# E-Learning Instructional Management for Students with Intellectual Disabilities

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**ABSTRACT:**

Online teaching is inevitable during the COVID-19 pandemic as schools and educational institutions globally are forced to close. This sudden paradigm shift from the traditional classroom to remote online teaching has disrupted the education system in general. The study aims to examine the e-learning practices of a school-to-work transition program using TPACK Framework for students with intellectual disabilities (IDs). An in-depth study was conducted with 25 students with IDs on the process of curriculum design, technology setup, as well as roles of all stakeholders. Findings show the importance of collaborative support with clear roles and planning are essential to achieve effective management in online and individualized learning. This paper highlights the challenges and problems encountered by both teachers and students. Practical guidelines, processes, and teaching strategies of the e-learning system are proposed for the betterment of e-learning management of teaching and delivery.

*Keywords:* E-learning, Instructional Management, Curriculum Design, Intellectual Disabilities, Transition

## INTRODUCTION

The global COVID-19 pandemic has changed many facets of life, especially education. The impact of the school closure to curb the spread of the virus and the education havoc it has wrecked resulted in more than billions of children worldwide failing to cope with their studies (Abdullah et al., 2020). The Malaysian government has introduced e-learning approaches for public schools, namely home-based teaching and learning (PdPR) and DidikTV, an education TV that is aired for 17 hours every day. Other private education institutions have been conducting their online classes with different online technologies. Universities in Malaysia have spent hours and millions of ringgits to create digital course content, curriculum, and assessment on their university Content Management Systems (CMS), respectively (Annamalai, 2021). However, teachers and students must adopt the distance learning system, and many problems arise during online classes. Some common challenges of online teaching include low engagement from passive learners and teachers' ICT knowledge and skills (Hu & Li, 2017; Stott, 2016; Suvarna Latha, et al., 2022), disconnection between the teacher and the students due to asynchronous learning experience (Nambiar, 2020; Wang et al., 2018), and having difficulty of collaborative learning (Al-Samarraie & Saeed, 2018).

The abrupt school closure and the transformation from physical classes to online learning affects students significantly, especially students with intellectual disabilities (IDs). It was found that the general education program cannot be applied to students with IDs because as many of them need differentiated instructions and support in the development of communication and self-care skills as well as support from parents teaching them at home (Buchnat & Wojciechowska, 2020; Kim & Fienup, 2022). The research problem with online learning for students with mild intellectual disability is the lack of research on their online lesson experiences, as well as the barriers and necessary support that they may require (Colombo & Santagati, 2022). This has caused increased stress and challenges in providing appropriate care and education at home for students with IDs (Suvarna Latha, et al., 2022). Other research challenges address by other researcher for online career readiness programs for IDs include providing accessibility and comfort with technology, age-appropriate content and implementing universally designed curriculum strategies (Grigal et al., 2019).Before introducing an online learning system for these students with IDs, devices, software, and internet, connections need to be set up for online learning. Other aspects that need to be taken into consideration for an e-learning system are attention span, communication, duration of a lesson, competencies to learn independently when it comes to finding and replying to messages, reading online comprehension, digital knowledge, and the scope and design of curriculum, these are all challenges for teachers. In Malaysian education for students with IDs, e-learning is in its infancy stage, resulting from the pandemic.

There are six sections in this paper. The paper starts with an introduction to the education situation during the pandemic in Malaysia and the e-learning practices for special needs education. The second section discusses significant studies on e-learning systems in relation to transition to work for students with IDs. It is followed by the methodology and research approaches of the study. The finding presents the important outcomes from the data analysis. The proposed solutions, applications, and implications of the study are discussed in the section of the discussion. The conclusion summarizes the main ideas on e-learning instructional management and concludes good practices for teaching students with intellectual and developmental disabilities.

## LITERATURE REVIEW

Scholars have come out with overlapping conceptualizations of e-Learning and its variables. Aparicio et al. (2016) have done an extensive review of e-learning systems, and they suggest a holistic e-learning system theoretical framework that incorporates three salient elements: (i) stakeholders; (ii) technology; and (iii) service. The stakeholders of an e-learning system refer to the teachers, educational institutions, content moderators, administrators, suppliers of technology, and auditors. According to Kim & Fienup (2022), teacher effectiveness is the most vital determinant in online learning. These people are the individuals who interact, manage, or maintain the e-learning system. Technology elements of an e-learning system refer to the mechanics, tools, and equipment that enables online learning. Multimedia technology encompasses multimedia for online activities such as imagery, audio, video, animation, 3D, Virtual Reality, and authoring tools. Technology functions of an e-learning system include information searchability, content creation, communication, and collaboration functions. An effective e-learning management system is also made up of helpful services which link to the curriculums, learning materials, practical pedagogies, instructional strategies, and communication.

A renowned theoretical framework that guides teachers to integrate their subject knowledge and pedagogical knowledge in their teaching by using mixtures of analogies, life examples, explanations, and helpful demonstrations. This theoretical framework is called pedagogical content knowledge (PCK), and it was introduced by Shulman (1987; 1986). The PCK model stresses the instructional strategies and representation, a transformation of content knowledge to teaching delivery. PCK also emphasizes the student's understanding of the learning process and problems. Much educational research has found that PCK positively impacts student achievement in obtaining knowledge and possessing skills related to learning outcomes (Gess-Newsome et al., 2019).

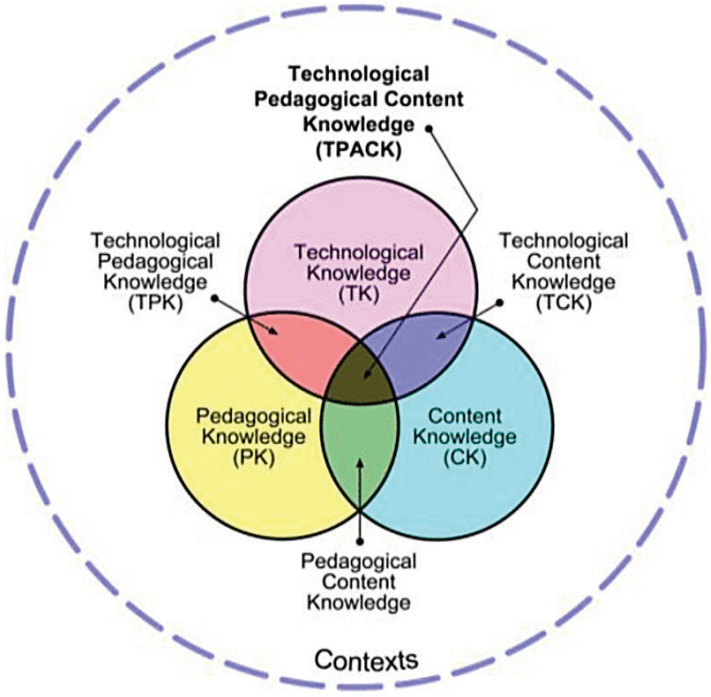


Figure 1. Technological Pedagogical Content Knowledge (TPACK) Framework (Mishra & Koehler, 2006)

Educational scholars have been continually developing PCK with integrated technologies. Technological Pedagogical Content Knowledge (TPACK) was introduced by Mishra and Koehler (2006). The core elements in TPACK are technology, content, and pedagogy. The overlapping subsets are Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), and Pedagogical Content Knowledge (PCK), as shown in Figure 1. The critical development of TPACK is brought by the teacher learning community stresses the collaboration between teachers and knowledge sharing among the team members (Voogt et al., 2015). Moreno et al. (2019) systematically reviewed the TPACK modelpedagogical and content knowledge. This research presents an analysis of several publications in international databases that address the matter of the TPACK model. Accordingly, a review of the scientific literature applying the documentation as a systematization method was performed. The present study analyses 37 contributions, published between 2014 and 2017, indexed in the Web of Science (WoS). They concluded on the positive impact of technological competence on student attainment in meeting the course objectives and improving learner performance and problem-solving in the context of TPACK.

Rapanta et al. (2020) found that the online curriculum design needs to consider the presence of cognitive, social, and facilitatory as well as adjust to the requirement of the online assessment. Teachers must consider whether the students are mentally prepared to participate in the digital learning environment. Due to the COVID-19 pandemic control movement, teachers need to create a sociable environment that encourages interaction between students and teachers to students. Teachers must also be actively facilitating students on the online learning platform to provide mentoring support to students. The pedagogical knowledge design of online activities uses multiple approaches, including online offline, real-time, or flexible schedule distance learning modes.

Special needs researchers have been exploring how E-learning and distance learning strategies impact students with IDs, highlighting their cognitive abilities, competencies, academic abilities (Parmigiani, et al., 2021), and general attitudes (Petretto et al., 2021). Additionally, they stressed the significance of accessibility of sites, platforms, and learning materials (Pirani, 2015; Zhang et al., 2020), and the need for a model that can factor in individual differences in learning and functional profiles. Relevant studies also delved into the importance of reasonable accommodations and personalization for students with IDs in E-learning and ICT (Parmigiani, et al., 2021) and how teachers' competencies can promote inclusion (Al-Mamari, 2021; Bjekić et al., 2014). However, more study is required in neuropsychology, pedagogy, education, and E-learning sciences to develop and design effective E-learning platforms, materials, and tools based on advanced knowledge and research evidence.E-learning for students with intellectual disabilities encompasses a broad-based knowledge which commonly include academic skills, communication skills, social and interpersonal skills, occupational and vocational skills. During the Covid-19 pandemic, 'Let Me Grow Up©' transition training was implemented to build work

aspiration in students with intellectual disabilities as an enhancement to the current transition programme in the school curriculum due to school closure using TPACK framework. The role of family became prominent specifically in managing the goal-setting for employment in this online learning platform (Estrapala & Reed, 2019; Parmigiani, et al., 2021). Barriers to access employment could be complemented by family involvement and inter-agency collaboration for students with IDs (Bialik & Mhiri, 2022). These online activities are carefully planned and well thought :

(1) Context: Teachers to design more personalized and contextualized learning objectives for students upon understanding family background.
(2) Tools and resources: Teachers to consider the tools and infrastructure that enable internet access and medium of communication for the teachers, students and their families.
(3) Tasks: Teachers need to promote a student-centered approach and peer-collaborative learning.
(4) Roles: Teachers need to build rapport and trust with students and families.
(5) Assessment: Teachers must ensure that students are not able to cheat in the online examination with the family support.
(6) Learning objectives: Teachers must consider the purpose of the lesson and learning accomplishment based on consultation with families.

This model aims to ensure students with IDs are provided the learning opportunity and granted equal access to educational rights under Section 28 of the Persons with Disabilities Act 2008 despite having experienced school closure (Othman & Rahmat, 2020).

The study seeks to answer research question on the extent of accommodation and support provided to students with IDs in the e-learning instructional management.

## METHODOLOGY

The study goes through an iterative cycle of reviewing and revising the curriculum and instructional strategies to create more effective online teaching and delivery. This research inquiry process is based on the problem-solving approach, which has several observational settings and ways to collect the data, which includes online observational fieldwork, parent focus group, surveys, reflective teacher journals, and video recordings of online workshops (Wu et al., 2022). The study was conducted to observe the online learning process targeted at compromising the needs of students with IDs. Twenty-five (25) students aged between 15 to 21 are recruited with their consent and supported by their parents. An online consent form was created using google platform. Each participant was explained about the research procedure and the steps to preserve their privacy. Parents were present during the explanation and acknowledged their support for the project.

### Iterative Cycle of research inquiry

The research process went through an iterative cycle to think about the problems that arise and take remedial action to improve student learning. The iterative cycle starts from (i) planning; (ii) implementing and collecting data; (iii) sharing and feedback; (iv) evaluating, and (v) taking actions to improve, as shown in Figure 2.

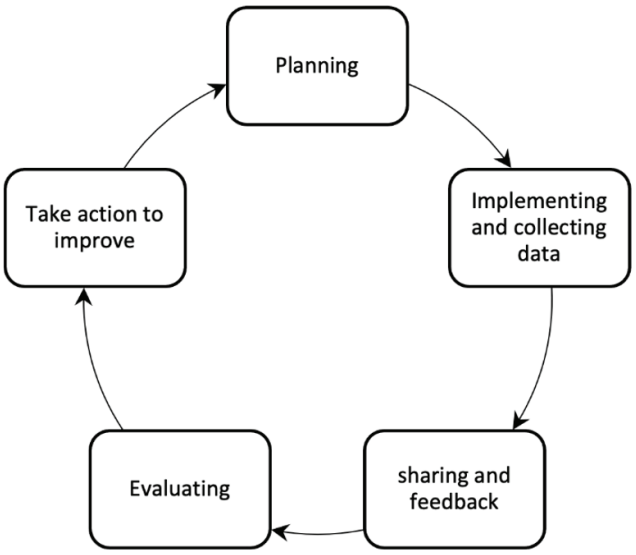


Figure 2. Iterative cycle of research inquiry

### Online Observational Fieldwork

This study has been carried out in collaboration between a university and several national schools that support and prepare students with IDs for the workforce with ten workshops of the school-to-work transition program run via Zoom video conferencing meeting. Twenty-five students were divided into four groups and attended the online workshops from home. The students used their laptops to attend Zoom meetings and attempted lesson-related games with their tablets or mobile phones. During the workshop, the online meeting was recorded.

Furthermore, five teachers facilitated the training and ten volunteers helped to observe the learners in every online lesson. Participants' observation field notes were written, and a post-training feedback meeting was held immediately after each online lesson. The field notes con-

tain the list of the items of the lesson, responses, behaviors, guidance from parents, feedback, and suggestion for improvement.

**Parent Focus Group Interview**

Before the first school-to-work transition workshop, a briefing and parent focus group were conducted. Parents are informed regarding the objectives and learning outcomes of the program. In addition to the content outline of the program, they are required to prepare their own devices and equipment that enable the internet connection, video conferencing meeting, and necessary software to perform the workshop tasks. A parent focus group interview was arranged after conducting ten workshops. Parents actively gave feedback and suggestions to improve the program further while perceiving the next cause of action to plan for their child's transition to work.

**Survey**

Evaluating the program's effectiveness and assessing the student's performance is essential. Thus, participants' parents completed self-assessment questionnaires to evaluate their knowledge and competency about the school-to-work transition program.

**Reflective Teacher Journals**

There were ten volunteers and five teachers involved in every online workshop. These volunteers were caretakers and allies of students with IDs, and the teachers were the educators of special needs education. All volunteers and teachers prepared the lesson plan and delivery flow by conducting multiple online meetings before each workshop.

During the workshop, volunteers passively and quietly observed the students' responses, facial expressions, body language, and behaviors without interfering with the outcome of the learning process. They filled in the observation fieldwork form and reported what they had observed. Teachers have also kept their teacher reflective journals to continually improve instructional strategies, teaching styles, approaches, and methods. The reflective teacher journal helped the teachers reflect on the online workshop experience of those enjoyable moments, engaging sessions, effective teaching strategies, and the challenges they faced.

A post-workshop meeting for all volunteers and the teachers was held immediately after every workshop to discuss the workshop session to improve the management of the online curriculum and teaching as part of the participatory action research data collection process.

**Video Recording of Online Workshop**

All the online workshops were recorded. It captured the presentation, shared content, and text messages on the meeting chat.

## FINDINGS

The school-to-work transition online curriculum is designed based on the Aparicio (2016) holistic e-learning systems theoretical framework, which mainly focuses on the dimensions of people, technologies, and services.

As shown in Figure 3, the program's stakeholders included students with IDs, special needs educators, technologists, and parents. The tools or apps used for fun workshop assessment include Kahoot, Quizziz, WordWall, and Flipping Book. An interactive browser point presentation that engages students was Pear Deck with Google Slides. Students were required to complete their homework for the workshop with essential Microsoft Office and Google Workspace.

The pedagogical model of e-learning is considered distance learning or distributed learning. Instructional strategies used in the course planning include outcome-based learning, Bloom Taxonomy, personalized learning tasks, gamification, use of visuals, collaborative learning, brainstorming, small group discussion, interactive teaching, and active learning.

The action research inquiry was conducted with ten students (Group A) in Cycle 1. The online curriculum design was improvised and innovated based on the multi-dimensional analysis of the learner, context, task, and tools used. Subsequently, the improvised online curriculum is implemented for the 15 students (Group B) in Cycle 2 to refine the following components of online delivery to answer the research questions. It is divided into 6 sections of e-learning instructional management:

1. Tasks (Activities)
2. Assessment (Instructional Strategies)
3. Roles (stakeholders)
4. Tools & resources (technology)
5. Interactivity and communication (instructional strategies)
6. Independence (instructional strategies)

**Task**

Students with IDs were grouped according to students learning abilities. The findings show that students with low support need to find some tasks less challenging, whereby students with high support needs face difficulty completing tasks requiring critical thinking. Students

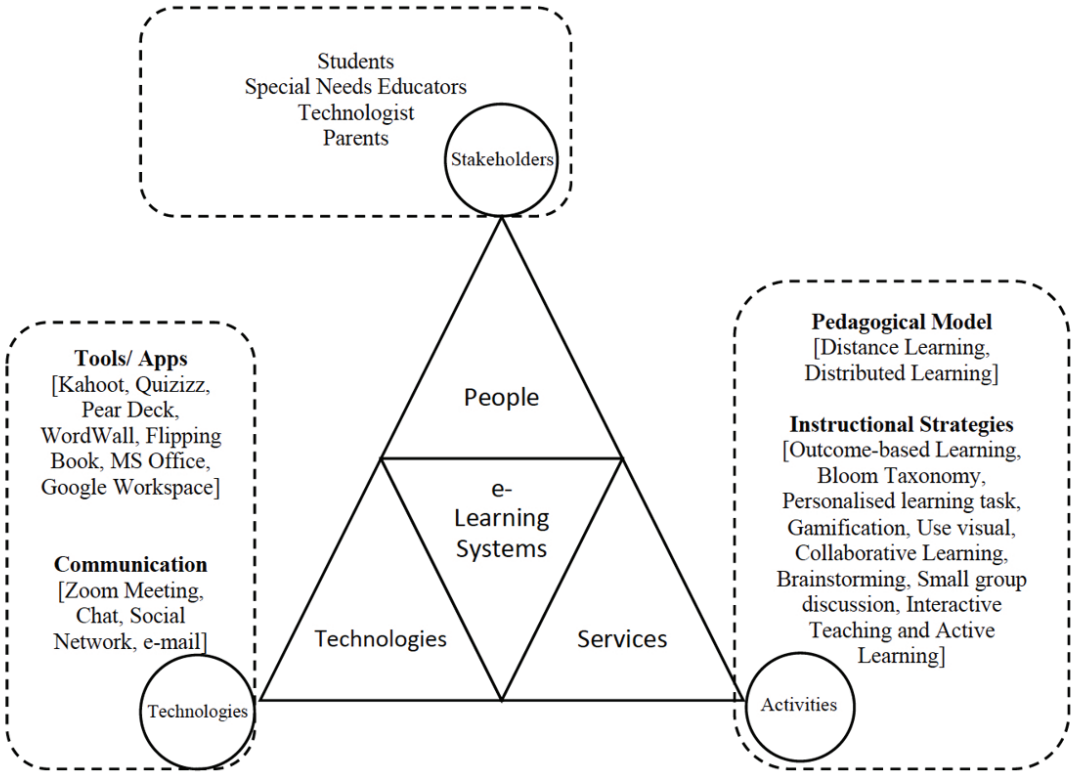


Figure 3. An E-learning instructional management framework for the online workshop

were excited and motivated throughout the first ten workshops in game-based lessons. Gamification tremendously affects the students as they show high engagement and enjoy learning. They felt rewarded whenever they won or received positive feedback from the game.

Besides, all students in the first ten workshops could quickly grasp and understand the concept of employment when the teachers related the topic to their families, friends, and daily life events. Students could also easily understand the topic when presenting a relevant picture instead of long descriptive texts. It was noted that students used a long time to digest long sentences; thus, the number of words for each PowerPoint slide is adapted to be more concise with few words. Students were happy when their names were called to participate; thus, getting all students engaged in learning is crucial. Each student can answer whenever the teacher calls every name in the class, and they pay more attention to the subject taught.

**Assessment**

Students were arranged into breakout rooms for small group discussions. Therefore, students were given more personalized feedback, quality time, and attention. The main advantage of having breakout rooms was that teachers could provide more prompts and helpful guidance to complete the tasks given. Meanwhile, the learners' progress could be closely monitored. Hence, students had the opportunity to demonstrate understanding and skills throughout the discussion session. For instance, when the students were asked to think further about their future careers as part of the assessment, they needed help choosing the professions. Besides, the performance and student understanding could be assessed through the homework given for each workshop.

**Roles**

Stakeholders of the workshops involved parents, special needs educators and volunteers, and/or caretakers. These educators are compassionate school teachers with years of experience dealing with students with behavioural issues, autism, down syndrome, and learning disabilities. Teachers play more than one role. They build rapport with the students by studying the profile of each student, learning to call the students by name, learning students' interests and hobbies, and creating games to arouse students' interest. They also provided additional support during the online classes to ensure students understand the teaching content and can participate well during the session. Follow up teaching support was provided using other messaging and calls.

**Tools & Resources**

The teaching materials was improved based on the needs of the students, and it was used for the second

round of workshop. Dyslexia-friendly colours are used as background in PowerPoint to improve the readability of dyslexic people. The ten workshops are conducted on ten consecutive weekends at night. Considering the infrastructure that the students can access, teachers use Zoom meetings as a video conferencing app, Microsoft Office software, and available online resources that they can access. However, several times, the communication between the teachers and students could have been more effective, as some students switched their cameras on and off. This has caused the teachers not able to gauge their responses and read face and lips expressions. Moreover, students were frustrated whenever they faced technical issues such as experiencing slowness of Internet connection and microphone problems. When they noticed their voices were not heard due to a microphone problem, they felt demotivated and immediately lost interest in the topic.

**Interactivity and Communication**

The language used for the workshop in the first ten workshops is English with Chinese subtitles. However, it was noted that a few students had difficulties expressing themselves in English. Hence, their caretakers supported them in speaking on their behalf during the workshops. A minority of students could use the meeting chat room to find and reply to messages or express their thoughts during the workshop. The interaction between the teachers and the students was mainly in verbal form. Some students needed to gain computer skills and type any messages in the chat room. Sometimes, the caretakers key in the message on behalf of the students who have difficulty expressing difficult words in English. Most of the students did not ask questions during the workshop as they struggled to formulate their queries and raise questions regarding the lesson topics.

Students were happier, more engaged, and proactively involved themselves more whenever their friends were giving responses. It was noted that some students needed more time to give immediate responses or correct answers when the teacher asked a question. Follow-up discussions were conducted after the workshop by the caretakers.

**Independence**

After the first two workshops were conducted, the students were noted to be more independent, disciplined, and able to take charge of their learning. Students with high support needs are generally not confident to express themselves and constantly seek assurance from their caretakers during the workshop.

## DISCUSSION

Online teaching and delivery are examined, and challenges and problems have been identified and discussed in this section.

**Preparation for Workshop**

Before the workshop, the caretakers of students with IDs must prepare to ensure that the tools and equipment are working, such as devices, internet connection, microphone, speakers, and camera. The e-environment was fully utilized to promote learning for students with IDs (Parmigiani, et al., 2021; Petretto et al., 2021). Caretakers must be well-informed regarding the software to be installed, the steps to access the online meetings, and where to get the learning materials. Moreover, caretakers are expected to avoid unnecessary interference, such as helping the students to answer the questions during the workshop. Teachers need to communicate their expectations of the lessons and give clear instructions. Time management is vital as the workshop sessions exceed the time limit several times. Teachers must set time limits for teaching and allocate more time for small group discussions and interaction. After each workshop, caretakers needed to ensure that the homework was completed without the help of the parent or guardian. Teacher-parent collaboration is noted to be critical in online learning for students with IDs (Kim & Fienup, 2022; Suvarna Latha, 2022).

**Online Curriculum Design**

A picture speaks a thousand words, and visuals are more effective than text as it tells the story in an attractive way that attracts students' attention. Instead of using blocks of text as teaching materials, more eye-catchy infographics, audio, video, and animation highlight the important facts that help improve learning and memory recall (Abdulrahaman et al., 2020). Interactive media has been effective for students with IDs, where family support is vital in its implementation (Sholikhati et al., 2022; Suvarna Latha, 2022).

Regarding teaching pedagogy for students with intellectual disabilities (IDs), the "One size fits all" approach does not work. The curriculum design needs to be more "personalized" and changed according to the learner's ability and contexts (Parmigiani, et al., 2021; Petretto et al., 2021; Wu, et. al, 2022). More complicated and challenging tasks should be designed for students with low support needs, whereas simple tasks should be designed for students with high support needs. Different kinds of

support and assistance should be provided, and different teaching approaches based on universal design learning need to be employed for intellectually disabled students according to their intellectual abilities in general education settings (Al Hazmiet al., 2018).

Gamification works in online class settings; it is an excellent tool for meeting learning outcomes. Students are more engaged in online activities when motivated to work towards the game's rewards (Bovermann & Bastiaens, 2020; Kim & Fienup, 2022; Sungjin & Sangkyun, 2021). They are more willing to take on challenges as they advance their levels to master the subject matter at their paces. Gamification builds up the excitement of learning and promotes healthy competition among peers in class.

A sense of belonging in online classes must be created to form a positive learning environment that helps improve student results and satisfaction and lower dropout rates (Brodie & Osowska, 2021; Peacock & Cowan, 2019). Students feel satisfied and happy when the teacher pays attention to them by welcoming them with a smile, calling them by name, and giving them chances to present or express their ideas, and they will feel more connected to the teacher and the class.

Small group discussion works well for online learning. All students are assigned to different breakout rooms for group discussion. The small group discussion offers students more opportunities to voice their ideas and thoughts. Working in a team also helps to develop a learning climate within the small group. Furthermore, small group discussion promotes teamwork and leadership skills (Kozlowski, 2018; Parmigiani, et al., 2021; Sadowski et al., 2018).

A minority of students have a language barrier; therefore, the existing learning material and resources are improvised. The second 10 workshops were conducted in Bahasa Malaysia since the students were recruited from secondary public schools. However, the medium of instruction could be bi-lingual to overcome the language barriers. Students with high support need to work on thinking critically about the tasks given and finding it difficult to express their opinions. It is suggested to provide communication, public speaking, presentation skills, and critical thinking topics for future workshops. Students have difficulty choosing the profession for their future job, so it is good to include individual personality assessments before the workshop to explore employment opportunities suitable for their personalities (Ramadhani et al., 2020; Sheldon et al., 2020).

## CONCLUSION & RECOMMENDATIONS

The online curriculum, teaching methods, process, and procedures of the e-learning management system, and the competencies of students with intellectual disabilities are explored. The stakeholders, technologies, and services are the three salient elements that form efficient e-learning systems. Stakeholders include the academics (teachers) or non-academics (parents, guardians, caretakers, or social workers), who always play several roles in managing and supporting the learners. Concluded by Wu et al. (2022), this study posited a decision model taking into learner's factors, contextual reality, and professional expertise underpinning reasonable accommodation for students with IDs with the support from families (Estrapala & Reed, 2019; Parmigiani, et al., 2021; Petretto et al., 2021). The technology involved in online delivery needs to be easily accessible and user-friendly. An essential substance of the e-learning management system is online curriculum design, whereby the teachers need to take into account the IT competency of students, the scope of online lessons, attention span, and the duration of each online lesson. The findings presented are based on the observation of the workshops and interviews and may not be generalized to students with different learning disabilities. The most important note is that teachers must keep reviewing and revising the instructional strategies to positively impact student learning and create an enjoyable online learning environment. The limitation of the research study on instructional strategies for cognitive impairment groups is the lack of consideration for important factors such as the type and severity of impairment, age, gender, cultural background, education level, previous experience with instructional strategies, and overall cognitive ability. To address these limitations, future research on personalized instructional strategies for different cognitive impairment groups needs to be further explored to add to the depth of the study.

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**DECLARATIONS OF INTEREST**

None

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