# Toward Inclusive Digital Teaching in Malaysia: Challenges, Strategies, and Future Directions

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## ABSTRACT

This study synthesizes equity- and accessibility-oriented approaches to digital teaching in Malaysian higher education and proposes a qualitative design to validate and extend the synthesis. The objectives are to (i) map persistent challenges limiting equitable participation in digital learning, (ii) consolidate practical strategies currently used by institutions and lecturers, and (iii) outline future directions that align with national policy (RMK-12, MyDIGITAL, and the Digital Education Policy). A narrative review of recent scholarship (2020–2025) and sector reports was conducted and organized into four domains—Technical, Pedagogical, Engagement, and Assessment & Feedback. The proposed empirical component comprises two purposively sampled focus groups with experienced lecturers using a semi-structured protocol; transcripts will be analysed through reflexive thematic analysis with double-coding to enhance coherence. The synthesis highlights recurring technical constraints (unstable internet, device shortages, digital divide), limited digital-pedagogy capacity and uneven UDL adoption, online isolation and low social presence, and assessment pressures linked to academic integrity and low-personalization feedback. Cross-cutting, evidence-informed strategies include low-bandwidth and offline contingencies, device-loan schemes and IT helpdesks, continuous professional development with mentoring, inclusive course design, interactive LMS with peer projects and breakout rooms, and formative/peer assessment with multimodal feedback. Future directions prioritize centres of excellence for teaching and learning, AI-enabled teaching assistants and adaptive/personalised learning within robust governance, institution-wide accessibility responsibilities and universal standards, predictive analytics for timely support, and QA rubrics that integrate integrity-by-design. Collectively, the framework provides a practicable roadmap that links immediate classroom tactics to institutional systems change. The forthcoming focus groups are expected to contextualize feasibility, surface discipline-specific nuances, and refine priorities for scalable, policy-aligned implementation in Malaysian universities.

**Keywords:** Digital equity; accessibility; higher education (Malaysia); digital pedagogy; assessment and academic integrity

## INTRODUCTION

The importance of digital innovations in education and their connection to equity and accessibility in teaching is a global phenomenon. Any form of education backed by cutting-edge technologies or pedagogical practices that efficiently use technology is called digital teaching (Breen, 2018). Digital teaching innovation is the latest tool or idea that aims to balance and improve equity and access to education for all, regardless of their background. The goal of equity in education is to give every student the same opportunity to acquire important skills and knowledge that will enable them to lead fulfilling lives and make positive contributions to society (Hidayat Ali et al., 2024). Accessibility in education ensures that everyone has equal access to educational

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opportunities, resources, and services, regardless of whether they have a disability or not. This matter should be considered and prioritized in the context of digital teaching.

Therefore, both aspects related to digital teaching and learning need to complement each other. It refers to any form of instruction that is supported by cutting-edge technologies or pedagogical strategies that make efficient use of the technology. Digital education innovations can be described as state-of-the-art technologies or ideas that improve access and equity to both teaching and learning (Choi-Lundberg et al., 2023). According to Timotheou et al. (2023), digital education can help educators and students bridge the achievement gap, but it can also exacerbate already-existing gaps and make it more difficult for educators to help students from disadvantaged groups to thrive in educational institutions.

Furthermore, the effects of the COVID-19 pandemic dwindle in comparison to the disruptions anticipated by strong new technologies, as well as the risks and the "right" role for the institution in implementing digital education innovation is a crucial matter, as important as the governments who play significant roles in encouraging innovation ecosystems nationwide (Ahmed et al., 2022; Coleman, 2021; Resta & Laferrière, 2008).

In the Malaysian context, although initiatives to speed up innovation and technology adoption, as well as to enhance digital infrastructure and services, were made during the Eleventh Plan, there are still a number of issues to be resolved. The delayed development of the digital economy, which is primarily caused by a lack of infrastructure and disjointed governance and contributed to the expansion of the digital divide, is one of the problems associated with digitalization. This problem is further compounded by the fact that low-income people cannot buy digital services. Efforts to implement cutting-edge technology in embracing 4IR were impeded by low technology acceptance, insufficient investment in Research & Development, Commercialization & Innovation, and a skills shortage (EPU, 2021). Hence, Malaysia, through its Twelve Plan (2021-2025), aims to decrease the digital divide by focusing on equity and accessibility of digital transformation and innovation by having the Malaysian Digital Economy Blueprint. It is built upon three primary pillars: strengthening security, well-being, and inclusiveness; resetting the economy; and enhancing sustainability. In order to promote these themes and pave the path towards a successful, inclusive, and sustainable nation, the four policy enablers are concentrated on strengthening public services, accelerating the adoption and innovation of new technologies, enhancing connectivity and transportation infrastructure, and nurturing future talent. In terms of speeding up innovation and technology adoption for its citizens, Malaysia's development process has entered a new phase with the implementation of Policy Enabler 2: Accelerating Innovation and Technology Adoption and Game Changer XI: Enhancing Digital Connectivity for Inclusive Development (EPU, 2021)

Although the number of internet users and the internet penetration rate in Malaysia in January 2025 has reached 34.9 million users with a penetration rate of 97.7% (Kemp, 2025), the issue of equity and accessibility to digital education still requires attention from all stakeholders, especially the government and educators. The focus of this study is on the challenges, strategies, and future directions that may be crucial in promoting the best practices in integrating digital education in higher education, given the abundance of studies examining the concerns and problems related to equality and accessibility in it. Thus, this conceptual paper examines possible challenges, strategies, and future prospects in order to address equity and accessibility in the context of digital teaching innovation in education.

## LITERATURE REVIEW

The literature review will discuss the challenges, strategies, and future directions of digital innovations in education and their connection to equity and accessibility in teaching, and then will look into future directions and how the topic is relevant to government policy.

### Challenges, Strategies, and Future Directions

The COVID-19 pandemic has disrupted education systems worldwide, forcing many educational institutions to adopt digital teaching methods to ensure continuity of learning (Bozkurt et al., 2020). While digital teaching offers many benefits, it also poses significant challenges for academicians. This conceptual paper explores the

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challenges of digital teaching for academicians to promote equity and accessibility for all, and discusses strategies and future directions for addressing these challenges.

Recent work continues to emphasise accessibility and inclusion as core to equity in digital teaching. A comprehensive review of 91 sources synthesised three major themes—barriers to learning online, frameworks for accessible and inclusive online learning, and responsibility for accessibility—offering concrete implications for practice in higher education (Lomellini et al., 2025). Complementing this, research from low-resource contexts underscores how equitable access to learning and assessment requires redesign of modalities and support systems, not only device provision (Dawadi et al., 2024).

## Challenges of Digital Teaching for Academicians

The following are some of the key challenges faced by academicians in digital teaching:

### Technical Challenges

One of the key challenges is providing stable and reliable internet connectivity for both educators and students (Al-Fraihat et al., 2020). Academic institutions need to ensure that both educators and students have access to high-speed internet to facilitate seamless online learning. The lack of stable internet can lead to disruptions in learning and affect students' overall learning experience (Dong et al., 2021). Technical support is another important consideration for academic institutions to effectively address the technical challenges of digital teaching (Bozkurt et al., 2020). Akpen et al., (2024) suggest that academic institutions need to provide adequate technical support to both educators and students to ensure the effective delivery of online education. This support can include IT support teams, online training sessions, and resource centres.

### Pedagogical Challenges

Maintaining student engagement and motivation is another challenge of digital teaching. Research consistently finds that the absence of physical presence and face-to-face interaction in online learning environments can lead to decreased student engagement, increased feelings of isolation, and reduced motivation (Hollister et al., 2022). Students often report less immediate feedback, diminished social presence, and fewer opportunities for spontaneous interaction, all of which can hinder their willingness to participate and their sense of belonging (Xiao et al., 2024). Traditional assessment methods, such as exams and essays, are often inadequate for online learning. Effective digital education requires alternative assessment strategies and that academics develop new technological, pedagogical, and assessment skills to ensure quality and engagement in virtual environments (Al-Maqbali & Al-Shamsi, 2023). As noted by Hodges et al. (2020), many academics lack the necessary skills and experience to effectively use digital technologies in teaching.

### Students' Engagement Challenges

Student engagement can be a challenge, as digital teaching can create a sense of isolation and reduce interaction (Fernandes et al., 2014). Multiple studies confirm that students transitioning from traditional classrooms to online environments frequently experience decreased engagement and motivation. This is primarily attributed to the lack of spontaneous interaction, diminished sense of community, and fewer collaborative opportunities online (Rajan et al., 2024; Akpen et al., 2024; Eden et al., 2022). Similarly, Bozkurt et al. (2020) identified the lack of social presence as a significant challenge in online education. The absence of nonverbal cues, such as facial expressions and body language, made it difficult for students to connect with their peers and instructors, which in turn affected their engagement in the learning process.

Student engagement literature has also advanced. A 2025 meta-analysis reports that social presence remains a significant predictor of engagement and learning outcomes in online higher education, reinforcing the need for intentional community-building and interaction design within LMS-mediated courses (Mykota, 2025).

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**Assessment and Feedback Challenges**

Assessment and feedback can also be problematic in digital teaching environments. One of the main challenges of digital assessment is ensuring academic integrity. Li and Lalani (2020) note that the lack of face-to-face supervision and proctoring can make it difficult to prevent cheating and plagiarism in digital assessments. Another challenge is providing timely and meaningful feedback to students. As Lee and Choi (2021) point out, digital feedback can often be impersonal and lack the nuance and depth of face-to-face feedback. Digital assessment and feedback also require careful consideration of accessibility and inclusivity. As Ayasrah et al. (2023) note, digital tools and platforms can present barriers to students with disabilities or those from diverse backgrounds. Academics can address this by ensuring that assessments and feedback are designed with accessibility in mind, such as providing alternative formats and ensuring compatibility with assistive technologies.

**Strategies for Addressing Challenges**

The following are some of the effective strategies for addressing the challenges of digital teaching:

**Professional Development**

One approach to professional development is to provide ongoing training and support for educators as they adapt to new digital teaching methods and tools. Sims et al., (2023) suggest that this approach can be particularly effective when it is tailored to the needs of individual educators and incorporates opportunities for reflection and feedback. They also highlight the importance of creating a supportive and collaborative learning environment that encourages educators to experiment with new approaches and learn from one another.

Another effective strategy for professional development is to promote a culture of lifelong learning among educators. This includes providing opportunities for educators to pursue advanced degrees or certifications in digital teaching, as well as encouraging them to engage in ongoing self-directed learning and professional networking (Bozkurt et al., 2020). By promoting a culture of continuous learning, educators are better equipped to stay up-to-date with the latest digital teaching technologies and trends, and are better able to adapt to changing circumstances as they arise.

In addition, mentoring and coaching can be valuable professional development strategies for educators, particularly when they are paired with opportunities for hands-on learning and experimentation (Geletu, 2023). Mentoring and coaching can provide educators with personalized support and guidance as they navigate the challenges of digital teaching and can help them build the skills and confidence necessary to implement new approaches and technologies effectively.

**Course Design**

Course design includes the use of multimedia materials and active learning strategies, which can also enhance digital teaching. AlRawi and AlKahtani (2021) suggest that course materials should be designed with a Universal Design for Learning (UDL) framework, which takes into account the diverse needs of students with different learning styles and abilities. This requires incorporating a range of multimedia elements, such as videos, podcasts, and interactive quizzes, to engage students and present information in different ways.

Additionally, designing effective digital courses requires a focus on creating engaging and interactive learning experiences. As noted by Chima et al. (2024), instructors must carefully design their courses to provide opportunities for student collaboration and active participation, as well as to foster a sense of community among learners in online environments. This can be accomplished through a range of strategies, including the use of breakout rooms, online forums, and collaborative projects.

Furthermore, Fuentes, Newton and Reed (2021) highlighted the importance of designing online courses that align with students' needs and preferences in order to enhance engagement. They noted that the one-size-fits-all approach to online education often fails to cater to the diverse learning styles and backgrounds of students, leading to disengagement and low retention rates.

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Finally, designing effective digital courses requires ongoing professional development for instructors. As noted by Haarala-Muhonen et al., (2023), instructors must be trained in the use of digital tools and technologies, as well as in effective teaching strategies for online and hybrid environments. This requires ongoing support and training from academic institutions, as well as opportunities for instructors to engage in peer learning and collaboration.

**Communication and Support**

Providing clear and detailed instructions for accessing and using online platforms can help overcome connectivity issues (Al-Fraihat et al., 2020). Additionally, academic institutions can provide technical support services to both educators and students to address technical issues and ensure a seamless learning experience (Rostami et al., 2021).

Besides that, academicians should use synchronous and asynchronous communication tools. Asynchronous tools such as discussion forums and email allow for students to communicate at their own pace, while synchronous tools such as videoconferencing and instant messaging enable real-time interaction and feedback (Moorhouse & Wong, 2022). By utilizing a combination of these tools, educators can create a supportive learning environment that fosters student engagement and collaboration.

Personalized feedback and support can also be implemented in digital teaching. It can be delivered through various means such as audio or video recordings, written comments, or rubrics (Ryan et al., 2019). This approach enables educators to provide tailored feedback that can help students understand their strengths and areas for improvement. Additionally, providing students with personalized support through one-on-one meetings or virtual office hours can help build a sense of community and support in digital learning environments (Hsu et al., 2022).

Finally, professional development programs that focus on the development of communication and support skills can also be effective in addressing challenges in digital teaching. These programs can provide educators with the necessary skills and knowledge to effectively communicate with and support students in online learning environments (Meyer, Kleinknecht & Richter, 2023). By emphasizing the importance of effective communication and support in digital teaching, professional development programs can help educators create engaging and supportive learning environments that foster student success.

**Assessment and Feedback**

Academics can adopt various strategies to promote student engagement in digital teaching. For instance, they can incorporate interactive tools, such as virtual simulations and gamification, into their online courses to increase student participation and motivation (Diaz & Estoque-Loñez, 2024). They can also leverage social media platforms and discussion forums to facilitate student interactions and create a sense of community in the online classroom (Hrastinski et al., 2020).

Regular and timely feedback can be helpful in digital teaching. Parmigiani et al. (2024) noted that students often feel disconnected in online learning environments, and providing regular feedback can help bridge this gap. This feedback can take many forms, including comments on assignments, discussion board posts, and emails. Additionally, instructors can use video feedback to create a more personalized and engaging experience for students. Digital courses should include multiple opportunities for feedback throughout the course, such as formative assessments and peer review activities. This allows students to receive timely feedback on their progress and adjust their learning accordingly.

Assessment and academic integrity discussions have rapidly evolved with the rise of generative AI. A 2025 systematic review maps how AI complicates integrity and calls for principle-based policy, assessment redesign, and staff–student AI literacy rather than reliance on detection tools alone (Bittle & El-Gayar, 2025). Related analyses caution that detection technologies are imperfect and should be complemented by authentic assessment strategies. In open and distance education, AI is argued to offer opportunities to improve access and quality, though evidence at scale remains mixed, suggesting a cautious, systems-oriented adoption (Xiao et al., 2024).

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**Future Directions**

Continued professional development is crucial for academicians to adapt to evolving digital teaching technologies and methods (Bozkurt et al., 2020). Institutions need to continue to provide professional development opportunities for academicians to keep pace with the rapidly evolving digital teaching landscape. Collaboration and sharing can also help academicians share best practices and develop new strategies for effective digital teaching (Amemasor et al., 2025). Academicians can collaborate and share best practices and resources with their colleagues to improve the quality of online teaching.

Integration of emerging technologies, such as virtual and augmented reality, can provide new opportunities for engagement and learning in digital teaching environments (Chen et al., 2015). Institutions need to explore and integrate emerging technologies, such as virtual reality and artificial intelligence, to enhance the online learning experience.

Digital teaching presents significant challenges for academicians, but with the right strategies and support, these challenges can be overcome. Professional development, course design, communication and support, and assessment and feedback are key strategies for addressing these challenges. Continued collaboration and integration of emerging technologies are important future directions for improving digital teaching.

**Relevance to Government Policy**

In Malaysia, the policy landscape has shifted with the Dasar Pendidikan Digital by the Ministry of Education Malaysia (2023) detailing objectives, six pillars, and initiatives to develop digitally competent educators, improve infrastructure, and strengthen partnerships. At the national level, the Malaysia Digital Economy Blueprint (MyDIGITAL) frames digital inclusion—such as broadband as basic infrastructure—and a whole-of-nation approach to bridging the digital divide (Economic Planning Unit, 2021). Recent policy analysis indicates that implementation gaps persist, especially in rural areas, and recommends targeted capacity-building and infrastructure acceleration to close equity gaps (Ismail, 2025).

One of the key areas of focus for RMK-12 is the digital transformation of Malaysia's education system. The plan aims to accelerate the adoption of digital teaching and learning technologies to enhance the quality of education and ensure equal access to education for all Malaysians. The plan proposes several initiatives to facilitate the adoption of digital technologies in education and to ensure that all Malaysians have access to quality education regardless of their socio-economic background. One of the initiatives by the government is the Digital Education Transformation (DET) initiative, which focuses on improving the quality of teaching and learning through digital technologies. DET aims to provide a comprehensive digital platform for teachers and students to access quality learning materials and resources, collaborate with peers and educators, and receive personalized feedback and assessments. Therefore, this study will help to identify the challenges and strategies to achieve this aspiration.

This study is also directly related to SDG4, which aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. By implementing digital teaching and learning initiatives, the Malaysian government is working towards providing access to quality education for all, regardless of geographic location or socio-economic background. The focus on enhancing the quality of teaching and learning, as well as promoting innovation in education through the use of technology, is in line with the goals of SDG4. Furthermore, by ensuring that students are equipped with the necessary digital skills and competencies, the government is also contributing towards achieving SDG4's target of ensuring that all learners acquire the knowledge and skills needed to promote sustainable development.

Table 1. Summary of Challenges, Strategies, and Future Directions in Digital Teaching Innovations

| Domain | Challenges | Strategies | Future Directions |
|---|---|---|---|
| Technical | Unstable internet, device shortages, digital divide (Dong et al., 2021; Ministry | Low-bandwidth platforms; offline resources; device loan schemes; IT support | Broadband expansion; affordable connectivity policies; PPPs; policy alignment via MyDIGITAL and |

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|---|---|---|---|
| | of Education Malaysia, 2023; Deng & El Hag, 2024). | (Akmal et al., 2022; Bozkurt et al., 2020; Rostami et al., 2021) | DPD (Economic Planning Unit, 2021; Ministry of Education Malaysia, 2023; Ismail, 2025) |
| Pedagogical | Lack of digital pedagogy skills; limited UDL adoption; reliance on traditional exams (Afonso et al., 2025; Hodges et al., 2020; Means, 2010) | Continuous PD; mentoring; inclusive course design; authentic assessment; curricular integration of digital competence (Bozkurt et al., 2020; Correia et al., 2025; Ma & Ismail, 2025) | Centres of excellence; AI-enabled teaching assistants; adaptive learning; institution-wide accessibility responsibility (EDUCAUSE, 2025; Lomellini et al., 2025; UNESCO, 2023) |
| Engagement | Online isolation; low social presence; lack of collaboration (Fernandes et al., 2014; Hrastinski et al., 2020; Bozkurt et al., 2020) | Interactive LMS; peer projects; breakout rooms; social media tools; deliberate community-building (Austin & Kortemeyer, 2022; Martin et al., 2024; Oyarzun et al., 2023) | VR/AR/XR immersive learning; predictive analytics; AI-driven personalisation; emphasise social presence effects (Tao et al., 2025; Marougkas et al., 2024; Mykota, 2025) |
| Assessment & Feedback | Academic integrity issues; limited feedback personalisation (Lee & Choi, 2021; Bond et al., 2024; Guruge et al., 2025) | Formative & peer assessments; multimodal/video feedback; accessible rubrics; AI literacy for staff and students (Li & Lalani, 2020; Oyarzun et al., 2023; Wu & Chen, 2021) | Universal accessibility standards; AI-integrated academic integrity approaches; institutional QA rubrics; cautious, systems-oriented AI adoption (Ahmed et al., 2022; UNESCO, 2023; Xiao et al, 2024) |

Building upon the literature, four thematic domains—technical, pedagogical, engagement, and assessment—emerge as critical in shaping equity and accessibility in digital teaching. Each domain presents unique challenges, but the literature also offers actionable strategies and forward-looking directions. Table 1 synthesizes findings across these domains, highlighting how immediate interventions (e.g., professional development, low-bandwidth platforms, interactive LMS tools) address short-term issues, while systemic reforms (e.g., broadband expansion, AI-integrated learning, institutional QA standards) ensure long-term sustainability. This synthesis underscores the importance of aligning institutional practices with Malaysia's RMK-12 and MyDIGITAL initiatives and global frameworks such as SDG4.

Finally, beyond access, recent synthesis work on digital competence highlights the need to integrate digital competence across curricula and strengthen institutional support structures for educators and students, pointing to future research on organisational infrastructure and leadership (Ma & Ismail, 2025).

## Conceptual Framework

The conceptual framework (Figure 1) consolidates findings from the literature review into a structured flow. The framework illustrates how four challenge domains—Technical, Pedagogical, Engagement, and Assessment—feed into institutional strategies (Professional Development, Inclusive Course Design, Communication and Support, and Accessible Assessment). These strategies, in turn, drive outcomes of Equity and Accessibility in digital teaching, while aligning with policy imperatives such as Malaysia's RMK-12 and the UN Sustainable Development Goal 4 (SDG4).

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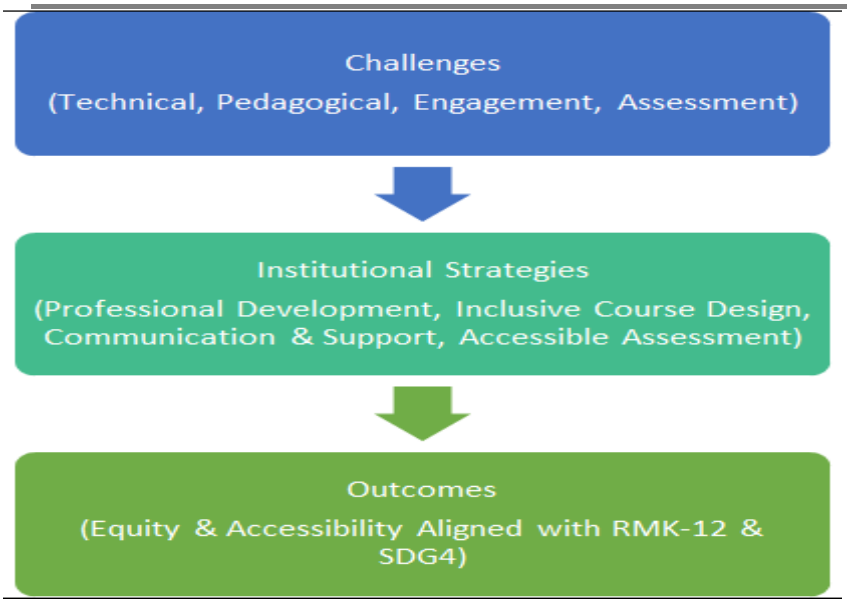


Figure 1. Conceptual Framework for Equity and Accessibility in Digital Teaching Innovations

## METHODOLOGY

The research aims to investigate the challenges, the strategies, and the future directions of the equity and accessibility considerations in digital teaching innovations. Little is known about this topic, and as such, we will use a qualitative research design to collect the data. We will use focus group discussions to unearth the information from the respondents to answer the research questions.

A focus group consists of bringing people from a homogeneous background together into a focused discussion, typically involving six to ten participants in an open discussion led by a moderator. For this study, we intend to conduct two focus groups. Each group will consist of between eight to ten participants with one moderator.

### Sampling Techniques

The researchers will use purposive or judgemental sampling to ensure they have a range of participants from the lecturers. The lists of possible respondents will be developed in consultation with an authorized person from the participating university. We will approach the potential participants with a letter of invitation, which outlines the goals of the study. The individuals who answered positively will be contacted and invited to the focus group sessions. The inclusion and exclusion criteria of the participants are as follows:

1. The participant must be a permanent lecturer from the participating university.

2. The participant must already have served the university for at least 5 years.

### The Instruments

The instruments for data collection are the semi-structured focus group interview questions that will be developed by the researchers based on the literature. The semi-structured focus group interview guide will help the moderator to focus the discussions during the focus group based on the study's objectives. The guide begins with the introduction, which informs participants of the purpose of the study and their right to get a copy of the report and to withdraw from the study at any time without penalty. It also stated that all interviewees will be de-identified, except if the interviewees request identification. The questions are open-ended in nature and are grouped together based on similar concepts and logical occurrence.

The researchers will pre-test the focus group interview guide to ensure the questions are understood by the respondents and to test the technology that we used to record the interviews. Pre-test helped us to refine our data collection plans with respect to both content and procedures to follow (Yin, 2003). The pre-test will be carried

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out with two senior lecturers from each university; they will be excluded from the study population. They must have sufficient experience to confirm the content validity of the questions in the guide. The selection of the participants for the pre-test is based on their occupation, working experience, convenience of access and geographic proximity.

**The Data Collection**

The focus group discussions will be conducted through face to face for better interactions between the participants and moderators to gain more in-depth information. The participants will be asked to sign a consent form before the focus group sessions start. The sessions will be recorded using an audio-visual recorder with the participants' permission; the recordings will later be transcribed by the researchers. The audio recording will be transcribed using Google Voice and NVivo to analyse the results. From the results, the researchers will develop the framework for the equity and accessibility considerations in digital teaching innovations.

**Data Analysis**

Data analysis and interpretation of the qualitative data, that is, through the use of thematic content analysis, begins with coding. Coding is `the process of defining what the data are about' (Charmaz, 2006). A well-established coding method was used to guide the coding of the interviews and documents. To enhance the meaning and capture the emotion, thematic analysis of transcripts will be conducted, and participants' answers will be quoted in the findings.

To ensure the reliability of the findings, the findings from the two focus groups will be compared and cross-case analysis will be done. To ensure validity, unexpected findings from the text will be declared and compared with existing literature.

To conclude, the data analysis consists of analysing individual focus groups and is then followed by cross-case analysis. This reflects triangulation, which ensures the reliability and increases the validity of the analysis of the findings.

## CONCLUSION

This paper is a part of a bigger study that will be undertaken by the researchers. The researchers believe the study can have an impact on society by improving the quality of education and the learning experience for students. By addressing the challenges faced by academicians in digital teaching, the study can help to enhance student engagement, motivation, and achievement in online learning environments. This can, in turn, improve the overall education outcomes for students and contribute to a more educated and skilled workforce in society.

The study may also have an impact on the economy by promoting the adoption of digital technologies in education. The COVID-19 pandemic has accelerated the shift towards digital teaching, and the study's findings and strategies can help academic institutions to effectively incorporate digital technologies into their teaching practices. This can result in cost savings for academic institutions and can provide greater access to education for learners, regardless of their geographic location. Additionally, the increased adoption of digital technologies in education can help to prepare students for a rapidly changing workforce and contribute to the growth of the digital economy.

In addition, the study may have an impact on the nation by improving the quality of education and contributing to the development of a skilled workforce. By addressing the challenges faced by academicians in digital teaching, the study can help academic institutions to effectively deliver education, even in times of crisis such as the COVID-19 pandemic. This can ensure the continuity of education and contribute to the development of a knowledgeable and skilled population that can drive the economic growth of the nation. Additionally, the study's strategies for addressing challenges in digital teaching can contribute to the development of a robust and resilient education system that can adapt to changing circumstances and support the nation's long-term development goals.

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Equity and accessibility in digital teaching innovations may be extremely important in advancing the Sustainable Development Goal (SDG) of "Quality Education," which focuses on guaranteeing inclusive and equitable quality education and encouraging lifelong learning opportunities for everyone. SDG 4 may benefit greatly from these innovations. It is anticipated that equality and accessibility will have a significant impact on digital teaching innovation with respect to SDG 4, fostering inclusive education, lowering educational inequalities, empowering educators and students, addressing digital divides, and advancing lifelong learning.

In conclusion, achieving SDG 4 depends on taking fairness and accessibility into account while developing innovative digital teaching strategies. Setting these factors in order of importance will help us build an inclusive, equitable, and adaptable educational ecosystem that will provide possibilities for lifelong learning and guarantee high-quality education for all students. The researchers may strive toward a more accessible, equitable, and sustainable educational environment in accordance with SDG 4 goals by incorporating these approaches.

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