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Experiences of Parents and Teachers with Virtual Classrooms during the COVID-19 Restrictions: A Study Focusing on Inclusive Education in Malaysia

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Abstract: The COVID-19 pandemic has resulted in emergency remote teaching in many countries. In Malaysia, not all households were prepared for remote teaching. This has caused some groups of students to be left out. Therefore, in this study we aim to investigate the experiences of parents and teachers concerning inclusiveness of the education delivered via virtual classrooms during the pandemic time in Malaysia. Questionnaires were distributed online to gather feedback from parents, teachers and anyone having both roles. 379 respondents completed the questionnaire. The findings indicate that stable Internet access, adequate information and communications technology (ICT) competencies among teachers and parents, and a more holistic role of the Ministry of Education could contribute to implementing a more inclusive remote teaching. Statistical data showing significant associations suggest that parents and teachers having master's degree and above tended to be more concerned with providing inclusive remote teaching to the students. Readiness in making virtual classrooms more inclusive was higher among those teaching science and mathematics subjects than those teaching art and humanities subjects. An implication of this study is to guide the implementation of digital teaching and learning in the future, considering the involvement of policy makers, researchers, teachers, and parents.

Keywords: emergency remote teaching; virtual classrooms; COVID-19; inclusive education; teachers and parents



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1. Introduction

The educational landscape has transformed dramatically since the declaration of COVID-19 outbreak as a public health emergency by the World Health Organization (WHO) in 2020. Emergency remote teaching was implemented by many countries in order to minimize learning disruption during these challenging times. Many teaching activities had to be conducted on digital platforms without pre-planned resources and infrastructure [1]. The pandemic has accelerated the digitalization of the teaching-learning process worldwide and reset the education trends of the future. The use of information and communications technology (ICT) in the educational process has significantly increased, and this has created new challenges. Not all households have the necessary resources for remote teaching and learning. In Malaysia, some households cannot afford the electronic devices required for digital learning, and where they live (urban, suburban, or rural) may affect their Internet access [2]. It is therefore imperative to ensure every student has equal access to all learning opportunities and participation on the digital platforms like they did in physical classrooms before the pandemic.

The pandemic has changed the way teachers and students interact in the classroom. The Malaysian government has implemented several transmission and protective measures in response to COVID-19. Movement Control Order (MCO) which encompasses nationwide

lockdown, quarantine, social distancing, school closures, and emergency remote teaching and learning was mandated on 18 March 2020 in order to prevent the spread of coronavirus. Since then, Malaysians experienced a prolonged state of social isolation [3] and reduced physical interactions with others apart from their families [4]. As virtual classrooms replaced traditional classrooms during the lockdowns, educators had to teach in the absence of face-to-face contact with students. This has posed issues for effective communications between educators and their students. As a result, teachers derived a sense of alienation and feeling disconnected from the conventional teaching process working in this type of setting [5]. Teachers were also unable to obtain direct feedback from students about their understanding of the course contents via facial cues [6].

As the teachers could not be in physical classrooms with the students, complementary support from parents was crucial to assist students in gaining confidence, self-efficacy, and mastery-approach goals when attending virtual classrooms [7]. Such support was especially essential for students who faced challenges in managing their assigned learning activities in full autonomy. As parents were the only physical close contact students could have, parents' involvement has become more significant than before virtual classrooms started. This has raised further concerns regarding parents' commitment to be actively involved in their children's learning process when working from home concurrently [8] and being able to provide necessary assistance and adequate resources for virtual classrooms, such as laptop or desktop, stable Internet connection, etc., [9].

The unprecedented MCO has pushed remote teaching and learning to the forefront of education in Malaysia. This paradigm shift in the education system has created new challenges for both parents and teachers in supporting students to engage in digital learning environments. Moreover, learning loss induced by school closures has also become evident as many students have had a hard time participating in virtual classrooms due to limited or no access to ICT tools and Internet connection after school closures for over 40 weeks in Malaysia [10]. At the point of writing this paper, teachers and students have all returned to physical classrooms as schools reopened across the country. However, the Malaysian health ministry warned that the COVID-19 pandemic was not over yet [11] and WHO has been still monitoring and responding to this pandemic [12]. As this paradigm shift in education has already been initiated, and there is potential for utilization of remote teaching and learning in the future, the quality of virtual classrooms should be enhanced so that teachers, parents, and students are ready for the digitization of education.

It is crucial to ensure that no student is left behind when the education is switched from physical to virtual classrooms. Education has to remain inclusive despite its platform, as UNICEF defines, "inclusive systems value the unique contributions students of all backgrounds bring to the classroom and allow diverse groups to grow side by side, to the benefit of all". Although the term "inclusive education" is most of the time used in the context of education for children with disabilities, it also includes all groups of children that have been excluded, such as speakers of minority languages [13]. A review studying themes in inclusive education pinpointed other factors contributing to certain group of children being in inequality, for instance gender, wealth disparities, and practices among teachers. In this study, we argue that as education converted from physical to virtual classrooms, students that faced challenges attending virtual classrooms were in inequality and therefore, were being excluded from getting quality education. Considering the importance of providing inclusive education to all children, we would like to explore the experiences of parents and teachers in Malaysia concerning inclusiveness of the education delivered via virtual classrooms during the COVID-19 pandemic. By exploring their experiences, we would like to investigate what has been done and what could have been done better. As the study was focusing on general practices, we were not looking at any particular group of students that the term inclusive education usually is referring to.

2. Materials and Methods

Our study is an exploratory study that aims to examine the practices among teachers and parents. Thus, a descriptive survey research method was adopted where both quantitative and qualitative data were collected. The quantitative data consisted of demographic data of the respondents and Likert scale items of five domains, which were developed based on relevant works [14–16]. They were affective, behavior, cognition, competence, and awareness. The qualitative data comprised six open-ended questions which attempted to seek more in-depth understanding that could assist in the interpretation of the quantitative data.

A similar questionnaire was earlier used in a study investigating secondary science teachers regarding providing an inclusive education through virtual classrooms [17]. In this study, we further developed the questionnaire and made necessary changes as potential respondents were from more diversified background and had different roles. The questionnaire in this study had five main sections. First, the respondents were required to answer some demographic questions, which include gender, age, education level, living area, ICT skills (self-rating from 1 to 10; 1 is very low and 10 is very advanced), and ICT tools that they have been using since virtual classrooms started taking place. Section 2 was only applicable for parents to answer. Here we asked them about the number of child/children they had attending kindergarten, primary, secondary, and/or tertiary school respectively, and their household income. In Section 3, only teachers were required to answer. They were asked about years and subjects of teaching, school area, type of school they were teaching (public or private), and whether their work has increased due to the implementation of virtual classrooms. A follow-up question was prompted to seek for reasons or more details toward respondents who had experienced a work increase.

Section 4 consisted of a list of 24 statements which respondents had to answer based on a Likert scale (1-Strongly disagree, 2-Disagree, 3-Somewhat disagree, 4-Neither agree or disagree, 5-Somewhat agree, 6-Agree, and 7-strongly agree). The option of N/A (not applicable) was offered as well. These 24 statements were developed based on the five domains; statements in the affective, behavioral, and cognitive domains were adopted from [16] while those in competence and awareness were from [14,15]. Language, validity, and reliability of the survey in this study were checked prior to data collection. The questionnaire was validated by a secondary school English language teacher which has a PhD in Teaching English to Speakers of Other Languages (TESOL). The areas covered included grammar, vocabulary used and clarity of the statements within the questionnaire. To ensure the validity and reliability of the questionnaire, pilot study was conducted with non-participating respondents prior to the actual study. Statistical analysis was carried out to determine the Cronbach's alpha value. Results showed that all statements in the five domains were in the acceptable range with the alpha value more than 0.7 [18]. Table 1 illustrates how we defined each domain and the statements in each of them.

In Section 5, respondents were asked about the resources they were aware of that students did not have access to when attending virtual classrooms. They were allowed to choose more than one option, and they were given options of a stable Internet at home, devices to attend virtual classrooms, such as laptops, PCs, mobile phones and/or tablets, space for attending virtual classrooms, assistance from the parents, and others (kindly specify). Lastly, we asked open-ended questions to gain more in-depth understanding regarding their experiences with virtual classrooms. They were "What do you think about virtual classrooms?", "Any positive or negative experiences/interesting stories you would like to share with us about when you conduct virtual classrooms?" and "Are there any other things you would like to inform us?"

Table 1. Domains reflecting inclusive education and the respective statements.

Domain (What to Measure)	Statements
Affective: Attitudes of parents and teachers concerning the inclusiveness of education in virtual classrooms	<ul style="list-style-type: none"> • Students face challenges in communicating with teachers in a virtual classroom. • Students in the virtual classroom cannot keep up with the day-to-day curriculum. • Students have difficulties understanding the teachers in the virtual classroom. • Teachers face challenges adapting the virtual classroom to meet the individual needs of all students. • Students' participation in the virtual classroom is low as compared to the physical classroom. • Students are willing to speak when they are in the virtual classroom.
Behavior: Parents and teachers' perception of teachers' behavior towards providing an inclusive learning environment in virtual classrooms	<ul style="list-style-type: none"> • Teachers are willing to encourage their students to participate in all activities in the virtual classroom. • Teachers are willing to adapt the curriculum to meet the individual needs of all students in the virtual classroom. • Teachers are willing to modify the virtual learning environment to adapt to the needs of their students. • Teachers are willing to adapt their communication techniques to ensure that all students in the virtual classroom can participate in the learning. • Teachers are willing to adapt the assessment of individual students in the virtual classroom to achieve the learning objective.
Cognition: Parents and teachers' perception of students' experience attending virtual classrooms concerning inclusiveness	<ul style="list-style-type: none"> • Students have similar learning experiences when they learn in virtual classrooms and physical classrooms. • All students can learn in the regular curriculum in the virtual classroom. • Virtual classrooms provide appropriate learning experiences to all students. • Students should be taught in a physical classroom to obtain the best learning outcome.
Competence: Parents and teachers' digital skills in providing inclusive education	<ul style="list-style-type: none"> • I am able to use the ICT tools and/or apps to provide quality education, or to assist my kid(s) to obtain quality education via virtual classrooms (such as Google Classroom). • I have received the necessary training and assistance from the school with regard to assisting the teaching, or teaching in the virtual classroom. • I attend courses to increase my knowledge to use ICT tools and/or apps. • My colleagues help me when I face challenges in using ICT tools and/or apps. • I explore myself through resources available to equip myself with digital skills required for virtual classrooms.
Awareness: Parents and teachers' consciousness in providing inclusive education	<ul style="list-style-type: none"> • I am well aware that students face difficulties in attending virtual classrooms. • I have been informed about students' difficulties in attending virtual classrooms. • I realize that not all students have equal access to attend virtual classrooms. • I know that the school has attempted to ensure that all students have equal access to attend virtual classrooms.

2.1. Data Collection

The data collection lasted from 21 October 2021 to 28 April 2022. During this period, the Malaysian government was imposing pandemic restrictions. Therefore, the physical paper-and-pencil questionnaire was replaced with a virtual questionnaire, i.e., Google Form as the data collection platform. Besides reducing the risks of physical contact between researchers and respondents, this survey method could reach respondents across a larger geographical area.

Convenience sampling strategy was adopted in this study. All parents having kid(s) attending kindergarten, primary, secondary, and/or tertiary school, and teachers either teaching at primary, secondary, and/or tertiary school were invited to answer the questionnaire. By involving all of them, we intended to observe differences in their practice. We sent the questionnaire link via social media platforms to all accessible networks possible. In addition, schools and universities at top management level were approached as well to seek assistance in distributing the questionnaire to their teachers to answer.

2.2. Data Analysis

We first analyzed the data by looking at the respondents' demographic background, and their experiences with virtual classrooms concerning ICT tools used and resources that students did not have access to when attending virtual classrooms. Qualitative data analytic techniques were then applied to the opinions and recommendations from respondents using NVivo released in March 2020. This software supports two types of text-based queries, namely the word frequency query and the text search query. By using the software, word clouds are generated to extract high frequency words [19]. However, these words are non-contextual, and the positive and negative connotations are indistinguishable [20]. Text search queries were then executed to identify how each high frequency word was used in sentences of the text data and thus accelerated the coding process of responses to open-ended questions [21]. The data findings and their associations with the roles of respondents being teachers, parents, or both were subsequently analyzed. Demographic data, for instance, the areas where they live, where the schools are located, etc. were made association to the findings of high frequency words. The word cloud is a rapid analysis tool that enables researchers to identify key patterns in the data in a short period of time and present the information in the form of simple graphics [22]. Since the approach is often used as an auxiliary analysis tool in research [23], it was found suitable in this study as the qualitative data gathered were intended to provide deeper understanding and hence possible explanation to the findings, both in respondents' demographic data with their experiences with virtual classrooms, and their scores of each domain.

The quantitative data were further analyzed using SPSS software version 26. Two different types of statistical analyses were applied in the analysis process namely descriptive and inferential statistics. Descriptive statistics was used to analyze the demographic data to determine the distribution of teachers' and parents' data who took part in the research. The inferential statistics employed in this study were independent sample *t*-test and one way ANOVA. The statistics used to determine the differences between two or more groups of different categories toward inclusive education provided during the pandemic period. Post hoc tests (Tukey's HSD Test) were carried out when there were significant results shown in one-way ANOVA, with the aim to further understand which group(s) had significant differences. The results of the Tukey's HSD test could provide a deeper insight for a better understanding of the pattern and comparison between the three groups within this research.

3. Results

A total of 379 respondents answered the survey questionnaire. To avoid confusion between the roles of "teacher (only) and parent (only)" and "being both teacher and parent", we refer the group of having both roles as T&P.

3.1. Demographic Background

Table 2 summarizes the numbers of respondents, who were either teachers, parents, or both, with their respective age group, gender, highest education obtained, the area they lived (urban, suburban, or rural) and their self-rated ICT skills. The average scores of their self-rated ICT skills were both 7.2 for parents and teachers' groups respectively, and 6.9 for T&P.

Table 2. Summary of respondents' demographic background.

	Teacher Only	Parent Only	Both Teacher and Parent (T&P)	Total
Age				
Below 30	42	4	3	49
31–40	63	45	51	159
41–50	15	59	40	114
51–60	20	16	18	54
Above 60	0	1	2	3
Total	140	125	114	379
Gender				
Male	50	43	26	119
Female	88	81	87	256
Prefer not to say	2	1	1	4
Total	140	125	114	379
Education				
No schooling completed	0	1	0	1
Primary school	1	3	3	7
Secondary school	5	28	2	35
Trade/technical/vocational training	1	6	4	11
Bachelor's degree	81	48	64	193
Master's degree or higher	51	39	41	161
Prefer not to say	1	0	0	1
Total	140	125	114	379
Area living in				
Urban	87	79	76	242
Suburban	44	38	26	108
Rural	9	8	12	29
Total	140	125	114	379
ICT skills				
1	0	2	0	2
2	0	0	0	0
3	0	1	2	3
4	3	2	4	9
5	18	15	13	46
6	15	19	22	56
7	41	32	28	101
8	44	26	31	101
9	15	17	13	45
10	4	11	1	16
Total	140	125	114	379

Table 3 summarizes the number of child/children the parents had attending kindergarten, primary school, secondary school, and higher education respectively. Among 239 respondents who were parents, more than 50% have child/children attending primary

school. Among the 239 parents, 72 respondents earned a household income above RM 10,000 per month, 53 respondents earned between RM 7500 and RM 10,000, 40 respondents between RM 5000 and RM 7500, 39 respondents between RM 3000 and RM 5000, and 14 respondents earned below RM 3000. Twenty-one respondents preferred not to answer on their household income.

Table 3. Overview of the number of child/children the parents had attending kindergarten, primary school, secondary school, and higher education.

Number of Child/Children Attending	0	1	2	3	4	5 and Above
Kindergarten	140	74	20	3	2	0
Primary school	86	92	54	5	1	1
Secondary school	138	65	27	7	1	1
Higher education (college, university, matriculation, etc.)	187	29	17	4	0	2

Most of the teachers in this study taught for less than 10 years (102 out of 254 respondents). It was then followed by 91 respondents (11 to 20 years), 43 respondents (21 to 30 years), 17 respondents (31 to 40 years), and 1 respondent (41 years and above). In terms of subjects taught, around 40% of the respondents (105 out of 254) taught languages (Malay, Mandarin, Tamil, and English). 99 respondents taught natural science subjects, such as general science, biology, physics, and chemistry. A total of 74 respondents taught mathematics and/or additional mathematics. Other subjects included art and design (49 respondents), Islamic/religious/moral studies (24 respondents), computer/information and communications technology (ICT) (14 respondents), history (14 respondents), social science (business, accounting, management, etc.) (14 respondents), geography (8 respondents), engineering (7 respondents), pedagogy and training (3 respondents), communication and media (3 respondents), counseling (3 respondents), and lastly cultural studies and special education (1 respondent each). 186 of 254 teachers taught in public schools, and the rest in private schools. The number of respondents teaching in urban, suburban, and rural areas were 163, 71, and 20 respectively.

3.2. Experiences about Virtual Classrooms

Concerning ICT tools used to conduct virtual classrooms, we can group these ICT tools into three categories. First was the synchronous platform to conduct classes and meet-up between teachers and students. For this category, Google Classroom was the most (297 respondents, 78.36%), followed by Zoom (253 respondents), Microsoft Teams (117 respondents), Google Meet (29 respondents), WeBex (20 respondents), and VooV (3 respondents). Second category was for communications, which included assisting students outside of ordinary virtual classrooms, providing materials, making announcements, etc. WhatsApp was the most used (313 out of 379 respondents, 82.6%) in this category, and it was the most used ICT tool (more than Google Classroom) as parents used it to communicate with the teachers. Information was distributed and teaching materials were sent through WhatsApp from teachers to parents. In this category, other communication platforms were Facebook (112 respondents), Telegram (17 respondents), WeChat (6 respondents), Discord (4 respondents), and LINE (3 respondents).

Last category was the ICT tools to assist in teaching. The teachers used these ICT tools to produce and share teaching materials, carry out interactions with the students, assess students' performances, etc. YouTube (221 respondents) was used the most among teachers. They either shared educational videos made by others, or made their own videos and shared them via YouTube to the students. Other ICT tools fell under this category included Blackboard (12 respondents), Padlet (9 respondents), Jamboard (6 respondents), Kahoot (4 respondents), Quizizz, Canva, Whiteboard.fi, Wordwall, Mentimeter, TwoSeven, Moodle, and Miro (each with 2 respondents). Two mathematics teachers reported using GeoGebra.

In terms of resources that the students did not have access to when attending virtual classrooms, most parents agreed that stable Internet at home was one of them (334 out of 379 respondents). It was then followed by devices required to attend virtual classrooms (258 respondents), assistance from the parents (204 respondents), and spaces for attending virtual classrooms (167 respondents). These resources were mentioned by some respondents when answering the open-ended questions in the questionnaire, and we further describe them in this section.

A total of 210 out of 254 respondents having a role as teacher expressed experiencing work increase due to the implementation of virtual classrooms. When looking into the qualitative data they had provided, most of them mentioned spending more time to prepare digital materials that could attract the students' attention for their virtual classrooms. This included making and editing videos, preparing digital quizzes and presentation slides. As they were unfamiliar in using ICT tools in teaching before, they had to spend time learning using them. Comparing physical homework and assignments, it took the teachers longer time to both explaining to the students and grading them. At the beginning stage, for small kids, parents had to involve in assisting their children using ICT tools for virtual classrooms. Some parents were reported needing assistance from teachers in using these ICT tools. Lastly, some of them mentioned lacking the clear guidelines on teaching and working hours. Some teachers were fully aware that not all students had the necessary resources such as devices and Internet to attend virtual classrooms, and parents were busy working during daytime. These students and parents therefore had to contact the teachers in the evening. Although the teachers tried to accommodate the best they could, they would appreciate clear guidelines regarding working time.

Figure 1 illustrates 50 terms of high frequency from the four open-ended questions in the questionnaire. The three most frequently used words in the answers to each open-ended question are highlighted in orange and shown in larger font. In general, the respondents recognized the pros and cons of virtual classrooms. The findings indicate that the inclusiveness of online education depends on several factors such as good Internet coverage, governmental support in providing the teachers and students resources needed for virtual classrooms, cooperation between teachers and parents, etc.

"Good", "internet", and "time" are the three words with the highest frequency in the question "What do you think of the virtual classroom?", which appeared 70, 20, and 20 times, respectively in the responses. For respondents who used the word "good", they believed that virtual classrooms were a good alternative to physical classrooms during the lockdown. However, some also highlighted the need for self-discipline for students to have an effective learning environment. As for the respondents who used the word "internet", most of them recognized that stable Internet access was a prerequisite to inclusive online education. In the responses, the word "time" was mostly used as an adverb such as "at times", "sometimes", "for the time being", and so on. Interestingly, there were five responses mentioning that the teaching and learning process was deemed timesaving as everyone was allowed to receive education at home without the hassle of commuting to school. These respondents included one teacher, two parents, and two T&Ps. Referring to their demographics, they either lived and worked in urban areas, lived in rural areas but worked in suburbs, or lived in suburbs but worked in urban areas.



Figure 1. 50 terms of high frequency from the open-ended questions.

For the question “Any positive experiences or interesting stories you would like to share with us about when you conduct virtual classrooms?”, the most frequent words included “good”, “share”, and “presenting”. They appeared 20, 14, and 14 times in the responses, respectively. In general, the word “good” was used in a positive tone throughout the responses. Among the good experiences they have had, some thought that the increased use of ICT tools in virtual classrooms has enhanced the ICT competencies of teachers and students because they were constantly encouraged to explore different tools for teaching and learning. In addition, respondents who had good experience with virtual classrooms reported other advantages such as the freedom for students to have classes in any setting and recorded class videos that allowed them to replay what they have learned or missed in class. Respondents who used the word “share” stated that the information sharing process was considered more effective with the use of screen sharing function, which has enabled the instructors and learners to share instructional materials, videos, or websites with ease. Next, those who used the word “presenting” emphasized that virtual classrooms enabled students to explore the ICT tools they needed to present their assignments in class.

Despite these advantages, virtual classrooms had their downsides too. For the question “Any negative experiences you would like to share with us about when you conduct virtual classrooms?”, the most frequent words included “internet”, “time”, and “connection”. They appeared 45, 26, and 24 times in the responses respectively. Poor Internet connectivity was regarded as the major barrier to remote teaching and learning in Malaysia among the respondents. Some students had to miss their classes when network disruption occurred. Of those who mentioned these statements, 55.6% of the respondents lived in urban areas, 31.9% in suburban areas, while only 12.5% in rural areas. Similar to the responses of opinions about virtual classrooms, the word “time” was also mostly used as an adverb. However, six respondents reported some young learners were having a hard time concentrating for long hours in the class. At the same time, it was challenging for teachers to interact with and monitor the students on the screen. For parents with young kids, distraction was inevitable when working from home because they sometimes had to be available to assist their kid in school activities. Next, the high frequency word “connection” in this section mainly referred to the unstable or weak Internet connection that respondents had experienced in

online classes. Among those who highlighted the issue of poor Internet access, 41.7% lived in urban areas, 45.8% in suburban areas, and 12.5% in rural areas. When we investigated the locations of the schools among teachers who reported bad Internet, urban areas accounted for 42.9%, suburban areas accounted for 42.9%, and rural areas accounted for 14.2%.

Lastly, for the “Are there any other things you would like to inform us?” question, only 92 out of 379 respondents answered the question. The three most frequent words, i.e., “good”, “internet”, and “education” also appeared to have lower frequency. They were used 14 times, 13 times, and 10 times in the responses, respectively. For the word “good”, it has been used in both positive, neutral, and negative tones. These respondents were aware of the advantages and disadvantages of virtual classrooms. Five used the term as an adjective in a positive tone and suggested that good use of resources and equipment was the key to successful online learning and teaching. All of them were T&P. Three left their “good luck” messages, and one believed that it was not a good time for our country to implement virtual classrooms now given the limited resources we had. Following that, some stressed that a stable Internet connection was a determining factor in the readiness of the virtual classroom. However, the internet coverage in Malaysia was apparently still insufficient. Regarding the issue of internet access, three respondents believed that the government could certainly play a vital role in upgrading the necessary infrastructure required for remote learning and teaching. Finally, the respondents also shared their views on the current education system in Malaysia. Some thought that the pandemic has accelerated the digitization of education, while others believed that hybrid modus, i.e., classrooms taking place in virtual and physical form, was about to become the new normal for local education. Moreover, five respondents particularly emphasized the need for the Ministry of Education in Malaysia to develop a holistic education blueprint to promote education transformation to keep pace with the evolution of ICT. They also hoped that the findings of this research could serve as a reference for the policymakers.

3.3. Associations between Demographic Variables and Scores in Domains

We further divided the statistical data into three main categories for a more detailed analysis. The categories were the respondent being teacher only, parent only, and T&P. Relationships between demographic variables and the domains (affective, behavioral, cognitive, competence, and awareness) were further analyzed using *t*-test and one-way ANOVA. Based on the output, certain domains were found statistically significant. Similarly, significant differences are also found in the overall readiness toward providing an inclusive education using virtual classrooms. Table 4 shows the mean (M) and standard deviation (SD) for each of the five domains and the overall scores. The grey-shaded columns indicate the groups with the higher mean value. Meanwhile the mean value with * indicates that the *p* value is in the significance level with $p < 0.05$.

From the perspective of gender, significant differences were obtained in the affective and awareness domains for T&P and parent’s category. For other domains, no significant difference was obtained from these two categories. Despite not having any significant difference for male teacher category, their scores for affective and awareness domains were higher than female teachers. This indicates that both male teachers, parents and T&P were more concerned about and aware of the inclusiveness of education in virtual classrooms. Meanwhile for the category of teacher only, significant differences were obtained in behavioral and competence domain. For these two domains, females in all three categories scored higher than males. It can therefore be suggested that females in this study had higher willingness and competencies to make virtual classrooms more inclusive than males.

Table 4. Summary of mean and SD for all domains with respective demographic variables and categories.

Demographic Variable	Category	Variable Value	Mean (M) and Standard Deviation (SD)					Overall
			Affective	Behavioral	Cognitive	Competency	Awareness	
Gender	T&P	Male	5.07 * (0.97)	4.98 (1.37)	4.31 (1.25)	5.45 (1.04)	5.90 * (0.80)	5.14 (0.79)
		Female	3.98 (1.08)	5.33 (1.14)	4.09 (1.09)	5.59 (0.93)	5.16 (1.41)	4.81 (0.84)
	Teacher	Male	4.48 (1.33)	5.06 (1.55)	3.88 (1.14)	5.01 (1.42)	5.77 (1.13)	4.83 (1.07)
		Female	4.38 (0.98)	5.66 * (1.09)	4.17 (1.02)	5.71 * (0.92)	5.53 (1.12)	5.08 (0.76)
	Parent	Male	4.52 * (1.12)	4.67 (1.20)	3.81 (1.18)	3.93 (1.87)	5.12 * (1.65)	4.41 (1.03)
		Female	4.00 (1.12)	4.82 (1.08)	3.69 (1.28)	4.03 (1.55)	4.46 (1.63)	4.20 (0.94)
Age	T&P	≤40	4.13 (1.12)	5.66 * (0.83)	4.14 (1.10)	5.88 * (0.83)	5.96 * (0.76)	5.08 (0.68)
		>40	4.60 * (1.04)	5.23 (1.16)	4.38 (1.07)	5.56 (0.86)	5.46 (1.28)	5.03 (0.72)
	Teacher	≤40	4.41 (1.15)	5.76 (0.95)	4.05 (1.08)	5.51 (1.23)	5.92 * (0.84)	5.11 (0.75)
		>40	4.93 * (0.82)	5.51 (1.21)	4.71 * (0.99)	5.55 (0.97)	5.50 (1.06)	5.24 (0.73)
	Parent	≤40	3.98 (1.29)	4.85 (1.02)	3.45 (1.43)	3.78 (1.66)	4.28 (1.51)	4.14 (0.93)
		>40	4.56 * (1.06)	4.89 (0.93)	4.21 * (1.15)	4.39 * (1.56)	5.06 * (1.43)	4.62 * (0.73)
Academic Qualification	T&P	Bachelor and below	4.65 (1.14)	4.94 (1.30)	4.09 (1.22)	5.18 (1.23)	5.30 (1.25)	4.84 (1.05)
		Master and above	4.81 (1.10)	5.63 * (1.05)	4.32 (1.00)	5.80 * (0.90)	5.82 * (1.18)	5.27 (0.60)
	Teacher	Bachelor and below	5.02 * (1.09)	5.39 (1.26)	4.04 (1.04)	5.39 (1.09)	5.75 (1.06)	5.13 (0.83)
		Master and above	4.58 (1.11)	6.11 * (0.88)	4.48 * (1.16)	5.92 * (0.94)	5.47 (1.32)	5.31 (0.76)
	Parent	Bachelor and below	4.40 (1.04)	4.47 (1.23)	3.56 (1.33)	3.66 (1.61)	4.50 (1.65)	4.14 (0.95)
		Master and above	5.27 * (0.92)	5.29 * (1.16)	4.28 * (0.98)	4.53 * (1.89)	5.92 * (3.26)	5.06 (1.00)
Residential Area	T&P	Urban	4.59 (1.31)	5.59 * (1.08)	4.21 (1.17)	5.12 (1.31)	5.31 (1.34)	4.96 (0.99)
		Rural	5.14 * (1.02)	5.01 (1.32)	4.14 (1.17)	5.63 * (0.94)	5.84 * (1.08)	5.16 (0.71)
	Teacher	Urban	5.28 * (1.05)	5.43 (1.40)	4.00 (1.05)	5.27 (1.34)	5.50 (1.40)	5.13 (0.99)
		Rural	4.65 (1.04)	5.89 * (1.01)	4.46 * (1.18)	5.69 (1.07)	5.48 (1.13)	5.23 (0.77)
	Parent	Urban	4.35 (1.39)	4.37 (1.36)	3.60 (1.36)	3.83 (1.66)	4.44 (1.64)	4.14 (1.21)
		Rural	4.84 * (1.10)	5.02 * (1.08)	4.20 * (1.27)	3.84 (1.71)	5.24 * (1.30)	4.63 (0.92)

Table 4. Cont.

Demographic Variable	Category	Variable Value	Mean (M) and Standard Deviation (SD)					Overall
			Affective	Behavioral	Cognitive	Competency	Awareness	
School Location	T&P	Urban	4.57 (1.30)	5.01 (1.42)	3.93 (1.26)	5.13 (1.38)	5.35 (1.44)	4.80 (1.16)
		Rural	5.06 * (0.99)	5.10 (1.27)	4.64 * (1.10)	5.58 * (0.97)	5.38 (1.24)	5.16 (0.87)
	Teacher	Urban	5.21 * (1.12)	5.74 (1.14)	4.77 * (0.96)	5.81 * (1.06)	5.91 * (1.05)	5.49 (0.90)
		Rural	4.61 (1.05)	5.42 (1.28)	4.10 (1.11)	5.38 (1.14)	5.43 (1.17)	4.99 (0.89)
School Type	T&P	Public	5.11 * (0.95)	5.33 (1.18)	4.63 * (1.12)	5.23 (1.19)	5.38 (1.29)	5.15 (0.92)
		Private	4.50 (1.11)	4.98 (1.37)	3.96 (0.96)	6.00 * (0.83)	6.01 * (1.06)	5.07 (0.79)
	Teacher	Public	4.83 * (1.09)	5.51 (1.20)	4.23 (0.98)	5.55 * (1.13)	5.68 * (1.10)	5.16 (0.89)
		Private	4.44 (1.18)	5.24 (1.51)	3.87 (1.18)	5.02 (1.28)	5.14 (1.39)	4.75 (1.04)
Subject Taught	T&P	Science and Mathematics	5.44 * (0.92)	5.04 (1.17)	4.14 (1.09)	5.68 * (1.03)	5.91 * (0.95)	5.27 (0.78)
		Art and Humanities	4.59 (1.23)	5.85 * (1.00)	4.18 (1.29)	5.15 (1.42)	5.26 (1.60)	5.01 (1.10)
	Teacher	Science and Mathematics	5.20 * (0.83)	5.84 * (0.94)	4.84 * (0.87)	5.71 (0.97)	5.90 * (0.96)	5.50 (0.70)
		Art and Humanities	4.48 (1.22)	5.26 (1.50)	3.92 (1.12)	5.34 (1.28)	5.33 (1.35)	4.87 (1.06)

* $p < 0.05$.

In terms of the age group, for all the categories with age more than 40 years old, significant differences were found in the affective domain. This reflects that these three categories had a more concerned attitude with regards to providing an inclusive education for students attending virtual classrooms. For the category of parent only, all domains including overall scores were found statistically significantly different, except for one domain, which is the behavioral domain. This suggests that parents above 40 years old tended to have higher readiness in providing an inclusive education to their children.

When looking into academic qualification, an interesting pattern was observed from the analysis of statistical data. It was found out that all three categories with a minimum master qualification showed higher scores in all domains in providing an inclusive education to students attending virtual classrooms, except for teachers having a bachelor’s degree and below in affective and awareness domains. Such a pattern was more obvious in parent and T&P categories where all the domains had higher mean scores, and almost all with significant differences. This strongly indicates that parents and T&P with a minimum master qualification were more concerned and willing to make an effort in making the learning environment more inclusive for students during the pandemic period.

With respect to residential areas, significant differences were found in the domains within different categories, but mostly in the groups of those living in rural areas. Combining higher means (grey-shaded columns) with significant differences, it was clearly shown that both teachers and parents from rural areas were more likely and ready to provide an inclusive virtual classroom to the students as compared to those from urban areas. However, from a different perspective, the school location in addition to the role of being a parent could have an influence on the scores. Referring to Table 4, both significant differences and higher mean were found in T&P teaching in rural areas but for the category of teachers only, they were found in teachers teaching in urban areas. This might indicate that teachers without kids and taught in urban areas had better time and resources in making their virtual classrooms more inclusive to the students.

In terms of type of school, other than the domains of competency and awareness for T&P, all significant differences and higher mean scores were found in the T&P and teacher’s categories teaching in public schools. Similarly, concerning subjects taught, besides the domains of behavioral and cognitive for T&P, all significant differences and higher mean scores were found in the T&P and teacher’s categories teaching science and mathematics subjects. These findings suggest that teachers from public schools, and teachers of science and mathematics subjects tended to have more experience and hence higher readiness in providing a more inclusive education for students.

With regards to the years of teaching, we divided the categories T&P and teachers only into three groups, i.e., 10 years and below, 11 to 20 years, and above 20 years. Based on the result from ANOVA test (Table 5), post hoc test was carried out to examine which groups among the categories had significant differences. Results of the post hoc test are indicated in Table 6. Among all the domains, affective and awareness had the most significant differences in between the three groups. Teachers without kids who have taught more than 20 years were found more affective in providing an inclusive virtual classroom as compared to younger teachers without kids. In terms of having awareness concerning the inclusiveness of virtual classrooms, teachers with kids whose years of teaching were between 11 and 20 scored the highest.

Table 5. ANOVA result.

Domain	≤10 Years				11–20 Years				>20 Years				F	
	T&P		Teacher		T&P		Teacher		T&P		Teacher		T&P F (2111)	Teacher F (2137)
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD		
Affective	4.27	1.40	4.67	1.17	5.23	0.88	4.60	1.17	5.11	0.91	5.55	0.79	7.65 *	7.26 *
Behavior	4.88	1.62	5.42	1.35	5.45	1.06	6.06	0.93	5.56	1.08	5.42	1.15	2.49	3.55 *
Cognitive	3.87	1.15	4.00	1.05	4.89	0.85	4.18	1.16	4.91	1.06	4.30	0.97	10.15 *	0.93
Competency	5.26	1.51	5.32	1.25	5.68	0.96	5.34	1.26	5.19	1.03	6.31	0.64	6.48 *	7.88 *
Awareness	5.30	1.56	5.84	1.21	6.10	0.90	4.71	1.04	5.25	1.52	4.80	0.92	6.03 *	16.43 *

* $p < 0.05$.

Table 6. Post hoc test result (Tukey HSD).

Domain	<10 Years				11–20 Years				>20 Years			
	T&P		Teacher		T&P		Teacher		T&P		Teacher	
	11–20	>20	10–20	>20	<10	>20	<10	>20	<10	11–20	<10	11–20
Affective	−0.96 *	−0.84 *	0.06	−0.88 *	0.96 *	0.12	−0.06	−0.95 *	0.84 *	−0.12	0.88 *	0.95 *
Behaviour	−0.57	−0.68	−0.64 *	−0.01	0.57	−0.11	0.64 *	0.64	0.68	0.11	0.01	−0.64
Cognitive	−1.02 *	−1.04 *	−0.19	−0.30	1.02 *	−0.02	0.19	−0.11	1.04 *	0.02	0.11	0.30
Competency	−0.42	0.07	−0.12	−0.99 *	0.42	0.50 *	0.01	−0.98 *	−0.07	−0.50 *	0.99 *	0.98 *
Awareness	−0.80 *	0.05	1.13 *	1.05 *	0.80 *	0.85 *	−1.13 *	−0.01	−0.05	−0.85 *	−1.05 *	0.01

* $p < 0.05$.

4. Discussion

In this study, most respondents reported being concerned and have been putting effort in making education delivered via making virtual classrooms more inclusive. Our findings suggest that the readiness in providing inclusive education through virtual classrooms in Malaysia, with reference to the experiences of parents and teachers during the pandemic, largely depends on three factors. They are stable internet access, ICT competencies of teachers and parents, and the role of the government, particularly the Ministry of Education.

4.1. Stable Internet Access

First, prior studies have noted the importance of internet stability for online learning due to its dependency on electronic equipment and internet [24]. Limited internet access can prevent students from learning and will consequently affect their academic performances negatively [25]. As bad internet can hinder students from having equal opportunity in

getting quality education, this study sought to determine whether students had stable access to the internet while attending virtual classrooms. If the students did not have stable internet access, we would be interested in what teachers and parents had done to address this issue.

Our findings indicate that most respondents reported experiencing connectivity issues while attending virtual classrooms. These respondents mostly either worked or lived in urban or suburban areas, rather than in rural areas. [26,27] reported students living in rural areas in Malaysia faced more challenges in accessing the internet needed for an effective online learning environment, which differs from the findings presented here. Referring to the demographics of the respondents, 242 lived in urban areas, 108 in suburban areas, and 29 in rural areas. This explains why more urban and suburban residents suffered from internet problems than rural residents in this study.

To address the issue of students being excluded from virtual classrooms due to unstable internet access, some teachers in this study tried to make the materials accessible regardless of time. Some recorded their classes and uploaded as videos that students could stream anytime. The same practice has been reported in studies conducted in higher education institutions in Malaysia by [28–30]. Our findings show that this practice was widely practiced among teachers in primary and secondary schools, and it was crucial to achieve inclusive education through virtual classrooms. Although this practice could address the issue of unstable internet access, some respondents pointed out the involvement of the government in enhancing the quality of internet nationally. We further discuss the role of government in Section 4.3.

4.2. ICT Competencies

In this study, the average scores of self-related ICT skills were both 7.2 for parents and teachers' groups, and 6.9 for T&P (1 was very low and 10 was very advanced). This indicates that most teachers and parents had competent ICT competencies. When looking into the qualitative data, respondents were found to be able to use the digital tools and resources available to conduct synchronous classes, communicate outside of the virtual classrooms, share teaching materials, etc. In addition, they expressed that they had to learn to do all these. It is therefore likely that the digital skills and literacy of teachers and parents have improved ever since virtual classrooms took place. Several studies have shown that Southeast Asian countries including Malaysia had little knowledge about online learning environments prior to the pandemic, and many teachers lacked competence and skills to deliver quality education through virtual classrooms [31–34]. Nevertheless, some respondents in this study found an opportunity to constantly explore the various digital tools and resources they needed in online teaching and learning. Consistent with the literature [35], this study confirms that virtual classrooms could contribute to improving the ICT competencies and digital literacy among students and teachers. For small kids that require parents' assistance, parents' ICT competencies could be enhanced as well. All these would eventually enhance the nation's readiness for virtual classrooms that are inclusive.

4.3. The Role of Government

Policymakers have a responsibility to work with key stakeholders, such as educational institutes and communities to overcome challenges in remote teaching during the pandemic [36]. Previous research has reported that the Ministry of Education Malaysia has implemented four short-term strategies to minimize disruption to learning due to emergency school closures during the national lockdown, which included enabling flexible timetables and pedagogies, adopting synchronous and asynchronous virtual learning, launching educational television channels, and building digital learning communities for professional development [37]. From the qualitative data in this study, some of these strategies were observed, and they were perceived contributing to making education delivered via virtual classrooms more inclusive. However, we also noticed some rooms for improvement. First, there were no clear guidelines. The flexibility of timetables and

pedagogies has caused some teachers to report an increase in workload. 210 out of 254 respondents expressed experiencing work increase due to the implementation of virtual classrooms. The ministry could set clear guidelines for the schools and teachers so that teaching activities could be conducted with flexibility and yet within a defined timeframe to avoid unnecessary increase of workload. Second, the strategy of building digital learning communities for professional development was not made known to the teachers. This training program was meant to assist teachers in conducting virtual classrooms but none of the teachers in this study mentioned the program. Those who had spent time and effort in educating themselves with digital tools and materials for virtual classrooms appeared to be self-learning and/or exploring together with their peers at work. Such a program could equip the teachers with necessary competency and skills, and therefore teachers should be allocated time to attend it.

As suggested by [24], the Ministry of Education should develop a sustainable plan to look at professional development for teachers regarding remote teaching skills and digital literacy in response to the global trends. In this study, some respondents highlighted the need for the Ministry of Education to develop a holistic education blueprint to deal with the acceleration of digital education caused by the pandemic, as they believed that blended learning would be the new normal for future education systems. Previous studies mentioned that integrating ICT in the teaching and learning process remained challenging for many teachers and students in Malaysia [27,38]. One of the causes of this phenomenon is the lack of ICT infrastructure in schools. It is therefore believed that increased expenditure by the ministry will facilitate schools to upgrade the infrastructure needed to create a technology-driven learning environment and enhance digital practices among teachers and students. In this study, 258 out of 379 respondents reported students not having access to digital devices such as laptops, computers, mobile phones, etc., required for virtual classrooms. Therefore, it is recommended that the Ministry of Education allocates funds and subsidies to parents to purchase e-learning equipment.

In addition to ICT infrastructure, teachers' training focusing on teaching in virtual classrooms should be provided with the aim to contribute to a higher readiness among teachers in providing a more inclusive online education to the students. The technological pedagogical content knowledge (TPCK) framework explains how the teachers' pedagogical knowledge, teaching content, and technological knowledge are able to be blended and integrated in the teaching and learning process with the integration of technology [39]. Although teachers master the content of the subjects they teach, the pedagogical approach to deliver the teaching content might change due to the technological setting and pedagogical environment when it comes to teaching in a virtual setting. Hence, it becomes relatively important for teachers to receive continuous professional training on how they can deliver the content with effective pedagogy in the technological setting [40]. This will not only increase the effectiveness of knowledge delivery, but at the same time benefit teachers being inclusive to all students to learn better in a virtual setting.

Lastly, the government could invest more in building up a better internet infrastructure, which is one of the prerequisites for virtual classrooms. Several studies investigating experiences of virtual classrooms in Malaysia have pinpointed the same issue concerning slow internet [17,41,42]. Although some teachers in this study were willing to make an extra effort to produce teaching videos so that materials could be streamed by students having slower internet access, it is crucial to be aware that the processes became asynchronous. Students could not ask any questions immediately, and teachers could not respond on the spot either. This might result in an increase of teachers' work when for instance, several students require clarification for the same topic, but teachers can only respond separately instead of having to do it one time to all of them in a physical classroom. The practice of providing teaching video was perceived helpful in making virtual classrooms inclusive. However, in the long run, both students and teachers having a stable internet would secure a more inclusive remote education.

4.4. Demographic Background Influencing Individuals' Readiness in Providing Inclusive Education

Teachers' and parents' academic qualifications were found to be associated with domains in providing a more inclusive virtual classroom to students during the pandemic period. As postulated from the findings from this study, it is clearly shown that teachers and parents having at least a master's degree and above scored higher in all aspects in supporting students with a more inclusive learning environment from the domain of affective to competency. One of the possible explanations can be that teachers and parents with higher academic qualifications had higher exposure concerning the importance and urgency to ensure that virtual classrooms could remain as inclusive as possible like a physical classroom did. Findings from [43]'s study have shown that teachers with master's degrees had higher digital literacy and ICT integration in teaching and learning process. According to [43], this might have a correlation with the training received during their postgraduate studies whereby they were exposed to the use of ICT and technologies. Individuals who enroll in postgraduate studies in Malaysia tend to have more exposure to various types of ICT during their study period. Hence, this may result in higher readiness in them in providing an inclusive education through virtual classrooms when emergency remote teaching took place.

When looking into the association between subjects taught and scores of domains, the results showed that science and mathematics teachers tended to have a higher readiness and willingness to provide a more inclusive learning environment to students as compared to art and humanities. The findings from this study again affirm the result from a previous study comparing science, technology, engineering, and mathematics (STEM) teachers to humanities and social sciences regarding perceived ICT competency, attitude, and actual usage in using ICT in teaching [44]. STEM teachers scored higher than humanities and social sciences teachers in all three areas. In addition, existing studies also reported the availability of various ICT tools in supporting science and mathematics teachers in conducting virtual classrooms such as PhET interactive simulation and eduMedia [17], and Maxima, SymPy and Geogebra [45]. In this study, two mathematics teachers used GeoGebra.

In terms of gender, male participants in this study in general were reported having higher scores in the domains of affective and awareness, while the female participants scored higher in behavior and competence domains. Previous studies have both demonstrated there were differences in ICT use and/or digital literacy between male and female [46,47] and no differences [48,49]. In this study, one of the possible explanations to our findings was that the parents still played a more traditional role at home, i.e., mothers were assisting the children at home attending virtual classrooms more than fathers did. This may result in a more positive perception of teachers' behavior, and higher competency of mothers themselves in making virtual classrooms more inclusive to the students. Regarding male teachers and/or parents having scored higher in the domain of affective, this finding supports [50]'s finding, where they have found out that male teachers held more positive attitudes in providing an inclusive education to the students with disabilities.

5. Conclusions

The COVID-19 pandemic has dramatically changed the educational environment for teachers, students, and also parents as they had to assist their children at home when emergency remote teaching and learning took place during restrictions. Providing an inclusive education to students obtaining education remotely is crucial as we do not wish to have any student excluded or fell behind as everything was conducted through virtual classrooms. The purpose of the current study was therefore to explore the experiences of parents and teachers concerning inclusiveness of the education delivered via virtual classrooms during the COVID-19 pandemic. Through the exploration, we investigated what has been done, what could have been done better, and found factors influencing individual's readiness in making virtual classrooms more inclusive to the students.

The study has shown that stable internet access, adequate ICT competencies among teachers and parents, and more efforts from the government, particularly the Ministry of

Education could contribute to implementing a more inclusive remote teaching. Parents and teachers having master's degree and above tended to pay more attention to the inclusiveness of virtual classrooms. Based on subjects taught by teachers, those teaching science and mathematics subjects tended to have a higher willingness and readiness in making virtual classrooms more inclusive, as compared to those teaching art and humanities subjects.

One limitation of this study is that we might have excluded potential respondents who were not able to answer the online questionnaire due to different reasons. For instance, not feeling confident in answering a questionnaire in English, not having devices to answer the questionnaire and so forth. While the study itself was targeting for a more inclusive online education, we were totally aware to be as inclusive as possible to the potential respondents. Hence, alternative ways to answer the questionnaire were offered which include a person who could verbally translate the questionnaire by conducting an interview physically or using online conference system. However, we did not come across any of such respondents. Due to restrictions during COVID-pandemic, it was challenging to approach parents personally. This reason also contributed to the small number of respondents.

The findings of the study can provide useful information to guide the design and implementation of effective virtual teaching-learning process and improve parent involvement and school readiness in times of more digitalization is being implemented, or even of similar crisis. Necessary training should be provided to teachers to increase their digital literacy, and students should be exposed more to ICT use in the classes. ICT tools designated for teachers teaching art, humanities and social sciences could be developed more as well. Guidelines for virtual classrooms should be made clear and could be strictly followed, so that flexibility in teaching and learning could be achieved without having the teachers experiencing an unnecessary increase of workload. This study has implications for policymakers, researchers, teachers, and parents concerning the implementation of remote education, and general digital teaching and learning.

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