

# Pandemic Education and Google Classroom

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**Abstract:** *Teacher trainees attended their online lesson during pandemic Covid-19. The survey was conducted to identify the efficiency of Google Classroom as a teaching tool. The 40 teacher trainees from a teacher education institute in Klang Valley was selected as the samples. They gave their responses in the question via Google Form. Results showed that teacher trainees agreed that Google Classroom was an effective tool for online learning. However, 52.5% of them faced limited internet access. While there were various constraints in online learning, teacher trainees have to accept the new norm of learning online and gradually move to personalized learning.*

**Keywords:** Google Classroom, pandemic Covid-19, teacher trainees

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## 1. Introduction

Tools which do not incur much cost to the institutions are favoured more. Therefore, Google Classroom (GC) and Schoology are often used in teacher training institutes (Ramesh et al., 2021). There are various applications in GC that is open accessed. It is very convenient for the lecturers to plan and conduct their lessons systematically and effectively with Google applications (Gurnan et al., 2019; Leng & Roziah, 2021). Technology itself can change how people access, gather, analyze, present, transmit and simulate information (See, 1994). The usage of information communication and technology (ICT) creates a dominant learning environment (Mojgan et al., 2011). Besides, ICT can change the learning and teaching process in which students can learn and improve their knowledge in an active self-directed and constructive way (Volman & Van Eek, 2001). Furthermore, teaching and learning through computer-mediated communication allows users for the penetration of discussion across barriers of time and physical context, encouraging students to take part in learning ‘anytime’ and ‘anywhere’. In traditional learning environments, students are normally assessed based on their abilities to recall information or to understand fundamental relationships among ideas (Vighnarajah et al., 2011).

In the present pandemic situation, online learning is one of options to be considered worldwide. Online learning is widely accessible if the speed of internet infrastructures is stable. It also provides students with high flexibility in their learning schedules and learning capabilities (Hamdiah Jailani & Muhamad Firdaus, 2020). Lecturers and students could still communicate with ICT tools such as Google Meet, Zoom, Cisco Webex and Microsoft Teams. Ramesh et al. (2021) reported that pre-service teachers in teacher education institute mostly preferred Whatsapp and least preferred Zoom. E-portfolio could be prepared for each student to monitor their progress with the guidance of the lecturers and management staffs. It is a viable and free

online file management system. It may reduce the usage of papers when students need not to print out their notes and assignments. Yee (2021) reported that the positive roles and usage of online learning with her English teachers in a school. The teachers used various digital tools such as Google Classroom, Google Meet, Microsoft PowerPoint, Kahoot and Canvas. They used the tools synchronously and asynchronously to give lecture notes, prerecorded lesson, lessons attached to specific links, quizzes and tasks to their students at home. The outcome is quite promising though there were setbacks and hurdles in the process.

During Movement Control Order (MCO), all education institutes were ordered to close down temporarily. Students stay at home and learn online. Sudden changes pose some challenges for students and teachers and certain skills were required to continue with online learning. Usage of online learning among higher education institution is questionable due to lacking knowledge and sudden change of pedagogical practices (Abdullah et al., 2015; Ramesh et al., 2021).

Although there were many setbacks of online learning during the initial MCO, online learning gave various opportunities to personalized learning in future. The new prospect of a high-quality education in the future is moving towards personalization of individual need and preferences regardless of background and geography (Seldon, 2020). There are many innovative ways to teach, learn and access to learning. The role of teacher is not merely a knowledge provider. Teachers evolve their roles from knowledge providers to guides, leaders and facilitators that could customize to individual learner. A meaningful interaction between teachers and students would still be required with the physical and social interaction. However, every teacher and student in the world today could communicate across the world through internet. It is not necessarily to have a physical class.

Pandemic Covid-19 accelerated distance of learning by around 5 years. 91.3% of the total enrolled learners were affected in Malaysia (Lim, C.L., personal communication, June 16, 2021). We could observe a very obvious changes in our learning world. The foreseeable changes lead to the usage of cloud to the edge, immersive computing using Augmented Reality (AR) and Virtual Reality (VR), artificial intelligence, smart connected solutions and 5G networks. Although the foreseeable changes seem to be very challenging to our education system, the transformation is necessary, not an option. The pandemic Covid-19 obviously accelerated this whole processes. The transformation is required in the learning environment for the following reasons;

- i. Collaborative expectation are and above normal stance
- ii. Blended and remote learning could be conducted simultaneously
- iii. Internet of things (IoT) and Personal Digital Assistant (PDA) delivery automation.
- iv. Digital space convergence in both physical and virtual environments
- v. Emerging technology delivery and the outcomes required
- vi. Current pandemic climate capability and enablement

(Khor, H.C., personal communication, June 16, 2021)

The applications that are essential to education transformation are as below;

- i. Self-directed learning
- ii. Futuristic learning environment
- iii. Growth mindset cultivation
- iv. Adaptive learning
- v. Learning analytics
- vi. Digital citizenship
- vii. School2Home collaboration

(Vinesh, T., personal communication, June 16, 2021)

Smarter technology enables all kind of people in all kinds of processes to do all kinds of powerful things. If we are going to solve the great challenges of today and build a smarter tomorrow, we need all kinds of points of views to make all kinds of progress. Technology will not replace the teachers but the teachers who use technology will replace the teachers who don't use technology (Lim, C.L., personal communication, June 16, 2021).

In future, teachers need to rebuild their skills to adopt the new environment. These future skills involve technology adapter, digital citizen, creative thinker, problem solver, critical thinker, community of learners, curator of knowledge, facilitator, AR-VR creator and technology creative.

In future classroom, teachers with strong digital skills will promote digital learning. Besides as a facilitator, teachers promote creativity and innovation. The process of the teaching and learning would be driven by student analytic data. Teachers may use AR-VR digital tools in classroom if provided (Lim, C.L., personal communication, June 16, 2021).

From the media, we heard plenty of difficulties faced by the teachers, students and parents during their home-based learning. There are several ways to deal with hybrid learning if fully online learning is unlikely. First, the lessons should be more student centric. Second, it should promote high flexibility of human touch with hybrid teaching and learning. Third, it is built on the familiar situation for teaching and learning with the adaptation of smarter technology. Next, the discussion in online platform should only engage in small group. Teachers could separate the students in few groups. Then, teachers collaborate with students in a remote way if hybrid (Vinesh, T., personal communication, June 16, 2021). However, the time management of every lesson is important for the positive outcome of every lesson learned by the students. We do not want students sit in front of gadgets inactively for the whole day. This scenario may give rise to other problems such as emotional stress, eye sights problems, unstable data and line problems. Data and line problems in rural areas and weak signal scenario even happened in developed countries like Singapore. Therefore, it really depends on how the teachers deal with the issues.

## **2. Literature Review**

The Pandemic of Covid-19 changed the landscape of education in Malaysia. The physical lessons between teachers and students have changed to mainly digital learning. For older generations of teachers and students, it may take some times to adjust themselves. University students also found that online learning could improve their learning process although internet access is the main hindrance (Nuraffandy & Ling, 2011). The other research conducted by

Tuan Nguyeng (2015) found that physical lessons were more effective than online learning in Vietnam. However, the students of Generation Z would find the ease to handle their lessons and assignments. Besides removing the burden of over-packed school bags, parents who stay at home would have to look after the home-based learning of their children together with the teachers.

After approximately 14 months of home-based learning, parents began to wonder the efficiency and quality of home-based teaching. In physical class, teachers could monitor the students closely such as their disciplines, physical interactions and effective communication. In digital learning, teachers found that it was very difficult to monitor their students during online learning. Besides the weaknesses of internet speed, teachers also difficult to supervise their students' progress and behaviour. Students in primary schools tend to lose focus and disciplines. The issues were students ignored lessons by switching off their webcams and looked at other social media activities (Phan, 2021). In such long time at home, the students may lose their skills in expressing themselves or presenting their group works with little to nonverbal social interaction (Phan, 2021). Students also became inactive and sit in front of their laptops for their daily lessons. It may lead to emotional stress especially those students lacking of internet access facilities. The other challenges faced in online learning including of submission of assignments on due date, discipline and students adaptation in the new norms (Sorenson, 2012, Midcalf & Boatwright, 2020). Besides, it may affect their eyesights in such an unhealthy norms. In theory, pandemic education may seem like a comfortable practice, but its full impact still needs to be studied further (Phan, 2021). The confined education is workable for a short period of time because knowledge essentially coexists with healthy social interaction.

In teacher education institutes, teacher trainees already began their online learning since March 2021. The institutes introduce Google Classroom as their principal official mean of online learning besides other online applications and social medias were allowed as secondary means. Google Classroom is an online connectivity platform that allows teachers to post announcements, share learning materials, assign assignments and edit assignments (Shahazwan & Anwar, 2021). This product of Google is linked to the Gmail, Drive, Hangout YouTube and Calendar. Its obvious advantage is its accessibility and user friendliness. To master Google Classroom, users need to master other applications that serve as the basis in its system. It is like we need to master the grammar and vocabulary to construct a good sentence. As it was stated earlier in the article, students preferred Google Classroom when teachers played their active roles. Google Classroom could play its role in self-directed learning to improve and motivate the learners (Hemrungrote, Jakkaew & Assawaboonmee, 2017; Jastini, Izwan & Sarah, 2016; Kwane, 2020). However, Iftakhar (2016) found that Facebook was widely used in his study compared to Google Classroom that showed some restrictions in the teaching process.

Apart from determining that the equipment and facilities are well-maintained, administrators must take the initiative to lead by example, whereby they themselves are efficient users of technology. Even though there is an very obvious digital gaps between the senior and junior teachers as well as among the students, user friendly technology and the eagerness to learn could solve this issues. Human resources must be well-managed and training programs involving teachers need to be well-monitored so that every teacher receives training appropriate to their instructional needs (Tan, 2001).

The government distributed a large amount of allocation to Ministry of Education to get ready with the infrastructures for online learning during the pandemic season. However, the outcome of the online learning was not compatible with the allocation used. The students were not benefited from the usage of online learning (Jabatan Audit Negara Malaysia, 2019).

Although outbreak of Covid-19 and Movement Control Order forced many educator to embrace online learning, Information Communication & Technology (ICT) itself is not a teaching approach (Aida Suraya, 2011). The use of ICT itself does not ensure effective learning. It cannot be simply assumed that the integration of ICT into classrooms, whether in the form of courseware and other applications, will necessarily result in improved teaching practices and enhance students' outcomes. However, we could not ignore that the effectiveness of ICT could be maximized and their potentials realized by integrating ICT into teaching practices that are consistent with constructivist pedagogy, in which students are actively engaged in their own learning. Computers and communication technologies are amazing tools for moving the centre of power in a classroom over to the students (Aida Suraya, 2011).

The Covid-19 pandemic has been very challenging for the whole education system. The teachers are not the ultimate gatekeepers in this digital classrooms but they could help students to translate knowledge learned to skills and instil positive attitudes in learning (Vishalache Balakrishnan, 2021). Until today, we still come across news and reports about digital gap in schools. Many lower secondary students in a rural school do not even know how to log on to their online classes through they have had computing and information technology lessons from their primary years (Vishalache Balakrishnan, 2021). It is sad to know that knowledge in their early years has failed to prepare them in secondary school especially during this pandemic season. Although paradigm shift from traditional to online education could not materialize fully just in two years of pandemic Covid-19, it does give another viable option for higher education institutes to continue running their lessons online. Lecturers were forced to change their delivery of programme and assess the learning of their students (Azrin Ariffin, 2021). The physical demonstration of certain clinical procedure and practical lessons such as laboratories and physical educations has been replaced with prerecorded videos accordingly. However, not all clinical and practical lessons could be prerecorded and personal attentions could not be attended to students online. Some psychomotor skills such as dissection are impossible for students to master if there were not conducted in physical lessons (Azrin Ariffin, 2021). Hand-on training with real patients must be conducted under the close supervision. There were arguments on the type of assessments for online lessons. Lecturers, students and even the parents queried the validity of alternative assessment done online. Would it serve the purpose of assessment especially when it involved skills and competencies?

The Covid-19 pandemic has also presented a host of new perspective for the education sector. Digital learning also reduces the issue of over-packed with books in the school bags that lead to health issue in the long run. Online learning, which is home-based gives flexibility of times for students and teachers. Teachers could look after their own children and reduce their burden in their family expenses if they could manage their lesson and home tasks effectively (Phan, 2021). In theory, pandemic education may seem like a comfortable practice, but its impact in the long is yet to be fully studied. In long run, healthy social interaction in school could not be ignored as it would affect the emotional and mentality of the growing students. Students need to interact, discuss and play with their peers in school. However, online learning has its place and will continue to appeal to a distinct segment of learners, such as working professionals, where the convenience of online learning has its advantage (Wing, 2021). Online communities are no substitute for physical lessons since they could not replace the warmth of meeting people



face-to-face or sense of belongings when we are in the lecture halls. Besides, students find themselves lacking opportunities to socialize with their peers and educators (Aw, 2021). Thus, this situation would undermine their developments of social skills. The transition from physical classes to online lessons has been an abrupt process. It is more important now than ever to promote a sense of community within classes. Simple ice-breaking activity that allows teachers and students to learn each other's names is of inestimable importance in cultivating a mutually supportive class environment (Aw, 2021). It is foreseeable the technology would continue to complement the on-campus teaching. The large lectures with hundreds of students could be conducted with a Zoom-like delivery. When the means of teaching changed, it would spur the alternative examinations, such as online assessments to the traditional examination. Perhaps the biggest issue exposed by the global pandemic in Malaysia is the existence of a clear digital divide. In Malaysia, some of the basics are still missing, such as the availability of the internet access in non-metropolitan areas and access to computers particularly those in the B40 (Bottom 40% of the Malaysian household income) group (Wing, 2021).

### **Problem Statement**

The Movement Control Order (MCO) began from 18 March 2020 and continued in phases until 3 October 2021. During MCO, the classes have to be temporarily closed and replaced with either online lessons or hybrid lessons. Google Classroom (GC) is the official platform recommended by Institut Pendidikan Guru Malaysia (IPGM). The other online applications and social medias would act as the supportive tools for GC. As stated in the operational procedure provided by the Malaysian Qualifications Agency, the lessons opted to be conducted online in order to fulfil the course learning outcome. Thus, the lecturers and teacher trainees must attend lessons according to the official schedule (Institut Pendidikan Guru Malaysia, 2020).

Although GC is used as the mean to facilitate online learning, teachers still came across various challenges such as the number of participants that could join in the GC platform itself is limited, interpersonal communication could not be fostered and students tend to leave the online classes (Bao, 2020). The accessibility of internet also related to the household income of the family. Lots of students were not able to study at home since the surrounding is not conducive. They were forced to purchase prepaid internet data to attend the online lessons (Syed Ismail et al., 2021). The other challenges were low turnout, the digital skills of teachers, teacher centre approach, limited devices and adaptability, disciplinary problems and poor internet accessibility (Shahzwan & Anwar, 2021; Yee, 2021). The outbreak of Covid-19 has shown a huge gap in digital divide among our students.

### **Sample**

The sample is 40 teacher trainees who sat for subject Pengantar Pengajian Profesional (subject code: GPP1063). They registered in Feb 2021. They attended their classes physically from Feb till March 2021 before the campus closed. They stayed at home and attended online lessons from March till May 2021.

### **Method**

Survey

### **Instrument**

Questionnaire via Google Form

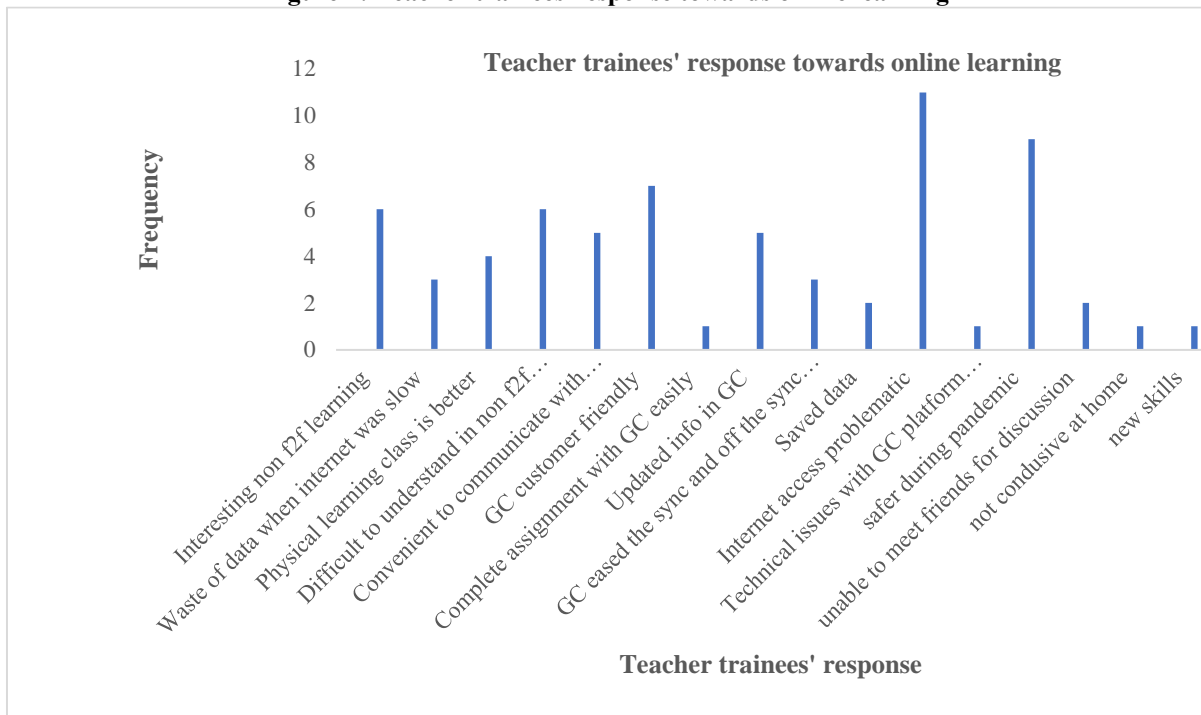
### 3. Methodology

The researcher conducted the survey using Google Form which attached to students' official email account. Students gave their feedback and return the questionnaire to the researcher in two weeks.

### 4. Result and Discussion

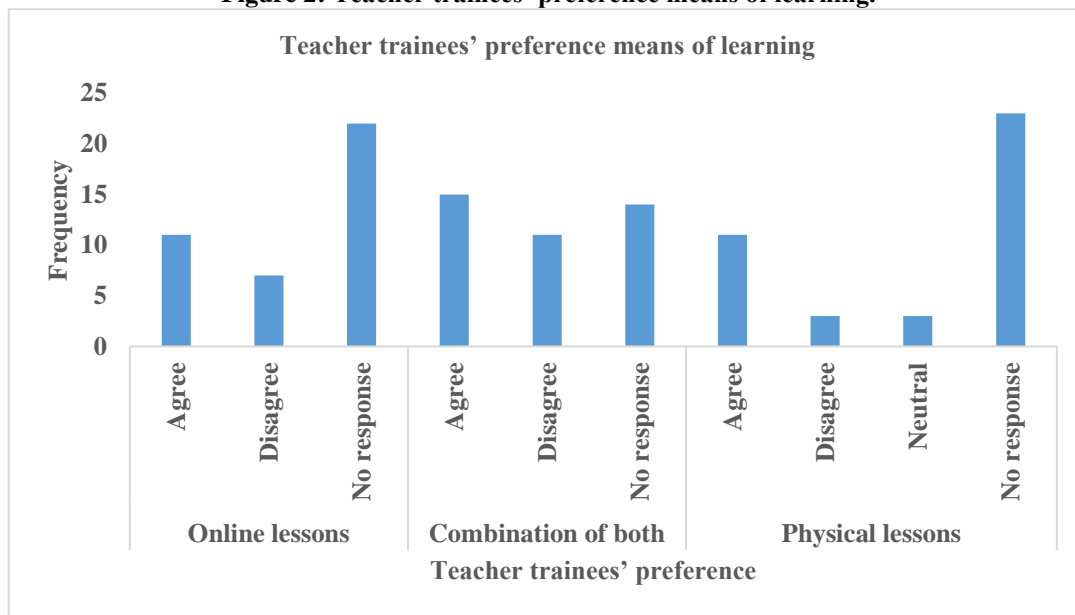
The samples (n=40) agreed that GC was an effective tool for online learning. 19 students agreed that internet access was not a problem for them. Although 100% of the samples agreed that GC was an effective tool for online learning, they still faced internet access problematic during the lessons at the peak hours. From Chart 1, it was shown that teacher trainees felt safer at home during the pandemic. They felt convenient to communicate with lecturers with GC and WhatsApp. They also found that non face-to-face learning interesting although some trainees prefer physical classes.

Figure 1: Teacher trainees' response towards online learning

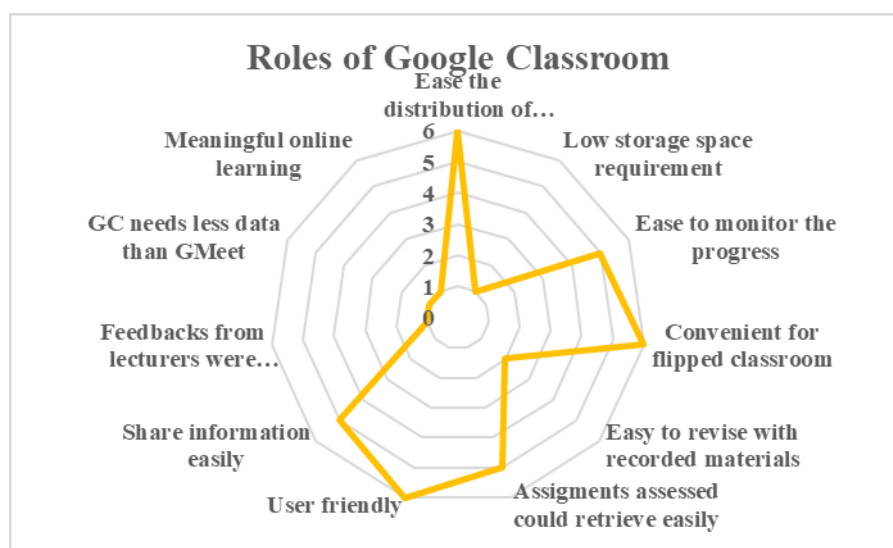


The Google Classroom (GC) assisted teacher trainees in their assignments, save their traveling cost, systematic data storage and user friendly. GC could be applied with the addition of Google Drive, Google Docs, Google Sheets, Google Slide, Google Calendar, Gmail, Quizizz, Kahoot and other applications (Hamdiah Jailani & Muhamad Firdaus Mohamad, 2020). Leng & Roziah (2021) reported that teacher trainees satisfied with the application of GC in their History course. They found that GC is easy to be used, upload and download learning materials and could be accessed without time and location restriction. Teacher trainees could carry out their self-learning easily.

**Figure 2: Teacher trainees’ preference means of learning.**



There were different opinions of teacher trainees’ preference means of learning. While some of them agreed with either physical lessons or online lessons, certain teacher trainees chose to have hybrid lessons. From Chart 2, there were a significant number of teacher trainees (52.5%) did not give their responses citing limited internet access periodically. This particular group of teacher trainees would prefer physical lessons. A survey carried out by Syed Ismail, Abdul Hameed, Hong, Mohd Jin & Ahmad Subki (2021) found that 488 teacher trainees (98.4%) used WhatsApp to attend their online lesson. The learning level of the teacher trainees during online lesson was moderate high (mean=3.67). However, 336 (67.7%) teacher trainees mentioned that limited internet access was the main issue faced by them. They also felt burdened by the excess of the online assignments and tutorials given. From different scenario, some teachers could teach online and offline synchronously and asynchronously to counter the limited internet access. In fact, teachers are not either compulsory or require to teach online all the times. In order to conduct efficient online teaching and learning, the institutions need to improve the basic amenities, the skills of users and standard user manuals.



**Figure 3: Roles of Google Classroom**



Teacher trainees preferred GC because the distribution of assignment is convenient and easily to be retrieved. Besides, GC is easier to monitor the students' progress. The tool itself is very user-friendly. Results from Chart 4 were similar to results in Chart 3. Teacher trainees gave a likable response toward teaching and learning of subject GPP1063 Pengantar Pengajian Profesional using GC that were similar to survey related to the benefits of GC.

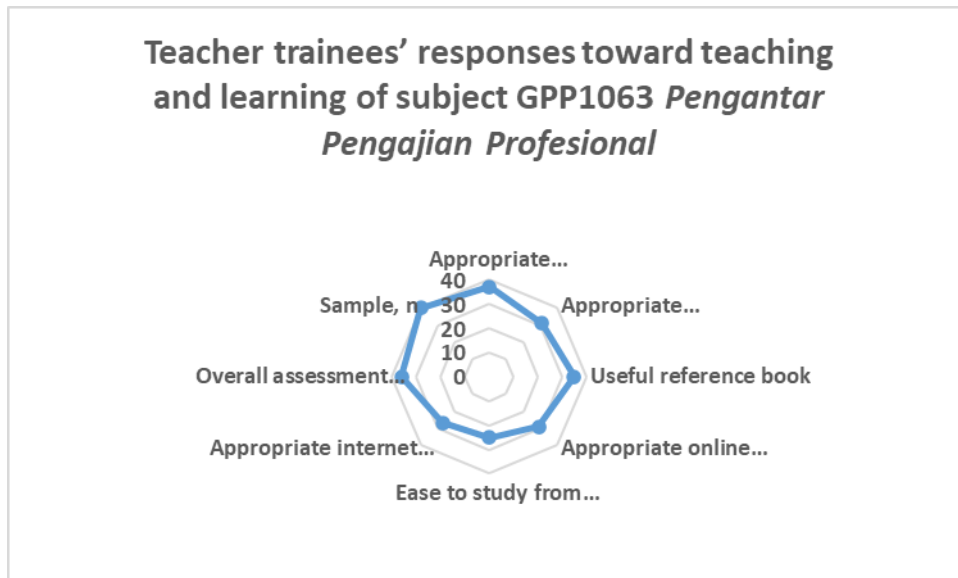


Figure 4: Teacher trainees' responses toward teaching and learning of subject GPP1063 Pengantar Pengajian Profesional

Overall, teacher trainees agreed that Google Classroom is an effective online platform for their lessons. The lecturer was able to carry out his lessons although the internet access was a major issue during the Covid-19 pandemic. Teacher trainees could use the Google Classroom frequently. They faced less issues such as weak internet access and higher data usage that is common in Google Meet. However, teacher trainees would not be able to access to Google Classroom or the likes if their areas are not in the coverage of the internet providers and in the areas that poorly accessed due to the nature of the locations. Google Classroom is an effective teaching and learning tool due to their personal experience. If the online learning continued till the coming semesters, those subjects that required practical, experiments and hand-on activities would be affected. Since these activities could not fully teachable with online learning, it will affect the understanding of the teacher trainees. There was a digital gap between teacher trainees from urban and suburban areas. Those teacher trainees from well-to-do families would access to digital tools easily compared to those from low-income families. Digital infrastructure was another factor that further divide teacher trainees of different background. They have different challenges to meet regardless of their background. Social media such as WhatsApp and Telegram were generally another supporting learning tools for many teacher trainees.

Though teacher trainees supported the three ways of lessons conducted, they disagreed that they were instructed to return to campus in the mid-term of the present semester. The reasons cited were wastage of time, inconvenient for those who live far away from campus and affect the present lectures. They preferred to return to campus after completed the present semester.

Lessons were conducted in the classrooms when teacher trainees returned to the campus. Those who unable to return to campus due to various valid reasons were allowed to follow the recorded lessons or online lessons. Due to the physical constraints of the classrooms and certain

standard operating procedures given by the authority, some teacher trainees would need to attend their physical lessons alternately. Teacher trainees valued the face-to-face interaction positively. They preferred to meet their peers and lecturers after a long period of home-based learning. Some of them might worry about the spread of the Covid-19 pandemic. In the classroom, they pose higher discipline and learn meaningfully.

Teacher trainees who disagreed with physical lessons in campus were in small number. The reasons given were the enforcement of Covid-19 standard operating procedures in the campus was not strict, restriction of movement affected their daily life and the continuously spreading of the Covid-19 virus.

If online learning continued till December 2021, 11 teacher trainees would agree; 7 disagreed and the other 22 did not give their preferences.

Reasons to disagree were stated as below.

- i. Affect the eyes and posture if sitting too long in front of the screen.
- ii. Social interaction in physical classes made lessons fun and interactive.
- iii. Disagree if Covid-19 dropped.

If online learning combined with physical lessons when appropriate till December 2021, 15 teacher trainees would agree; 11 disagreed and the other 14 did not give their preferences.

Those who agreed to the combination, were with the following points;

- The usage of technology in education is the latest trend not to be ignored.
- Both means promote excellent interaction.
- Balanced approach in this current Covid-19 pandemic

If fully physical lessons resumed from June 2021 after Covid-19 pandemic subsided, 11 teacher trainees would agree; 3 disagreed; 3 neutral and the other 23 did not give their preferences.

Teacher trainees stated that;

- Physical lessons ease the interaction between lecturers and the trainees.
- Boring and dull in physical lessons.
- The spread of Covid-19 cases in the campus as the trainees would return from different states
- The campus is located in Selangor, which is reported to be the state with highest cases of Covid-19 in Malaysia

## **5. Conclusion**

The pedagogical and technical knowledge of teachers is paramount important to the efficiency of the teaching and learning process. Teachers have to be prepared and be open minded towards the gradually continued challenges in education. The online lessons have been widely accepted by teachers and students. Teachers have to adapt to new strategies to improve the learning process of students.

The benefits of online learning are worth exploring. The government should consider at incorporating online education meant for pre-service teachers. Online educators improve

student outcomes and more importantly lowers the tuition cost whether the lecturer are equipped with necessary skills and knowledge to conduct online learning. Looking at the past record, teaching and learning in teacher education institutes are based on face-to-face models' prevalence of online learning is almost non-existent.

Some of the pedagogy theories and models might not be applicable when it comes to online teaching and learning. Continuous professional development and staff training in using learning platforms augurs well in preparing for distance learning. Technology integration in the classroom is about to bring many benefits to teachers and students. However, various studies reported that technology integration in the school curriculum is still at a low level. In the long run, they would be capable to implement portal-based teaching and learning in schools. Teachers need to be exposed to designing lessons integrating both resources from the internet for the purposes of instruction. The training can help ensure teachers are equipped with the knowledge and skills to use the hard technology (equipment and infrastructure) and soft technology (methods, strategies and approaches) to enable them to optimize using and integrating internet in the classroom.

It was estimated 45% of the students in higher learning institutes accept the new norm of learning. Therefore, the teachers should transform their current pedagogical instruction. The old school application of face-to-face teaching would slowly fade away. The learning process will move to individualized or personalized learning. The other stakeholders would gradually produce more e-learning modules for 21st century employability market.

## Reference

- Abdullah, M., Abdullah, A.H., Rosman, A.S., & Ilias, M.F. (2015). Garis panduan bagi Hafiz Al-Quran menurut pandangan Al-Nawawi. Kertas dibentangkan dalam International Conference on Islamic Education and Social Entrepreneurship. [https://www.academic.edu/19775153/Garis\\_Panduan\\_bagi\\_Hafiz\\_al\\_Quran\\_Menurut\\_Pandangan\\_Al\\_Nawawi](https://www.academic.edu/19775153/Garis_Panduan_bagi_Hafiz_al_Quran_Menurut_Pandangan_Al_Nawawi)
- Aida Suraya Md Yunos. (2011). ICT integration in mathematics teaching and learning. In S.L. Wong, Mas Nida Md Khambani, Abu Daud Silong & Othman Talib (Eds.), *Teaching & Education: Issues, empirical research and applications* (Revised ed., pp. 89-119). Penerbit Universiti Putra Malaysia.
- Aw, W.C. (2021, September 19). Make online spaces for students. *Staredu*, 8.
- Azrin Ariffin.(2021, September 5). Online clinical courses: Let's be realistic. *Staredu*, 7.
- Bao, W. (2020). Covid-19 and online teaching in higher education: A case study of Peking University. March 2020, 113-115. <https://doi.org/10.1002/hbe2.191>
- Gurnan Kaur Sidhu, Lydia Foong Yoke Yean, Lim Hwee Jean, & Ahmed Elysyad Abdelhai. (2019). Knowledge and understanding of Google Classroom as a teaching and learning tool: A case study. *International Journal of Advanced Science and Technology*, 28(8), 687-695.
- Hamidiah Jailani, & Muhamad Firdaus Mohamad. (2020, Disember 15-16). Penggunaan Google Classroom dalam pengajaran dan pembelajaran secara dalam talian: Satu tinjauan [Paper presentation]. Institut Pendidikan Guru Kampus Pendidikan Islam 1st International Conference on Educational Research, Bangi, Selangor, Malaysia.
- Hemrungrote, S., Jakkaew, P., & Assawaboonmee, S. (2017). Deployment of Google Classroom to enhance SDL cognitive skills: A case study of introduction to information technology course. *International Conference Digital Arts, Media & Technology (ICDAMT)*. <https://doi.org/10.1109/ICDAMT.2017.7904961>.

- Iftakhar, S. (2016). Google Classroom: What works and how? *Journal of Education Social Science*, 3, 12-18.
- Institut Pendidikan Guru Malaysia. (2020). Panduan tatacara pengoperasian pengurusan pembukaan semula IPGM (KPM100.1/7/Jld. 2 (50)).
- Jabatan Audit Negara Malaysia. (2019). Laporan ketua audit negara 2018 siri 1 (1st ed.). <https://www.audit.gov.my/index.php/ms/laporan/aktiviti>
- Jastini Mohd Jamil, Izwan Nizal Mohd Shahrane, & Sarah Syamimi Mohamed Rodzi. (2016). The application of Google Classroom as a tool for teaching and learning. *Journal of Telecommunication, Electronic and Computer Engineering*, 8(10), 5-8.
- Kwane, Ansong-Gyimah. (2020). Students' perceptions and continuous intention to use e-learning systems: The case of Google Classroom. *International Journal of Emerging Technologies in Learning*, 15(11), 236. <https://doi:10.3991/ijet.v15i11.12683>.
- Leng, W.M., & Roziah Mohamad Ali. (2021, August 3-5). Penggunaan Google Classroom dalam pengajaran dan pembelajaran kursus sejarah pelajar PDPP [Paper presentation]. Institut Pendidikan Guru Kampus Temenggong Ibrahim & Yayasan Tun Hussein Oon 5th International Conference on Teacher Learning and Development, Johor Bahru, Johor, Malaysia.
- Midcalf, L., & Boatwright, P. (2020). Teacher and parent perspectives of the online learning environment due to Covid-19. *Delta Kappa Gamma Bulletin*, 87(1), 23-34.
- Mojgan Afshari, Kamariah Abu Bakar, Wong, S. L., Bahaman Abu Samah, & Foo, S. F. (2011). Teachers and the use of information and communication technology. In Wong, L.S., Mas Nida Md Khambari, Abu Daud Silong & Ohman Talib (Eds.), *Technology & Education* (pp. 8-18). Penerbit Universiti Putra Malaysia.
- Nuraffandy Yahaya, & Ling, N.N. (2011). Kesiediaan penggunaan e-learning di kalangan pelajar tahun kedua kursus sarjana muda sains, komputer serta pendidikan: Satu tinjauan. *Journal of Educational Social Science*, 1, 121-140.
- Phan Ji Wei. (2021, July 4). Is 'pandemic education' up to standard? *Staredu*, 8.
- Ramesh Rao Ramanaidu, Chantirasekar Karpan, Shasitharan Raman Kutty, Chander Vengadasalan. (2021, August 3-5). Migration to online learning: Evaluation by pre-service teachers. [Paper presentation]. Institut Pendidikan Guru Kampus Temenggong Ibrahim & Yayasan Tun Hussein Oon 5th International Conference on Teacher Learning and Development, Johor Bahru, Johor, Malaysia.
- See, J. (1994). Technology and outcome-based education: Connections in concept and practice. *The Computing Teacher*, 17(3), 30-31.
- Seldon, A. (2020). *The fourth education revolution reconsidered*. University of Buckingham Press.
- Shahazwan Mat Yusoff, & Anwar Farhan Mohamad Mar Zaini. (2021, August 3-5). The effectiveness of using Google Classroom application on the teaching efficiency during Malaysia Movement Control Order among secondary school teachers. Institut Pendidikan Guru Kampus Temenggong Ibrahim & Yayasan Tun Hussein Oon 5th International Conference on Teacher Learning and Development, Johor Bahru, Johor, Malaysia.
- Sorenson, C. (2012). Learning online at the K-12 level: A parent/guardian perspective. *International Journal of Instructional media*, 39(4), 297-307.
- Syed Ismail Syed Mustapa, Abdul Hameed Abdul Majeed, Hong, L.L., Mohd Jim Hamzah, & Ahmad Subki Miskon. (2021, August 3-5). Pelaksanaan pembelajaran secara atas talian dalam kalangan siswa guru. Institut Pendidikan Guru Kampus Temenggong Ibrahim & Yayasan Tun Hussein Oon 5th International Conference on Teacher Learning and Development, Johor Bahru, Johor, Malaysia.

- Tan, S.Y. (2001). Peranan pengetua sekolah dan penggunaan komputer sekolah sebagai satu inovasi: Satu kajian kes di Pulau Pinang. *Jurnal Pendidikan Guru*, 10, 34-40.
- Tuan Nguyeng. (2015). The effectiveness of online learning: Beyond no significant difference and future horizons. *MERLOT Journal of Online Learning and Teaching*, 2(2), June.
- Vighnarajah, S., Wong, S.L., & Kamariah, A.B. (2011). Development of instructional tools in the iELC Discussion platform. In Wong, S.L., Mas Nida Md Khambani, Abu Daud Silong, & Othman Talib (Eds.), *Technology & Education: Issues, empirical research and applications* (Revised ed., pp. 223-242). Penerbit Universiti Putra Malaysia.
- Vishalache Balakrishnan. (2021, October 24). Teach students to learn. *Staredu*, 7.
- Volman, M., & Van Eek, E. (2001). Gender equity and information technology in education: The second decade. *Review of Educational Research*, 71(4), 613-634.
- Wing, L. (2021, October 17). Teaching with tech. *Staredu*, 7.
- Yee, B.C. (2021). Amalan pengajaran dan pembelajaran secara dalam talian dalam kalangan guru-guru interim semasa pandemik Covid-19. Institut Pendidikan Guru Kampus Temenggong Ibrahim & Yayasan Tun Hussein Oon 5th International Conference on Teacher Learning and Development, Johor Bahru, Johor, Malaysia.