



EFL Teachers' Use of Digital Technology to Facilitate M-Learning

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Abstract

Taking the concept of mobile-learning as development of instructional technology of what commonly called e-learning, this study aimed to firstly identify the digital products and approach used by EFL teachers for online instruction. Moreover, frequently used digital technologies chosen by the teachers along with contextual factors of using them were investigated. To achieve these objectives, SAMR (substitution, Adaptation, Modification, and Redefinition) model was selected as the framework of corresponding the technology use with the four levels to facilitate effective online instruction. Descriptive analysis of a questionnaire distributed to twenty-three English teachers from four universities in Indonesia resulted in almost equal distribution of technology use to facilitate m-learning purposes within the four levels. Moreover, contextual factors related to the institutional policy of online learning, the features and nature of the technology products, and the students' varied challenges were admitted affecting teachers' use of digital technology to facilitate m-learning.

Keywords: *digital technology, m-learning, online instruction*

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1. INTRODUCTION

Learning and instruction has been viewed as complex-interconnected process involving an interplay between its physical, psychological, and cognitive dimensions. Using face to face mode of instruction that has been known for centuries, it has challenges and problems that sometimes should be approached comprehensively through lengthy procedures and mechanisms by several stakeholders of education. Meanwhile, online learning, as we all know, has been enriching classroom lessons, offering its flexibility, resourcefulness, multimodality, and potentially engaging learning experience for students. The method even has been used widely for various independent learning and teaching purposes. Its buzzwords range from e-learning, distance learning, online learning, and even the recent-emerging term mobile learning.

This study, addressing English teachers' use of digital technology at time when distance instruction becomes obligatory, is taking the concept of mobile learning, henceforth called m-learning. Scholars have been proposing different views and concept of m-learning. (Pieri, M., Diamantini, 2009) conceptualize it as a modality of any learning content delivery with portable devices such as the Personal Digital Assistant (PDA), Tablet PC, e-book, and mobile phones. Accordingly, (Roschelle, 2003; Trifonova, A., 2003) propose that any form of learning through devices which are small, autonomous from the electrical supply, and offer portability to use them anytime and anywhere is called m-learning. Different from e-learning, m-learning is not just electronic, it is mobile (Shepherd, 2001). A more moderate view calls it the development of e-learning by using mobile devices and wireless transmission (Pieri, M., Diamantini, 2009). Proposing similar view, (Peters, 2009) asserts m-learning as a subset of e-learning (which is web-based delivery of content and learning management). Therefore, the intersection between mobile computing and e-learning enables users to produce anytime and anywhere learning experiences (Pieri, M., Diamantini, 2009)

Taking a more conceptual dimension of how instruction works, other scholars view m-learning has little to do with the physical devices themselves. Instead, it is "the experience and opportunity afforded by the evolution of educational technologies" (McQuiggan et al., 2015). Focusing more on time and space flexibility, this mode of instruction is believed to offer prompt, on-demand access to a personalized world filled with tools and resources for knowledge construction, collaborating with others, and cultivating experiences otherwise unattainable. It is therefore, this concept differentiates between "mobile learning" and "mobile devices" in a way that the focus is on the adaptation and use of the latest advances of digital

technology. The concept also redefines the responsibilities of teachers and students, and blurring the lines between formal and informal learning. (Peters, 2009), proposing more radical view in the future that m-learning, while mostly situated within the e-learning framework, that it is connected to the kind of “just enough, just in time, just for me“ model of flexible learning.

As little has been known on the elaboration m-learning and its technology use for online instruction in Indonesian context, this study is directed to answer the following questions:

1. To what extent does the use of m-learning technology match with the SAMR framework?
2. What technology products are frequently used by teachers to facilitate m-learning in the online instruction along with their facilitating and inhibiting factors?

This study expectedly portrays dimensions of m-learning and its application in online instruction in EFL context. Moreover, the institutional policy to conduct online learning due to Coronavirus outbreak could be put into practice differently into ‘classroom’ pedagogy as contextual factors are known to contribute towards teachers’ use of ICT.

2. METHODOLOGY

2.1 Respondents

The respondents of the study were 23 lecturers of English Department from four teaching institutes, namely Universitas Negeri Yogyakarta, Universitas Kristen Duta Wacana, Universitas Muhammadiyah Kalimantan Timur, and Universitas Widya Gama Mahakam. The respondents were obtained using random sampling. They consisted of six males (26.1%) and seventeen females (73.9%). The 30.4% of the respondents (7 English lecturers) were from Universitas Negeri Yogyakarta, the 47.8% of the respondents (11 English lecturers) were from Universitas Kristen Duta Wacana, the 17.4% of the respondents (4 English lecturers) were from Universitas Muhammadiyah Kalimantan Timur, and 4.3% of the respondent (1 English lecturer) was from Universitas Widya Gama Mahakam.

The respondents’ teaching experiences varied from less than 5 years (8 English lecturers), 5 up to 10 years (8 English lecturers), 11 up to 20 years (6 English lecturers), and more than 20 years (1 English lecturer). The 22 respondents had completed Master degree (95.7%) while 1 respondent had completed Doctorate degree (4.3%). The teaching courses of the participants include Classroom Management; Comprehension of Long Talks; Educational Linguistics; English Phonology, Semantics, and Pragmatics; English Structure; ESP; Functional Grammar; Intermediate Grammar; Intensive Reading; Psychology of Learning; Listening for Academic Context; English for Study Skills Development; Public Speaking;

Reading; Research Proposal Writing; Structure for TOEFL PBT; Technology Enhanced Language Learning; TEFL; Web Technology for Language Learning.

2.2 Instruments

The present study employed an adapted questionnaire from Makarere University (Jude et al., 2014) evaluating their use of ICT for instruction. The instrument was called Digital Technology for Distance Learning. This instrument comprised two sections. The first section was the Demographic Data of the respondents. It involved the city of living, gender, age, teaching institution, teaching department, teaching experiences, and last degree completed. The second section was the items for Digital Technology for Distance Instruction represented four elements of the SAMR model – substitution (10 items), augmentation (10 items), modification (10 items), and redefinition (9 items). All items were described in the form of statements and formed as 4-point scale (1 – never, 2 – sometimes, 3 – often, 4 – always).

2.3 Data Analysis and Procedure

To determine the validity of the instrument, each item of the questionnaire was tested using Pearson Correlation using SPSS 22. As displayed in table 1, the Pearson correlation coefficient of each item is statistically significant ($p = 0.005$). Thus, each item is considered valid.

Table 1. Test of Validity

Section	Substitution	Augmentation	Modification	Redefinition
Pearson Correlation	0.432	0.483	0.452	0.590
	0.526	0.736	0.539	0.543
	0.604	0.463	0.473	0.804
	0.341	0.529	0.693	0.762
	0.445	0.567	0.677	0.709
	0.273	0.763	0.488	0.435
	0.601	0.362	0.571	0.463
	0.474	0.342	0.558	0.757
	0.633	0.770	0.798	0.808
	0.503	0.056	0.564	

Moreover, the Cronbach's Alpha was also used to determine the reliability of the instrument. As can be seen in table 2, the Cronbach's alpha was 0.860 indicating a high level of internal consistency. Therefore, the instrument can be considered reliable.

Table 2. Test of Reliability

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.860	.872	4

The data of the present study was analyzed quantitatively and qualitatively. The quantitative data were obtained through carrying out descriptive analysis. The descriptive analysis was used to obtain the data related to the English lecturers' use of digital technology for Mobile Learning due to Covid-19 outbreak along with four elements of the SAMR model, namely Substitution, Augmentation, Modification, and Redefinition. The analysis was then carried out using SPSS Statistics 22 to reveal the average occurrence of each element of the SAMR model. Meanwhile, the qualitative data were obtained through two open-ended questions in the instrument. The questions were: (1) what mobile technologies do you frequently use to enhance students' language development during Covid-19? (2) what facilitating and inhibiting factors interfere with your distance instruction during Covid-19?

3. FINDINGS

3.1 Technology for M-learning within SAMR Framework

As elaborated earlier, SAMR-adapted questionnaire comprises four dimensions, namely substitution, augmentation, modification, and redefinition. The results are elaborated as follows.

Table 3. Substitution ICTs

No	Items	N	Mean	Average Occurrence	SD
1	I use word processor software to prepare my lecture, assignments, and examinations	23	2.91	0.73	0.848
2	I use Power Point presentation or similar program to deliver my lectures	23	3.26	0.82	0.752
3	I upload teaching materials on LMS (Learning Management System) such as Google Classroom, Schoology, Moodle, etc for students to access	23	3.39	0.85	0.656
4	In support for the instruction, I use electronic communication such as	23	3.70	0.92	0.635

	email, Whatssap, or social media to my students.				
5	I refer my students to electronic databases or internet sources for reference materials	23	3.30	0.83	0.559
6	I use online smart boards/interactive boards in my class	23	1.74	0.43	0.752
7	I ask students to submit their course work assignment through e-Mail, LMS, or similar platforms	23	3.48	0.87	0.846
8	I administer quizzes/tests/examinations electronically using online test maker such as Quizzes, Google Form, Socrative, etc.	23	3.00	0.75	0.853
9	I use facilities in LMS or other platforms to encourage discussions and peer feedbacks	23	3.13	0.78	0.757
10	I use Online sharing Tools such as GDrive or Dropbox to share files or documents with my students	23	3.04	0.76	0.976

The first dimension is Substitution which comprises ten statements. It can be noted in table 3 that all of the participants seem to have been incorporating substitution within their m-learning. Moreover, it can be seen that the average occurrence of item 4 is higher than other statements that is 0.92. It means that most of the participants have been using electronic communication to conduct m-learning during their teaching activities. Most of these apps allow group communication and help to build a closer social networking environment for users (Vrocharidou, A., & Efthymiou, 2012). (Lauricella, S., & Kay, 2013) have found that both text and instant messaging (IM) are useful and viable tools to augment the communication among peers and faculty in higher education. For teaching and learning support with instant messaging, IM tools could be used to support synchronous discussion activities (Hou, H., & Wu, 2011). Nevertheless, WhatsApp as a Web 2.0 IM tool can also be considered as a social networking tool. The functionalities supported by WhatsApp can widen opportunities for pedagogical rethinking (Conole, G., & Alevizou, 2010). By making use of the special features offered by WhatsApp, purposeful activities can help students to learn more effectively (Beetham, H., & Sharpe, 2013). It is also found that most of them always ask students to submit their course work assignment through e-mail, LMS, or similar platforms according to the

average occurrence of statement number 7 reaches 0.87. In the field of LMSs a lot of studies have been done that focused on LMS as a tool and technology to manage and share knowledge in educational organizations (Shawar, 2009). However, there are many participants who have not been utilizing online smart board/interactive boards in their class as seen on statement number 7 in which the average occurrence is only 0.43 for the usage of online smart board/interactive boards.

Table 4. Augmentation of ICTs

Section	No	Items	N	Mean	Average Occurrence	SD
Augmentation	1	The use search engine features (e.g. Google syntax or punctuation features)	23	3.09	0.77	0.793
	2	The use of the editorial tools in my word processor	23	3.00	0.75	0.798
	3	Online dictionaries and thesaurus and the combination	23	3.09	0.77	0.900
	4	The use of track changes tool in my word processor	23	2.78	0.70	0.951
	5	The use of plagiarism detection software	23	2.48	0.62	0.846
	6	The use of blogs, online articles, or repositories as teaching material	23	3.00	0.75	0.798
	7	The use of online conference apps to teach	23	2.96	0.74	0.878
	8	The use of AR (Augmented Reality) tools	23	1.61	0.40	0.656
	9	The use of gamification activities.	23	2.61	0.65	0.722
	10	The integration of videos or tutorials to strengthen student understanding.	23	3.09	0.77	0.515

The second dimension is Augmentation which consists of ten statements as well. In accordance with the data in table 4, all of the participants seem to have involved augmentation in their m-learning activities. The average occurrences of statements number 11, 13, and 20 are higher than other statements, each of them is 0.77. It means that most of the participants use search engine features in searching the content. Internet searching is a common activity in our daily life. Approximately 500 million searches are performed on major search engines every day, and Google is used by 70% of the world's Internet searches (SEO, 2011). Search engines are useful tools and several tutorial articles, videos, posters, and websites are available to help users learn how to search on the Internet. Effective Internet search skills embody these new

literacy skills. Additionally, middle school students are prime targets for information literacy skill training because they have reached a developmental stage where they can better comprehend the reliability of information (Henry, 2005).

They also search meanings and synonyms of words using online dictionaries and thesaurus like Merriam Webster, Oxford, or dictionary.com. Moreover, the participants also integrate videos or tutorials in their lectures to strengthen students' understanding. The selection of appropriate video clips and methodology for their display within the teaching materials represents an important issue for curriculum design, leading to positive learning outcomes (McConville, S. A., & Lane, 2006). Using appropriate teaching media and methods to organize and present only relevant information may also increase the efficiency of the self-learning process (Ruiji, 2012). Another method to engage and to motivate students is showing entertainment videos (Steffes, E. M., & Duverger, 2012). As (Steffes, E. M., & Duverger, 2012) reported, showing supplementary videos within an entertainment context at the beginning of the class can be used to increase the positive mood of the students. Unfortunately, there are many participants who have not used AR tools to support their teaching and learning process as seen in the table that there are 11 participants who never include AR in tools in their class.

Table 5. Modification of ICTs

Section	No	Items	N	Mean	Average Occurrence	SD
Modification	1	Recording my online lectures or class and give them for self-study	23	2.17	0.54	0.778
	2	Taking video/audio recordings while lecturing and use the media for self-improvement	23	1.91	0.48	0.733
	3	Converting PPT slides into video files to deliver my lecture	23	1.91	0.48	0.949
	4	Encouraging students to use Google docs to work on group assignments/course work	23	2.39	0.60	0.891
	5	Modifying videos using its features to facilitate students' understanding	23	2.00	0.50	0.798
	6	The use digital stories or story telling for assignment	23	2.22	0.55	0.951
	7	Video projects as assignment and publish them online	23	2.74	0.68	0.864
	8	The use of web-based tools such as file Meme Makers, Video Editors, Mindmap Makers, and the likes	23	2.17	0.54	0.984

9	The use of visual representation of ideas or understanding using infographics or posters	23	2.35	0.59	0.982
10	The use of material repositories in forms of website or blogs	23	1.61	0.40	0.722

The third dimension is Modification which comprises ten statements. According to the result displayed in table 5, all of the participants seem to have incorporated modification within their m-learning. It can be noticed that the average occurrence of statement number 27 is higher than other statements as many as 0.68. It means that most of the participants ask their students to create and publish videos as one of the assignments in conducting m-learning. (McCoy, 2011) highlighted the preference of today's learners in utilizing the internet search engines over visiting libraries for learning resources while popular sites such as YouTube and Facebook do offer instant access to a vast range of video recordings, the excitement of hands-on learning through personal involvement in the video production is an experience which the existing pre-uploaded videos can never offer to our learners. Video projects are usually impossible to be managed by a single individual, thus the project will 'force' students of different learning styles to work together in groups at the same time, integrate various learning skills so as to achieve their common language goal of producing the video project (Kaplan, 1986; Torrence, 1985) Besides, video projects also give students reasons to be personally involved in language tasks and take ownership as well as pride in their achievement (Masterman, 1980).

Most of the participants (0.60 or 12 out of 23 people) also often encourage their students to use Google docs to work on their group assignment. In recent decades, there has been an increasing interest in developing new collaborative technology, such as online applications, to enhance collaboration (Apple, K. J., Reis-Bergan, M., Adams, A. H., & Saunders, 2011; Vodanovich, S. J., & Piotrowski, 2001). Among newly developed online applications, Google Docs is an especially promising tool for collaboration. In higher education, educators have begun to explore the educational merits of Google Docs. One study reported that students found Google Docs more enjoyable to use when compared to Microsoft Word (Apple, K. J., Reis-Bergan, M., Adams, A. H., & Saunders, 2011). (Brodahl, C., Hadjerrouit, S., & Hansen, 2011) found students' attitudes and competence using online writing applications (i.e., Google Docs and EtherPad) played more important roles in students' perceptions of collaborative writing as compared to other demographics characteristics (e.g., students' gender or age). Students reported positive experiences with collaborative writing using these tools. But, as many as 12 participants never made a repository in the form of website or blog for their teaching material.

Table 6. Redefinition ICTs

Section	No	Items	N	Mean	Average Occurrence	SD
Redefinition	1	Combining online tools and apps to help students learn better or to encourage independent study	23	3.22	0.80	0.671
	2	Combining class with open education resource (such as MOOC)	23	2.22	0.55	1.085
	3	Maximizing features of LMS such as randomizing quiz questions, Deadline setting, Answer Check.	23	2.87	0.72	1.058
	4	Using digital game-based learning to arouse students' interests and to facilitate more challenging learning experience.	23	2.30	0.58	0.876
	5	Using products of Artificial Intelligence for my language instruction for instance speech recognition, grammar/spelling auto-correction, voice recognition, and the likes.	23	1.96	0.49	0.878
	6	Exploring various online sources of learning to facilitate students' understanding	23	3.39	0.85	0.656
	7	The use of digital-based project learning.	23	2.78	0.70	0.850
	8	Facilitating students to choose digital technology products or media	23	2.52	0.63	0.815
	9	The use of digital-authentic material such as online movies, news, non-educational videos.	23	3.04	0.76	0.947

The fourth dimension is Redefinition consisting of ten statements. It is noteworthy to notice that, in table 6, the average occurrence of statement number 36 is higher than that of other statements that is 0.85. Related to this finding, the rapid development of app technologies has made these English learning apps have capability to integrate different media, for example, text, picture, animation, audio and video can be integrated in order to create a multimedia instructional material, as well as prompt students' interest in studying. Online resources or web materials are important resources for distance learners to achieve effective learning ((Mutiar, D., Zuhairi, A., & Kurniati, 2007). Using online resources is being regarded as having the

function to improve the quality of learning, increase the chance of accessing to education and training, reduce the expenditure consumed on education and facilitate the effectiveness and efficiency of education (Alexander, 2001).

This is followed by statement number 31 as the second highest response as many as 0.80. This means that participants also encourage their students to use online tools or apps to help them learn better or for their independent study. Redefinition also highlights the use of artificial intelligence or AI. Based on the result, it is found that the number of participants who have used products of Artificial Intelligence for their language instruction for instance speech recognition, grammar/spelling auto-correction, voice recognition, and the likes is considered low, as many as 0.49. This means that the participants have not really utilized the AI and AR technology optimally.

4. DISCUSSION

4.1 Technology Use for m-learning

In this section, the researchers discuss several points related to the frequent use of technology as well as its facilitating and inhibiting factors during the implementation of m-learning. Several digital technologies are employed by the English lecturers to support the m-learning implementation. One of the highly used digital technologies is Zoom. It is indeed that Zoom app is one of the essential platforms allowing the teachers and students to utilize a number of major technologies and features (Felice, 2017). The Zoom application is selected as one of the platforms in m-learning due to its advantageous feature that is share-screen feature. The share-screen feature in Zoom is admittedly enabling the participants to present the learning materials while, at the same time, explain and discuss the learning materials with the students online. However, even though the Zoom application provides a beneficial feature to do m-learning, it also brings some issues. Using Zoom needs a good and stable internet connection. Thus, it would be a burdening issue for the students who live in particular areas in which the signal and internet connection are unstable. Besides internet connection, the students' digital skills may also become the inhibiting factor in using Zoom. This is due to the fact that it is their first-time using Zoom so that it may take some time for them to get used to it. These findings are similar to (Felice, 2017) who asserts that several issues may arise due to the process of teaching in an online format such as the importance of defining a role, the need to choose components for inclusion, and the feeling of loneliness. Hence, it is crucial for the teachers to provide several tips as the guidance and starting point to conduct m-learning.

Another highly used digital technology during m-learning is Google-based applications, namely Google Docs, Google Form, Google Site, and Google Meet. The Google-based applications are likely to provide abundant sources of learning materials. The use of Google-based applications also helps the students in exposing and enriching them to more authentic resources. In addition, the Google-based applications can be an alternative platform for the students living in certain areas in which the signal and internet connection are unstable since the Google-based applications can be used to implement asynchronous learning activities. Whatsapp application is also one of the highly used technologies during m-learning. By using Whatsapp, the English lecturers are able to communicate with their students discussing the learning materials in a more flexible time. It also provides the students with more motivating language learning since chatting and learning may happen at the same time (Ahmed, 2019). However, utilizing both Google-based applications and Whatsapp during m-learning may also bring some issues. Firstly, the lecturers cannot provide real-time feedback as effectively as in face-to-face interactions. Secondly, sometimes, the students do not see their devices as potential learning tools since they do not use the devices as effectively as possible. Furthermore, by using Google-based applications or Whatsapp, the lecturers cannot control the time duration since the students may be late to participate in the learning activities.

One of the interesting findings in the present study is the use of exclusive applications in certain teaching institutes. For instance, the e-class or the Learning Management System (LMS) of Universitas Kristen Duta Wacana is employed during m-learning by several respondents. In addition, the Be-Smart UNY from Universitas Negeri Yogyakarta is also utilized by several respondents to provide learning materials and activities to the students. The e-class of Universitas Kristen Duta Wacana and Be-Smart UNY from Universitas Negeri Yogyakarta are the LMS that are functioned to enable and enhance continuous language learning (Por, F., Mustafa, Z., Osman, S., Phoon, H., Fong, 2012). The e-class of Universitas Kristen Duta Wacana and Be-Smart UNY from Universitas Negeri Yogyakarta are employed along with other digital technologies namely, Schoology, Mentimeter, Youtube, Canva, Kahoot, Quiper, and Quizziz. Not only are those technologies able to provide abundant learning materials and activities that are beneficial for both the English lecturers and students, but they are also able to assist the students in enhancing their autonomous learning habits. Nevertheless, the guidance of the English lecturers is still needed to ensure that the implementation of digital technologies during m-learning can help the students achieve the learning objectives.

In relation with policy making, all three universities issued technical guidelines along with a formal letter to enforce the policy of administering distance instruction. In the guideline, all three universities instructed online teaching-learning due to Covid-19 pandemic with few similar points of recommendations in general to shift from face-to-face instruction and adjust syllabus accordingly within the remaining time of the semester. However, it was noted that two universities outlined more comprehensive elaboration of the details including recommendation of tools, programs, platform to use, choices of material delivery, and options test administrations. Moreover, it was noted that two of the universities had managed and run Learning Management System (LMS) for blended or flipped learning management system. Therefore, the technical guideline explicitly included these LMS to use. Additional tools, platforms, and online sources could be used to enrich, offer variations, or facilitate instruction effectiveness. Tutorials of more technical procedures to use recommended LMS and other platforms were further provided by these two universities. In relation with online class administrative report such as student attendance and class report, one university regulated explicitly, and two others did not. It appeared that two of the university demonstrated quite similarity in terms of policy of online instruction and its technical details, whereas the other one released general instruction for it.

4.2 Limitation of Study

Regardless of its growing acceptance, theoretical elucidation of the SAMR model in the peer-reviewed literature is limited. As the consequence of this lack of theoretical explanations or explorations of the SAMR model, both teachers and others involved with educational technology integration, such as professional development providers and technology specialists may be led to interpret and represent the SAMR model in different ways (Hamilton et al., 2016).

5. CONCLUSION

As online instruction offers flexibility, resourcefulness, multimodality, and potentially engaging learning experience for students, this method has been used to substitute face-to-face lesson due to Coronavirus outbreak. For this purpose, adopting instructional technology to transform learning to a full online scenario, careful consideration has to be placed on several arising issues.

This study, addressing teachers' selection of technology use using SAMR framework, appeared to result in almost equal distribution of the four clusters. It could be inferred that teachers' use of technology to facilitate m-learning in this study covered its comprehensive

purposes from merely substitution of “traditional” mode of learning to the use of technology to redefine it. These certainly could not be detached from their contextual factors, among others the institutional policy of technology use. It provided direction and guidance, along with illustrations depicting what and how the online instruction amid the Covid-19 pandemic should be approached by teachers. Meanwhile, other contextual factors such the technology features, facilities, and limitation offered choices of what and how they should be used. Furthermore, it had been noted that the students’ technical competence, digital literacy, resource support, and workloads were equally important to the technology use in m-learning.

In terms of its future study, there are a few more that are yet to be discovered by researchers and practitioners in this area. Issues regarding the technical aspect of the technology use, for instance, are apprehensive because a lot have been highlighted. Besides, when classifying the influential factors of mobile learning, few studies discussed the technical aspect as the plus point for imparting knowledge through the learning mode. Moreover, the technology convergence between various instructional technology modes (e-learning, m-learning, and d-learning) and their intersections provide wider opportunities for more extensive and deeper research.

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