Challenges of Using Digital Learning Resources among Higher Education Students in Nepal: A TPACK Framework Analysis

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ABSTRACT

This study aimed to explore the challenges faced by higher education students on the use of digital learning resources in classrooms during and after the COVID-19 pandemic. The study was conducted among higher education students studying in the Master of Education (M.Ed.) programme with specialized in Health Education from Tribhuvan University (TU), Nepal employing an exploratory qualitative research design with a narrative inquiry approach. For this study, three campuses under the TU were selected purposively, where three focus group discussions were conducted to solicit information from 18 participants, with six from each campus. The Technological Pedagogical Content Knowledge (TPACK) explanatory framework was used to analyze the data under four broader themes: technological challenges, pedagogical challenges, content-related challenges, and other challenges. The findings of the study indicated that the students faced multiple levels of challenges such as lack of personal hardware devices, internet service, and appropriate knowledge of using digital learning resources like Zoom, Google Meet, and Microsoft Teams, along with financial and pedagogical challenges that further impeded their access to these resources. Despite the university's adoption of online classroom teaching guidelines, the implementation was ineffective, and the curriculum remained outdated, hindering the ability to envision classroom activities beyond the university's premises. The study underscores the need for systemic reforms, including investments in ICT-based infrastructure, faculty professional development programs, curriculum modernization, and policy reform to ensure equitable access and effective digital learning. Future researchers are encouraged to conduct intervention-based studies in collaboration with stakeholders to address the underlying challenges as identified by this study.

Keywords: COVID-19, Digital learning, Higher education student, TPACK

INTRODUCTION

The advent of digital learning has revolutionized modern education by introducing flexible, technology-driven learning experiences that transcend the boundaries of traditional classrooms (Railean, 2017; Yadav, 2024). Digital learning typically involves an internet connection and can include virtual face-to-face interactions such as webinars, online lectures, virtual meetings, video tutorials, and e-textbooks (Singh et al., 2023). Agormedah et al. (2020) argued that the development of e-learning began in the late 1980s and early 1990s when the first form of electronic education, Computer-Based Training (CBT), was introduced. Digital learning includes many distinct and overlapping terms, such as e-learning, online learning, virtual learning, blended learning, etc. It is an umbrella term for any type of online course or learning that takes place through distance education and not in a traditional classroom (Singh & Thurman, 2019).   With the ongoing

transformation of the education system, it is essential to evaluate the effectiveness of digital learning practices (Azorín, 2020). Global paradigm changes in the field of education have been brought about by the digital revolution (Gyawali, 2020).

Digitalization is particularly important at the university level for planning, teaching, researching and evaluating academic sessions, since we are moving to a completely new world of blended learning in the post-pandemic era (Paposa & Paposa, 2023). Educational experiences occur in synchronous and asynchronous environments using various internet-connected devices. Students can learn and engage with teachers and other students in these settings from anywhere they live (Shakya, 2017). The Government of Nepal introduced a digital learning system to continue teaching and learning amid the pandemic. But the students who were in the remote areas faced challenges in continuous learning through synchronous mode of discussion (Upadhayaya et al., 2021). The Ministry of Education, Science and Technology has approved an 'Alternative Learning in Higher Education Facilitation Framework-2077 BS' and introduced the framework for implementation through the University Grants Commission (UGC), including alternative procedures regarding teaching, learning, research, examination and evaluation at the university level (UGC, 2020). The COVID-19 pandemic has raised tremendous obstacles for the world's higher education sector including in Nepal (Gyawali, 2020). Despite having barriers at varying levels, amid COVID-19, the Universities of Nepal have started digital learning classes using learning management systems and tools such as Moodle, MOOCs, Zoom, Google Meet and Microsoft Teams (Gyawali, 2020). Online learning can serve as a substitute for traditional education after Covid-19 since most participants preferred blended learning, and this approach would be more effective and successful (Paudel, 2020).

Tribhuvan University (TU) has developed an Online Teaching Guideline Framework-2077 BS to implement an online teaching system during the pandemic, and later, once the pandemic became less terrible, the university adopted a blended mode of learning in its constituents and affiliated campuses. Affordability of the internet is comparatively low among low-and-middle-income students, especially at government-run universities like TU (Baral, 2022), including the teacher education program of the Faculty of Education (FoE). Evidence shows that there are several challenges in running digital-based classes (Nepal, 2020; Paudel, 2022; Subba & Subba, 2021). Such challenges could be a lack of will and zeal among both teachers and students, insufficient supporting and facilitating infrastructure, technology, and affordability (Lamichhane, 2020). A Nepal-based study showed that nearly three-fourths (72%) of people have some form of internet access, and most of them are urban-centric (Sharma, 2020). To our best knowledge, less attention has been paid to uncover the underlying challenges of using digital learning resources (DLRs) among higher education students (HESs), particularly M.Ed. health education students of TU. In this context, this study aimed to explore the challenges of using DLRs among HESs.

Theoretical Framework

Technological, Pedagogical, and Content Knowledge (TPACK), a theoretical framework for understanding knowledge required for effective technology integration (Mishra & Koehler, 2006), has been used as the guiding theoretical framework for this study. The TPACK framework focuses on the integration of technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK) by teachers. It provides a guiding framework for teachers to implement educational technology in their classroom teaching (Setiawan & Phillipson, 2020).

Figure 1. *The TPACK Framework*
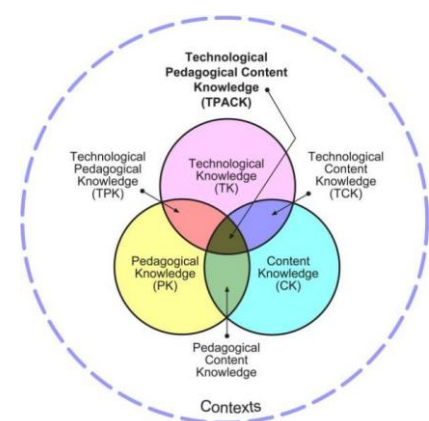
TPACK presents a holistic model that theorizes the relationship between and the contribution of, technological, pedagogical and content knowledge to effective technology

enhanced teaching-learning (Falloon, 2020). The three major domains of the framework: content knowledge, pedagogical knowledge, and technological knowledge helped us to explore the challenges of using DLRs among HESs.

RESEARCH METHOD

Research Model

The study utilized an explorative qualitative research design with a narrative inquiry approach (Cresswell & Poth, 2018), which helped us unfold the series of personal stories and lived experiences of the participants regarding the challenges of using DLRs among HESs.

Study Site and Participants

This study was conducted in Kathmandu, where the Master's in Health Education program was run under the semester system of the FoE, TU. One Central Department, one TU constituent campus, and one TU-affiliated community campus were purposively selected. M. Ed students specializing in Health Education, as the research participants, were selected. All the present students on the day of information collection were included in the study. Among the 18 research participants (six from each institution), there were both male (67%) and female (33%) participants from multi-ethnic groups, including *Brahmin* and *Chhetri* (44 %), *Janajati* and *Aadhibasi* (44%), and *Madheshi* (12%).

Data Collection Methods and Tools

In this study, focus group discussions (FGDs) were used to solicit the information using semi-structured guideline, followed by probing. We did not utilize in-depth interview since participants could not manage their time individually as they were quite busy in their academic activities. Instead, FGDs were employed as an alternative method to explore their personal and/or shared stories and lived experiences among the group members (Creswell & Poth, 2018) either before or at the end of their classes. The FGDs lasted between 30 to 45 minutes. We conducted one FGD at each institution. The FGD guideline was framed under four themes; technological challenges, pedagogical challenges, content-related challenges and other challenges (financial and policy-related challenges). The guideline was developed based on the guiding research questions. The validity of the guideline was ensured through a literature review and feedback from university teaching faculties. The mock interview was also conducted in an institution among a similar cohort group, who were not included later as research participants. FGDs were conducted in a quiet room after informing the participants about the research issues. However, one FGD was conducted in a grassy field of the campus, where the participants requested to be interviewed and to have discussion. The discussion was initiated with warm up (introductory) question such as: How do you feel while sharing your own story about the challenges of using digital learning resources for your higher education purposes? This hooking strategy made the participants feel ease to discuss further. During the discussion, probing was frequently used, which enabled them to tell their stories in a natural flow. Each discussion was recorded using the first autghor's (PS) personal cell phone, set to flight mode to avoid interruptions. Other researchers served as timekeeper and notetaker.

Data Analysis

After completing each FGD, the first author listened the audio recording carefully and then transcribed it in the local language (Nepali). The second author (YRU) ensured that the audi recordings were transcribed accurately. The first author read the transcription several times untill he became familiar with the information. The 'framework approach to analysis', also known as 'matrix-based analysis method, was used to analyze the data. This framework is considered a more deductive form of analysis, increasingly being used in health research (Pope & Mays, 2020). Following six steps of the framework approach explained by Pope

and Mays (2020, p.128), the first author immersed himself in the transcribed documents to reflect on the text. The TPACK explanatory framework was used to develop the themes and an appropriate quotation was labelled and sorted across the three sets of transcriptions using a matrix table in the spreadsheet. One theme (Other challenges) and its two underlying sub-themes were also drawn from the data (see Table 1). To ensure coherence in the groupings, the themes and sub-themes were reviewed. Subsequently, matrices for each theme were developed in the spreadsheet. The findings were explained in the textual form under four themes as presented in the result section.

Table 1. *Themes and Sub-Themes Related to Challenges of Using Digital Learning Resources*

Research Title	Main/Central Theme	Sub-Themes
Challenges of Using Digital Learning Resources	Technological challenges	Hardware-related challenges
		Software-related challenges
	Pedagogical challenges	--
	Content-related challenges	Curriculum-related challenges
	Other challenges	Financial challenges
		Policy-related challenges

Rigor and Quality Standard

As Creswell and Miller (2000) and Finlay (2006) articulated, we followed the criteria of credibility, transferability, dependability, and confirmability to maintain the quality standard and trustworthiness of the study. Credibility (truth value of the study) was maintained by expert consultation while developing FGD guideline and research sites and participants were purposively selected to obtain their genuine narrative accounts. Thick descriptions of the data and research process were provided to enhance transferability in the research. We selected representative students from each institution for the FGDs, which helped us to maintain the transferability among M. Ed students of FoE, TU in Kathmandu. Dependability (reliability) was maintained by using the same guideline in each FGD. For confirmability (objectivity), the second author reviewed the data analysis process thoroughly. The entire research process has been syatematically addressed in the study (Shrestha et al., 2023).

Ethical Considerations

This study was approved by Health and Population Education Department, Central Department of Education, TU. Administrative approval was obtained from each institution before reaching to the participants. To maintain the privacy of the institution, their names were anonymized. Participants' privacy and confidentiality were ensured throughout data analysis and during reporting and presenting the findings (Regmi et al., 2022). The first author (PS) frequently visited the departments and campuses to build rapport with administrations and participants. PS shared the purpose of the study and asked the participants about their free time to participate in the FGDs. During the data collection process, harmony and collegiality across the institutions and among the participants were maintained (Upreti et al., 2024) to create natural setting for the FGD. The first author took verbal and written consent from each participant prior to the FGDs.

FINDINGS

In this study, findings are presented under four themes following the TPACK explanatory framework.

Technological Challenges

A major concern was the urgent and unexpected need to offer online courses for previously face-to-face learning courses. This compelled educators to enhance learning opportunities and build distinctive learning environments through technological advancements. The findings related to the technological challenges are presented under two sub-themes: hardware and software-related challenges.

Hardware-Related Challenges

Hardware, in this study, refers to desktop computers, personal laptops, monitors, keyboards, mouse, laptops, mobile phones and computer labs which facilitate both learners and teachers in joining online classes. One of the students from campus one shared :

"I had only a mobile phone to join my classes and did not have access to a laptop. Thus, I wrote all my assignments from the first to the fourth semester by hand into my notecopy, showed it to the teacher, then made corrections and went to the cyber and sometimes to my friends to complete my assignment." (FGD Institution 1)

Sililar to this, student from campus two mentioned, "*I had only a cellphone and didn't have access to a laptop. I submitted all my assignments through handwritten text"* (FGD Institution 2)*.* Another student from campus three also shared a similar story, "Al*though my teachers suggested that I use a personal computer, I used a mobile phone to take my classes and submitted the assignments with great difficulty"* (FGD Institution 3).

The above quotations reveal that HESs struggled with hardware-related challenges while continuing their online classes during and after COVID-19. They also shared that they rarely received computer lab facilities even after returning to their campuses after COVID. Instead, they had to visit cyber centers (private communication centers providing computer and internet services for a fee) to retrieve learning resources and type and print the documents related to their assignments.

Software-Related Challenges

Online classes became common only after the COVID-19 pandemic in higher education classrooms of Nepal (Gautam & Gautam, 2021). Before the pandemic, virtual classes were just limited to theory based learning. The software including Google Meet, Teams, Zoom, WhatsApp, Facebook Messenger have been commonly used in the Nepali higher education. However, the participants of this study reported that they faced software related problems while attending online classes. One of the FGDs members from campus three shared, "Al*though we were asked to take our classes using Microsoft teams, I never found it easy to connect to my class due to its slow performance. The software was not enough smooth to open our video during the classes and even upload our assignment"* (FGD Institution 3).

Similarly, a student of campus one added:

"I remember my first semester classes; our department had taken classes from Google meet during the COVID-19 pandemic. But I could not sign in for two weeks since I did not have Google account at the time. This created an additional burden and tension because I could not upload my first assignment-with in the given time frame." (FGD Institution 1)

But students from campus two had different opinions. They shared that their teachers were also unable to handle the software properly. As a result, they could not enjoy their online classes. One of them stateed:

Though we were unaware of using Microsoft team for online classes, most of our teachers were also unable to run the software properly. They could not even share PPTs. I remember one of our friends assisting the teacher to share and upload the PPTs. (FGD Institution 2)

The accounts indicate that most of the higher education students faced software-related challenges in their online classes, particularly using Zoom, Microsoft teams and Google meet. Both students and teacherds experienced unwavering isssues in sharing the PPTs during the online classes and submitting assignments due to limited accessibility and poor network connectivity, and inadequate software handling competency.

Pedagogical Challenges

Pedagogical challenges, in this study, refers to challenges related to classroom teaching, assigning academic tasks and performing assessment using online platforms. The participants discussed that teachers' pedagogical incompetency remained another barrier of their online classes. Student from campus one said:

*Except for the young faculties, most of them did not have sound knowledge and skills regarding digital-based classes. It may be due to the generational gap. Moreover, we did not enough enjoy the interactive classes in our online classes except a few faculties.*FGD Institution 2)

Students from the campus three discussed discussed the similar issues and stated, *"Though our teachers have access to external knowledge, they do not have much knowledge and skills to handle the technology in their online classes"* (FGD Institution 3).

The participants also indicated that they faced challenges to submit their assignments using digital tools due to poor skills in using DLRs. They urged upgrading their skills and emphasized the need for faculty development regarding the use of DLRs before conducting online classes.

Content/Curriculum-Related Challenges

The participants discussed that theory-focused curriculum hindered their ability to engage effectively in online classes using digital devices. A participant from campus two emphasized the need of incorporating hands on contents in the curriculum and stated, "*we learn theoretical classes regarding how to use digital learning resources in our classroom but our teachers hardly integrate digital devices in their classes. The practical part is missing to us*" (FGD Institution 2).

Participants from campus three also mentioned that they were being deprived of having practical courses related to the digital learning classroom in their campuses and conceded, "*After Covid-19, digital-based learning has become common from school to university. But our curriculum still focuses on theoretical classes about using digital learning tools instead of integrating them into daily classroom teaching*" (FGD Institution 3).

Similarly, participants from campus one expressed that the higher education curricula are still in need of focusing on practical classes such as incorporating digital learning tools and learning management systems in the course. They shared:

Our curriculum does not promote digital learning tools in classroom teaching. Many students of our campus still do not get practical classes or any training regarding the use of digital learning tools in higher education classrooms; instead, they are just limited to theory classes.(FGD Institution 1)

These excerpts suggest that higher education curricula have not met the needs of digital generation. Participants strongly urged integrating DLRs into their daily classroom activities.

Other Challenges

Other challenges in this study include two sub-themes: financial challenges and policy related challenges.

Financial Challenges

The financial status of the students also played a crucial role in attending online classes. The HESs, particularly those from FoE, TU, could not afford Wi-Fi at home, so, they frequently missed onloine learning opportunities. Due to poor financial background, they were unable to purchase mobile data packs regularly. They were unable to attend their day-to-day classes due to the lack of WIFi connection both at their homes and campuses. One of the students among campus three says:

Sometimes it was difficult to afford data packs for online classes because I did not have enough pocket money, especially when electricity supply collapsed frequently. Internet facilities were not available on the campus, so, we could not purchase data when required." (FGD Institution 3)

Another argument from the campus two student also closely aligns with the above,

"due to financial problems, I could not afford data to take online classes regularly, that's why I had missed many online classes. Here, campus also has not provided free Wi-Fi access to us" (FGD Institution 2).

The above narratives reveal that HESs faced financial challenges to complete their online classes. Most of the participants belonged to remote areas where a proper electricity supply and internet facility were not available due to geographical difficulties.

Policy-Related Challenges

There is no clearly defined strategic framework for higher education regarding digital learning practices. Athough the university has a regulatory policy on online classes, it is equally important to implement effectively to provide the studnets with digital learning facilities. In line with this, students from campus one shared:

Linking digital learning to national policy is very good. In this era of digital technology and ICT, the authorities made the policy of online classroom from the central level. But they do not know about the condition of the livelihood of the students who belonged from the remote areas. The policy maker should visit each campus and make it ready to implement online classes. There is a huge gap between policy and practices. (FGD Institution 1)

Students from the campus three also argued that though the policy seems okay to run online classes but there is a gap at practice level. A participant shared, "T*hough digital classroom-related policy seems good, its implementational part, especiaally at community and private campuses is challenging. The community and private campuses do not mandatorily implement the central level policy and program* (FGD Institution 3). These accounts reveal discrepancies between policy and practice regarding implementing online classes.

DISCUSSION

This study explored the challenges faced by HESs studying at TU using digital learning resources during and after COVID-19. The findings reveal several critical challenges hindering the effective integration of DLRs in higher education classrooms in Nepal, categorized under four central themes: technical challenges, pedagogical challenges, content-related challenges and other challenges.

The findings highlight that HESs do not have access to a personal computer and/or laptop to attend their online classes, but they use mobile phones to attend the classes and submit their assignments. Similar to this result, some studies conducted in Nepal state that the greatest problems were observed due to limited hardware devices and/or the absence of devices (Efriana, 2021) and poor internet connectivity (Rijal, 2022). Similarly, recent research conducted in Syrian institutions indicates that insufficient computer resources were one of the greatest obstacles to classroom teaching (Albirini, 2006). The findings of the present study also reveal that insufficient infrastructure and a lack of digital devices, such as computer labs, computers and laptops, created significant technical challenges in higher education classroom teaching. Similarly, a study conducted in a Saudi institution found that limited access to the internet during the day and a lack of hardware impeded technology integration (Al-Alwani, 2005). The findings further indicate that software-related problems are another underlying challenges in digital learning classrooms. In line with this, Balanskat et al. (2010) reported that both students and teachers face various technical issues, such as failing to connect to the internet due to poor Wi-Fi connections. Supporting these findings, a study in Turkey revealed that a low number of computers, outdated or slow digital learning systems, and limited educational software

remain significant barriers to the successful implementation of digital learning practices in Turkish institutions (Toprakci, 2019).

The findings of this study also indicate that still university teachers are not familiar with the integration of digital devices in higher education classrooms, especially those who are senior faculty. They lack digital-based pedagogical skills and trainings. They need to be trained to use these specific digital learning tools. In assimilation of this finding, Lawal et al. (2020) also emphasize a limited adaption of digital learning practices by the teachers in their respective workplaces. A study conducted in Saudi Arabia also reports similar reasons for failures in using educational technologies: the weakness of teacher training in the use of computers, and the use of a delivery teaching style instead of investing in modern technology (Alhamd et al., 2021). According to Rana and Rana (2020), some initial training is needed for teachers to develop appropriate skills, knowledge and attitudes regarding the effective use of computers to support students' learning. TPACK focuses on TK, PK and CK, offers a productive approach to many of the dilemmas that teachers face in implementing educational technology in their classrooms (Mishra & Koehler, 2006). A study conducted among higher education teachers also reports that the lack of teachers' confidence, motivation, skills and knowledge are the challenges of using ICTs in higher education classrooms (Paudel, 2022).

The findings of this study further indicate that the curriculum is not suitable for meeting the demands of 21st-century students growing in the digitalization era. Similar to this, research suggests that Nepalese higher education curricula remain heavily content-driven, prioritizing theoretical classes over practical, technology-integrated learning (Regmi, 2024). In line with the finding of this research, another study demonstrates that the successful implementation of digital learning curricula largely depends on teachers' positive interest and willingness, as they ultimately determine how ICT is integrated into classroom practices (Bullock, 2018). Similarly, a study conducted in Turkey revealed challenges related to teachers' unwillingness to teach digital learning practices; findings reveal that only a few teachers could adopt digital teaching methods because they were not well trained (Toprakci, 2019).

Moreover, the study demonstrates that campuses lack sufficient financial resources to support digital learning in higher education classrooms. Most participants were from low-income families, making it difficult for them to afford digital learning devices. Additionally, participants noted that the limited resources available on campuses and within departments are primarily allocated to administrative and library staff, leaving students and faculty with minimal access to these tools. This finding aligns with Adnan and Anwar (2020), who highlight that during the COVID-19 crisis, universities' financial constraints hindered the development of distance learning, as they received no additional funding to acquire digital learning tools. In line with this finding, Fry and Cilluffo (2019) also argue that many students cannot afford laptops or personal computers, further exacerbating barriers to digital learning.

Besides this, higher education policy on the use of digital learning classrooms plays a pivotal role for the success of integrating digital learning practices at higher education classrooms. In line with this, Paudel (2021) argues that the courses currently practiced are not ICT friendly, it is therefore, universities should take appropriate strategies to prepare the policy, classroom curricula, teachers and students to be blended learning friendly. A case study among higher education teachers in Nepal reported a lack of clear strategy to implement the ICT education policy and to fund for the ICT infrastructure and professional development of university staff to integrate ICT in teacher education (Rana & Rana, 2020). Adedoyin and Soykan (2020) also highlight that digital learning policy should be embedded to education which enhance teachers and students knowledge and skills regarding the use of digital learning practices. Rubagiza et al. (2011) discuss that the formation of digital learning policies in education, although embedded in the national digital learning policies

of the country, is seen to be crucial as digital learning practice plays an important role in preparing individuals in institutions for the workplace. The improvement of educational systems and increased educational attainments are primary to countries' preparation for global, technology-based changes in all sectors (OECD, 2021). Another study also focuses on developing policies that will increase the number of qualified digital learning personnel, such as encouraging many institutions to start digital learning practice related courses, and tertiary institutions working hand-in-hand with higher educational institutions and other stakeholders to develop a digital learning practice curriculum that provides appropriate digital learning skills relevant to the teaching and meets the current and future needs of the institutions (Balanskat & Gertsch, 2010). Paudel (2022) also reveals that the biggest challenges of utilizing ICT in classroom teaching relates to teachers' competencies and the ICT policies endorsed in the country.

Although the qualitative nature of the study may limit the generalizability (transferability) of the findings to other contexts, the results derived from Health Education students in the M.Ed. program of TU may be similar for other M.Ed. students of TU in Kathmandu. This is because participants for the FGDs were purposively selected from the central department, constituent campuses, and affiliated campuses, providing a representation of similar participants from the remaining institutions.

CONCLUSION

This study aimed to unfold the challenges of using DLRs among HESs during and after the COVID-19 pandemic. The study identifies its findings under four central themes: technological challenges, pedagogical challenges, contents-related challenges and other challenges. Findings indicate that students, particularly those representing from low-income and remote places, face major obstacles in classroom learning due to inadequate access to digital learning devices and reliable internet facilities. Theory-driven curricula and insufficient faculty professional development can hinder effective learning in higher education classrooms. Although policy frameworks for online classes could open up the avenues for higher education degree for students residing at home even from remote areas, developing ICT-based infrastructure at the institutional level is obligatory. Moreover, resuming daily classroom teaching powered with digital learning tools and learning management systems has become mandatory to the unwavering needs and demands of the 21st century digital generation. The study underscores the need for systemic reforms, including financial investments in institutional development with minimum required ICT-based infrastructure, faculty professional development, curriculum revisions that are friendly with media and technology, and policy reform to ensure equitable access and effective classroom learning in higher education institutions. Future studies should explore tailored interventions with stakeholders' collaboration to address the underlying challenges identified by this study, enabling HESs to better prepare themselves for the real-world situation.

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