Assessing the Innovation of Mobile Pedagogy from the Teacher’s Perspective

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Abstract: This paper focuses on the use of mobile technology to assist teaching and learning in distance education. It aims to investigate teaching behaviour in mobile pedagogy and examine the impact of technology on current education. A case study was conducted through semi-structured interviews with a cohort of 30 Chinese lecturers who taught English through online tutoring. Thematic analysis was used to analyse the interview data and the assessment was based on teacher perceptions of mobile pedagogy. The impact of technology on the current educational environment is discussed through an analysis of mobile pedagogy and teacher perceptions. The findings show that mobile pedagogy is highly regional in practice and nature and features in-country software applications and social communication tools. Despite the attributes of connectivity and flexibility, mobile pedagogy only disrupted traditional teaching methods, leading to minimal changes to the education system. This study provides recommendations for the sustainable development of mobile pedagogy for future education systems in the digital age.

Keywords: mobile pedagogy; higher education; sustainable development; thematic analysis

1. Introduction

Given the abrupt transition from classroom lectures to online instruction caused by COVID-19 in 2020, mobile pedagogy has influenced the norms of teaching and learning in different education systems, from primary to higher education. According to the Sustainable Development Goals (SDG) report, the COVID-19 pandemic has deepened the global learning crisis, resulting in 147 million children missing over half of their in-person instruction in 2020–2021 [1]. In response, the SDG goal proposed for education is to ensure inclusive and equitable quality education and promote life-long learning opportunities for all. Technology-driven distance learning is an important tool for making education practicable and equitable. Studies show that mobile learning and mobile pedagogies are playing an important role in education [2,3], however, the effectiveness of mobile pedagogy is a major concern for educators [4]. Although modern teachers have the skills to manage virtual learning environments and motivate students to learn from distance [5], educators disagreed on how to use mobile pedagogies to lead effective and sustained teaching practices in education systems [6,7].

Long before COVID-19, educators had been making use of mobile phones as a learning tool in and beyond the classroom, using technological advances to improve teaching and learning in a global context [8]. As a result, mobile learning and pedagogies rebuilt the concept of disruptive pedagogy, encouraging ubiquitous learning environments, where teachers design innovative pedagogies to achieve real-time immediacy and extensive connections [9,10]. Accordingly, mobile pedagogy provides opportunities for learners to enhance ubiquitous learning and seamless experiences [11,12]. For example, mobile pedagogy has been widely adopted for English language learning to enable authentic language interaction [13,14]. A systematic review of mobile learning related to mathematical
studies showed positive learning outcomes [15]. Seamless learning environments support a variety of educational university programs to enable lifelong learning across the world [16]. Particularly, emergency remote teaching during the COVID-19 lockdown has proven the effectiveness of mobile pedagogy in facilitating the delivery of online courses [17]. Thanks to the flexibility to learn and teach at any time and from anywhere, mobile pedagogy ensures that educational activities run on schedule.

However, there is a need to explore the feasible innovation of mobile pedagogy in the current educational environment, especially considering the impact of COVID-19. Scholars have discussed the potential for the sustainable development of mobile pedagogy in education systems. The authors [15] indicate that the effectiveness of mobile pedagogy across formal and informal contexts is unclear. The authors [18,19] argue that mobile pedagogy has not fully shown how to exploit the connectivist, real-time, feasible characteristics of mobile learning scenarios. Research by the authors [17,20] points out that the limitations of mobile pedagogy, such as peer isolation, poor interactivity, and increased screen time, have undermined its use. Educators must design effective mobile-technology-supported learning experiences aimed at formal and informal environments to increase mobile pedagogical use [21]. There is a lack of assessment to identify teachers’ perceptions of their experiences regarding the use of mobile pedagogy [22]. The authors [23] conducted a comparative study in the UK, Australia, Belgium, Cyprus, Ireland and the Netherlands to identify and evaluate innovative mobile pedagogies during the pandemic, which showed that teachers are adapting traditional classroom pedagogies for use online by transferring former face-to-face teaching to online teaching. Furthermore, there is limited research discussing the use of mobile pedagogy in China in terms of use of technology and teachers’ perceptions. As such, this study examines disruptive technologies and teaching practices in China, thus enriching the knowledge of mobile pedagogy in worldwide practice.

This study aims to address the issue of mobile pedagogy in China, examining its innovations in education and the use of technology. The research questions are as follows:

- How are mobile teaching practices affecting distance learning in China’s higher education?
- How can mobile pedagogy be evaluated based on teachers’ perceptions?

The remainder of this paper proceeds as follows. First, relevant research is reviewed to address the theoretical background and empirical research on mobile pedagogy. Then, the research design and thematic analysis process are explained, followed by coding findings. Following this, the results are discussed. Finally, a conclusion and the limitations of the study are given.

2. Literature Review

2.1. Disruptive Technologies

The term ‘disruptive technology’ was coined by McGraw, who explained it as simple commercialised products in an emerging market [24]. Christensen believes that the force of emerging disruptive technology enables customization, and pushes schools to shift from a monolithic class model to a student-centric model [24]. The use of technology for learning provides opportunities to modularise the education system and personalise learning. Burden et al. discussed the usability of disruptive devices, including hardware, software and communication technology, foreseeing learning potential with disruptive technologies [25]. Likewise, Alexander argued that the combination of mobile technologies would transform education, tuning learner recipients into learner nomads [26]. Pedagogical innovation is supposed to change with disruptive technologies, but this is arguably not reflected in actual practice [27]. Based on the longitudinal action research in mobile learning, Cochrane and Thomas highlighted the use of technology for reforming teaching practices in different learning contexts [28]. Disruptions to pedagogical practices have been invested in virtual learning environments for educational innovation. However, little evidence showed the anticipated fruition of teaching practices from existing pedagogical implementation using disruptive technologies [29]. As seen by [19], current pedagogies lag behind and are misaligned with diverse learning opportunities in the digital age.
2.2. Mobile Pedagogy Using Disruptive Technologies

Many studies have discussed disruptive technologies and teaching with mobile pedagogy. Technological improvement adds flexibility to the teaching and learning process [27,28]. Digital tools and internet connectivity expanded seamless and ubiquitous learning environments to facilitate distance education [30]. Mobile pedagogical practices, such as open online classes, mobile-assisted language learning, and smart teaching and learning are research trends in distance education. Table 1 shows a review of mobile pedagogies depicted by scholars.

Table 1. Review of Mobile Pedagogy.

<table>
<thead>
<tr>
<th>Scholars</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kearney et al.</td>
<td>‘Pedagogy of mobile learning with features of authenticity, collaboration and personalization’. [31] (p. 14)</td>
</tr>
<tr>
<td>Schlenker</td>
<td>‘Mobile pedagogy embodies a defining set of principles and methods that leverage social and geographical context in learning’. [32] (p. 225)</td>
</tr>
<tr>
<td>Cochrane</td>
<td>‘New forms of social constructivist pedagogy’. [28] (p. 69)</td>
</tr>
<tr>
<td>Kukulska-hulme, Norris &amp; Donohue</td>
<td>‘Mobile pedagogy is an unusual term since it is more common to talk about mobile learning. The use of mobile devices, which is often accompanied by learner mobility across diverse contexts and settings, puts a spotlight on learners and their experiences, but in so doing it may obscure the vital role played by teachers’. [13] (p. 7)</td>
</tr>
<tr>
<td>Norris &amp; Kukulska</td>
<td>‘Mobile and technology supported pedagogy’. [14] (p. 112)</td>
</tr>
<tr>
<td>Kearney, Burden &amp; Schuck</td>
<td>Smart mobile pedagogy is ‘the teaching strategies, activities and teacher-initiated approaches that support and enable smart learning to flourish’. [19] (p. 142)</td>
</tr>
</tbody>
</table>

As mentioned by scholars, mobile pedagogy has emerged with the popularity of mobile learning, highlighting portability and flexibility in order to provide inclusive learning opportunities, that is, technology-supported, learner-centered, borderless learning models. Hence, mobile pedagogy requires the ability to use technology to facilitate the transfer of knowledge and training skills in space and time. The UK Open University defines mobile pedagogy as “new pedagogies making use of technologies to go further, to open up new possibilities” [33]. In addition to the application of advanced educational technologies, emphasis should be focused on the intended use of technology to fit educational environments. The prospect of mobile pedagogy is to stimulate effective learning in an equitable and inclusive way. Cochrane at al. concluded that pedagogy should be designed with a focus on the context and content of the students [34], as illustrated in Figure 1.

![Figure 1. Hierarchical analysis in mobile pedagogy.](image-url)
Advances in educational technology have had a significant impact on flexible learning environments. The authors [35] investigated mobile pedagogical practices in K-12 using a systematic review; the results indicated that high-level innovation only occurs when there is a radical shift in student engagement across boundaries. However, student agency and learning outcomes depend heavily on high levels of autonomy. As such, mobile pedagogy is digitally disrupted by technological interventions [36,37] with connectivity and flexibility of mobile learning [25,35,38,39] aiming to meet the needs of learners in the digital age.

2.3. Disruptive Technologies and Mobile Pedagogy in China

China is advancing information technology in the form of digitalisation, networked connectivity and smart technology to improve rural education [40]. Government policies have emphasised a close relationship between information technology and all-round education in the digital era. In addition, China provides opportunities for teachers to further their lifelong learning by providing continuous support in ICT knowledge and skills [41], especially in the rural regions to achieve equitable quality education. As a result, the use of mobile pedagogy has rocketed from concept to practice in order to improve the quality of education around China [42,43].

Mobile pedagogy has shown a positive effect in improving modernised education in China [44,45]. In addition, learners have responded favourably to learning Apps and social media [46]. However, recent studies show that MOOC education has gone from a high to a medium even low point in universities [47–50]. Indeed, mobile pedagogy in higher education is facing poor performance and high student dropout rate [51,52]. There is a need to assess the innovation and feasibility of mobile pedagogy from the teacher perspective in order to achieve its sustainability.

3. Methodology

3.1. Research Design

This study adopted a qualitative methodology to investigate teachers’ perceptions. The research design used in this study is interpretive paradigm. Interpretive paradigm, mostly used in social sciences, is constructed on the basis of individual subjective experiences that influence an understanding of the world [53]. Individual experience is emphasised in the interpretive paradigm [54] to explore perceptions, experiences and backgrounds. Thematic analysis is used to better understand the phenomenon in virtual learning environments. In this study, data were collected through interviews, transcribed verbatim into instrument data, then summarised, compared and categorised using codes and coding [55].

3.2. Data Collection

3.2.1. Sample Population

The sample were a cohort of 30 university lecturers who taught English as a foreign language to undergraduate students. All of them had been using mobile technologies to conduct online teaching since the end of 2019. In order to fully reflect a scenario of teaching practice using mobile pedagogy, each participant had to take a certain number of online classes, i.e., 10 period online classes per week or above. Demographic information is presented in Table 2.

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Description</th>
<th>Number (N = 30)</th>
<th>Percentage of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Under 30</td>
<td>6</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>31–40</td>
<td>12</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>41–50</td>
<td>9</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>51–60</td>
<td>3</td>
<td>10%</td>
</tr>
</tbody>
</table>
Table 2. Cont.

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Description</th>
<th>Number (N = 30)</th>
<th>Percentage of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>5</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>25</td>
<td>83%</td>
</tr>
<tr>
<td>Education</td>
<td>Bachelor’s degree</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Master’s or above</td>
<td>27</td>
<td>90%</td>
</tr>
<tr>
<td>Teaching experience</td>
<td>Under 10 years</td>
<td>8</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>11–20 years</td>
<td>15</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>21–30 years</td>
<td>7</td>
<td>23%</td>
</tr>
</tbody>
</table>

3.2.2. In-Depth Interview

We followed the interview procedures of [56]. Based on a semi-structured interview protocol, we encouraged participants to share their online teaching experiences, both operational and perceptional. The interviews lasted an average of 35 min. After the interviews were completed, memos were written and organised. With participants’ consent, all interviews were recorded and transcribed verbatim through Iflyrec, a transcription App.

In order to achieve in-depth communication [57], the interview process was conducted in Chinese, the native language of the participants. This study used the back-translation technique used in cross-cultural research [58], which means that all transcripts were translated from Chinese into English and then back into Chinese. Afterwards, these documents were sent to the participants for translation consent and authorisation.

3.2.3. Ethical Considerations

We described the purpose of this study to the participants and obtained their consent prior to the interviews. Moreover, we gave each participant a consent form explaining the details. To ensure the privacy of the participants, we anonymised their names and any possible identifiable indicators that appeared in the quotations.

3.3. Data Analysis

Data analysis was performed in two stages. The first was a coding process, in which the data were coded according to the text relevant to the research. In the second stage, we generated themes from the coding. Specifically, we compared the patterns of coding, divided them into groups, and summarised the categories with themes. The streamline of the codes-themes-assertions model [55] is shown in Figure 2.

Figure 2. Codes-to-assertions Model.
3.4. Credibility and Reliability

A controversial claim about qualitative analysis is that researchers may fail to be impartial when dealing with interview data and may interpret the data with bias. Therefore, self-evident analysis is necessary [59]. We outline here the process with credibility and reliability, as shown in Figure 3.

![Thematic Analysis Flow](image)

**Figure 3.** Thematic Analysis Flow.

4. Results

4.1. Coding Results

The example of open coding is shown in Table 3. In this process we categorised the original data into groups. After open coding, we used axial coding to build the link between codes. In this process, the codes were sorted to establish the connection (see Table 4). In addition, we used a coding-theme concept map (see Figure 4) derived from NVivo to display the relationship between themes and subthemes. The participants are anonymous for confidentiality [60].

<table>
<thead>
<tr>
<th>Original Data</th>
<th>Labelling</th>
<th>Initial Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I recommend domestic applications and platforms.” “They focus on learning experiences to achieve the goals of China’s higher education.” “Most Apps are domestic Apps, along with a small number of global Apps, like VOA, BBC, Kahoot.” “Teaching platforms, such as Chaoxing Learning, Ulearning, Rain class was used for communication and assigning homework.”</td>
<td>Apps and software</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Open coding sample (excerpt).
Table 3. Cont.

<table>
<thead>
<tr>
<th>Original Data</th>
<th>Labelling</th>
<th>Initial Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>“For me, mobile pedagogy is recorded subject niche for students’ review and preview work, kind of MOOC or Flipped classroom.”</td>
<td></td>
<td>Teaching design</td>
</tr>
<tr>
<td>“Mobile pedagogy is technology-aided communication between teachers and students via WeChat, for example, assign homework, post notifications, reading material before or after class.”</td>
<td></td>
<td>Description of mobile pedagogical practice</td>
</tr>
<tr>
<td>“I do not think mobile pedagogy can achieve any specific goal different from conventional pedagogy. I think they serve the same goal, which is to teach students knowledge.”</td>
<td></td>
<td>Teaching aim</td>
</tr>
<tr>
<td>“We use advanced technology to innovate teaching, however, the curriculum and evaluation follow the traditional way.”</td>
<td></td>
<td>Description of mobile pedagogical practice</td>
</tr>
<tr>
<td>“Everything is working for the teaching and learning outcomes.”</td>
<td></td>
<td>Description of mobile pedagogical practice</td>
</tr>
<tr>
<td>“I personally have an agreeable attitude because I think mobile learning and teaching is an inevitable trend.”</td>
<td></td>
<td>Attitudes</td>
</tr>
<tr>
<td>“It assists teaching and exceeds traditional means of teaching.”</td>
<td></td>
<td>Attitudes</td>
</tr>
<tr>
<td>“Too much interference with the use of technology. Students are easily distracted by mobile devices.”</td>
<td></td>
<td>Attitudes</td>
</tr>
<tr>
<td>“Students show a positive response to this mobile teaching—students like it.”</td>
<td></td>
<td>Students’ engagement</td>
</tr>
<tr>
<td>“Students seemed OK with this teaching. I am not sure of the teaching outcome.”</td>
<td></td>
<td>Students’ engagement</td>
</tr>
<tr>
<td>“I cannot see students’ faces, have no idea whether students follow me or not.”</td>
<td></td>
<td>Students’ engagement</td>
</tr>
</tbody>
</table>

Table 4. Axial coding sample.

<table>
<thead>
<tr>
<th>Themes</th>
<th>Subthemes</th>
<th>Categories</th>
<th>Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>Software</td>
<td>Domestic Apps and learning management systems</td>
<td>Frequently used in mobile pedagogy, such as: Dubbing show, You Dao, China Daily, Chaoxing Learn, Rain Class, Ulearning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Global Apps and learning management systems</td>
<td>Mostly for learning interest and extensive knowledge, such as: TED, Kahoot, VOA, BBC</td>
</tr>
</tbody>
</table>
4.2. Assessing Disruptive Technologies

In terms of technology, innovative practices involving software and hardware are well-represented in current education. Indeed, market demand for educational applications and digital gadgets is surging despite the economic downturn in 2022 [3]. Software applications, including learning management systems (LMS) and online teaching platforms, such as Tencent meeting, DingTalk, Chaoxing Learn, Ulearning, and Rain Class are popular tools for online teaching and learning in China. Social communication applications, such as Tencent QQ, and WeChat are used frequently to interact with students. Most of these applications are in-country technology, as described below:

Remark 1. I recommend domestic applications and platforms. They focus on learning experiences to achieve the goals of China’s higher education. Of course, I recommend that students use abroad applications to enhance their learning. But for me, Chinese applications are easier to handle. The digital platforms are easier to use.

Participants emphasised the user-friendliness of in-country applications, which made it simple for them to apply mobile pedagogy. Despite some technical issues, most of the participants shared their successful experiences of implementing mobile pedagogy, as stated by P10:

Remark 2. It is good and successful. I had a few technical problems, but they were all solved quickly. We fully prepared the devices for teaching, and the university supported us in every aspect.

In addition, participants strongly agreed that the interactive function of mobile pedagogy in distance teaching and learning offers students the freedom to ask and answer questions without being noticed by their peers.
Remark 3. I find some students, who are not active in face-to-face class, are quite brave in online classes. For example, they leave messages in the chat box.

It provides opportunities for inactive students to participate in class, and students feel less embarrassment if they make mistakes (Participants 7, 11, 23). The attribute of enabling learners to interact seamlessly across distant geographies and to become a borderless learning community is a common benefit of mobile pedagogy.

4.3. Teachers’ Attitudes

The majority of the participants showed supportive attitudes towards the use of mobile pedagogy. Their attitudes are summarised in Figure 5.

Figure 5. Teachers’ attitudes.

Supportive attitudes are listed and include the tendency of future education, convenience in teaching etc. Unsupportive attitudes include ineffective teaching, distraction, technical concern, and privacy exposure. The main comments in support of favorable attitudes are listed below:

Remark 4. I personally have a more agreeable attitude because I think mobile learning and teaching is an inevitable trend. It assists teaching and exceeds traditional teaching methods, helpful to promote students’ enthusiasm and interest in learning. It is beneficial for learning.

Remark 5. It should be promoted and encouraged because students are used to the model of mobile learning. It is an educational environment, a tendency, and students’ learning habit.
Remark 6. The current era is changing fast. I may describe it as an era of post-modernism. Network ecology is very developed. Mobile pedagogy is the teaching tool in our time. If you don’t catch up with the advanced technology, you will be doomed to be left far behind.

In addition to supportive attitudes, a quarter more expressed unsupportive opinions, as described below.

Remark 7. I don’t think mobile pedagogy will last long. It is an emergency teaching behaviour in response to COVID-19. Teaching and learning will go back to normal face-to-face class. Anyway, they have to take paper exams.

Remark 8. My university still requires students to take paper-based exams with the monitor of teachers. For me, students have to follow all the rules of paper exams, which discouraged the use of technology in teaching.

Remark 9. I am very worried when I use mobile pedagogy. You know, there are so many private incidents that come to light in webcasts.

Technical problems i.e., unstable Wi-Fi, web cameras, unmuted microphones, and an unresponsive system happen unexpectedly. In particular, teachers are concerned that their privacy will be exposed during the use of technology, for example, by forgetting to turn off the camera, unmuting the microphone, or the appearance of a family member on camera.

4.4. Feasibility and Sustainability of Innovation

As for the effectiveness of mobile pedagogy, the participants did not have clear visions for its future benefit. Because mobile pedagogy was an emergency plan in response to the COVID-19 outbreak, the participants showed ambiguous perceptions, viewing it as a replacement and the only option for class teaching under these circumstances. Although the government and institution demanded the use of mobile pedagogy during the COVID-19 outbreak, the higher education system did not prepare to set any specific goals for distance schooling. Furthermore, universities still rely on traditional methods to evaluate teaching outcomes. P16 pointed out the dilemma of using mobile pedagogy:

Remark 10. I do not think there are any differences before and after using mobile pedagogy. Furthermore, the results of using mobile pedagogy are poor, hardly achieve teaching objectives with traditional teaching methods.

In addition, there was no difference in course syllabi, examinations and student assessment after technology mediation. P16 elaborated her viewpoints as follows:

Remark 11. Everything is similar, teaching objectives, teaching design, assessment etc. We use mobile pedagogy, but we still require students to attend paper-based exams if possible. Mobile pedagogy enhances teaching, but we still use traditional ways to assess teaching outcomes.

Mobile pedagogy enhances teaching models; however, the assessment system has not changed. The adoption of mobile pedagogy changed teaching strategies, but the education system, including assessment and evaluation, did not change. There are some pilot online exams, for example, the IELTS indicator. However, online exam results have less credibility compared to paper exams.

Remark 12. I don’t trust online exam results. Students have a lot ways to cheat online. For example, how do we authenticate the identity of test-takers in distance?

Technology is effective in designing distance learning models, but at the same time, it facilitates cheating and plagiarism. The reliability and validity of online tests in a
virtual environment are issues that affect the sustainability of mobile pedagogy in the education system.

5. Discussion

5.1. Efficacy of Mobile Pedagogy

Mobile pedagogy is considered as an advancement in teaching across national boundaries, as reviewed in the literature (see Section 2.2); however, this study found that the use of mobile pedagogy is limited with a strong regional dimension. This corroborates the studies of [61,62], which point to the prevalence of in-country applications and platforms in distance education. These applications focus on specific knowledge of regional course descriptions, and the test system caters to the needs of local learners. From this perspective, educational technology reflects the local education system and represents the characteristics of regional education, and is hardly universal, despite its attributes of connectivity and ubiquity.

Innovations using disruptive technologies are mainly found at the student level. As described by [35,38], technology-enhanced pedagogy invoked learner-centered, reflective and collaborative learning processes. In this regard, mobile pedagogy identifies the learning community, and seeks to address the needs of learners by facilitating and developing interaction between participative subjects through social interaction tools. Meanwhile, the potential of technology-based teaching practices is obvious in the digital age, that is, a positive relationship is observed in technology mediation [25], where teachers adopted technology effectively to support online teaching and learning activities.

Regarding the use of mobile pedagogy, the results showed limited innovation in teachers’ pedagogies and conception. As indicated by [63], educational strategies bear the hallmarks of traditional classroom pedagogy. This is consistent with the report of [25], which classified disruptive mobile pedagogies as medium or low in innovation. Furthermore, this study found that teachers were under enormous pressure. They are more concerned about the unpredictable failures associated with the use of technology. In contrast to face-to-face teaching, mobile pedagogy is subject to unpredictable errors that are irrelevant to teaching but may have a negative effect on teachers. As indicated by [35], mobile pedagogy has blurred the boundary of formal and informal environments.

5.2. Impact on Higher Education

This study sheds light on the reform of the higher education system. Mobile pedagogy has been used for schooling innovation; however, traditional teaching methods are only disrupted. The use of mobile pedagogy is limited by the purpose of achieving existing curriculum goals [64]. Practically, mobile pedagogy is considered innovative because it enhances teaching strategies for learning. However, innovation in formal educational environments changed little. Consistent with [65], teaching staff continue to focus on traditional practices to achieve course objectives. The very important issue is that, despite the diversity and flexibility of instructional designs, the education assessment system remains the same.

As discussed in the literature, the integration of technology, pedagogy, and content has led to new educational activities, but this professional, applied knowledge requires a collaborative effort between content experts, educational technology developers, educational researchers, and pedagogical practitioners [20,66,67]. Most participants perceived paper-based exams as a formative assessment to measure student learning. The effectiveness of appropriate online assessment systems in a virtual environment is a pressing need for educational trends.

To sum up, the innovative attributes of mobile pedagogy have raised questions about the current curricula and testing system in higher education. Nevertheless, little has been done in terms of the higher education system [68]. As online learning and teaching are becoming mainstream for universities, it is necessary that virtual online exams become part of the education system. However, higher-order thinking skills are not suitable for designing
online exams and many subjects are limited by virtual environments [69]. The effectiveness of online assessment requires institutional, administrative, and pedagogical support.

5.3. Sustainable Development of Mobile Pedagogy in the Post—COVID-19 Era

Disruptive technologies and teaching with mobile pedagogy have flourished due to social distancing and lockdown policies to address COVID-19. Mobile pedagogy has worked effectively in the emerging situation to achieve the purpose of education. However, sustained use of technology in education is obscure. A key corollary to this issue is the digital-use divide, as articulated by [23]. Defined by [70], the digital-use divide requires that we not only have appropriate access to technology, but also expertise on its optimal use, particularly to promote interactivity in teaching and learning, which is the main problem that exists in current mobile pedagogical practice. Teachers are replicating ‘traditional’ classroom methods and incorporating them into online teaching by recording instructional videos, organizing activities, and sharing assignments online. All of these can be done in face-to-face class and may achieve a better result than in the virtual-learning environments. As researched by [18], mobile pedagogy is promising for student-centred online activities, but teachers play a weakened role. Therefore, the sustainable use of technology in teaching has been questioned by scholars [71–73], especially in the post-COVID-19 era. Apparent weaknesses, such as lack of social interaction, poor communication and poor student performance are seen as ineffective for disruptive technologies in mobile pedagogy.

As described in Table 1, disruptive technologies are perceived as the way to change a teacher-led class to a student-centric one. However, emergency teaching with disruptive technologies exposed the disconnect between teachers’ positive perceptions of integrated technology and its adoption in online situations. The future use of technology depends to a large extent on how teachers use mobile pedagogy to explore viable pedagogical innovations to improve teaching outcomes [19,35,74].

6. Conclusions

This study investigated the use of mobile pedagogy in distance teaching practice based on interviews with 30 lecturers. The findings show that mobile pedagogy is highly regional in nature and reflects in-country educational characteristics despite its connectivity and ubiquity. The adoption of mobile pedagogy has innovated teaching methods, but it has not touched the education system, which is an issue that hinders the sustainability of mobile pedagogy in formal and non-formal education. There is a need to improve the education system so that it is adapted to the digital age.

From the managerial perspective, this study provides enlightenment on the sustainable use of technology in current educational environments. It is proven that advances in educational technology have had a significant impact on flexible learning environments. Mobile pedagogy enhances teaching and learning through the provision of online tutorial services. However, teachers, as practitioners, are overlooked in the practice of assessing mobile pedagogy. The analysis of this study provides empirical insights for educators and institutions to improve pedagogy-related systems in distance teaching, particularly in the aspect of policies and institutions. In addition, it offers suggestions for future pedagogical innovations using technology in the digital age.

This study has several limitations. First, it has been conducted at a university located in China. Due to differences in the software market, applications and websites may vary from region to region. Additionally, the sample may be limited to the scope and may have overlooked teaching performance in other subject domains. Last, the interpretation of the interview data may be impacted, to a minor extent, by the researchers’ reflexivity.

Teaching using mobile pedagogy is still at a basic stage of being influenced by disruptive technologies to accomplish traditional teaching objectives. Issues related to online syllabi and assessment have rarely been innovated in pedagogical performance. It would be useful to explore specific courses featuring the use of mobile pedagogy, which would be valuable to guide teachers in their innovation.
Author Contributions: Conceptualization, J.Z. and S.Y.; methodology, J.Z.; software, S.Y.; validation, J.Z. and S.Y.; formal analysis, J.Z.; investigation, J.Z.; resources, S.Y.; data curation, S.Y.; writing—original draft preparation, J.Z.; writing—review and editing, J.Z.; visualization, S.Y.; supervision, J.Z.; project administration, J.Z.; funding acquisition, J.Z. All authors have read and agreed to the published version of the manuscript.

Funding: This research is funded by Ningxia Social Science Foundation (Grant number: 20NXRCC09), North Minzu University (Grant Number: 2021KYQD42).

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of North Minzu University (protocol code Ning (2019)3 and approved by 15 June 2021).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Not applicable.

Acknowledgments: The authors would like to thank all the reviewers for their valuable comments and suggestions for the improvement of this paper. Thanks also goes to all the teaching staff from the sample university.

Conflicts of Interest: The authors declare no conflict of interest.

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