

# Students' Motivation and Feedback on the Learning Potential from a Virtual Minecraft Event Competition

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**Abstract**—Minecraft is one of the most popular computer games that has caught the attention of educators all around the globe. The recent COVID-19 lockdown and restriction have reinforced the importance of embracing technology and being digitally proficient. Therefore, the use of technology must be an integral part of the teaching and student development process. Minecraft is a computer game with a huge following from enthusiasts and has also been recommended as a helpful learning resource for student development. Comprehending the value and potential of the infusion of technology into the learning experience, a completely online Minecraft contest for students in Malaysia was developed. This study shares and analyses the students' engagement in the event and competition that was purposefully held for school-going children in Malaysia. The study's findings are within the expectation of the initiators, where the events are seen as a positive, value-added activity to help reinforce students' learning. Deeper insights into student's opinions of the benefits and hosting routines were successfully attained. The results and findings will benefit educators' future planning of events that support and improve students' learning.

**Keywords**—Minecraft, learning, online event, discord, feedback

## I. INTRODUCTION

In the age of Industry 4.0, it is essential that students embrace and welcome the use of technology in their learning activities. The recent COVID-19 lockdowns have reminded educators of the importance of the virtual learning space. It is essential to consider the readiness of students to use the virtual platforms for their learning pursuits. Minecraft is a video game released in 2009 that has taken the world by storm. It has been considered to be one of the most popular video games of all time, with over 200 million copies sold [1]. Players from all parts of the world of different age groups play, interact and battle

each other virtually on a daily basis. It had actually started off as an Indy game initially by Markus Persson in 2009 but latter went mainstream with the acquisition by Microsoft who had continually developed the game to the delight of fans worldwide [2]. While many may know Minecraft as a form of a popular video game, Minecraft has also been explored and recommended by educators as a powerful tool for learning and education. There is even a dedicated version of Minecraft for schools known as Minecraft Education Edition launch in 2016. The game can be played on multiple platforms, including PCs, mobile devices, and also the consoles. The popularity of the game with the masses is clear, with the original game play content being routinely streamed and uploaded on popular video sharing platform like YouTube [3].

Minecraft is a virtual world, the first for numerous students. They are able to not only play existing content but can create version or iterations of their game play. Minecraft gameplay is very dynamic as there is an interaction with other players and also developers [4]. It is a building block-based video game that operates in a 3D sandbox. These blocks are a combination of different materials, with most of them being extractable and usable in an inventory. Utilizing these fundamental resources, players can craft weaponry and tools essential for their survival in the game [5]. Players are able to build and create things with the mined and collected resources. The game also contains a variety of other elements, including villagers, animals, monsters, plants, and terrain resources. It mimics the real-world conditions and challenges, with a number of simplifications being made into the game mechanics.

The environment and map are generated procedurally. No two games of Minecraft will be the same, giving players a different experience each time they play. When starting, players can choose either the creative or survival modes of play. For creative mode, player have access to a variety of resources and materials to create or build. It allows them a free hand to build and experiment with the

environment with little limitations. In survival mode, as its name suggests, there is some level of uncertainty and risk of the game ending abruptly. Players can select different difficulty levels and this affects how much damage and challenges are generated by the program against the player's progress in the game. To succeed in survival mode gameplay, players must overcome the challenge of limited resources by mining and crafting their own materials and tools from scratch. A player's primary concerns in survival mode gameplay will be food and shelter initially. Players work to collect resources and protect themselves from potential dangers in the game while in survival mode. Minecraft players will explore, traverse, and investigate the accessible spaces. In order to be successful, they must have the capability to find, organize, construct, use, and dispose of resources in the course of the game against opponents or the program.

Despite the fact that Minecraft's end goal is to overcome the Ender Dragon at the end, many players have opted out of pursuing that objective. Many players experience playing Minecraft doing whatever they want in the world as they please. This includes efforts in exploring the map, building structures, and looking for treasure, or farming. The multiplayer Minecraft experience is a driving factor for the increased popularity of the game. There are numerous community servers that cater to creative building challenges, obstacle courses, player versus environment, and player versus player gameplay.

Minecraft competitions are events in which players compete against each other in a predetermined challenge. These competitions can take various forms, such as building contests, survival challenges, or mini-game tournaments. And they can be organized by individuals, schools, or organizations. Minecraft competitions can be a fun and engaging way for players to showcase their skills and collaborate with others, while also promoting teamwork, problem-solving, and creativity. Traditionally, the competition will have some physical presence where organizers and participants will gather. However, the recent pandemic had encouraged the hosting of more competition in a fully online format.

## II. MINECRAFT IN EDUCATION

### A. *Technology for Education*

There is tremendous interest from educators in exploring the potential of Minecraft for learning with different scientific studies and projects exploring the educational side of Minecraft [6–8]. In past studies, it has been acknowledged that the gameplay of Minecraft is in line with the learning theories and pedagogies [9]. A game based approach in classroom teaching could make learning more interesting and promote more student engagements [10]. Minecraft has a strong connection to reality therefore, it allows players to experience the learning and also allows for learning by doing, virtually. It could simulate and model real life experiences in a safe, controlled environment for students. There is immense flexibility in learning, as Minecraft is basically a sandbox

game that allows for the possibility of player modifying the game script according to their own decision or to do it collaboratively with other players. The Lightweight Java Game Library Framework (LWJGL) allows for content creation and game script implementation without the requirement of user programming skills [11]. This makes it highly accessible and customizable for players and users. Educators can be able to modify the gameplay, rules, select and design content for intended learning outcomes. This is possible as Minecraft source code is open source and there is an active support community sharing best practices, mods and add on [12, 13]. The sharing of pre-built worlds and contents and the possibility to further tweak the content to the intended learning needs is most helpful for educators in preparing content for teaching purposes [14]. There are endless possibilities in the Minecraft gameplay, hence, students will be challenged to be creative and to explore their ideas and thoughts. To compete and to accomplish the tasks in Minecraft, students often will search for and learn additional information because a task like building something in the Minecraft world requires research into the topic in the real world. Minecraft could therefore promote improved learning skills and understanding.

### B. *Experiential Learning*

Students find it fun to learn beyond the classroom and through games, events, or activities, as they have the opportunity to learn through experiences. Many educators are adopting Minecraft for students learning in and outside the classroom. Minecraft provides the opportunity for students to learn via first-hand experience of accomplishing virtual real-world tasks. Minecraft gameplay can be customized by educators to enable the delivery of specific learning outcomes and to fulfill the specific requirements in class.

There are many learning benefits for Minecraft, including aiding students' knowledge and skill acquisition from the game and interactions. Minecraft can stimulate students' scientific inquiry senses and skills, they could experiment with different choices and conditions to see the different possible responses [5, 15]. The gameplay can be set to simulate real-world conditions, providing students with realism of the consequences of their choices. Students' grasp of math is tested in the gameplay as when they want to build structures, they will need to have a good understanding of the requirements of geometry, perimeter, area, and volume. Educators have also made use of Minecraft in developing students writing skills through the use of the game as a topic for writing, using the experiences for reflective and journal writing exercises or as an avenue for students to explore creative ideas and experiences for their essays. Players also develop their communication skills and abilities as they will need to work well among team mates to accomplish the gameplay objectives. The engagement with Minecraft can lead to increased students' motivation, development of their collaboration abilities, and programming skills [16]. Minecraft has significant potential for helping students to be more engaged with learning and to be active learners [16].

Students had been found to be excited and enthusiastic about attending Minecraft activities [17]. Furthermore, students who engaged in Minecraft activities have been noted to develop better leadership skills [18]. Players learn to collaborate effectively virtually and also in reality with their peers in the classroom.

### III. MINECRAFT ONLINE COMPETITION

A Minecraft competition event was organized in mid-2021 and was open to school going students in the whole Malaysia. The program had been running for a period of four months, with a requirement of at least one hour of direct interaction per week. The event was a structured virtual competition with technical tutorials, hands-on online workshops, small group training, target group discussion, guided explorations through the information sharing within the game and free time to work on individual or group projects. The competition was divided into two rounds, with the top 15 teams moving into the final phase. Prizes were allocated to the top fifteen teams.

The theme that was selected for the competition relates to cultural heritage preservation, as the organizing committee had felt strongly about the need to better educate students about preserving the historical and cultural identities of the surroundings. The authors had interacted, engaged, and observed the participants during the event. At the final days of the event, a voluntary feedback survey was sent to all participants. A total of 300 participants had agreed to take part in the survey and 284 completed forms were received. The online survey had included multiple choice Likert scale questions and open-ended options for the participants to feedback on their feelings and opinions on the event. For the Likert scale, the students could choose a response of “Strongly Like” to “Strongly Dislike” on a particular area of discussion.

Some authors who were present in the virtual event space had also taken field notes of important observations or occurrences that are of interest to this study’s scope. The notes were combined with the events publications and reports to form the base information use for this study. Invitations to participate in the competition were sent out to the different schools using the organizing committee’s personal network and also social media for greater reach. The Minecraft version used was in creative mode, the participants were free to use all the default functions and tools inside the software, however, the command blocks which need to be installed from external source were not allowed. There was a total of 103 teams comprising of 322 students that participated in the competition. The participants’ age ranges from 7 to 19. The competition is organized as the following routine outlined in Table I. Groups are given 4 months to complete the project, including to research about the suitable heritage building structure and to get familiar with the software, to build the entire virtual world and finally to record a video presentation and to complete the report. They presented their project online to a panel of judges who will grade the innovation, creativity and

fulfillment of the preset objectives of the competition. The best 15 teams will move on to the next phase to compete in an e-sport live event online. After 5 hours of live build process, the best 9 teams are selected as winners and are rewarded for their efforts.

TABLE I. THE ARRANGEMENT OF THE KEY ACTIVITIES

<b>(a) Preliminary Round Activities</b>	
<b>Month</b>	<b>Guided Activity</b>
1	Research in heritage buildings and its complexity. Sketch the building on a scaled paper.
2	Installing Minecraft software and attend online workshop/training to learn the basic skills. Learn the basic coding. Start building in the server. Technical support and discussion in small group.
3	Troubleshooting and problem solving within teams. Information sharing between teams.
4	Video recording and editing. Writing report. Sharing on social media
5	Online video presentation Judging session to select the top 15. Second round competition and evaluation.
<b>(b) Final Day Live Build Round</b>	
<b>Time</b>	<b>Guided Activity</b>
9.00 a.m.	Log in and registration in Minecraft server; Briefing on the rules and regulations.
9.30 a.m.	Start building on the designated area
11.00 a.m.	Perform survival skills in scavenger hunt at the heritage sites.
12.00 p.m.	Prepare and present the concepts and ideas
1.00 p.m.	Judging session to select the top 9 winners
2.00 p.m.	Virtual Prize giving and Closing ceremony in Minecraft server

The Minecraft server used in the competition has a primary hub where all participants can enter. The maps used in the competition were a template with a fixed size and in a flat world to encourages exploration and creative built of the scenarios envisioned by the student teams. Students can research and build virtually a particular heritage structure of interest to be presented in the competition.



Fig. 1. The A Formosa; A popular Melaka historical monument recreated in the Minecraft competition.

For example, several groups had selected the A Formosa Fort in Melaka, as illustrated in Fig. 1. They had to build the historical building based on the actual ratio, create interactive elements for the visitors during virtual tour, showcase the concepts through video recording, present the ideas through presentation slides to document all the outputs and finally to create the submission for the competition. Some examples of the other recreation of historical monuments are shown in Fig. 2. The students had to consider the requirements and technicalities of the actual heritage buildings when recreating the twin in Minecraft as shown in Fig. 3. Students are given the guidelines about the competition on an official website and given a free hand to complete the submission.



Fig. 2. The Stadthuys, one of the famous historical structures in Melaka.

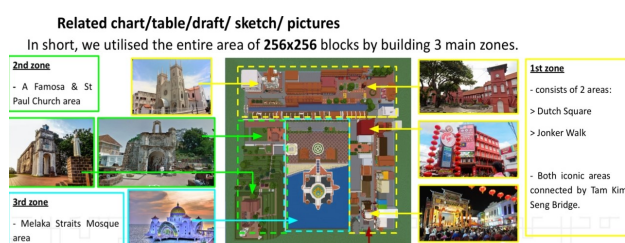


Fig. 3. Consideration of heritage buildings technicalities and relations when recreating in the Minecraft competition.

Due to the COVID restrictions and risk, the entire event was conducted primary on an online format. All the participants had taken part and interacted remotely. The organizers had selected the use of the Discord for communication and interactions with the participants. The organizers had selected Discord (<https://www.discord.com>) because of its already established popularity with the gaming communities. The past experiences and usage of particular technology will enable an easier learning curve in most settings [19]. However, it was also noted that the Discord program had not been formally used for teaching and assessments in the Malaysian school settings. Therefore, ample support and orientation of the use of Discord is still required for the participants. The availability of the required facility and infrastructure for the introduction of new approaches is essential [20]. Discord is available via apps or the web browser on the PC, mobile devices, and tablets. It is widely popular among the young generation gamers as a tool for chatting during online gaming, but it has now been expanded in use for other too. Discord allows for text chat, video or voice calls, screen, and file sharing. It is fast becoming a useful digital online platform for communication, sharing, and learning.

During physical events and competitions, students will have the opportunity to be seated close together in groups. They could move around and organize group chat and discussion easily due to the close proximity and presence. However, this has totally changed with the impact of COVID and the increased need for virtual or hybrid events. Therefore, the Discord environment could be used to create such flexibility for real time communication and sharing of resources. Discord can be used for personal and group communications. Discord Communities (servers) can be used to reach everyone (similar to a class announcement or sharing). Announcements or other information can be listed on the set Discord communities and be made available to all. Sub communities are also created to ensure certain discussion or information is provided to particular target groups. Participants may use the text channel in the communities to ask questions or to provide comments during the competition. The organizing committees who are the moderators in the communities will be moderating and providing the appropriate response. Some participants may also choose to not post in the community chat, but prefer to directly message the moderator with their questions. Apart from Discord, other social media platforms, such as YouTube and Google Drive, were also used to support the competition activities, especially for the rapid and wider sharing of media content.

#### IV. PARTICIPANTS FEEDBACK

At the end of the competition, a feedback survey was conducted by the organizing committee. All participants were invited to provide feedback and to share their opinion about the event. The collected information will help organizers to understand and improve future events.

##### A. Overall Satisfaction and Learning Experience with the Minecraft Competition

From the response collected and tabulated in Fig. 4, it is clearly evident that the feedback was very positive. Over 92% of the respondents had agreed or strongly agreed that the program is good. Similarly, over 92% of the respondents had agreed or strongly agreed that the Minecraft competition helps them to be more creative. Close to 85% of them had selected agreed or strongly agreed that they had learned new knowledge and that they had collected many precious experiences from participation in the events. Close to 84% of the respondents agreed or strongly agreed that the event had helped enhance their innovativeness in thinking. Nearly 81% agreed or strongly agreed that the event had been impactful and insightful for them personally. When probed on their perceived ability to solve problems, up to 79% of the respondents felt that they could solve the problems in the competition well. Interestingly, close to 5% had felt that they were not able to contribute successfully in the challenges requirements.

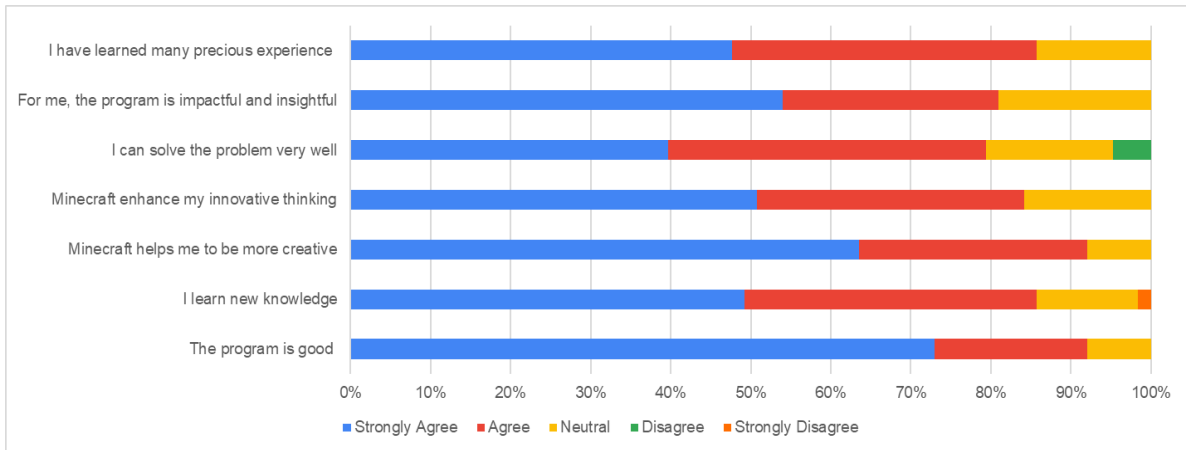


Fig. 4. Participants feedback on the competition.

### B. Technical Support and Issues in a Virtual Event

When asked about the level of support (virtually) and friendliness of the moderators (organizing committee) up to 89% of the respondents had responded positively to the question. Relating to how promptly the organizing committee responded to participants' query and issues, about 87% of the participants had agreed or strongly agreed with the fast response provided. It was also noted that about half of the participants had previously used Discord (likely in their gaming activities) while the other half of the participants found the Discord application to be new to them. A follow up question was directed to those who had not used Discord prior to the competition covering on the level of support provided by the organizing committee to help them use Discord effectively. Up to 80% of those probed agreed or strongly agreed that the support provided was adequate to enable them to participate effectively in the virtual competition using Discord. All the respondents were also asked about the ease in searching for information needed on the competition using the Discord server. About 70% of the respondents had agreed or strongly agreed with the notion that it was easy to get the information that they need on discord. Another question had probed the respondents on the usefulness of the competition website to provide information relating to the events and challenges and close to 94% of the participants had provided a positive reply.



Fig. 5. Word cloud of the open ended participants feedback response.

There were some technical and connectivity issues affecting the participants and they had shared their insights in the open ended questions in the survey. As noted in the word cloud in Fig. 5, the key issues include;

Internet stability and lag, Familiarity with Discord, Joining (connecting) to Discord channels or chats, Coding for Minecraft, Learning and cooperation to solve issues.

### V. FURTHER DISCUSSION AND REFLECTIONS

The host and participants of the event have generally a positive view on the benefits of engaging with Minecraft. Students can acquire much more experience and spend time exploring on additional knowledge beyond what is taught in the classroom. From the survey feedback, observation, and reflection on the event, there are a number of favorable learning experiences. From the review and further analysis of the responses, key reflections outlining the benefits of the engagement in a virtual Minecraft competition were determined.

Minecraft is such a great tool for learning because it encourages players to be more creative and to embrace problem solving innovatively. In Minecraft, players are given a vast, open world to explore and build in. They can gather resources, craft items, and create structures to survive in this virtual world. This encourages players to think creatively and propose solutions to problems they encounter in the game. In this competition for example, if a student needs to build a specific heritage building, they must think about what materials they have available and device a plan for constructing the structure with reference to the requirements set in the competition. This process requires students to think critically and to use their creativity to find a solution. The Minecraft competition had allowed teams to learn about different concepts and ideas in a fun and interactive way. For example, they had explored basic physics concepts by experimenting with different materials and structures in the game. They can also learn about history and culture by building structures and landscapes inspired by the theme of the competition.

As noted, this competition required participants to explore cultural heritage structures around them for virtual recreation. Through this experience, participants were able to gain knowledge of the significance of preserving cultural heritage in a more engaging manner than reading about it in a book. Many of the participants had enjoyed creating custom skins and building structures

that are unique to their style. They have made some detailed research into the actual heritage buildings but are still able to do some further customization in Minecraft. This allows students to express themselves and explore their creativity in a safe, virtual environment. Therefore, students not only learn new knowledge about culture and historical monuments but they are able to express their opinion and creative ideas.

As a broad theme was purposefully set for this competition, the participants are able to explore and discover new knowledge on their own. In the guidelines of the competition and instructions provided, there were no standard predetermined paths dictated, so students were free to explore and determine their group-built directions. This encourages them to think independently and to take ownership of their learning. A group may decide on a particular unique concept towards the provided theme, and the members might all spend hours experimenting with different approaches and build techniques, learning and discovering new things as they go. This type of self-directed learning is a powerful way to encourage curiosity and critical thinking.

The competition challenge set is open-ended and hence requires teams to think critically and develop their problem-solving skills. They would often encounter challenges and obstacles that they must overcome in order to progress in the competition. Problem-solving ability is a valuable skill that can be applied to many different situations in life, and Minecraft provides a fun and engaging way for students to practice and develop these skills. From the survey, majority of the participants were confident with their problem-solving abilities. However, there might still be students, especially the younger ones, who are daunted by the complexity of open-ended challenge found in the competition. The mentoring from group seniors and moderator of the competition could indeed be helpful for supporting such cases.

It is evident that collaboration and teamwork are essential in this virtual competition. In order to be successful, students must cooperate and work towards a collective goal. It is essential that they collaborate and synchronize their efforts in order to make their collective ideas a reality. Developing effective team collaboration in person is difficult, and the difficulty only heightens in a virtual competition setting. Participants need to learn to work effectively with others and build strong teamwork skills remotely using Discord and other available digital tools. Minecraft has been known for its extensive and interactive community of players who share their designs and opinions on the web. This allows players to learn from one another and see what other players are doing in the game. This sense of community helps players feel connected and encourages them to continue learning and exploring in Minecraft. This is also clear in this virtual competition, participants have the chance to build relationships with their peers and observe the creative works of their contemporaries. Many had shared that the competition has allowed them to acquire some priceless and pleasurable experiences.

It is noteworthy that the virtual competition had also enabled participants to gain new knowledge and skills. When discussing about learning potential of Minecraft, many would highlight that it allows players to practice and develop their coding and programming skills. The game allows for players to create own custom structures and more. The skill of coding and programming is a valuable skill in the era of Industry 4.0 and Minecraft provides a fun and engaging way for students to practice and develop these skills. It is envisioned that the operations in Industry 4.0 will be much enhanced with automation and autonomy of systems [21]. Hence, many parents are also excited by the prospect of their kids taking up a career in the field of coding and programming and thus are supportive of the children's interest with the Minecraft competition. By engaging with the competition, participants had been able to not only develop their soft and technical skills but also to acquire deeper insight relating to the competition theme. This unique Minecraft competition provided participants a fun and engaging avenue to learn about cultural heritage building and preservation. Being in a virtual environment, participants had also the opportunity to experiment and learn from their mistakes. Using Minecraft, teams are free to try new ways and interpretation of heritage buildings without fear of failure. Experimenting with different ideas and making mistakes are essential components of learning. The Minecraft competition provides a secure and supportive environment for students to practice and hone these skills. Many students had enjoyed creating their custom environment and building structures that are inspired by their own stories and imaginations. The competition had also provided the students an opportunity to further develop their storytelling and narrative skills. This allows them to develop their storytelling skills and to express themselves creatively in a safe and supportive environment.

Overall, the Minecraft competition hosted had been a suitable platform to help promote students further learning. It had stimulated student's creativity, problem-solving and promoted better awareness about cultural heritage preservation. It had also helped students to have better social skills, collaboration, and teamwork, gaining coding and programming skills, and presentation narrative skills. The experience and feedback from the event concur with the view of many that Minecraft is fast becoming a popular and powerful tool for learning and education.

## VI. CONCLUSION

The shift towards more digitization is changing how the world operates today. It is foreseen that the next generation of students will need to be ready for the challenges and expectations of the era of Industry 4.0. Students should be exposed to and trained in the use of technology from an early age and scholars have suggested the use of good video games such as Minecraft can help to improve student's motivation and learning abilities in schools. This paper had revealed that students had been deeply engaged with the Minecraft competition

and had been motivated by its challenges. Due to the complications of the COVID-19 restrictions, the shift of the event into a fully virtual mode has not dampened the enthusiasm and participation in activities. Students were able to interact and communicate well using electronic means such as Discord in this event. There were some minor dissatisfactions or areas for further improvement that were provided by the participants. Overall, the outlook of Minecraft events and competition to promote students learning is very positive. As more educators and institutions recognize the value of using video games as a teaching tool, and as more students become familiar with and comfortable using the game, it is likely that we will see even more creative and innovative ways of using Minecraft in schools. However, it is important for educators to be familiar with the game and its educational potential in order to effectively incorporate it into their classrooms and make the most of its educational benefits.

The findings as revealed in this paper would be helpful in the planning and organizing of virtual events competition for school children to learn and engage effectively. Further research can probe the learning capability of Minecraft competitions in correlation to its effect on learning various school subjects. As a meaningful and purposeful extra-curricular activity, the Minecraft competition challenge had been successful in promoting a deeper interest of students on the competition topic, the use of computer and remote networking devices, collaboration and teamwork to achieve a common goal. Such learning and experiences will undoubtedly be beneficial for the students' further study and beyond.

#### CONFLICT OF INTEREST

The authors declare no conflict of interest.

#### AUTHOR CONTRIBUTIONS

N.Y.G.L. and Y.J.P. designed and conducted the research. N.Y.G.L., Y.J.P., K.H.W., L.J.Y. and H.S.K. analyzed the data and wrote the paper. All authors had approved the final version.

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