGS

One of the main problems with online learning is the lack of ability on the part of the instructor to boost student participation and sustain it until the end of the online session. To sustain participation and collaboration, online learning must be more oriented towards communication and collaboration between students and teachers in the learning process (Tawafak et al., 2019). Trust might be engendered online by promoting a sense of social presence (Rahman et al., 2019), as it could affect peer contact and social interaction (Hwang & Song, 2018). The researchers of this study have highlighted three findings from the interview feedback given by the 42 students. The reality of the learning process during the MCO can be captured and understood from a description of the students’ internet facilities, students’ emotions, students’ routine changes, the technology used, and the online course content.

Findings on Students' Internet Facilities

The suspension of the formal education process during the Movement Control Order (MCO) period has led to new challenges for educators, especially in ensuring continuity of the teaching and learning process. Live teaching and learning through video-conferencing applications such as Zoom and Google Meet require good internet connectivity. As an alternative, educators and learners may use non-real-time teaching and learning tools such as Google Classroom, Telegram, and WhatsApp. However, there are several obstacles in delivering online learning. Learners who reside in rural areas have trouble in joining virtual classes due to issues with poor connectivity, or in a worst-case scenario, there is totally no internet access. Based on the model produced from sentiment analysis, there were 54 negative responses out of the total 150 responses that were related to the learning environment. The students generally believed that internet facilities were needed to support the online learning environment. Various studies have highlighted the importance of internet facilities for supporting online learning, especially during the MCO (Adedoyin & Soykan, 2020; Adnan & Anwar, 2020; Basuony et al., 2020). Apart from that, some students may need some time to get familiar with the workings of their online classes. Poor internet connection has also seriously affected collaborative activities among instructors and learners. There have been instances when students were not even able to register and join online classrooms, and hence such teething problems could demotivate the students and not sustain their interest in the online learning activities.

Findings on Student Emotions

Based on the feedback from the WhatsApp interviews, the researchers conducted a sentiment analysis to find out how students have responded towards their online learning during the MCO period. The researchers interviewed a total of 42 students regarding their emotions about online learning during the MCO. The interview input was recorded by using Excel format so that the data can be uploaded to the Rapidminer software for the sentiment analysis. Figure 3 shows the sample answers from the students' feedback in Excel format.

Figure 3

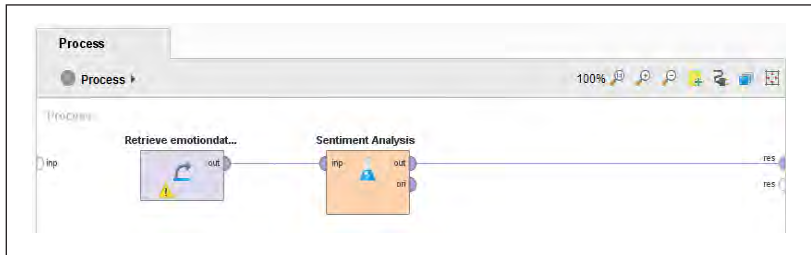
Examples of Students' Feedback in Excel Format

No	Comment
1	not to much change in my lifestyle except that i cant go buy breakfast everyday
2	not too much change also since this is what i usually do when semester break except not going out
3	Not much change...I prefer Face to face because easy to understand what we learn...👍👍👍
4	I miss study by using face to face method.
5	I just worried about how we are going to do about our project if we need to do an online class. 😞 And all
6	i'm feeling weird at the moment. i don't know what to do and i don't know how to cope with this change
7	hard to believe that we have to do online class from now on until end of semester. Hope that we all can
8	My feeling about this changes situation is too much worried about assessment and final exam because i
9	im worried I cannot catch up for the following subjects during online classes. hope everything gonna be
10	i learn new things since its 2020 right. e-learning is not too bad for me because i dont need to walk to cla
11	I feel so worried and scared of having online classes since i dont think that i'll be able to understand eve
12	I'm missing everyone at UiTM Machang include madam,lecturers,my friends of course,chairs,tables...I h
13	A little bit scare and culture shock because i never try learn with e-learning before this
14	It is not good.. I cannot study on my own.. When i am at home it is hard for me to open a book..
15	im scared. i dont know how can we handle these online classes later but it doesnt make me worried so r
16	Of course I feel so worried about online classes, project and final exam.
17	I hope UiTM will give the best decision for the students
18	a bit awkward to study at home via online with alls but will try my best. hopefully the online class and a
19	I feel a bit worried and scared at the same moment because of online class. But I hope everything will b
20	i am very concerned and worried how am I will able to understand learning online. I do afraid we can't c
21	kinda weird coz everything was going online ..by not seeing my friends in real time a little bit hard for m

Figure 4 illustrates the operators used in Rapidminer in order to carry out the sentiment analysis on students' emotions during the MCO. The Excel formatted data, labelled as 'emotiondata.xlsx', comprised 150 sample sets from the 42 students. The sample set was a set of conversations from the interviews carried out in the students' WhatsApp group. The 'Sentiment Analysis' operator used the sample set to generate results of the sentiment analysis of students' emotions during the MCO. Meanwhile, Figure 5 shows the sentiment analysis on students' emotions. Most students felt 'Neutral' in terms of their emotions during the MCO. Most of them felt comfortable and neutral about staying at home even as their normal face to face classes were postponed for a period of time.

Figure 4

Sentiment Analysis Process of Student Emotions during the Movement Control Order

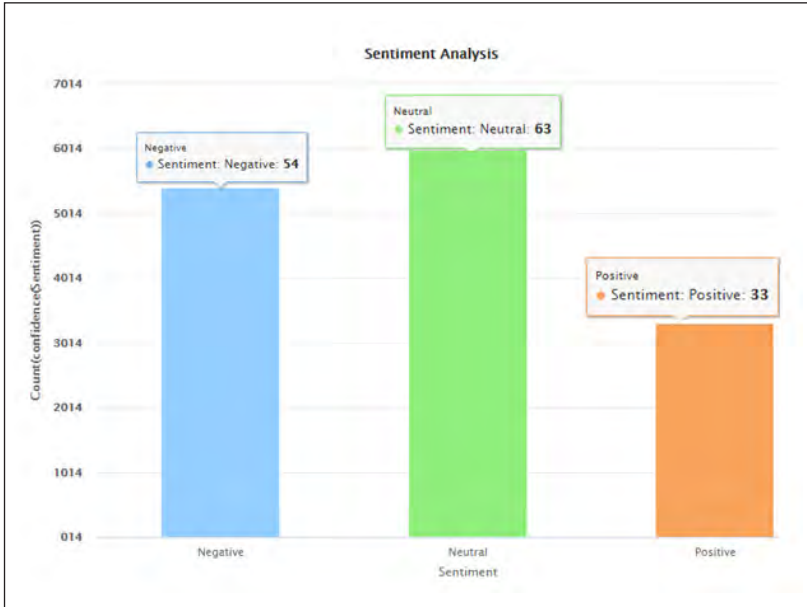


The 'Neutral' feeling was a reflection of their emotions towards learning during the MCO. The students needed time to adjust to the new norm, since they had to learn individually at home and could not join their friends for face-to-face lessons in the university.

Figure 5 shows that students were generally ignorant when it came to managing their learning independently. The researchers found that in terms of technology use, a gap existed in eliciting requirements for informal and free-flowing interaction, which would have allowed one to get to know the other personalities in the online learning group, and this could have improved emotional levels in the group communication. By guiding student emotions during the MCO, it would have improved their awareness on self-directed learning and thus, prepared them to use online learning fully during the semester while under MCO.

Figure 5

Sentiment Analysis Results of Student Emotion during the Movement Control Order

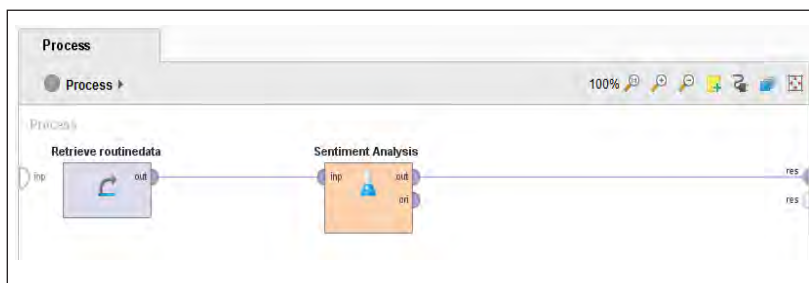


This study has also found that social presence was crucial for maintaining online learning interaction. The degree of social presence felt would have increased if the online interaction was able to be sustained or monitored. Figure 5 shows that there were 63 ‘Neutral’ messages with regard to student emotion towards online learning during the MCO. This seemed to suggest that there was a lack of engagement among students when they were learning virtually. This result could serve as a warning sign to the instructors that they should improve their teaching techniques in order to motivate the students and to help sustain student interest in their learning under the new norm of attending virtual classes all the time.

Figure 6 shows the sentiment analysis process on change of routine among students during the Movement Control Order. Two operators were involved in executing the sentiment analysis. By using the RapidMiner software, student routine dataset in ‘routine.xlsx’ was retrieved from an excel file. The ‘Sentiment Analysis’ operator allowed for the convenience in processing and resulting polarity of students’ opinions in change of routine.

Figure 6

Sentiment Analysis Process on Change of Routine among Students during the Movement Control Order



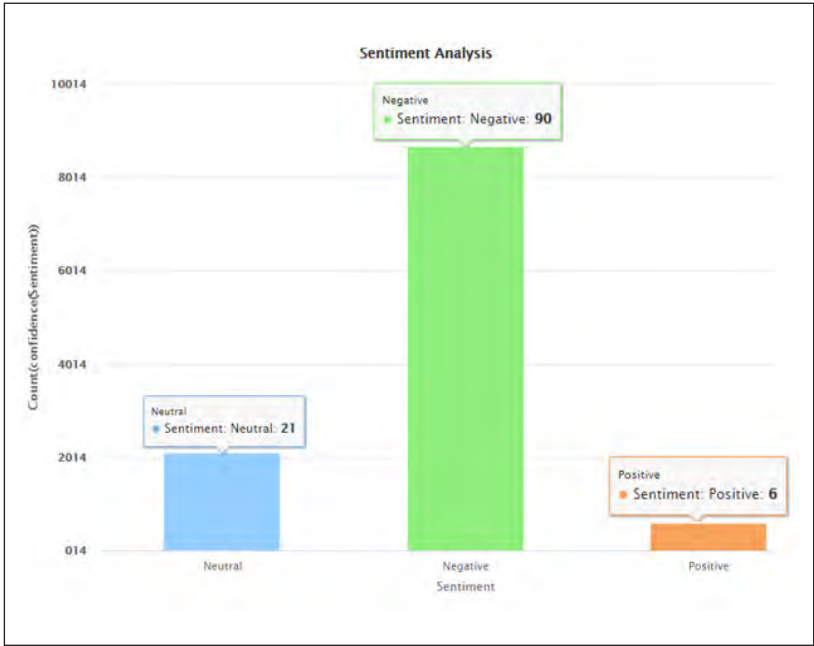
Based on Figure 7, most students had ‘Negative’ sentiment on change of routine during the Movement Control Order. Most of them were worried for various reasons. They were concerned about their lack of understanding to start their own self-directed learning, were bored during online classes, and felt uncertain on how to cope with assignments and projects. They also missed the face-to-face classroom setting. This study has shown the importance of ensuring good social presence in conducting online classes. It is also crucial to help students to change their mind set regarding online learning.

Collaborative activities in e-learning would allow learners to communicate and engage in knowledge sharing, regardless of the ways of interaction in the online learning platform (Bourkoku et al., 2019). Learners can perform activities such as discussions, online quizzes, assignments, announcements in an online forum, and chatting with friends in an informal setting can help them to feel comfortable in freely sharing their knowledge and ideas.

However, there were challenges in sustaining learning interest in online learning (Wong et al., 2020). Some students lacked the motivation to interact and felt insecure in sharing their opinions through online learning (Roebuck et al., 2019). There was also the problem of preserving the usability of online learning among students, which could reduce the flexibility to learn anytime anywhere (Lew et al., 2019). The present study has highlighted the importance of social presence during collaborative activities, as social presence in the virtual environment will help to engage learners with discussions, online quizzes, assignments, announcements in an online forum, and when chatting with friends. ‘Positive’ sentiments among students can be increased whenever the students manage to participate actively in online learning.

Figure 7

Sentiment Analysis Results on Change of Routine among Students during Movement Control Order

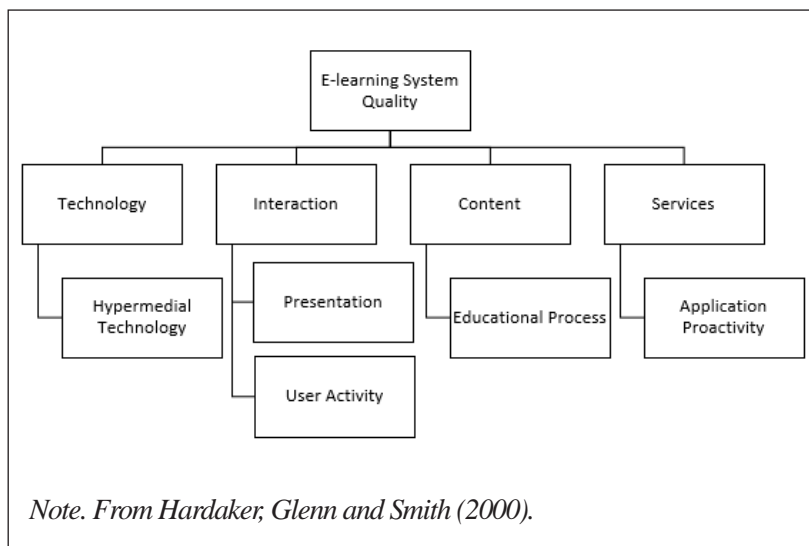


Technology and Content

In a study by Ameen et al. (2019), it was pointed out that e-learning might face difficulties, not only in terms of its high cost and quality of content, but also in terms of the quality of interaction among users in a user-friendly manner. E-learning can lead to a higher cost as a user-friendly facility must be made available all the time. Figure 8 shows the elements of a quality online learning system which has to include the appropriate technology, interaction, content, and services (Hardaker et al., 2000). Interaction can be seen as one of the crucial elements determining online learning quality.

Figure 8

Online Learning Quality



Another study described elements that can act as indicators in producing a successful online learning.

These indicators contribute to learner and technology aspects, as well as social aspects in online learning. The social aspects mentioned are learning style and intelligence, learners' attention, types of learners, collaboration issues, attitudes and interests, and effectiveness of the learning application to the learners (Aouidi et al., 2019). Elements such as good preparation of software and other materials can stimulate collaborative learning environment (Salehi & Largani, 2020). For instance, a good atmosphere of collaborative learning experience encourages question and answer sessions among students and allows them to challenge one another to answer questions in e-learning.

In order to engage students through e-learning, content also plays a role in allowing interactivity among online students. Content can help students to better understand the subject matter and achieve learning outcomes. During the MCO, the study found that the most serious challenge was to attract students to engage themselves in the online learning process as they lacked interest in e-learning.

CONCLUSION

In conclusion, this study has discussed the issues and challenges of online learning during the COVID-19 pandemic in Malaysia. Collaborative participation is important in sustaining online classes. Currently, the Movement Control Order (MCO) has been imposed in Malaysia and as such all higher education institutions or universities must implement a teaching and learning delivery system that complies with the MCO regulations. A sentiment analysis was conducted on 42 students of Universiti Teknologi MARA Kelantan, Malaysia. The sentiment analysis results showed that students felt 'Neutral' emotions during the MCO period. This seemed to suggest that there was a sense of ignorance among students and reflected their lack of readiness in handling full scale online learning. Therefore, higher education institutions or universities need to play their part in increasing awareness on the importance of continuing to learn online during this challenging period of the MCO. The students also showed 'a Negative' sentiment towards full scale online learning during the MCO period. As such educators need to even try harder to ensure the success of online learning despite the presence of such a student sentiment during the MCO. Currently, higher education institutions or universities and educators have been able to rise up to the challenge of preparing suitable online teaching and learning materials to address the issue of motivation and increase students' confidence level from time to time. This study has concluded that the challenges among educators, students, and higher education institutions or universities can be addressed if there is proper planning and continuous efforts to motivate the students to benefit from online learning during the pandemic.

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