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A Preliminary Study on the ICT Facilities and Teachers' View on Virtual Teaching and Learning for Autistic Students in Malaysia during Pandemic

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Abstract

The objective of this study is to examine the use of ICT by autism care centres (ACC) in Malaysia during the pandemic as well as to know the ACC teachers' view on Virtual Teaching and Learning (VTL) platform. A preliminary study through site visits to four (4) selected care centres were carried out to get visual insight of ICT facilities used by them. An online survey was conducted to get feedback from the teachers on the perceived usefulness and their willingness to adopt the VTL. The site observation results found that all the care centres have basic ICT requirements that can help the teachers to access the internet and do e-filing records, but lack of ICT resources limits the VTL. The survey results reveal that more than 81% of the responding teachers are interested and support the implementation of VTL platform. They are confident that the platform able to aid them in VTL especially during pandemic. It is concluded that the objectives of the preliminary study are achieved and the VTL is very well accepted. Finally, further study on the digital model of teaching-learning that support the development of VTL platform is essential to move forward towards VTL implementation.

Keywords: Virtual Teaching and Learning, Autistic, Digital Model, ICT Competencies, Digital Learning Platform

Introduction

The COVID-19 pandemic problem has led the government to implement the Movement Control Order (MCO) which resulted in the closure of all kindergartens, public and private schools, including day schools and full boarding schools (Yahya et al., 2021; Naciri et al., 2020). Consequently, many students, including special needs students, unable to continue their studies in the classroom. However, learning efforts are still continuing through the implementation of online learning at home (Hussin et al., 2021; Sufian et al., 2020). Under the

situation caused by the pandemic, the quality and inclusiveness of education are threatened, and the risk of many children being left behind is increasing. Therefore, schools, teachers, children, and parents have to adapt to new method of teaching and learning.

The pandemic has resulted a worse impact on students with learning disabilities as the communication between the students and teachers has become increasingly isolated and access to educational materials has become unavailable (Hussin et al., 2021; Mat & Mustakim, 2021). Not to be outdone, children with learning disabilities especially autistic students, need special help and support so that what is taught to normal children can also be taught to them through a special approach that suits their abilities. An approach education based on their abilities and skills in a new normal is required (Cerbo & Rabi, 2019).

A special platform should be considered as the aided technology that could be utilised to support virtual teaching and learning (VTL) for autistic students during pandemic (Sufian et al., 2020). With this special need, they would be able to gain the same understanding and knowledge as normal children which could reduce the gap in terms of learning between them. Therefore, a VTL platform with special approach for the autistic students is needed to reduce the problem. Challenges in teaching and learning involving autistic students should be studied to serve as a reference for Information & Communication Technology (ICT) needs for the development of the VTL platform. The ICT needs should include the needs of teachers at care centres as well as the needs of parents at home.

The shortage of special education teachers has also brought challenges to provide effective education to students with special needs, including autistic students. With the advancement of digital technology nowadays has given a ray of hope for improvement in teaching and learning methods to autistic students (Othman & Ewan, 2020). Assistive and instructional technology enables autistic students across the spectrum to participate fully at home, at school, and in the community.

In this preliminary study, an attempt is made to examine the use of ICT by autism care centres during pandemic. Three objectives have been set which are:

1. To examine the ICT facilities available and being used during pandemic
2. To examine the perceived ICT competencies of teachers and their views on VTL platform
3. To examine and analyse the ICT requirements at the autism care centres

Four (4) selected autism care centres have been visited to get visual insight and find out what the ICT equipment and tools are available and being used at the care centres. Two types of questionnaires have been designed and distributed among the principals and teachers of the autism care centres. The first questionnaire to be responded by the principal of the centre, is designed to find out the ICT facilities available at the centre. The second questionnaire aims to get the perceived ICT competencies among the teachers of the care centres as well as their views on the proposed implementation of VTL.
The following sections present the problem of teaching and learning during the pandemic, the relevance to international and government policy, other related studies, the methods used for the study, and the fact findings gathered from the observation and surveys.

Literature Review

Relevance to International and Government Policy

According to the Education Act 1996, pupils with special needs under the responsibility of Malaysian Ministry of Education (MMOE, 2020a) are defined as students with visual, hearing and learning disabilities. Children with learning disabilities are those who have cognitive problems that are considered educatable and entitle to get a formal education.

Through the Malaysian Education Development Plan (MEDP) 2013-2025, MOE has clearly set out targets to be achieved in terms of quality, equity, access in education, efficiency, and effectiveness of educational management over a period of 13 years. Based on these targets, eleven (11) strategic shifts and operations to transform the country's education system have been formulated. The first shift in MEDP is to providing equality access to international quality education. Students with special needs, including autism, are no exception. Among the main target groups in Shared Prosperity Vision 2030 (SPV 2030) is people with special needs. The main principle of the new national policy is to promote development for all level of communities in Malaysia.

This study is in line with the government's efforts to produce human capital that contributes to the prosperity of the country. The research is also in line with the 10-10 Malaysian Science, Technology, Innovation and Economy Framework (MySTIE) which embark on a journey of socio-economic transformation powered through the creation of a vibrant STIE ecosystem. The research will pave the way for the autism society to improve their innovative and creative capability as a means of enhancing quality of life. Goal 4 of Sustainable Development Goals (SDG) is ensuring inclusive and equitable quality education for all persons with disabilities (United Nations, 2021). One of the targets is to build and upgrade education facilities that are child, disability, and gender sensitive and provide safe, nonviolent, inclusive, and effective learning environments for all.

Other Related Studies

The problem of teaching and learning during the pandemic has become a problem for teachers and lecturers at all levels from preschool to university. Due to the outbreak of the pandemic, many schools and schools had to be closed schools (Robinson et al., 2021; Yahya et al., 2021; Naciri et al., 2020). A more significant effect is on autistic students who are unable to continue learning. This is because they have been physically separated from their teachers. Autistic students need guidance with the presence of their teachers in the same place. According to the research of Gopal (2017), the factors for autistic children to master social skills include teachers, visual aided teaching, peers, environment and cooperation, and the roles of parents. The cooperation between parents and teachers plays an important role in helping children with autism in dealing with their disabilities. The role of parents is to provide continuing education at home, which may have a positive impact on them (Narzisi, 2020). Compared with children who receive education only in school, children who receive parental education and care at home show better development. It can increase their development potential as well self-confidence (Kaul, 2018; Selva, 2017).

Several studies on learning disabilities have shown that lack of professional knowledge by special education teachers lead to challenges in providing effective education (Toran 2019; Kaul, 2018; Selva, 2017). Kaushik (2018) emphasizes in his study on the lack of resources to manage learning. Special education teachers are at the forefront of meeting the special need children. Therefore, they should be prepared and trained to provide a quality learning

experience to special need children who previously did not have the opportunity to go to school.

A study conducted by Othman and Ewan (2020) emphasizes on emerging problems related to teachers' preparedness and competency in dealing with the children with disabilities, limited instrument resources and lack of expertise. They suggested that a virtual application platform need to be constructed to overcome the problems as well as to assist in managing and administering special education. They concluded that the need for a reference point that can help teachers and parents to face and handle learning disabilities.

With the availability of internet technology, it can to some extent help the learning process at home with online guidance by teachers (Cohen, 2021; Robinson et al., 2021). But for autistic students, this is very difficult for them. Therefore, instructional requirements for VTL need to be established to help parents and teachers guide autistic children through virtual learning methods at home especially during the pandemic.

Methodology

To achieve the study objectives, two (2) types of data collection method which are site observation and online survey were carried out. The main objective is to get understanding on the use of ICT by autism care centres during pandemic. The data taken is then analysed to find out the ICT capabilities of the centres as well as the ICT competencies of the teachers. ICT capability is the collection of skills, facilities, processes, and or technology required to design, develop, manufacture, repair or maintain systems. In this context of study, it is the capability related to autism care centres to provide VTL services to their students and communities.

Site Observation

Site Observation Form is used as a guideline to conduct observations on the ICT facilities available at the autism care centres. The form has five (5) sections, each specific to a particular aspect. Each section has different requirements which requires direct observations. The form provides a checklist to record comments as well as judgments on all aspects observed throughout the visit. It is necessary to check all the required aspects in this form before ending the observation to ensure that they are not left unobserved.

The form contains a checklist of aspects that include:

1) ICT Infrastructure (Internet, Website)
2) ICT Securities (CCTV, Network Security)
3) ICT Storage (File Explorer, USB Pen, External HD)
4) ICT for Teaching & Learning (Hardware & Software, Social Media, VTL)
5) ICT for Administration (Ms Office, Email, Accounting System)

Online Survey

The second method used was the online survey where the questionnaires were distributed to potential respondents through convenience sampling method, which is a non-probability sampling technique, where the autism care centres were selected based on their convenient accessibility and proximity to the researcher. Google Form was used as the data collection platform and the survey was distributed to several autism care centres in Malaysia through

e-mail and WhatsApp application. The online questionnaire responses could be filled using laptop, desktop, tablet, or mobile phone and takes about five minutes to complete.

Result and Discussion

A preliminary study was carried out onto the autism care centres in Malaysia to obtain information on the current ICT capability as well as teachers' competencies. Four (4) selected autism care centres have been visited to observe and get visual insight of ICT facilities used by them. Two (2) online surveys were then conducted to get feedbacks from the principals and teachers of the autism care centres. The first survey was addressed to the principals or managers of the autism care centres for the purpose of obtaining information on the background of the care centres including the ICT facilities they have. The second survey was aimed at the teachers to obtain information on the use, capabilities, and skills of ICT that they have. Teachers were also asked to provide feedback on their views on the proposed development and implementation of VTL as one of the essential elements in their teaching and learning.

Observation of ICT facilities

Site observations were done at the four (4) selected autism care centres: one (1) in Perlis, one (1) in Langkawi, and two (2) in Selangor. Due to sensitivity and ethical issues, the name of the care centres and related information cannot be disclosed. They are labelled as A, B, C, and D at random. Table 1 shows the summary of the site observations of ICT facilities of the care centres.

Table 1
Summary of Observation on the ICT facilities

Aspects to be observed	Centre A	Centre B	Centre C	Centre D
ICT Infrastructure				
Internet	√	√	√	√
WiFi	√	√	√	√
ICT Securities				
CCTV Camera	√	√	√	√
Access Security	X	X	X	X
ICT for Teaching & Learning				
PC	X	X	X	√
Laptop	√	√	√	√
Handphone	√	√	√	√
TV LCD/LED	√	√	√	√
Digital Screen board	X	X	X	X
Projector	X	X	X	√
Specific Software	X	X	X	√
YouTube	√	√	√	√
Certain websites are used as reference	√	√	√	√
Virtual Reality	X	X	X	X
ICT for Administration				
Microsoft Office	√	√	√	√
Email	√	√	√	√

Accounting System	X	X	X	X
ICT Storage				
File Explorer	√	√	√	√
USB Pen	√	√	√	√
External HD	X	X	X	X

In term of ICT infrastructure, all the care centres have high speed internet access equipped with Wi-Fi and the installation of security cameras is a basic requirement. Outdoor security cameras are installed for deterring crime as well as monitoring outdoor activities within the care centres compound. Meanwhile, in each classroom, a surveillance camera is installed to monitor student activities. All the cameras are integrated and controlled by a specific software that can be accessed and managed by the manager of the care centre. None of the care centres are installed with door access because physical security locks are adequate and more practical for them.

The site observation also reveals that appropriate ICT facilities are also provided for the use of electronic teaching and learning. Most care centres have the necessary ICT equipment for their operations. Only one care centre has a projector compared to the other three. Specific software such as digital Quran is also used by one of the care centres as an electronic media for its advanced students. Each care centre has its own syllabus content. The syllabus is guided by the care centre counsellors and autism paediatricians they consult. Most teaching-aided learning tools and materials are not digital-based. For digital content, they get it from the internet and mostly from YouTube and some from autism community related websites.

Online Survey1 – Addressed to the Principals/Managers

The Online Survey1 was the extended sample of data collection of ICT facilities due to limitation to carry out many site observations which require longer time and more cost. The survey was distributed to more than ten (10) autism care centres in Malaysia, however only six (6) care centres were responded. The objective of the survey is to get feedback on the use of ICT as well ICT capabilities that the care centre has. Thus, only the manager of the care centre was given the right to provide feedback on this survey. Figure 1 shows feedbacks from the responded care centres.

Figure 1. Feedback on the ICT capabilities

Based on the feedback received, all the care centres stated that PCs and laptops are the ICT needs that they most want to help the teaching learning process. Nevertheless, most of them also stated that they also need teaching-learning software, digital screen boards and even multimedia tools. In terms of the type of ICT knowledge or skills most needed to support daily work and also improve teaching techniques, two (2) care centres stated they need skills in using software that can help management, two (2) care centres stated they do not need any ICT skills, while the other two care centres, each stated they need basic ICT technology skills, and skills in using software that can aid teaching. Regarding the biggest challenge in teaching children with autism, Figure 2 shows the open-ended feedbacks received from the principals/managers of the care centres.

Figure 2. Open-ended Feedbacks

Online Survey2 – Addressed to the Teachers

The objective of this survey was to obtain information on the ICT competencies perceived by teachers as well as feedback on the proposed development and implementation of VTL. The survey was distributed to all teachers of a sample of autism care centres where sixteen (16) responses were received. Details of responses including the teachers' background, ICT skills, the use of ICT in teaching and learning, and views on the VTL are described here.

Teachers' Background

Figure 3 reveals that among the responding teachers, there is one who has a master's degree, 56% have a degree, 18.8% have a diploma, and the rest are SPM and STPM holders. However, in terms of special education possessed, 31.3% have ever attended a course or have a special education certificate. It is also found that only 12.5% of the responding teachers have less than a year of experience in teaching and learning that relate to autism and most of them have between 1-5 years of experience.

In terms of conduct VTL during pandemic, survey found that 43.8% of the responding teachers regularly conducted online teaching during a pandemic, 25% always did, 18.8% very rarely did, and 12.5% never did. It reveals that VTL is the big challenge faced by autism teachers throughout the pandemic.

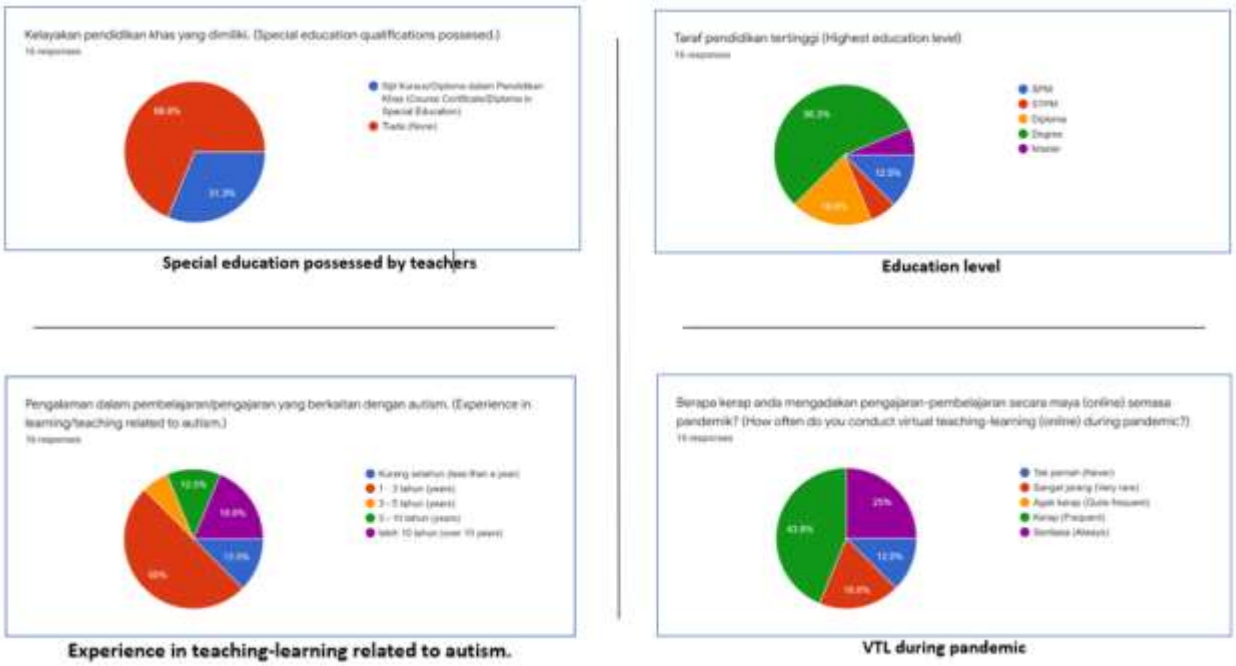

Figure 3. Teacher's Background

ICT Skills

This section presents the teachers' responses related to ICT skills obtained from the Online-Survey2 as shown in Figure 4. The survey result found that 62.5% of the responding teachers do not have any certification in ICT skills. This is a significant figure that should be seen and given attention especially for preparation towards VTL requirements and implementation.

Teacher's feedback regarding the basic skills using applications shows that, most of the teachers are good at Ms Word, Ms PowerPoint, Ms Excel, and File browser. The result also points to the fact that vast majority (93.8%) of the responding teachers have knowledge in

Microsoft Office, 87.5% have knowledge in social media such as YouTube, Facebook, and Twitter, 31.3% have knowledge in database, and surprisingly there are also responding teachers who know about programming. The respondents were also asked on the ICT equipment/gadgets that they are always used. From the survey sample collected, it is found that all the respondents always use handphone and laptop, 25% of them always use PC and 18.8% always use tablet. The results also indicate that handphone and laptop are the most common equipment/gadgets used by the teachers.

Responses regarding the communication, WhatsApp (100%) is the most used social media to communicate with parents or guardians, 75% of the respondents commonly use telephone, 43.8% use Facebook, 31.3% use email, 18.8% use Telegram, and 6.3% use Twitter. Other supported results reveal that majority of the responding teachers have chosen WhatsApp (75%) as the most frequently used as digital community network. The rest chose Facebook and Instagram as their digital community network. Frequent type of information communicated with the parents/guardians are notifications (93.8%), news (37.5%), and invitation (43.8%).

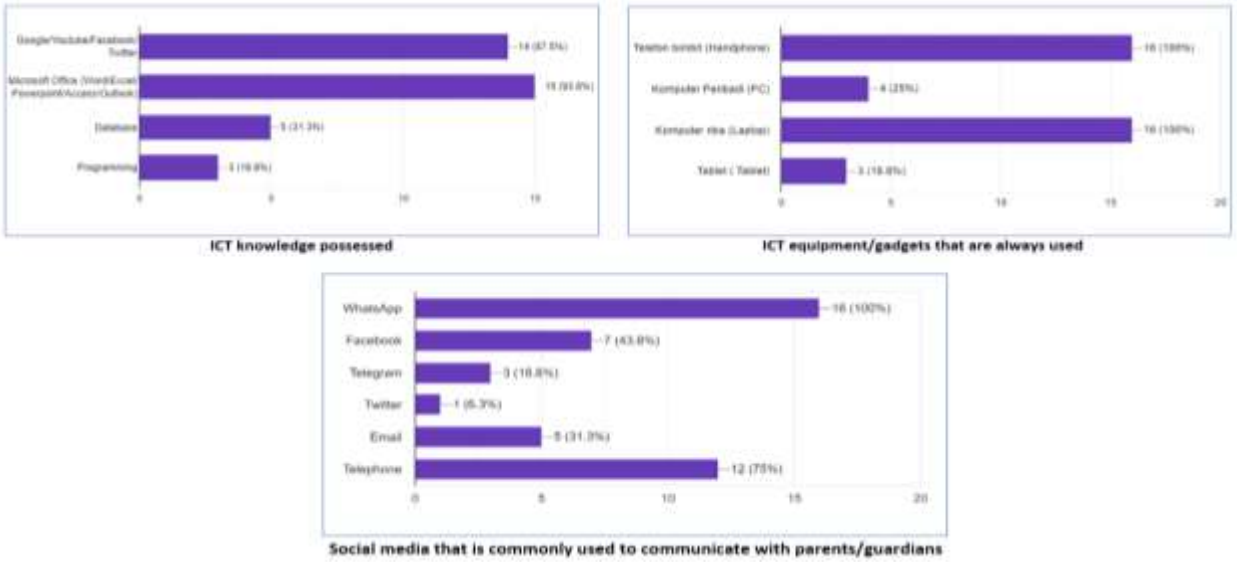

Figure 4. ICT Skills

The use of ICT in Teaching & Learning

In this context, the teachers were asked about their skills in e-learning or virtual learning, the use of ICT software, type of ICT gadgets and software used, frequency use of ICT, frequency conduct online teaching, ICT resources, ICT needs, and ICT storage. Comparisons of knowledge and virtual learning skills among teachers indicate that there is a relatively large gap. As shown in Figure 5, majority (56.3%) of the respondents have moderate or very little knowledge about virtual learning and 6.3% do not know at all.

However, there are also number of teachers who have good knowledge in virtual learning, 25% of them are very proficient and about 12.5% have good skills in virtual learning. The survey also showed that most teachers use laptop (68.8%) as teaching aids, 43.8% use TV and mobile phone, 31.3% use tablet, 12.5% use PC, and only 6.3% use multimedia projector.
As for learning module development**,** 43.8% responded that they often use ICT software to build their learning modules, 31.3% sometimes use, and 25% never use. Result for frequency

of using ICT in classroom shows that the majority of teachers often use ICT in their classrooms (56.2%) and 43.8% rarely use ICT in their classrooms.

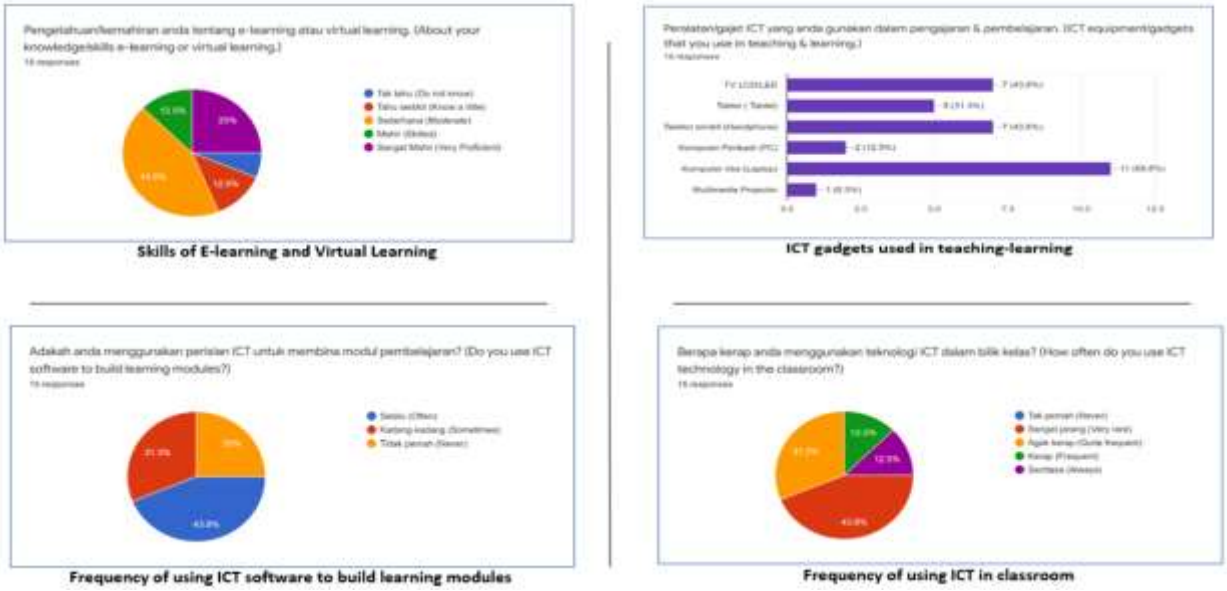

Figure 5. The use of ICT in teaching & learning

Figure 6 shows that, most responding teachers wanted to have high speed internet (93.8%) as ICT needs to help them in teaching process. Other ICT needs required are laptop (75%), learning content software (62.5%), PC (31.3%), digital screen board (31.3%), and multimedia projector (18.8%). It is also shows that most teaching-learning software used by the responding teachers were obtained from YouTube (93.8%) and related websites (68.8%). Other sources were Google Playstore (31.3%), Mobile Apps (25%), and from the care centres (25%). None of them are from vendor.

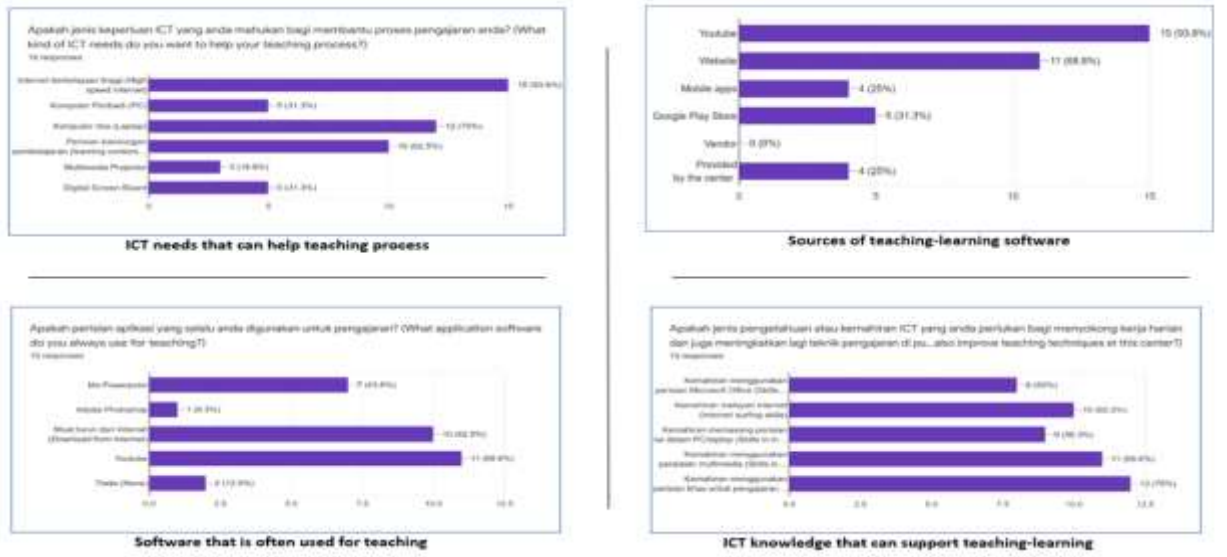

Figure 6. ICT needs that can help teaching process

Regarding the software that is often used for teaching, Videos from YouTube (68.8%) are the most used, followed by downloaded apps from the internet (62.5%), Ms PowerPoint (43.8%), and Adobe Photoshop (6.3%). The results also indicate that 12.5% of the responding teachers

do not use any software for teaching. In terms of ICT knowledge, most responding teachers wanted to have knowledge in the form of skills to use specific software that could improve teaching-learning (75%). Other ICT type of skills they required are skills in using multimedia system (68.8%), internet surfing skills (62.5%), software installation skills (56.3%), and skills in using Microsoft Office (50%).

Teachers' View on VTL Platform

This section presents the results of teachers' view about proposed development and implementation of VTL Platform for autism community. The average score of S1 is 75% as shown in Table 2. This is a very positive indication of interest level showed by the responding teachers about using VTL in teaching. This is also reinforced by most teachers giving feedback supporting the implementation of VTL during the pandemic with the average score of 71.2% (refer S2). The percentages from both statements provide a strong indication of support and interest of the teachers which could give a very positive impact on this study. With the average score of 65.6% for S3 indicates that majority of the responding teachers confident that the use of digital technology able to help education for autism.

Table 2
Teachers' view on VTL Platform

Item No.	Statement	Average Score (%)
S1.	Are you interested in using VTL in teaching?	75
S2.	Do you support virtual learning during a pandemic?	71.2
S3.	Do you believe the use of digital technology can help education for autism?	65.6
S4.	With the VTL platform allows the autism teachers to use their creativity to build the content of learning modules.	81.3
S5.	The VTL platform can help teachers and parents/guardians communicate better during a pandemic.	81.3
S6.	With the VTL platform, parents/guardians can get autism information faster.	82.5

In conclusion, the survey findings reveal that in principle, all (100%) the responding teachers agree that by having a VTL Platform, it would allow them to use their creativity to build the content of learning modules and the parents/guardians able to get autism information faster. In term of communication, almost all the responding teachers agree that the VTL platform able to help teachers and parents/guardians communicate better during a pandemic Therefore, these findings strongly indicate that the establishment of VTL Platform is very well accepted by the respondents. This is evidenced by the results of the average score obtained for S4, S5 and S6 above 80% as shown in Table 2.

Conclusion and Recommendation

In a nutshell, the results of the preliminary study found that the 3 main subjects that need to be considered and used as the basis for the requirements of VTL design, development and implementation which are; (1) lack of ICT capability, (2) lack of ICT skilled teachers and (3) lack of digital resources. It can be concluded that the findings show a low level of ICT use by

teachers. The lack of digital resources and digital contents at the care centres contribute to the low level of ICT use. Personal skills to use ICT is also one of the critical factors of motivation in the effectiveness use of digital contents for VTL.

A special fund for autism care centres should be proposed and established to upgrade their ICT facilities especially digital content development. Regarding future research, further studies on innovation tools using advanced technologies such as virtual reality (VR) and augmented reality (AR) have to be conducted to include them as part of the VTL platform. More interviews and detailed discussions with autism experts and technologists about new methods of digital teaching and learning for autism need to be conducted to generate comprehensive ICT requirements for the development of the VTL platform.

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