Tec Empresarial
P-ISSN: 1659-2395; E-ISSN: 1659-3359

ADAPTING TO REMOTE EDUCATION: CHALLENGES AND OPPORTUNITIES

***WANG HAIDONG**
Department: Limkokwing University of Creative Technology.
Email: 948433291@qq.com

***Dr Mohd Saleh Bin Abbas**
Department: Limkokwing University of Creative Technology.
Email: mohdsaleh.abbas@limkokwing.edu.my

Abstract: During the outbreak has driven numerous higher education institutions to swiftly transition to pandemic-driven online learning/remote education, characterized by its rapid pace and largely unstructured nature. Within this unparalleled context, it becomes crucial to comprehend the role of technology in promoting the educational process and to grasp the perspectives of both educators and students as they navigate the transformative effects of the pandemic. This study seeks to explore how technology influenced learning during the initial phases of the outbreak and how both students and educators perceived this impromptu shift. Findings shed light on the widespread adoption of remote education technologies in response to the pandemic, impacting various aspects of the educational process, the utilization of IT platforms, and individual adjustment. The emergency transition to remote education yielded diverse outcomes for the educational process, while experiences with IT platforms generally proved positive and personal adaptation tended to be challenging. The contribution of adapting to remote education lies in its exploration and analysis of the multifaceted challenges and opportunities that arise from the shift to remote learning modalities. By thoroughly examining the transition to remote education, the study highlights the diverse array of challenges faced by educational institutions, educators, students, and other stakeholders. In addition to identifying challenges, the study explores the opportunities inherent in remote education. These opportunities may include increased flexibility and accessibility, innovative teaching methods and technologies, and the potential for expanding educational reach to underserved populations.

Key words: Pandemic-Driven Online, Distance education, EiE, technology tools, productivity.

1. Introduction

On December 31, 2019, China officially notified the World Health Organization (WHO) about an outbreak of a novel coronavirus (WHO, 2020). According to Li et al (2020), shortly thereafter, direct transmission was confirmed, and prompting to assert that significant efforts would be necessary to contain the spread of the virus. By March 2020, the WHO declared COVID-19 a pandemic and urged nations to take immediate and decisive action (WHO, 2020).

In response to these developments and in an effort to mitigate the rapid transmission of Covid-19 while maintaining academic continuity, Global educational establishments began to suspend and avoid physical contact in classes and transitioned to remote instruction (UNESCO, 2020). As of April 2020, the COVID-19 pandemic had affected more than 1.5 billion students, equivalent to 91.3% of total enrollment, spanning 194 countries (UNESCO, 2020).

In the realm of post-secondary institution, the pandemic's consequences were profound. A global study found that 91% of higher education institutions had either already replaced or were in the process of replacing conversational teaching methods with remote activities (Marinoni et al., 2020).

Advancements in information and communication technology (ICT) facilitated this transition from physical to pandemic-driven online/remote learning, helping to prevent significant disruptions to the educational setup during the outbreak. This shift had been underway even before the pandemic, with research indicating that the traditional model of education based exclusively on classroom interactions was becoming outdated (Ally & Prieto-Blázquez, 2014). However, while some higher education institutions had already embraced online learning (OL), for others, the adoption of such methods was entirely new and presented numerous challenges.

The unprecedented nature of pandemic-driven online during the pandemic is highlighted by Watermeyer et al. (2021) as it brought about what they termed 'afflictions,' stemming from the swift and full shift to online delivery and the initial adoption of digital teaching methods at a fundamental level. This emergency shift posed significant challenges, prompting ongoing research to analyze the impacts of the outbreak on educational industries, particularly emphazing on the challenges and opportunities arising from this impromptu situation (Adedoyin & Soykan, 2020; Dhawan, 2020; Lassoued et al., 2020). Evaluating the experience with emergency remote education (ERE) in higher education institutions is crucial to inform the development of future well-planned distance or online platform initiatives (Hodges et al., 2020).

Additionally, it provides insight into the context, input, and process evaluation of ERE, which are essential for informing the design of future learning endeavors by higher education institutions (Hodges et al., 2020). In summary, the contribution of adapting to remote education: challenges and opportunities lies in its comprehensive examination of the issues at hand, its exploration of potential benefits, its development of actionable strategies, and its promotion of dialogue and collaboration among stakeholders. By addressing these aspects, the study aims to inform and empower stakeholders to effectively navigate the transition to remote learning modalities and maximize their potential for enhancing the overall educational experience.

Problem Statement

Despite the potential benefits of remote education, the swift shift to pandemic-drive online during the outbreak exposed significant challenges in areas of access, engagement, pedagogy, assessment, and student well-being. To ensure a high-quality learning experience for all students, educational systems must adapt by addressing these difficulties and fostering a more equitable, engage, and efficient remote acquiring knowledge environment.

The shift to pandemic-drive online in teaching methods, coupled with learning centered around students and engaging sessions, amidst increased student distractions, necessitates an innovative pedagogical approach in HEIs, posing challenges for faculty members. In recent years, there has been a push to shift away from teacher-centered approaches towards learner-centered instruction (Moate & Cox, 2015). Learner-centered content delivery is characterized by its multidimensional, non-linear nature, contextualized within social settings. This approach fosters students' engagement, involvement and self-reliance but also introduces the risk of distraction.

Learner-centered pedagogy, rooted in constructivist learning theory, prompts educators to perceive education within relational and social frameworks (Crawford et al., 2020). The sudden shift to remote education due to events such as the outbreak has presented both challenges and opportunities for educational institutions, educators, students, and stakeholders. While remote education offers flexibility and accessibility, it also brings forth significant hurdles, including technological barriers, disparities in access to resources, difficulties in maintaining student engagement and motivation, and concerns about the quality of learning outcomes. Addressing these challenges effectively requires a comprehensive understanding of the complex dynamics involved in remote education and the identification of strategies and solutions to optimize the opportunities presented by this evolving educational landscape.

Plus, the educators face challenges in sustaining student engagement and mitigating distractions and technology misuse. With digital platforms, educators must design content not only for information delivery but also to stimulate creative thinking and implementation skills. This represents a significant transformation and challenge as the concept of an inclusive classroom is still evolving, with current educational approaches falling short of fully realizing student-centered classrooms (Modan, 2020).

2. Literature Review Distance Education

In the literature review, distance learning is described as an educational approach where students and instructors are geographically separated, often utilizing technology to facilitate instruction and communication. This method enables individuals to access educational content remotely, overcoming barriers of time and location. Scholars highlight its flexibility, scalability, and potential to reach diverse learners, but also discuss challenges such as digital equity, social interaction, and the need for effective pedagogical strategies tailored to remote environments.

In the past decade, "education in emergencies" (EiE) has emerged as a prominent focus within humanitarian crisis response, advocacy, and academic research (Aguilar & Retamal, 2009; Burde et al., 2017; Versmesse et al., 2017). Burde et al. (2017) assert that ensuring school attendance is paramount before implementing other interventions, as conflict often hampers access to education. In response to crises, options learning systems such as fast-tracked learning programs, education based in communities, and provisional learning spaces have been established to support EiE. Research indicates that providing structured, meaningful, and creative activities in school or informal learning environments improves students' emotional and behavioral well-being (Ager et al., 2011; Berger & Gelkopf, 2009; Kostelny & Wessells, 2008). In the literature review, the impact of COVID-19 on distance learning is extensively explored. Scholars examine how the pandemic has accelerated the adoption of remote education worldwide, disrupting traditional learning models and necessitating rapid adaptations by educational institutions. They discuss various aspects of distance learning during this period, including the implementation of online platforms, challenges related to technology access and digital divide, strategies for maintaining student engagement and motivation, and the role of teachers in facilitating effective remote instruction. Additionally, researchers analyze the long-term implications of COVID-19 on education and highlight lessons learned for future preparedness in remote learning initiatives.

Within the context of this article and its focus on teaching and learning during the pandemic, this phenomenon is referred to as Emergency Remote Education (ERE). The transition from conversational instruction to ERE has presented numerous challenges and opportunities. A key issue is the compulsory shift in attitudes of education administrators, instructors, and learners towards the significance of ERE (Ribeiro, 2020). One of the major drawbacks of the ERE system is the lack of direct interaction and communication between teachers and learners. This aligns with Lassoued et al. (2020), who identified four categories of major barriers to achieving quality in ERE during the outbreak: individual, pedagogical, technical, and financial and organizational obstacles. Similarly, Watermeyer et al. (2021) highlighted teachers' negative experiences with the migration to ERE, including issues related to preparedness, confidence, institutional support, access, workload, and the challenges and opportunities afforded by the transition.

Significantly, the limited of faculty readiness for distance online platform and the disruptions caused by changing to online teaching platform have been identified as primary challenges in adopting technology for teaching in blended and online learning environments (Brown, 2016; Cutri et al., 2020; Hung & Chou, 2015; Rasheed et al., 2020). Additionally, Adedoyin and Soykan (2020) summarized the challenges faced by higher education institutions during this digital transformation, including compatibility gaps in certain disciplines, technological limitations, disparities in student performance, faculty readiness, and the need for modifications to grading systems.

Moreover, Gillis and Krull (2020) identified perceived barriers to success in courses during the pandemic, which primarily revolved around COVID-19-related issues, changes in academic structure, and new living situations. These personal constraints, particularly concerning new living arrangements, have led to disruptions and distractions during ERE sessions. Instructional techniques employed during ERE, such as live Zoom lectures and discussions, are viewed as accessible but less effective and enjoyable by students (Gillis & Krull, 2020), echoing the challenges outlined by Dhawan (2020) regarding the weaknesses and obstacles associated with radical transformations in education.

The rapid and abrupt digital transformation of higher education institutions during the pandemic has resulted in increased workloads and stress for both educators and students, ultimately affecting academic performance and mental well-being.

Moving from emergency-driven online content delivery to a holistic, continuous online pedagogical approach.

Pedagogy pertains to the most effective methods for facilitating learning. Successful pedagogy requires educators to understand and determine the optimal approach for delivering course material to facilitate student learning effectively. E-learning necessitates a distinct pedagogical approach, particularly in areas such as online assessment and individual and group interactions. E-learning goes beyond simply presenting information on websites; it also involves the cultivation of new ICT skills (Islam, Beer, & Slack, 2015).

Presently, there is no definitive answer to this question, but it is evident that ongoing physical isolation is affecting the academic workforce (Crawford et al., 2020). This phrase describes a shift in educational practices. Initially, during emergencies such as the COVID-19 pandemic, educational institutions often had to rapidly transition to delivering content online as a temporary measure to ensure continuity of learning. However, the aim is to evolve beyond this emergency-driven approach towards a more comprehensive and sustainable online pedagogical strategy.

Emergency-driven online content delivery by referring to the immediate response taken by educational institutions to deliver educational content through online platforms in response to unexpected events or crises, such as natural disasters or public health emergencies. The focus is primarily on providing access to content to ensure that learning can continue despite disruptions to traditional in-person teaching methods. Next, holistic, continuous online pedagogical approach. This represents a more comprehensive and long-term strategy for online education. Instead of simply delivering content, this approach encompasses all aspects of teaching and learning in an online environment. It involves designing courses with careful consideration of pedagogical principles, instructional design, assessment methods, student engagement strategies, and ongoing support for both educators and learners. The emphasis is on creating a cohesive and effective online learning experience that mirrors or enhances the quality of traditional face-to-face

instruction. In essence, the phrase describes the progression from a reactive, short-term response to crises towards a proactive, sustainable model of online education that prioritizes pedagogical excellence, student engagement, and continuous improvement.

The shift to online teaching methods, coupled with the adoption of student-centered learning models and interactive sessions amidst potential student distractions, necessitates an innovative pedagogical approach in HEIs, posing challenges for faculty members. Over the past decade, there has been a push to replace teacher-centered methods with learner-centered instruction (Moate & Cox, 2015). This pedagogical approach prioritizes a democratic approach, fostering active student participation and self-direction, while acknowledging the possibility of student distraction. Emergent from constructivist learning theory, learner-centered pedagogy encourages educators to view education within relational and social spheres (Crawford et al., 2020).

This transition involves shifting from a temporary, emergency-driven method of delivering educational content online to establishing a thorough and permanent framework for online teaching. It encompasses the development of robust online teaching strategies, the integration of technology into curriculum design, the implementation of supportive resources for both educators and learners, and the establishment of long-term plans to sustain effective online education delivery. The emergence of digital platforms is anticipated to prompt an imperative shift in the education system. However, it remains challenging to forecast the precise impact of these transformations on traditional institutions, which were purposefully structured to facilitate close interaction among researchers, students, and educators. While technological advancements may enable gradual transitions to online programs, it is crucial to effectively manage the substantial differences between face-to-face interactions and online content delivery.

Cornard (2004), as cited in Islam et al. (2015), identified four distinct areas of expertise essential for online instructors: pedagogical, social, technical, and managerial. Through a questionnaire conducted by Cornard (2004), significant concerns among academics were highlighted, including:

i. Loss of control over student behavior.
ii. Decreased concentration compared to traditional modes of instruction.
iii. Challenges in navigating online platforms.
iv. Feelings of being disconnected from students due to the inability to observe them directly.

The transition from traditional or blended learning models to entirely virtual networks will not occur overnight. Challenges such as inadequate home office infrastructure and a lack of necessary skills to design online educational content present significant obstacles.

Theory of Learning Through Technology Mediation.

The "Theory of Learning Through Technology Mediation" is an educational framework that explores how technology can facilitate and enhance the learning process. It posits that technology serves as a mediator between learners and the learning environment, influencing the way knowledge is acquired, processed, and applied. According to Bower (2019, p. 1036), the concept

of "technology-mediated learning" suggests that technology serves as the conduit through which information is conveyed and individuals are connected.

Bower's (2019) theory of technology-mediated learning (TML) offers an integrated and comprehensive theoretical framework for developing and analyzing situations where technology facilitates learning. The Theory of Learning Through Technology Mediation posits that technology plays a pivotal role in facilitating and mediating the learning process. This theory emphasizes that technology serves as a mediator between learners and the knowledge they seek to acquire. It suggests that technology, such as computers, tablets, or interactive software, can enhance learning by providing learners with tools, resources, and environments that support their cognitive processes.

According to this theory, technology can mediate learning in several ways:

i. Access to Information: Technology provides learners with access to vast amounts of information and resources that may not be readily available through traditional means. This access allows learners to explore diverse perspectives, engage with multimedia content, and conduct research to deepen their understanding of concepts.

ii. Interaction and Engagement: Technology offers interactive and engaging learning experiences through multimedia elements, simulations, and educational games. These interactive tools stimulate learners' curiosity, promote active participation, and enhance their motivation to learn.

iii. Adaptation and Personalization: Technology can adapt to learners' individual needs, preferences, and learning styles. Adaptive learning systems use algorithms to analyze learners' performance and provide personalized feedback, recommendations, and learning pathways tailored to their unique strengths and weaknesses.

iv. Collaboration and Communication: Technology facilitates collaboration and communication among learners, educators, and experts across geographical boundaries. Online platforms, discussion forums, and social media enable learners to collaborate on projects, share ideas, and engage in meaningful discussions, fostering a sense of community and collective learning.

v. Reflection and Metacognition: Technology supports learners' metacognitive processes by providing tools for reflection, self-assessment, and goal-setting. Digital portfolios, learning journals, and self-assessment quizzes encourage learners to monitor their progress, identify areas for improvement, and develop their metacognitive skills.

Overall, the Theory of Learning Through Technology Mediation underscores the transformative role of technology in education, emphasizing its potential to enhance learning experiences, empower learners, and promote lifelong learning in diverse contexts.

Key elements of TMT include:

i. Technology: This encompasses hardware, software, and services related to computing, electronics, and information technology. This can range from consumer electronics like

smartphones and laptops to enterprise solutions such as cloud computing, artificial intelligence, and cybersecurity.

ii. Media: Media refers to the content, platforms, and channels through which information is communicated or entertainment is delivered to audiences. This includes traditional forms of media like television, radio, newspapers, and magazines, as well as digital media such as websites, social media platforms, streaming services, and online gaming.

iii. Telecommunications: This involves the transmission of voice, data, and video over long distances via various means such as wired and wireless networks. Telecommunications companies provide services like mobile and fixed-line telephone services, internet access, broadband connectivity, and networking solutions for businesses.

iv. Innovation: Innovation is a cornerstone of the TMT industry, driving advancements in technology, content creation, and communication infrastructure. Companies in this sector continually invest in research and development to create new products, services, and experiences that meet evolving consumer needs and preferences.

v. Convergence: TMT industries are increasingly converging, blurring the lines between technology, media, and telecommunications. For example, telecommunications companies may offer media streaming services, media companies may develop technology products, and technology companies may provide communication services. This convergence creates opportunities for synergies and integrated offerings but also challenges traditional business models and regulatory frameworks.

vi. Regulation and Policy: Due to the significant impact of TMT on society, governments often regulate these industries through policies related to competition, consumer protection, privacy, intellectual property, and content censorship. Regulatory changes can profoundly affect the operations and strategies of TMT companies, influencing everything from market entry to mergers and acquisitions.

vii. Globalization: TMT markets are increasingly globalized, with companies operating across borders and serving diverse international audiences. Globalization presents opportunities for expansion and market growth but also challenges related to cultural differences, regulatory compliance, and geopolitical risks.

Understanding these key elements is essential for stakeholders in the TMT industry, including companies, investors, policymakers, and consumers, as they navigate a rapidly evolving landscape shaped by technological innovation, changing consumer behaviors, and regulatory dynamics.

Engagement and Active Involvement between Educators and Students

Encouraging active student participation can involve various strategies. Faculty can frequently pause during sessions, prompting students to utilize the hand raising feature available in many Learning Management Systems (LMS) to contribute thoughts and answers. Additionally, employing features like polls facilitates engagement and enables real-time assessment through multiple-choice formats. Another effective method is utilizing discussion boards or forums, akin

to just-in-time teaching, for pre-class preparation and post-class reinforcement. However, our observations suggest that students may not naturally gravitate towards these forums. Hence, integration of these activities into regular learning tasks and assessments becomes crucial. Moreover, to foster meaningful interaction, students should be explicitly instructed to engage with their peers' contributions. Post-class discussion boards, structured around specific questions related to the session's content, serve as effective tools for pinpointing misconceptions or gaps in understanding.

These varied pedagogical approaches not only assure faculty of maintaining curriculum quality and achieving learning outcomes in virtual settings but also offer opportunities to enhance student engagement and learning in novel ways, as illustrated in Figure 1. In the depicted scenario, students (depicted in green) and faculty (depicted in yellow) interact through various communication modalities within the virtual classroom. Students can engage visually via computer cameras and filters, or actively through text and chat, as well as more passively through features like raising their hand or participating in polls. Importantly, offering students flexibility in choosing and combining these communication modalities supports diverse learning styles and preferences, thereby enhancing virtual instruction effectiveness for a broader spectrum of college students (for further insights, refer to Neuwirth et al., 2018, 2019).

Engagement and active involvement between educators and students are fundamental components of effective teaching and learning. First is engagement. Engagement refers to the degree of interest, attention, and participation demonstrated by students in the learning process. When students are engaged, they are mentally and emotionally invested in the subject matter, motivated to learn, and actively involved in classroom activities. Engaged students are more likely to retain information, demonstrate higher levels of achievement, and develop a deeper understanding of concepts. Educators play a crucial role in fostering student engagement by creating a supportive and stimulating learning environment, incorporating interactive teaching methods, and aligning instructional strategies with students' interests, needs, and learning styles. By using engaging teaching materials, encouraging active participation, and providing meaningful feedback, educators can cultivate a culture of engagement that enhances student learning outcomes.

Second by active involvement. Active involvement refers to the extent to which students are actively participating in the learning process through various cognitive and behavioral activities. Active involvement goes beyond passive listening and involves students in activities such as critical thinking, problem-solving, discussion, collaboration, and hands-on experiences. Educators can promote active involvement by designing learning activities that require students to apply knowledge, analyze information, and communicate their ideas effectively. Incorporating active learning strategies such as group work, case studies, role-playing, simulations, and project-based learning encourages students to take ownership of their learning, engage in higher-order thinking skills, and develop a deeper understanding of the subject matter.

Follow-up with effective engagement and active involvement between educators and students foster a dynamic learning environment where learning is meaningful, relevant, and enjoyable. By

promoting collaboration, curiosity, and a growth mindset, educators empower students to become active learners who are motivated to explore, inquire, and excel academically and beyond.

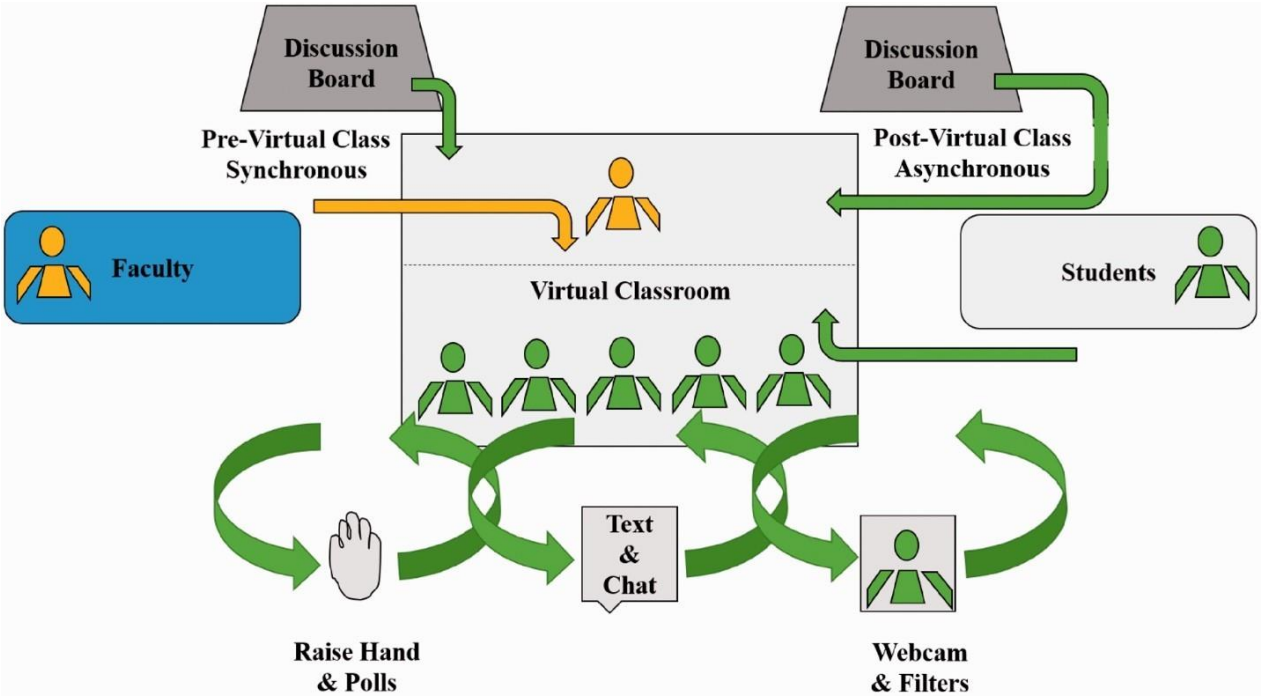

Figure 1: Students Engagement

Engagement and active involvement between educators and students" refers to the dynamic interaction and participation that takes place within the educational setting. It involves fostering a learning environment where both educators (teachers, professors, instructors) and students are actively engaged in the learning process, collaborating, communicating, and sharing ideas to enhance learning outcomes.

Firstly, the two-way communication. Rather than a one-sided dissemination of information from educator to student, engagement involves active dialogue and interaction. Educators encourage students to ask questions, express their thoughts, and contribute to discussions, fostering an environment where ideas are exchanged freely.

Must being an active learning strategy. The engagement goes beyond passive listening or reading. Educators employ active learning strategies such as group discussions, problem-solving activities, hands-on experiments, case studies, debates, and projects to stimulate critical thinking, creativity, and participation among students.

Do the personalization and differentiation. An effective engagement recognizes that students have diverse learning styles, interests, and needs. Educators tailor their instructional methods and content to accommodate these differences, ensuring that all students feel motivated and included in the learning process.

Ask for the feedback and assessment. By continuous feedback loops are integral to engagement. Educators provide constructive feedback to students on their progress, assignments, and performances, guiding them toward improvement. Similarly, students may provide feedback to educators on teaching methods and course materials, fostering a collaborative approach to learning.

Furthermore, developing and building relationships. Strong relationships between educators and students form the foundation of engagement. Educators cultivate a supportive and inclusive classroom environment where students feel respected, valued, and connected. Establishing rapport and trust encourages students to actively participate and take ownership of their learning.

Plus, integration of technology is a must. In today's digital age, technology can be leveraged to enhance engagement. Educators use various digital tools, platforms, and multimedia resources to create interactive learning experiences, facilitate communication, and provide personalized feedback to students.

Lastly, be real-world relevance: Engaging education connects classroom learning to real-world applications and experiences. Educators incorporate relevant examples, case studies, and projects that resonate with students' interests and aspirations, making learning meaningful and motivating.

Promotion of Autonomy and Empowerment: Engaged learning empowers students to take initiative and responsibility for their own learning journey. Educators encourage autonomy, self-directed learning, and critical inquiry, empowering students to explore topics independently and develop lifelong learning skills.

By fostering engagement and active involvement between educators and students, educational institutions can create vibrant learning communities where curiosity is nurtured, knowledge is co-constructed, and students are empowered to reach their full potential.

3. Methodology

Introduction

This section introduces the research design and other research methods used in this study. The section will describe in detail the research site, population and sampling techniques, use of scales, validity and reliability of scales, data collection procedures, and data analysis. This chapter briefly discusses the Adapting to Remote Education, Challenges and Opportunities. The types of statistical analysis used in this study will be introduced in detail in the data analysis discussion before the summary of this chapter.

Research Design

This study adopted a quantitative method, because quantitative research is suitable for predicting and controlling the relationships between variables (Creswell,2017). The choice of research method depends on its applicability, ability to solve the research problem, and ability to achieve the research objectives. The main purpose of this study is to explore about Adapting to Remote Education, Challenges and Opportunities in higher education institutions. Quantitative research is the best way to analyze problems of relationships between variables, with the purpose of uncovering, predicting and controlling phenomena. Considering that questionnaire surveys are an effective way to obtain perceptual and attitudinal data (Wang Hong, 2016), we adopted a set of mature survey questionnaires, aiming to infer causal relationships between variables (Yang Qiang, 2020) through descriptive and inferential statistical methods to respond to research objectives. Therefore, the best research method for this study is quantitative research.

Correlational research aims to determine the extent to which a change in one factor is related to changes in one or more factors based on a coefficient index. Correlation is the most appropriate method for observing whether variables are interrelated (Fraenkel, Wallen & Hyun, 2016). Correlational research is an appropriate method for observing whether variables are interrelated. This study does not seek to determine a causal relationship for a variable, but wants to discuss its relationship with variables and other variables.

Survey method is used to collect the data needed for this study, involving questionnaires. According to Groves et al. (2009), compared with qualitative methods, the survey method can collect large-scale behavioral and belief data more efficiently, and make these data more comparable.

Sample Size

For the sample size of this study, appropriate sample sizes can be determined using empirical methods and statistical methods. The general standard for determining the sample size of a questionnaire survey study through the empirical method is between 100-500 (Singh and Masuku, 2014). Hill et al. (2005) believe that the questionnaire survey sample size is preferably between 100-200, with at least no less than 100. Fowler (1993) pointed out that for quantitative research, the sample size should be at least 100-200, and specific subgroups should be at least 50-100. It is generally required to be at least greater than 100, with better results between 200-300. At the same time, the sample size must be greater than 30 in order to make statistical inferences, otherwise the robustness of the results is poor (Hill 1998).

Since the total number and overall characteristics of production workers in Nankang's furniture manufacturing enterprises are relatively certain, this study combines relevant conclusions of empirical methods and uses Krejcie and Morgan (1970)'s calculation technique to determine the sample size. Krejcie and Morgan (1970) proposed a basic sample size calculation formula for

determining the sample size of a given population, which has been used by many researchers, as follows:

$$n = \frac{N \cdot Z^2 \cdot p(1-p)}{E^2(N-1) + Z^2 p(1-p)}$$

Figure 2 : Explanation of Calculation

Sampling Technique

The main criterion for selecting a sample for study is that the sample must be able to represent the population that researchers wish to infer about (Frankfort-Nachmias & Nachmias, 2008). The sample of this study consisted of 384 frontline production workers from furniture industry clusters in Nankang District, Jiangxi Province, China. There are two sampling techniques in research methods, namely random sampling and non-random sampling. For studies of large populations, the best technique is simple random sampling, because with this random sampling technique, the probability of each person in the population being selected is equal (Lavrakas, 2008), while non-probability sampling does not involve random selection, but rather selection of population elements according to non-random criteria (Dudovskiy, 2016). Therefore, this study adopts random sampling technique.

Four common methods for obtaining such samples are simple random sampling, systematic random sampling, stratified random sampling, and cluster random sampling.

Pilot study

In order to ensure the smooth progress of this survey, we conducted a small sample pilot study to ensure the internal consistency reliability of the four scales involved using Cronbach's α coefficient. The purpose of this pilot study is to further improve the questionnaire items so that they can be accurately understood by the respondents and avoid misunderstandings, as well as to check for possible deficiencies in the scales during the survey process, such as cross-cultural semantic deviations. As Leon et al. (2011) pointed out, pilot studies can provide valuable feasibility assurance to help improve procedures, estimate key parameters to guide resource allocation decisions, and can enhance the transparency and interpretability of subsequent evaluations.

Connelly (2008) pointed out that for descriptive research designs, pilot study sample sizes typically range from 10-30, and pilot study sample sizes can also account for 10% of the actual sample.

Bland and Altman (1997) suggest the following empirical practice for interpreting Cronbach's α coefficient:

Cronbach α > 0.9 = excellent
Cronbach α >0 .8 = good
Cronbach α > 0.7 = acceptable
Cronbach α > 0.6 = questionable
Cronbach α > 0.5 = poor
Cronbach α > 0.4 = unacceptable

In this pilot study, the Cronbach α coefficients all reached 0.7 or above, so the reliability of related scales is acceptable.

Validity

Scale validity refers to the degree to which a scale can accurately measure the concepts or constructs that it intends to measure (Kline, 2000). It reflects the quality of the scale and is an important indicator to ensure the reliability and usability of the scale (Reynolds et al., 2009). Factors affecting test validity include content validity, criterion validity, and structural validity (Straub et al., 2004). These different types of validity evaluate the validity of the scale by determining the consistency of measurement results with standards. Among them, content validity is fundamental.

Reliability

Reliability is an indicator reflecting the stability and consistency of the results of a measurement tool (Furr, 2011). It directly affects the accuracy of scale results and is the primary criterion for judging scale quality (Kaplan & Saccuzzo,2018). Commonly used statistical methods to judge scale reliability include test-retest reliability, Cronbach's α coefficient, and component correlation (Tang Qing et al., 2015). In practical applications, the reliability coefficient of a scale must reach at least 0.7 before it is considered acceptable (Nunnally, 1978); In basic research, this standard can be increased to 0.8 (Straub et al., 2004). This section discusses the reliability test conclusions of various research scales in previous studies to ensure that each instrument used in this study has good reliability.

Data Analysis Techniques

This study analyzes research questions and hypotheses. The main methods used are the social science statistical software package (SPSS) and structural equation modeling (AMOS). Data

analysis is explained in the form of descriptive analysis and inferential statistical analysis. Descriptive statistical analysis methods mainly include calculation of characteristic values (such as mean, mode, standard deviation, etc.) of data, drawing data distribution charts, cross-table analysis of data, etc.; Inferential statistical analysis mainly includes hypothesis testing, Pearson correlation analysis, analysis of variance, regression analysis, structural equation modeling (SEM), etc. Data missing value treatment has been performed before this analysis.

To analyze the data, in the first step all of the responses were coded by SPSS version 21 software. Additionally, various statistical processes were applied to answer the research hypotheses. For this purpose, this study utilized descriptive and inferential statistics. For descriptive statistics, a frequency distribution table was developed to include central tendency, dispersion and distribution of all variables. Graph descriptions were given based on the plotted graphs. Moreover, in this part, the first research question was evaluated by using the mean value of students' responses to questionnaires in order to assess the status of students and remote education.

4. Summary

This chapter details the research methods, including research design, population and sampling procedures, descriptions and evaluation criteria of various scales, analysis of scale validity and reliability of survey procedures, methods of data collection and data analysis. The content discussed in this chapter lays the groundwork for the results of the research in the next chapter.

References

1. Adedoyin, O. B., & Soykan, E. (2020). Covid-19 pandemic and online learning: The challenges and opportunities. Interactive Learning Environments. Advance online publication. https://doi.org/10.1080/10494820.2020.1813180
2. Aguilar, P. , & Retamal, G. (2009). Protective environments and quality education in humanitarian contexts. International Journal of Educational Development, 29(1), 3–16. 10.1016/j.ijedudev.2008.02.002.
3. Anand, A. (2020). Covid lockdown impact: Parents ask for guidelines for kids' online classes. Retrieved April 21, 2024, from indiatoday.in: https://www.indiatoday.in/mail-today /story/covid-lockdown-impact-parents-ask-for-guidelines-for-kids-online-classes-1698525-2020-07-09.
4. Basilaia, G., & Kvavadze, D. (2020). Transition to online education in schools during a SARS-CoV2 coronavirus (COVID-19) pandemic in Georgia. Pedagogical Research, 5(4). doi:10.29333/pr/7937
5. Bettinger, E., & Loeb, S. (2017). Promises and pitfalls of online education. Retrieved July 18,2020, from brookings.edu: https://www.brookings.edu/research/promises-and-pitfalls-ofonline-education/
6. BizED. (2020). International student mobility and the impact of pandemic. Retrieved April17, 2024, from bized.aacsb.edu: https://bized.aacsb.edu/articles/2020/june/covid-19-and-thefuture-of-international-student-mobility.

7. Coman, C., Țîru, L.G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M.C. (2020). Online Teaching and Learning in Higher Education during the Coronavirus Pandemic: Students' Perspective. Sustainability, 12(24), 10367. doi:10.3390/su122410367
8. Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., . . . Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. Journal of Applied Learning & Teaching, 3, 1. doi:10.37074/jalt.2020.3.1.7.
9. Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. Psychometrika, 16, 297– 334.
10. De Angelis, D. (2014). eLearning Challenges and Opportunities. ELearning Industry https://elearningindustry.com/elearning-challenges-opportunities
11. Dimitriadis, G., McCarthy, C., Sultana, R.G., & Blackmore, J. (1998). Education, globalization and the nation state. British Journal of Sociology of Education, 19(4), 571–586.
12. Dr, S.S. (2015). Learning outcomes in an online vs traditional course. International Journal for the Scholarship of Teaching and Learning.
13. Duraku, Z.H., & Hoxha, L. (2020). The impact of COVID-19 on education and on the well-being of teachers, parents, and students: Challenges related to remote (online) learning and opportunities for advancing the quality of education. Retrieved from researchgate.net: https://www.researchgate.net/publication/341297812_The_impact_of_COVID19_on_education_and_on_the_wellbeing_of_teac hers_parents_and_students_Challenges_related_to_remote_online_learning_and_opportunities_for_a dvancing_the_quality_of_education
14. El-Azar, D., & Nelson, B. (2020). How will higher education be different in 2030?
15. Retrieved from britishcouncil.org: https://www.britishcouncil.org/voices-magazine/futurehigher-education.
16. Gupta, S. (2017). 9 Benefits Of eLearning For Students. ELearning Industry; eLearning Industry. https://elearningindustry.com/9-benefits-of-elearning-for-students International Association of Universities. (2020, May). The Impact of COVID-19 on Higher Education Around the World. Retrieved from iau-aiu.net: https://www.iau-aiu.net/IMG/pdf/iau_covid19_and_he_survey_report_final_may_2020.pdf
17. Internet World Stats. (n.d.). Usgae and Population Statistics. Retrieved April 17, 2024, from internetworldstats.com: https://internetworldstats.com/stats.htm
18. Islam, N., Beer, M., & Slack, F. (2015). E-learning challenges faced by academics in higher education: A literature review. Journal of Education & Training Studies, 3(5). doi:10.11114/jets.v3i5.947
19. Lancker, W.V., & Parolin, Z. (2020). COVID-19, school closures, and child poverty: A social crisis. The Lancet, 5, 5. doi:10.1016/S2468-2667(20)30084-0.
20. Lassoued, Z. , Alhendawi, M. , & Bashitialshaaer, R. J. E. S. (2020). An exploratory study of the obstacles for achieving quality in distance learning during the COVID-19 pandemic. Education Sciences, 10(9), 232. [Google Scholar]
21. Marinoni, G. , Land, H. V. T. , & Jensen, T. (2020). The impact of COVID-19 on higher education

around the world. Retrieved from International Association of Universities (IAU).
22. Meyer, K.A. & Wilson, J.L. (2011). The Role of Online Learning in the Emergency Plans of Flagship Institutions. Online Journal of Distance Learning Administration, 14(1),. Retrieved April 23, 2024 from https://www.learntechlib.org/p/52628/.
23. Moate, R.M., & Cox, J.A. (2015). Learner-Centered pedagogy: Considerations for application in a diadctic course. The Professional Counselor, 5(3), 379–389. doi:10.15241/rmm.5.3.379
24. Modan, N. (2020). Most educators are not equipped for student-centered learning.
25. Retrieved fromeducationdive.com: https://www.educationdive.com/news/report-mosteducators-arent- equipped-for-student-centered-learning/585012/
26. Neuwirth, L. S., Ebrahimi, A., Mukherji, B. R., & Park, L. (2018). Addressing diverse college students and interdisciplinary learning experiences through online virtual laboratory instruction: A theoretical approach to error-based learning in biopsychology. In A. Ursyn (Ed.), Visual Approaches to Cognitive Education with Technology Integration (pp. 283–303). Pennsylvania: IGI Global publishers.
27. Pranam, A. (2019). Transforming online learning with artificial intelligence. Retrieved April 17, 2024, from forbes.com: https://www.forbes.com/sites/aswinpranam/2019/10/04/trans forming-online- learning-with-artificial-intelligence/#5afae3aa432e
28. Pulsipher, S. (2020). Covid-19 acclerates disruptive trends facing higher education. Retrieved from forbes.com: https://www.forbes.com/sites/scottpulsipher/2020/07/08/covid-19- accelerates-3- disruptive-trends-facing-higher-education/#10be59e538df.
29. Q. Li et al. (2020). Knowledge structure of technology licensing based on co-keywords network: A review and future directions .International Review of Economics & Finance.
30. Quintana, C. (2020). College student visa: Trump admin bars new foreign students taking online classes in US. Retrieved from usatoday.com: https://www.usatoday.com/story/news/education/2020/07/24/college-student-visa-ice-trump-covid-rule/5504422002/
31. Ribeiro, R. (2020). How university faculty embraced the remote learning shift. https://edtechmagazine.com/higher/article/2020/04/how-university-faculty-embraced-remote- learning-shift [Google Scholar]
32. The New York Times. (2018). Online classes are harming the students who need the most help.
33. Retrieved July 17, 2020, from nytimes.com: https://www.nytimes.com/2018/01/19/business/online-courses-are-harming-the-students-who-need-the-most-help.html
34. U.S. Department of Education. (2012). Understanding the implications of online learning for educational productivity. Retrieved July 17, 2020, from tech.ed.gov: https://tech.ed.gov/files/2013/10/implications-online-learning.pdf
35. UNF. (2021). LibGuides: Conducting a Literature Review: Benefits of Conducting a Literature Review. Libguides.unf.edu. https://libguides.unf.edu/litreview/benefits Western Sydney University. (2017). Literature review purpose. LibraryStudy Smart. https://www.westernsydney.edu.au/ data/assets/pdf_file/0006/1254786/Literature_review_purpose.p df.
36. Watermeyer, R. , Crick, T. , Knight, C. , & Goodall, J. (2021). COVID-19 and digital disruption

in UK universities: Afflictions and affordances of emergency online migration. Higher Education, 1–19. 10.1007/s10734-020-00561-y PMC free article] [PubMed] [CrossRef

37. WHO (2020a). Novel coronavirus – China. https://www.who.int/csr/don/12-january-2020-novel-coronavirus-china/en/
38. WHO . (2020b). WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. https://www.who.int/director-general/speeches/detail/who-director-general-s-opening- remarks-at-the-media-briefing-on-covid-19–-11-march-2020 [Google Scholar
39. WHO. (2021). Advice for Public. Who.int. https://www.who.int/emergencies/diseases/ novel-coronavirus-2019/advice-for-public.
40. Wollowski, M., Neller, T., & Boerkoel, J. (2017). Artificial intelligence education. AI Magazine, 38(2), 5–6. doi:10.1609/aimag.v38i2.2728
41. World Economic Forum. (2020). Three ways the coronavirus pandemic could reshape education. Retrieved April 17, 2024, weforum.org: https://www.weforum.org/agenda/2020/03/ 3-ways-coronavirus-is-reshaping-education-and-what-changes-might-be-here-to-stay/
42. Zalat, M.M., Hamed, M.S., & Bolbol, S.A. (2021). The experiences, challenges, and acceptance of e- learning as a tool for teaching during the COVID-19 pandemic among university medical staff. PLOS ONE, 16(3), e0248758. doi:10.1371/journal.pone.0248758