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A Modified 5-SPICE Framework Review on English Language Teachers' and Learners' Perceptions of an Educational Emergency

Md. Ziaul Karim
Department of Languages
Faculty of Agriculture
Bangladesh Agricultural University, Mymensingh-2202

Laxman Gnawali
Department of Language Education
School of Education
Kathmandu University, Nepal

Md. Kamrul Hasan*
Department of English
School of Humanities and Social Sciences
United International University, Dhaka-1212

Abstract. Covid-19 pandemic caused the biggest global on-site academic lockdown for more than a year, resulting in the largest disruption in the history of education. This review article highlights how tertiary English language education (ELE) in developing countries like Bangladesh continued during the unprecedented COVID-19 pandemic (from March 2020 onwards) - the 1st time long-lasting educational emergency that crippled the world. Considering this context, twenty (20) empirical papers on tertiary ELE from the COVID outbreak in 2020 to 2023 were reviewed through a Modified 5-SPICE framework where SPICE stands for Setting, Participants, Investigation type, Content and Ethical considerations applied by the reviewed articles. The thematic data analysis based on the Modified 5-SPICE framework applied Wellington's (2015, as cited in Cohen et al., 2018) seven data analysis stages. The findings disclosed that the COVID-19 educational emergency utilized some existing educational technologies (EdTechs) and made a forced entry of some new technologies. ELE teachers and students had mixed feelings as they faced initial challenges which they gradually tried to overcome. This paper sheds light on their perspectives and complexities in addition to the future possibilities of emergency EdTechs at the tertiary ELE level. The findings are expected to assist

*Corresponding author: Kamrul Hasan; *mkamrulhasan77@gmail.com*

pedagogues, policymakers, learners and other stakeholders to recognize the importance of the growing New Normal EdTechs to form a better Next Normal ELT pedagogy.

Keywords: educational emergency; educational technologies; techno-pedagogies; New-Normal education; emergency remote teaching

1. Introduction

English as a global language has established its consolidated roots in the education sectors of both developed and developing countries. The British colonized many countries like Bangladesh, India, Pakistan, Malaysia and Indonesia while countries like Nepal, Iran, and Saudi Arabia were never under their direct colonial power (Singh, 2021). Yet, English Language Education (ELE) has become an inseparable component of the higher education system in all these nations. At the tertiary level of education, according to Krsmanovic (2022), ''Almost all students all over the world are required to take English course(s) in their first or second year of study, no matter what the core subject is'' (p.1). Hence, English teachers need to teach one or sometimes multiple English language courses besides their core courses.

Before COVID-19, the ELE pedagogy in the developing world applied mostly the behavioristic knowledge transmission model with a one-size-fits-all approach like the hypodermic needle theory where teachers were like a 'sage on the stage' (King, 1993, p.30) while the students were like clay-made banks – passive recipients of coins (lessons). Traditional face-to-face brick-and-mortar classrooms with chalk and talk methods were predominant though the Grammar Translation Method (GTM) was replaced by the Communicative Language Teaching (CLT) approach in policy and paper (Kabir et al., 2020). As time passed, the ELE landscape underwent some ontological and epistemological reforms. For example, the 'native-speakerism idealism' (Fang et al., 2022, p.305) in ELE no longer holds water. For the emergence of World Englishes (Kachru, 1992, as cited in Fang et al., 2022) and the recent trends in teaching Global Englishes, ELE gained acceleration with ''multifaceted linguistic, cultural and multimodal practices'' (Fang et al., 2022, p.305) and Non-Native English Speaking Teachers (NNESTs) have outnumbered the Native English Speaking Teachers (NESTs). Therefore, the focus of ELE is shifting ''from the traditional, monolingual perspective towards multi/translingualism'' (Fang et al., 2022, p.306) in this 'trans-era' to promote a decolonizing pedagogy.

Researchers, teachers and policymakers were busy exploring new ways of effective physical classroom ELE pedagogies when COVID-19 in early 2020 like a shockwave (Maniruzzaman, 2022) swept the traditional teaching away and ushered in an era of educational emergency with a novel pedagogical shift (Ping et al., 2022). Consequently, a pedagogical crisis emerged where technology was the ultimate savior of the total education system. Afrin (2020) reported that times and technologies were in a quick flux and ''English teachers needed to hop on board before the train left'' (p. 80). The developed nations could quickly adapt to the virtual pedagogy since many courses were already run online through

distance mode but the developing states struggled to adapt to the new techno-pedagogies. This review paper through a modified 5-SPICE framework (See details in the Methodology section) tried to find out how the educational emergency is perceived by the tertiary English language teachers and students as delineated by the ethically conducted empirical studies. In addition, the review article is designed to find out the predominant themes that came to the fore out of the reviewed articles.

2. Literature Review

2.1. How COVID-19 Affected the Education System

The WHO declared COVID-19 a public health emergency on January 30, 2020 (Islam et al., 2021). On March 8, 2020, the first COVID-19 case was detected in Bangladesh (Ferdous & Shifat, 2020) and all academic institutions were closed from March 17 to March 31, 2020 (Khan et al., 2021; Rahaman, et al., 2021; Sultana, 2021). Although the University Grants Commission (UGC) and the Ministry of Education (MoE) were initially against virtual teaching (Sultana, 2021), the Education Minister had to finally recommend conducting all academic activities of universities through online modes on April 30, 2020, (Sultana, 2020). While some private universities tried to commence online classes from May 7, 2020 (Khan et al., 2021), the public universities started virtual classes flexibly from June 25, 2020, (Kamol, 2020). An identical situation also existed in many developing countries, especially in Asia. The pandemic affected 216 countries by June 2020 and produced much trepidation among all people. Patients were detected with COVID symptoms and millions of death casualties happened (Islam et al., 2021). All Higher Education Institutions (HEIs) were shut down (Muhaji, et al., 2023). A new pedagogical shift to emergency remote teaching (ERT) (Hodges et al., 2020), became a New Normal reality, a rescuer.

2.2. What is Education in Emergency?

Kragt (2021) opines that education in emergency (EiE) or educational emergency was shaped by the United Nations (UN) with the establishment of the Universal Declaration of Human Rights (1948) after World War II. In the past, educational emergencies occurred partially with a minor impact on the education sector either due to battles, political unrest or natural calamities like floods, cyclones, earthquakes, and landslides. Therefore, the UN highlights only four emergency causes: conflict, migration, natural hazards and health-related crises. COVID-19 is a health-related catastrophe that exposed global education to an 'unprecedented global emergency' (Pherali & Mendenhall, 2023, p.3).

Since 1950, UNESCO has been rendering EiEs to ensure people's right to education. It tries to ensure inclusive and equitable education under difficult circumstances by collaborating with ministries of education and regional and international partners. It always keeps the candle of education burning in the world's most acute humanitarian crises as in Ukraine and Afghanistan and in elongated conflicts, as in Syria and Iraq, through Disaster Risk Reduction in Education (UNESCO, 2023).

With education as a humanitarian response (Burde et al., 2017), the Inter-Agency Network of Education in Emergencies (INEE) was founded in 2000. In 2010, the right to EiEs was adopted as a resolution. COVID-19 confined the educational space to the digital realm, begging technological access to fulfill educational requirements (Gupta et al., 2021). It has created a long-term emergency situation (Novelli et al., 2017). Consequently, it was not UNESCO's headache only; every nation had to tackle the EiE with its fastest policy reform and adoption of some congenial EdTechs it could resort to. In this paper, we have used EiE, educational emergency and emergency education to mean the same.

2.3. Educational Technologies during COVID-19 Emergency

Educational technologies (EdTechs) include multifarious platforms, apps, software, and virtual and augmented reality (AR/VR) as pedagogical tools. There is a quick evolution of Web technologies (Web 1.0 to Web 4.0). By 1999, Web 2.0 (Social web) technology built on the previous Web 1.0 (Read-only web) came into existence. Since 2004, it has transformed into a social constructivist system where users can interact as active participants with one another by sharing their perspectives and opinions through tags, posts, shares, and likes. Some applications of Web 2.0 include Zoom, Netflix, Spotify, Instagram, Facebook, Twitter, LinkedIn, email, Pinterest, YouTube, TikTok, Flickr, Podcasting and many more instant messaging apps (Kenton, 2023). Gradually Web 3.0 (Semantic web) has come into existence to decrease human decisions as machines are providing contents on the web through artificial intelligence (AI). Web 4.0 (Symbiotic Web) is on the verge of becoming a reality (Singh, 2023).

Before COVID-19, WEB 2.0 tools were merely used on personal initiatives but after COVID-19, some were institutionally integrated as pedagogical tools. Web 3.0 with its live streaming and AI Chabot is getting popular now in the education sector. The pandemic accelerated the use of these EdTechs. Hence, all teachers need to master both non-internet (laptop, desktop, radio, TV, phone), and internet-based technologies now since after the pandemic, generation Z (children born between 1995 and 2009) students are getting more gadget-smart than before (Ahmad et al., 2019). Teachers also have to prepare for the new 'Generation Alpha' (children born between 2010 and 2025) who are also considered as 'Gen C or Generation COVID' by some researchers (Eldridge, 2023) due to their enhanced exposure to technologies.

2.4. Research Questions

This paper tried to find out the answer to the following questions:
(RQ1) How is the educational emergency perceived by the tertiary English language teachers and students as delineated by the ethically conducted empirical studies?
(RQ2) What are the other predominant themes that came to the fore out of the reviewed papers?

3. Methodology

As we planned to conduct a systematic review, one of them browsed the internet, looking for some existing frameworks. The 5-SPICE framework caught

his attention and he shared this with the other two researchers who also agreed to apply it for this article. This framework does not belong to a single proponent. Rather, it was proposed by researchers and clinicians from Brigham and Women's Hospital in Boston, MA and Partners In Health, Harvard Medical School, to allow all community health program stakeholders to participate in dialogues and analysis to accelerate the roles of the community health workers. SPICE actually stood for Setting, Population, Intervention, Comparison and Evaluation. However, these elements might be modified to suit a particular context. One such application of the 5-SPICE framework was applied by Palazuelos et al. (2013) in a community health worker program where SPICE referred to Supervision, Partners, Incentives, Choice and Education. Later, it was also used in health education research with minor modifications by Singh et al. (2015). Hence, we also modified the 5-SPICE protocol to fit with their research questions, naming it 'Modified 5-SPICE Framework' where 5-SPICE means Setting, Participants/Population, Investigation, Content and Ethical standards.

3.1. Reasons for the Choice of the 5-SPICE Framework

The researchers selected this framework for two reasons – (i) the purposive preference and (ii) the importance of the number '5'.

3.1.1. The Purposive Preference

The title of our study guided us to think of our research questions on which the total review was based. Therefore, it seemed very logical for us to adapt the 5-SPICE protocol since they could find in their research questions the five important segments in tune with the framework:

S- Setting (Where and when): The tertiary education sector during and after COVID

P- Population/Research Participants (Who): Tertiary English language teachers and students

I – Investigation (How): Original research or empirical studies/ Methodologies

C – Content (What): Teachers' and Learners' perceptions about educational emergency

E – Ethics (How): Ethical standards upheld by the reviewed studies

3.1.2. The Importance of the Number '5'

The term 'SPICE' is derived from the concept of five spices (cloves, fennel seeds, star anise, cinnamon and Sichuan peppercorns) which Chinese chefs usually use to create a sophisticated taste to engage all the five taste buds (sweet, sour, salty, bitter, and pungent/spicy). The history of 5 Spices originated in China in the 4th century BCE. The Chinese later developed the five spices 'Wonder Powder' which continues to add flavors to the meals in different cultures worldwide. This powder was traditionally used as an antiseptic and was believed to cure toothaches and indigestion (Bi et al., 2015). The term SPICE has five letters in it. The number 5 is related to many important ideas like the 5 senses (sight, touch, hearing, smell and taste) and the five fundamental components (earth, fire, water, air or wind, and space) of the world according to the 5-Elements Theory in Hinduism. It also has significance in other religions as in the Five Pillars of Islam and in the Buddhist Ethics of Pancha Sheela (5 virtues). Five is a magic number in Greek history since it represents the pentagram or pentacle (a five-

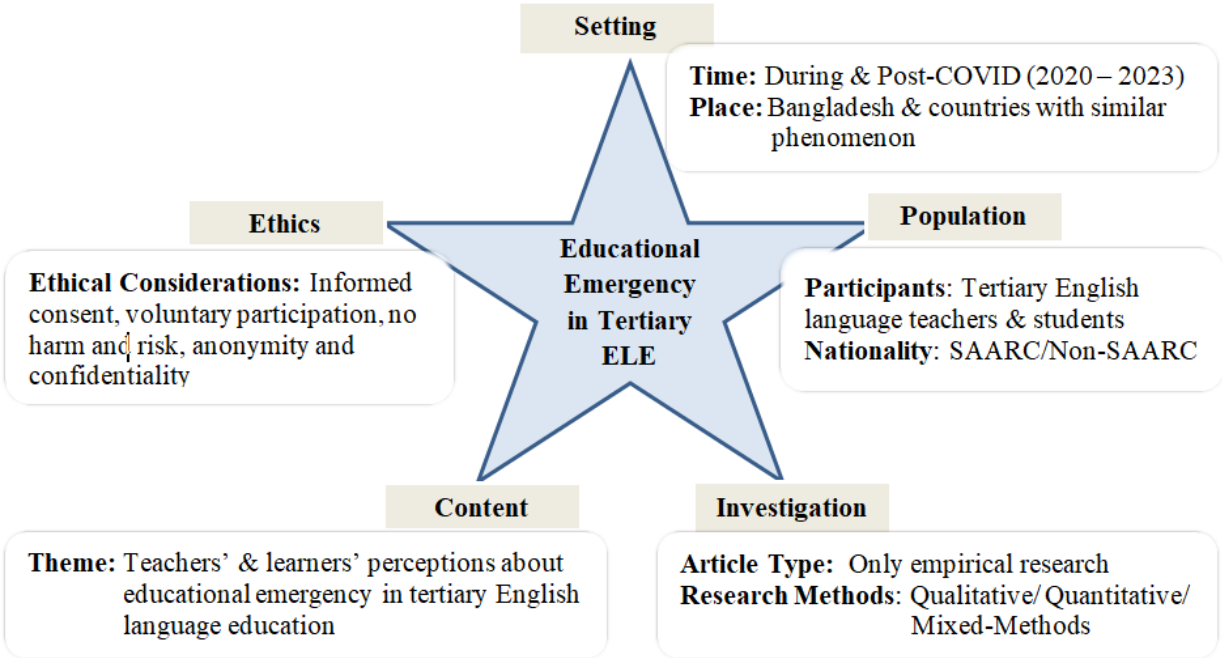
pointed star polygon) to symbolize humanity, perfection and protection from the devil.

3.2. Reasons for the Choice of the 5-SPICE Framework

We browsed 'scholar.google.com' on March 31, 2023, to search for original research articles on 'English language teachers' and learners' perceptions about educational emergency during COVID-19'. Write-ups displayed on screen included review articles, empirical studies, reports, theses, editorials, and book chapters. Therefore, we activated filtered options like 'sort by date' and 'type of articles'. We searched only empirical research studies in PDF forms from the year 2020 to 2023, since during and post-COVID pedagogical practices and emerging techno-pedagogies were the phenomena they were looking for. We read the titles and downloaded 30 PDF documents out of 100 lists from the first 1 to 10 pages of scholar.google.com. Then we browsed www.google.com with the same theme but included the name of the country 'Bangladesh'. Finally, we read the titles and downloaded ten articles from the first three pages. In total, we downloaded 40 articles.

3.3. Inclusion Criteria

After reading the abstracts of 40 articles, we selected only 20 for review. For screening and selecting the articles (20) for the review, the modified 5-SPICE framework was applied. Figure 1 shows the graphical representation of the modified 5-SPICE framework.



Concept taken from Palazuelos et al., 2013

Figure 1: Modified 5-SPICE framework graphically represented

From 2020, we selected four articles (two from Bangladesh, one from India and one from Indonesia). Seven articles (four from Bangladesh, one from Iran, one from Pakistan and one jointly from Saudi Arab and Bangladesh) published in 2021 were also reviewed. Eight articles (four from Bangladesh, one from Nepal,

one from Malaysia, and one based on 25 countries in 5 regions of Asia, Europe, Latin America, North America and the Middle East and another research work (on 40 countries including Serbia, Pakistan, Mexico, Greece, Philippines, UK, Italy, and Indonesia) from the year 2022 were selected for review. Finally, only one article from Indonesia published in 2023 was considered for this study. All these twenty (20) articles were from the field of English language education in universities during the COVID and post-vaccine periods. The researchers wanted to add some research works on the same theme from Singapore, Thailand, the Maldives and Srilanka, but when they browsed, the search engine 'scholar.google.com' showed none that could match their inclusion criteria (see Figure 1). However, the selected articles involved research participants from the Middle East, Europe, Asia Pacific and, North and South America. Table 1 showcases a year-wise summary of the reviewed articles sequentially based on the modified 5-SPICE framework.

Table 1: Year-wise Summary of the reviewed articles based on the modified 5-SPICE framework

Author (s)	**S-Setting (Time + Place)**		**P-Participants**	**I-Investigation**	**C-Content**	**E-Ethics**
	Year of Publication (2020-2023)	Countries (No. of Articles)	Population/ Research Participants	Methodology	COVID-time Educational Emergency	Ethical Standards
Afrin; Ferdous & Shifat; Subekti; Purushotham & Swathi	2020	**Total – Four (4)** Bangladesh (2) Indonesia (1) India (1)	60 EFL students of a private university Qualitative (10 EFL learners of a private university & 10 ELT teachers from different private universities); Quantitative (46 students and 20 teachers from private universities) 9 pre-service English teachers taking Technology for Language	Mixed Method (Survey Data & Textual Analysis) Quantitative (Data collected through Google questionnaire); Qualitative (data collected through semi-structured interviews over telephone and through online messaging) Qualitative (secondary data in the forms of the participants' written	Virtual EFL/ELT classes at tertiary level Dealing with mental health of ELT teachers and EFL learners in online learning Pre-service English teachers' beliefs regarding online learning implementation Online learning and its effects on English language skills among	Informed Consent Voluntary Participation No harm or risk Anonymity Confidentiality

			Learning class in the English Language Education Department of a university 130 students from an Engineering college	reflections/ Thematic analysis used to analyze the data Descriptive Survey method	higher education students	
Younesi; Sultana; Sifat et al.; Khan et al.; Rahaman et al.; Khan et al.; Islam et al.	2021	**Total – Seven (7)** Iran (1) Bangladesh (4) Pakistan (1) Bangladesh & Saudi Arabia (1)	220 responses from academic English learners and trainers from 23 Universities 30 students and 10 teachers of a private university 92 (54 female and 38 male) students of 5 private universities 158 teachers and 1468 students 15 students from private, public, and national universities 100 students and 5 university-level teachers 3 university teachers (the researchers themselves)	Mixed Method Mixed Method Mixed Method Mixed Method (Survey questionnaires and Focus Group Discussions) Mixed Method (Phenomenology & pragmatic paradigm) Qualitative phenomenology & auto ethnography	Virtual teaching of English language Online teaching impact on students' performance and teachers' new role Learner acumens of online EFL classes at Bangladeshi private universities Teacher and student voices about online instruction Perceived effectiveness, challenges, and suggestions about online learning Motivational strategies being employed in EFL classes Teachers' lived experiences regarding E-learning	

Rai; Ping et al.; Arju & Juhi; Maniruzzaman; Nisha; Aktar et al.; Koruyan et al.; Krsmanovic	2022	**Total – Eight (8)** Nepal (1) Malaysia (1) Bangladesh (4) 25 countries from - European, Asia Pacific, South/ Latin America, Middle East and North American regions (1) 40 countries- Serbia, Pakistan, Mexico, Greece, Philippines, UK, Italy, Indonesia and other countries not mentioned (1)	4 EFL teachers from four universities 21 sessional academics from the English language unit of a public university 100 1st year EFL learners from eight universities of Dhaka Jahangirnagar University teachers (8) & students (50) 50 student participants from different private universities 4 teachers from 4 public and private universities 156 University Teachers of English 89 EFL instructors and lecturers in tertiary education	In-depth unstructured interview under narrative inquiry Qualitative (One to one interview) Mixed-method Mixed-method (SPSS used for data analysis) Mixed Method Qualitative (Narrative Enquiry) Mixed-method Mixed-method (SPSS is used for data analysis)	Coping strategies of university EFL teachers for online instruction Challenges in technology integration for online teaching and learning English language learning challenges during the COVID pandemic Blended Learning in the New Normal Learners' perceptions about the effectiveness of virtual classes during COVID Teachers' narratives from initial virtual classrooms and professional development during the COVID English teachers' beliefs and practices during COVID Perceptions of EFL educators of their	

					instruction during the pandemic	
Muhaji et al.	2023	**Total – One (1)** Indonesia (1)	16 EFL teachers from 7 universities in West and East Java	Qualitative (Narrative enquiry)	Adoption of online technologies for language teaching	

3.4. Analytical Framework

According to Cohen et al. (2018), "Some of the analytical tools can be pre-ordinate (a priori: ideas, themes, codes, key points, analytical framework etc. decided in advance)" (p.644). As we chose the 5-SPICE analytical framework (see Figure 2), it was convenient to categorize the significant findings from the articles under five major phenomena. Figure 2 presents the modified 5-SPICE analytical framework of this paper.

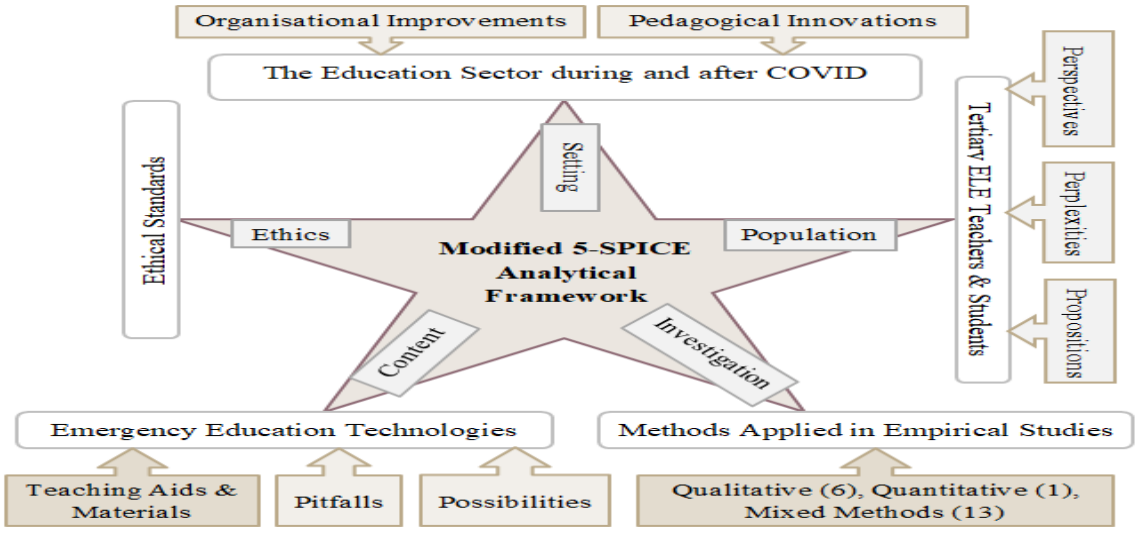


Figure 2: Modified 5-SPICE analytical framework

We kept the selected articles in four different folders named by years (2020, 2021, 2022 and 2023). Then they opened a Microsoft Word doc file where five thematic categories (See Figure 2) were typed in bold. The thematic analysis of this paper consisted of the following seven stages suggested by Wellington (2015, as cited in Cohen et al., 2018, p.646):

Stage 1: Familiarization with the data/literature also called 'Immersion'
Stage 2: Data/Literature Arrangement through reflection (dividing up the data according to the Modified 5-SPICE framework)
Stage 3: Data/Text Analysis (Selecting, filtering, classifying and re-categorizing)
Stage 4: Synthesizing or recombining data/text
Stage 5: Relating to other works and locating data
Stage 6: Reflecting again for further details
Stage 7: Presenting and sharing the findings with discussions

Firstly, we went through the selected articles and after getting familiar with the data, we arranged them under the five thematic categories with the names of authors and years of publication. Then, we read again, reflected, filtered the disorganized data to re-categorize them (i.e. similar information was classified together with in-text citations). After the third cycle of reading the data under the five major themes, we synthesized some repeated concepts and thematic analyses to get to the key analysis. Next, we related it to other works, read and reflected again before presenting and sharing the findings with discussions.

4. Findings

The findings are elaborated under five phenomena or themes divided into a few sub-categories (see Figure 2). The 1st theme 'Education sector during and after COVID-19' showcases organizational improvements and pedagogical innovations. The 2nd theme delineates stakeholders' (teachers' and learners') perspectives, perplexities and propositions for technology use. The 3rd one describes the methodologies applied in the articles. The 4th category focuses on teaching aids and materials, pitfalls and future possibilities of EiE technologies. The final theme (5th) exhibits the ethical standards upheld by the research works.

According to the selected analytical framework, the five themes are categorized based on the two RQs. The 2nd theme answers the 1st RQ while all the remaining four themes answer the 2nd RQ.

RQ1- How is the educational emergency perceived by the tertiary English language teachers and students as delineated by the ethically conducted empirical studies?

4.1. Tertiary English Language Teachers and Students

Teachers and students, the core stakeholders of an educational context, are the most affected by the ERT. The teachers' and students' viewpoints, the challenges they faced and their propositions regarding EiE technologies are separately described below:

4.1.1. Teachers' Perspectives

Ferdous and Shifat (2020) found out that teachers initially disliked online platforms due to poor net speed and device access. Self-doubt started to develop from their concern of not conveying their best efforts to the students. They felt it essential "to see the students' smiley faces in the flesh" (p.105). Sultana (2021) discovered that many teachers had no experience using technology inside the classroom and were not trained. Teachers' tensions between their past and present selves, stakeholders' interventions (University, UGC, and Ministry of Education), education context and infrastructure including the economy - all these ever-changing variables affected teachers' identities.

Due to '*massification*' (Ping et al., 2022) or massive student enrolment in higher education in Malaysia, sessional academic staff or adjunct faculty members were recruited. Yet, they were prone to experience a lack of professional development

and unequal opportunity compared to their full-time counterparts during the COVID period. Some teachers felt virtual teaching was 'like the union of the sky and the earth in a place like Mugu' (Rai, 2022, p.44). Initially it was like chewing the iron but gradually many teachers favored ICT integration in ELT during the pandemic. Teachers perceived online technology as challenging but achievable with time and energy (Muhaji et al., 2023).

4.1.2. Learners' Perceptions

Learners struggled to afford devices and internet packages to cope with virtual education (Shifat et al., 2021). However, Rahman et al. (2021) found out that students played active roles on social media during COVID-19 but were callous about receiving a text message either from a teacher or a friend. Learners also worried about 'session jam' - a common issue in many public universities in Bangladesh. Students think, real-time discussion is the key to satisfactory academic performance and immediate feedback on class activities can increase their learning. Many students can easily collect online materials but they get tired of reading those online or from soft copies (Ferdous & Shifat, 2020).

Sultana (2021) demonstrated that some students were dissatisfied because their teachers lacked techno-pedagogical skills. Therefore, they wanted their teachers to have IT knowledge, deliver the ELE content properly and publish their results on time (Purushotham & Swathi, 2020). Moreover, the universities failed to provide effective online LMS. Maniruzzaman (2022) showed students' preference for onsite classes over online classes which were boring and less interactive though they expressed their confidence in both modes.

4.1.3. Perplexities

Technophobia (Aktar, 2020; Islam et al., 2020; Aktar et al., 2022) was a problem both teachers and learners suffered from. Students seemed intimidated to communicate through emails and open accounts on prescribed platforms while many teachers were poor in using online teaching tools and sharing recorded lessons or materials (Aktar et al., 2022).

To conduct effective online education, teachers initially had to suffer from inadequate infrastructures or resources, limited pedagogical skills, lack of social connections with students and colleagues, poor internet, unsupportive gadgets, the app's complexity, lack of proper home environments, lack of online assessment techniques and affordability and equity issues (Ferdous & Shifat, 2020; Subekti, 2020; Afrin, 2020; Shifat et al., 2021; Khan et al., 2021; Islam et al., 2021; Rahman et al., 2021; Ping et al., 2022; Rai, 2022; Aktar et al., 2022; Arju & Juthi, 2022; Muhaji et al., 2023). Ferdous and Shifat (2020) revealed teachers' increased workload in preparing new digital PowerPoint presentations; their mental stress and frustrations regarding the uncertainties of salary, promotion, bonus and allowance; their physical and psychological gap with their students and colleagues; balancing personal and professional life. Other crucial challenges included inadequate online materials, physical discomforts, social isolation with stress, social disbelief, psychological anxiety, technological addiction and the digital divide between urban and rural teachers (Rai, 2022; Rahman et al., 2021). Arju and Juhi (2022) and Sultana (2021) found teachers

having problems operating breakout rooms for various tasks, fast technological troubleshooting, engaging students in activities, conducting online assessments and providing quick feedback. In the context of Pakistan, Khan et al. (2021) depicted similar picture where teachers struggled to keep learners motivated and maintain assessment ethics.

Shifat et al. (2021) revealed that online mode was more challenging for students than teachers. English language learners faced problems due to inadequate logistic provision, high-priced devices, slow and interrupted internet services, inaccessibility of class materials, raucous home environment, incessant reading of online materials, lack of interaction for language development, struggle with online assessment (Ferdous & Shifat, 2020), having stress, depression, insomnia and short temper and lack of family support (Islam et al., 2020; Sultana, 2021). Sultana (2021) also reported that learners had issues like not owning a laptop or computer, not having a webcam or working microphone and not recharging the mobile data for its cost. Furthermore, doing all kinds of tasks on a smartphone was not always possible. Arju and Juhi (2022) excavated challenges like boredom or fatigue emanating from less or no classroom interaction, lack of motivation, technical support and self-confidence and unfamiliar learning environments. Consequently, the new pedagogical transition might have influenced students' affective domains in areas like "empathy, self-esteem, extroversion, inhibition, imitation, anxiety and attitudes, which may have impacted their performance on the final examination" (Sultana, 2021, p.150).

4.1.4. Propositions

Arju and Juhi (2022) mention that COVID-19 is an emergency when building support communities, sharing knowledge and experiences is essential for teachers to provide meaningful learning processes aiming at therapy, empathy, and care for students. Khan et al. (2021) in Pakistan's context, claim that a motivated teacher can produce motivated students. However, a suitable environment is required where both students and teachers are friendly, cooperative and interactive to make the learning process productive and boost positive motivation.

Online pedagogical policy formulation, teacher training, upskilling the students for hybrid pedagogy, curricula redesigning, developing teaching materials and assessment strategies, integrating and installing technology, improving the infrastructure, ensuring robust internet access and adjusting the management systems are essential (Islam et al., 2021; Khan et al., 2021; Rahaman et al., 2021; Maniruzzaman, 2022; Aktar et al., 2022; Arju & Juhi, 2022). Ping et al. (2022) highlight equal training needs of sessional academics (part-time teachers) and full time faculty members. They emphasize utilizing the university's in-house LMS to accommodate synchronous and asynchronous classes and upload recordings of online lectures and self-learning materials. Islam et al. (2021) ask for a drive to formulate a uniform policy for organizations to avoid incongruities and ensure proper implementation through central and institutional monitoring.

Sultana (2021) thinks that teachers must take pedagogical risks for effective teaching. They have to self-train by attending webinars and MOOCs (Massive Open Online Courses). Frequent meetings among colleagues to share thoughts, ideas and techniques are required to bring the best out of the worst. Afrin (2020) recommends recording live lectures with the teacher's face while streaming, testing lecture slides and videos before a class launches, using existing resources and ensuring open access. She also highlights the need for arranging consistent webinars on techno-pedagogies in low-resource contexts like Bangladesh, offering decent pay packages to the pedagogues and developing hygiene amenities and supervision on campus. Shifat et al. (2021) endorse an interactive and collaborative learning environment, a combo of audio-visual text and sufficient tools for teaching in crisis.

Maniruzzaman (2022) considers effective and engaging pedagogies, such as pair and group work, simulations, role-plays, and jigsaws for students from diverse backgrounds. Quizzes, assignments, presentations, portfolios, viva voce – these formative assessments can be administered online while summative assessments like the course final examinations can be conducted onsite. Teachers must know how to store and share materials through online file hosting services like Google Drive, Dropbox, emails and Google Classroom. Teachers also require smartphone literacy. In this case, teachers require 'adaptive metacognition' (Maniruzzaman, 2022) which refers to changing oneself and one's environment according to the social and instructional variability.

Aktar et al. (2022) speculate that teachers require technological knowledge to find appropriate materials, select, adapt and adopt online materials, use and manage LMS. Students are also required to have fundamental digital literacy in operating and using them as applied and suggested by teachers. Arju and Juhi (2022) applaud collaborative peer review, feedback sessions and presentations to facilitate students' social needs. Khan et al. (2021) in Pakistan found out that multilayer lecture techniques remove the monotony of learners involving them in interesting activities. Khan et al. (2021) suggest teachers adopt asynchronous activities and flexible assignment deadlines. Online assessment should incorporate oral and written tests where students submit the Test Ethics Pledge and keep their cameras on (Lee et al., 2020, as cited in Khan et al., 2021) to ensure fairness and prevent cheating. They advocated for checking plagiarism through software packages (e.g. Turnitin). Islam et al. (2021) believe that time and space to prepare techno-pedagogical lectures and assessments should be budgeted for teachers. They argue for developing a rational, holistic and proper e-learning guideline and a common platform with the help of the government.

The second research question discovers the dominant themes.
RQ2- What are the other predominant themes that came to the fore out of the reviewed papers?

4.2. The Education Sector during and after COVID

COVID forced the education sector into a long-lasting EiE that required organizational improvements and pedagogical innovations to sustain after COVID-19.

4.2.1. Organizational Improvements

Although COVID disrupted the total education system, digital technologies served as a rescuer. In Bangladesh, only Open University established the required "infrastructure for e-learning and had been conducting its academic activities via the internet, intranet/extranet, audio and/or video tape, satellite TV and CD-ROM since 1992" (Arju & Juhi, 2022, p.14). Except for Open University, Bangladeshi universities had no distance education, let alone online education before COVID-19. Bangladeshis like many oriental nations used to consider universities with online courses, as certificate-producing institutes (Younesi, 2021). However, this remote online teaching-learning was warmly welcomed during and after the COVID-19 crisis.

Any sudden transition throws organizations into a critical situation when they must invest in professional development, capacity building and take measures to adapt to the change. The private-run organizations with swift top-down decisions were in the driver's seat in the case of applying online education more effectively than the government-owned ones where policies are usually adopted through tiered bottom-up planning. Islam et al. (2021) identified that some universities established an institutional G Suite affiliation. Concurrently, the IT wing of all universities became vibrant in arranging training sessions for teachers and students. All institutes adopted total virtual teaching during the pandemic period. Later after two doses of vaccines by mid-2021, technology-enhanced instruction, web-mediated instruction and mixed-mode instruction in the names of hybrid, blended or HyFlex (Hybrid-Flexible) education were applied when a teacher took classes from inside the classroom in the presence of some students while students with health problems could join online from their comfort zones. Though blended learning first developed in the 1960s and gained its formal terminology in the 1990s, it became a new pedagogy for developing countries like Bangladesh after COVID-19. Blended learning or hybrid teaching requires strong information communication technology (ICT) and highly qualified technical staff. The ICT wing of every university became vibrant to embrace the new techno-pedagogy. Similar was the case in many other countries in the world.

4.2.2. Pedagogical Innovations

Ping et al. (2022) and Rai (2022) believe that teachers could enhance their digital literacy by exploring different online platforms through self-initiation and self-discovery and taking help from colleagues, family members, and other networks. They could instantly share soft copies of the lecture notes and it improved teacher-student interaction.

Afrin (2020) postulated that students also had to learn new things to adapt to a rapidly shifting world. They developed soft skills and technological literacy to get hold of the teacher-provided materials and communicate well digitally. They

could access class materials synchronously and asynchronously and felt excited when they received their quiz grades instantly (Islam et al., 2021). ERT was less costly and less stressful as students could work from their own homes and comfort zones (Shifat et al., 2021; Ping et al., 2022). Incorporating face-to-face lectures with technology is an attribute of the flipped classroom and blended learning, where students can learn anywhere at any time at their own convenience (Ping et al., 2022).

4.3. Methods Applied in Empirical Studies

The twenty reviewed articles were all empirical studies that applied mixed method (13), qualitative (6), and quantitative (1) approaches. Mixed method approaches included surveys, textual analysis, Google form questions, focus group discussions, and telephone and online messaging. Some used SPSS (Statistical Package for Social Science) data analysis software. In the case of the qualitative study, Subekti (2020) used secondary data from participants' written reflections on online learning. On the other hand, Islam et al. (2021) adopted phenomenology and autoethnography. Rai (2022), Aktar et al. (2022), Ping et al. (2022) and Muhaji et al. (2023) conducted unstructured interviews under narrative enquiry. Only one article by Purushotham and Swathi (2020) used the descriptive survey method as part of a quantitative study. They selected 130 research participants out of 300 through probability sampling to conduct their research.

4.4. Emergency Education Technologies

This is a significant theme of this study. The transition from face-to-face classroom teaching to virtual pedagogy was obvious during COVID-19 and later blended learning or hybrid teaching was incorporated in the post-vaccine era as the 'show must go on' (Afrin, 2020). Maniruzzaman (2022) believes that for blended learning, infrastructural provisions, such as laptops and/or computers, interactive whiteboards, sound systems, multi-media projectors, sufficient power supply, high-speed internet connection, networking equipment, digital libraries, well-resourced classrooms and management facilities are required. The two modes - synchronous and asynchronous teaching-learning with ample technologies (See Table 2 below) came into the limelight after COVID-19.

Table 2: Technologies used in ELT during and after COVID-19

Technologies	Purposes	References
Zoom, Skype, WhatsApp, WebX, Facebook Live, Google Meet, Facebook Messenger, Viber, Microsoft Team, Adobe Connect	➢ synchronous applications ➢ video conferencing ➢ live classes ➢ real time talking	(Afrin, 2020; Islam et al., 2021; Nisha, 2022; Purushotham & Swathi, 2020; Rahman et al., 2021; Rai, 2022; Shak et al., 2022; Shifat et al., 2021; Subekti, 2020; Sultana, 2021)
Edpuzzle, Loom and OBS	➢ virtual interactivity	(Afrin, 2020)
Moodle, Schoology, Google Classroom, NAVID, VESTA	➢ asynchronous teaching-learning ➢ learning management	(Afrin, 2020; Rahaman et al., 2021; Shifat et al., 2021; Subekti, 2020; Sultana, 2021;

	systems ➢ web-based platforms	Younesi, 2022)
Wiki technology, Edmodo, Blackboard Learn	➢ some teachers use in universities as pedagogical aids	(Hsu & Lo, 2018 as cited in Muhaji et al., 2023), (Purnawarman et al., 2016 as cited in Muhaji et al., 2023), (Islam et al., 2021)
email, smartphone, SPADA, Google Apps, YouTube, Instagram, TedEd, Socrative, Blogs, Jitsi and Google Docs	➢ common apps	(Muhaji et al., 2023)
Panopto, Top Hat, BigBlueButton, LearnCube and WizIQ	➢ a few essential apps in ELE	(Afrin, 2020)

Sultana (2021) mentions that to carry forward the post-pandemic education system; many countries have already utilized "TV broadcasts, online libraries, resources, guidelines, online channels, and video lectures as alternative means to traditional classroom learning" (p.151). She claimed that at pre-COVID tertiary level in Bangladesh, technology

> *was limited to delivering lectures using PowerPoint slides, but now it has become a tool for all teaching and learning activities, as teachers became more engaged with technology going beyond mere PowerPoints to using other tools such as Zoom, Google Meet, Google Classroom, and Google Drive to deliver lectures and give tests, quizzes, and exams (p.135).*

4.4.1. Teaching Aids and Materials

Nisha (2022) posited that many students used mobile phones in the first place and personal computers in the second place in the case of online learning. Ferdous and Shifat (2020) and Khan et al. (2021) also found students using smartphones, laptops and desktops. Khan et al. (2021) discovered that teachers used PowerPoint slides, online articles, audio lectures and video clips more than the printed materials that none could access due to the libraries being closed.

4.4.2. Pitfalls of Technology Use

There is a proverb 'Haste makes waste'. The quick shift to remote teaching lacked much needs analysis and policy processes (Khan et al., 2021) resulting in inadequacies and difficulties. The government and the higher education authorities imposed technology on teachers and students without any trial. The rapid emergency situation did not allow institutions to adopt a planned system of pedagogical practices. Ferdous and Shifat (2020) posited that COVID halted the vital resources and support networks and teachers and learners fell out of the frying pan into the fire. Quick pedagogical practice shifts (Muhaji et al., 2023) and impromptu imposition of online teaching (Shifat et al., 2021) created serious challenges for them. Maniruzzaman (2022) speculated that the pandemic time pedagogical transition at lightning speed negatively affected student-teacher motivation, preparedness, attitude, practice and performance. Moreover, Aktar et al. (2022) reported that most of the universities had no virtual learning environment (e.g., Moodle, Blackboard, Canvas) to store and deposit any

materials, including PPT slides and recorded lectures which students could easily access.

4.4.3. Future Possibilities

Sultana (2021) predicts that ELE's new possibilities and positive effects during the pandemic may usher in an era of post-pandemic education through quality instruction and collaborative pedagogies. She also thinks that teachers may consider blended learning activities in regular classrooms in a similar future crisis. Aktar et al. (2022) echoed the same by claiming that the pandemic had offered plenty of innovations and technologies including AI (Artificial Intelligence), in the Fourth Industrial Revolution to shape the future of ELE. Subekti (2020) pronounces that synchronous and asynchronous modes boost learning effectiveness and reduce burdens allowing a win-win solution for both learners and teachers. She considers the LMS as a kind of sanctuary where learners can 'go slow to grow fast'. A teacher can use this platform for performing multiple tasks, such as monitoring students' activities, organizing lectures, uploading course materials, conducting assessments, giving feedback and opening discussion forums where learners can navigate during his/her flexible time parameter.

Rai (2022) believes that after the pandemic both tools Open Educational Resources (OER) and Open Educational Practices (OEP) have started to contribute to ELE. There is a paradigm shift that has transformed both teachers' and students' attitudes towards online education. The new dynamism will develop a high level of critical thinking, interpersonal, managerial and language skills and cognitive abilities in students. The ICT tools will help them perform as autonomous, creative and research-oriented learners with motivation. Rahaman et al. (2021) speculate that virtual learning tools will augment the new academic standard. Maniruzzaman (2022) believes that the new normal will accommodate ERT, virtual learning and traditional face-to-face learning.

4.5. Ethical Considerations

Ethical standards are important to conduct original research. Richard Mason in 1986 proposed PAPA (Privacy, Accuracy, Property and Accessibility) framework (Young et al., 2020) with the required ethical considerations. Privacy means confidentiality and anonymity. Participants' identities, and other details like contact information, associated departments, faculty names etc. must be anonymized. All collected data, transcription and audio recordings should be preserved confidentially and the data cannot be used anywhere without consent. Presenting true and original information without falsifying any data can uphold accuracy. Property right refers to the copyright of the legal owner of resources. Moreover, it's important to mention who will get access to the research works. In addition to the PAPA framework, other ethics include ensuring justice, assuring research participants of no harm and risk, taking informed consent and using the best polite language during interviews. Each of these reviewed articles (20) upheld these ethical standards.

5. Discussion

The shift to Emergency Remote Teaching was an emotional rollercoaster that simultaneously offered excitement, frustration, stress and reward for the teachers and students (Maniruzzaman, 2022). The findings lead to the following discussion based on the SWOC (Strengths, Weaknesses, Opportunities, and Challenges) framework.

5.1. Strengths

The greatest distance education experiment in history brought about the emergence of pedagogy of care (Bozkurt & Sharma, 2020) and established a positive 'culture-change moment' (Calonge et al., 2022). Teachers and students became well-equipped with strategies to solve technological glitches and show resilience and mindfulness to survive and continue teaching-learning in crisis moments, overcoming distance-learning pedagogy challenges. The new academic standard developed teachers' and learners' soft skills they lacked before. Teachers and organizations learnt how to overcome the session jam which students were worried about. The contactless EiE exposed all the academic stakeholders to hybrid pedagogy replacing stereotypical teaching. It gave birth to an era of techno-pedagogy for all where teachers require new identities as techno-pedagogues and students as smart App users and problem solvers.

To accelerate educational activities, academic institutions developed web-based tools and web portals where teachers uploaded soft copies of their lectures and instructions for students' convenience. All organizations ensured their digital presence to create new digital identities. They gave birth to their digital twins as a dire need of the time (Bozkurt & Sharma, 2020). Additionally, each organization created a Learning Management System (LMS) as a disciplined database (Aldiab et al., 2019 as cited in Islam et al., 2021) to support future teaching-learning. Ping et al. (2022) feel that this LMS is environment-friendly as it reduces the printing of note sheets. Thus, there is a transition from an old pedagogy to a new techno-pedagogy in the global educational context.

5.2. Weaknesses

COVID-19 created the greatest disruption to the higher education landscape giving rise to an 'educational punctuated equilibrium' (Calonge et al., 2022). Teachers could not properly enhance learners' overall performance and failed to properly monitor their students during exams when they could resort to plagiarism. The teaching agency and teacher identity were initially at risk. Students lost motivation and were suffering psychologically due to the lack of physical presence on campus for social interaction and face-to-face learning. EiE also generated digital poverty and digital divide among university teachers and students in low-resource settings.

5.3. Opportunities

All teachers tried to upskill their digital competencies as it was a sink-or-swim situation. According to Islam et al. (2021) during online classes, teachers posted announcements, recorded lectures, shared the screen, uploaded course materials

and were involved in live chatting. Gradually, they used ICT tools efficiently to conduct virtual or hybrid classes (Rai, 2022). Khan et al. (2021) stated that teachers demonstrated their humanistic stance and consideration for disadvantaged students and hence, human compassion emerged as a pedagogical quality (Afrin, 2020). The teachers felt they must be smart with Web 2.0 and Web 3.0 technologies to teach Generation Z (Muhaji et al., 2023) and Generation Alpha students, the digital natives born with gadgets. EiE made teachers and students understand resilience as an adaptive process to maintain their identities and continue learning, growing, and evolving despite multiple adversities. Islam et al. (2021) consider tech-based education as a timely weapon to face an invisible enemy (COVID-19). Both teachers and students had to make use of multiple devices (e.g., mobile phones, laptops, desktops, tabs) and social networking sites (e.g., Messenger, WhatsApp, Viber, and Imo groups) for academic purposes.

The changed circumstances enhanced digital technology use for which teachers and learners got training and technical support. Teachers learnt how to record audio and video lectures and live classes for learners' convenience. The government and mobile operator companies are taking steps to offer cost-effective data packages with uninterrupted internet services even in rural areas. The government and some private institutions are providing subsidies and stipends to disadvantaged teachers and students. The institutional website or blog is getting more secure, simple and user-friendly. A pool of dedicated and strong IT people to assist students and teachers with LMS functionalities, materials development, and instant problem-solving has been formed as an inseparable part of education. Interesting and relevant mini-lesson pedagogy is being designed for learner interaction through instructional modes in multiple formats, platforms, and devices. Hence, future EiE will adopt multi-modal ERT channels through the creation of a sustainable, robust emergency-resilient educational ecosystem.

5.4. Challenges

Mudzingiri et al. (2022) believe that education during the COVID emergency ''was accompanied by the challenges of digital technology resources and the lack of training and preparation for digital platforms'' (p.297). EiE gave rise to technophobia among teachers and learners. It injected turmoil and uncertainty across the education sector. There was an initial fear of deskilling and de-professionalization among academic staff. It also led to instructional frustration or even an identity crisis among teachers, all of which could lead to educators leaving the profession. Teachers felt worried about the over-dependence of students on assignments, presentations, short questions and quizzes. Virtual teaching resulted in a higher attrition rate among the students.

6. Conclusion

Through the Modified 5-SPICE framework, this paper addresses the importance of techno-pedagogies during COVID-19 in the tertiary ELE context. With some preliminary glitches, all the educational stakeholders, especially the teachers as 'frontline heroes' (Pherali & Mendenhall, 2023) have been able to keep pace with

the New Normal technologies. Desperate times call for desperate measures. ERT as a desperate measure during the pandemic has ushered in an era of techno-pedagogy for all. Every teacher and student has mastered hard and soft skills to be an unbreakable shield against such an emergency situation in the future. Hence, COVID-19 has been a blessing in disguise. It has given birth to institutional digital twins that will be a ubiquitous requirement to tackle any future catastrophe. Teacher agency and teacher identity may be under threat if techno-pedagogy is not embraced. However, tech-savvy teachers with ELE expertise and continuous professional development strategies will surpass teachers with conventional pedagogies and create consolidated identities and agencies. Despite the new insights gained by the study, this small-scale desk research has not been able to shed light on many other original research works in developed contexts. Therefore, further large-scale research needs to be carried out to add more insights into using EiE technologies at the university level in the wider ELE context. However, the pedagogical implications of the findings of this study can't be denied. The institutional authorities, policy makers, curriculum developers, teacher trainers, ELE pedagogues, learners and other stakeholders can gain valuable insight from the findings to perform better in the next-normal educational setting even though any unprecedented emergency arises.

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