Smart choice with smart device: the use of apps in accelerated online education for nontraditional students

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Abstract

Purpose – Based on student responses to a set of customized questionnaires, this study aims to present evidence that while student evaluations of instructors and courses remain consistent, a designated mobile app enhances perceived online learning experience.

Design/methodology/approach – This study addresses quality assurance issues in accelerated online graduate-level education by identifying factors that influence nontraditional adult student preferences for using mobile applications (apps).

Findings – It is evident that affordability and functionality are the two most important determinants of nontraditional student preferences for app-based learning, followed by mobility and ease of purchase.

Originality/value – These findings underscore the potential of app learning to bolster positive perceptions of online education. Findings of this study imply that integrating additional app learning tools can be used as a quality assurance mechanism and enhance nontraditional students’ satisfaction through improving their perceived online learning experience.

Keywords Online teaching, Accounting education, Continuing higher education, App learning, Quality assurance

Paper type Research paper

Introduction

The purpose of this study is to identify key motivating factors that drive students to use a designated mobile application (app) on their mobile devices in an online graduate-level learning environment. Additionally, it examines students’ perceptions regarding how their learning experiences are influenced while using this mobile app.

Higher education institutions cater to the market needs by offering accelerated-degree programs, including accelerated accounting courses and programs (Eames et al., 2018). Many of such courses and programs are provided online with flexible learning plans to attract working professionals (Mellieon and Robinson, 2021). Educators have been actively seeking effective strategies and innovative techniques to enrich the online learning experience for students (Bond et al., 2018; Barak et al., 2023) and to make sure quality education is provided in online settings (Zhao, 2003; Tripathi and Jeevan, 2009). The adoption of mobile applications can be one of the strategies implemented to facilitate student learning (Camilleri and Camilleri, 2019). Prior studies have been investigating the effectiveness of mobile learning in both in-person and online education (e.g. Kuhnel et al., 2018; Li and Liu, 2023).

This topic is particularly relevant in accounting education given the recent trends in this field of profession. The count of accountants and auditors in the USA has seen a reduction...
exceeding 300,000 in the past few years, signifying a notable 17% decrease in employment across the industry (Ellis, 2022). However, the number of undergraduate accounting students in the USA has been declining since 2016 (Hart, 2022). The entry barrier, notably the 150-h requirement for the CPA exams, stands out as a significant contributor to this decline by diminishing the return on investment for individuals pursuing a career in accounting (Mutoh, 2023). Addressing this issue requires the effort of faculty, firms and associations (Hart, 2022). For instance, an increasing number of higher education institutions have proactively initiated accelerated accounting programs or courses aimed at streamlining the completion of the additional 30 credit hours required. To further reduce students’ costs, many of these programs or courses can be completed entirely online (Eames et al., 2018). However, these initiatives prompt institutions to address unique quality assurance challenges specific to online education (Britto et al., 2013). Hence, new technologies, such as mobile apps, have become essential tools within an online learning environment, ensuring a consistent standard of educational quality. In this study, mobile app is defined as a software program designed and developed specifically for mobile devices, such as smartphones or tablets. These applications can be downloaded and installed onto individual devices.

To ensure online education quality, it is important to understand the effect of mobile app usage. However, a limited amount of accounting education research has been conducted to investigate the perceptions of students, including working professional students, concerning the adoption of mobile apps in accelerated online graduate-level courses. This study examines the issue of app learning based on student feedback obtained from the end-of-semester course evaluations of an online graduate-level accounting course. In this study, the analysis reveals that the use of a designated mobile app enhances students’ perceptions of academic performance improvement and satisfaction in the online learning environment. Furthermore, students indicate that affordability and functionality are the most critical determinants that promote the use of the mobile app to facilitate online learning. The next most important determinant is mobility, which is enhanced by learning flexibility and ease of purchase.

To the best of our knowledge, this study is the first to investigate the facilitating role of mobile app learning in an accounting education setting. Specifically, extending from the prior app learning literature focusing on the development and usage of mobile apps (e.g. Li et al., 2017; Xu et al., 2019; Lee and Xiong, 2022), this study documents that app learning affects students’ perceived online learning experience, engagement and satisfaction through cost-effective accessibility and improved mobility. More importantly, findings presented in this study suggest that integrating app learning to online accounting courses aligns with the processes of quality assurance in higher education.

**Literature review**

Online education has gained popularity over the past decade, and this trend is expected to continue in the foreseeable future (Mellieon and Robinson, 2021; Mandernach et al., 2006). Advancements in technology have led to an ever-increasing number of higher education institutions offering online courses and programs, thereby making higher education increasingly accessible to a growing population of individuals, including nontraditional students. Unlike traditional college students who directly enter postsecondary education right after high school, nontraditional students usually show at least one of the following characteristics: delayed enrollment, part-time student status, full-time employment, financial independence (Gilardi and Guglielmetti, 2011). To cater for the needs of nontraditional students, many universities offer courses and degree programs in accelerated form, which allows students to finish the study within a shorter time frame (Eames et al., 2018; Mellieon and Robinson, 2021). The accounting discipline has embraced such practice in response to
the recent decline in accounting enrollments nationwide. Accelerated programs effectively curtail costs for accounting students, enabling them to attain the necessary qualifications to sit for the CPA exams (Eames et al., 2018). Therefore, a substantial number of higher education institutions have begun promoting their accelerated online accounting programs to prospective students.

However, challenges co-exist with the emerging opportunities as how to maintain education quality becomes a more salient question in an online setting (Britto et al., 2013). As suggested by Istijanto (2022), maintaining education quality in an online environment requires distinct motivational factors compared with face-to-face teaching. Not only instructors need to cope with professional vulnerability in an online setting (Kelchtermans, 1996, 2009) and adapt to different teaching technologies (Cutri and Mena, 2020), online students also must conquer technical barrier, seek effective online learning strategies and balance learning effort and other demands, such as working and parenting (Lee and Xiong, 2022; Jung et al., 2023). In other words, accelerated online programs (AOPs) or courses can be beneficial to both students and schools only if they are carefully designed to meet students’ needs. For instance, Eames et al. (2018) present that a well-designed accelerated accounting program provides equivalent professional training to that offered by traditional accounting programs. Specifically, the authors do not find differences in terms of CPA pass rates or number of exam attempts between accelerated and traditional programs.

Therefore, to achieve optimal teaching outcomes, researchers and educators have dedicated a significant amount of effort toward improving the effectiveness of student learning in such online learning environments. For example, Goode et al. (2022) propose the adoption of technology-enhanced active learning among nontraditional students. Specifically, the authors document that students in condensed study can develop focus, confidence, critical thinking and independence through a learner-centered design, which promotes interactive and responsive self-access modules. Scott and Turrise (2021) discuss that online students value instructors’ effort to improve their online course engagement, which, in turn, enhances students’ online learning experience. However, all these learning outcomes cannot be realized without the appropriate assistance of technology. A consensus has been reached among students, faculty and administrators that access to the internet, learning resources and technological devices are among the most important factors that contribute to student success (Canvas, 2020).

Prior literature has identified information literacy and mobile technology as crucial factors among online students that contribute to their learning success (e.g. Pinto et al., 2022; Duan and Lee, 2022; Zaidi et al., 2021). Prior literature also recognizes that the choice of appropriate mobile apps is an important aspect to take into account when instructors aim to enhance students’ online learning experience. Specifically, Klímová (2019) demonstrates that for mobile learning to yield desirable outcomes in students’ foreign language learning, it is imperative that the mobile assistance is tailored to meet students’ needs and is consistently guided by an instructor. Through the utilization of suitable mobile apps, students are expected to consistently exhibit favorable learning outcomes and consistently enjoy satisfying educational experience (Sakibayev, 2021; Karim et al., 2021). This holds particular significance in an accelerated online accounting learning environment, where students are both budget-conscious and time-sensitive.

It is expected that the use of mobile apps can improve student learning experience for various reasons. The app learning creates a more realistic learning environment that facilitates student learning (Bai, 2019; Hwang and Chang, 2011; Daher, 2010; White and Martin, 2014). More importantly, applications on mobile devices generate a more accessible and flexible learning environment (Kearney et al., 2012; Sølvberg and Rismark, 2012; Ozcelik and Acarturk, 2011). This holds particular significance in the context of distance learning, where student satisfaction is closely intertwined with their intention to persist and continue
their studies (Joo et al., 2016). More importantly, understanding student perceptions can shed light on quality assurance practices, including the use of appropriate technologies (Chung Sea Law, 2010). In our specific setting, where students are provided the option to use a mobile app to complete specific course tasks, cost-efficiency and accessibility are the factors contributing to maintaining student learning quality. Therefore, this study aims to address the following research question:

RQ1. How does a course-specific application affect students' perceived online learning experience?

Research method
Our analysis is based on information collected from two sections of an online graduate-level accounting course required for nontraditional students without any accounting and finance background in an accelerated online MBA program. The course is designed to be the first or second required course for a non-business major student in this AOP. Compared to normal 16-week courses, this AOP course lasts for only seven weeks. In other words, the same amount of course load must be completed within half of the period it normally takes for students to complete a similar course. Therefore, this accelerated online accounting course is more challenging for students, especially those who had left school for years. The instructor's prior interactions with students taking this course indicate that many students feel slightly anxious about what to expect during their study.

As discussed earlier, the examined course is offered to students entering the business discipline without any accounting or finance background. Therefore, students taking this course will learn some basic concepts in accounting and finance, including topics about the time value of money. Students are required to acquire a financial calculator by the Friday of week five to prepare for the study in week six, in which they learn computations relevant to the time value of money. The HP 10bII+ financial calculator is recommended for this course because the instructor shows students how to use HP 10bII+ in learning materials, such as lecture videos, lecture notes, practice problem answer keys and e-mail communications. Although there are a variety of brands and types of financial calculators available in the marketplace, the operations can be quite different from each other. To optimize teaching efficiency, the instructor focuses on the tutorial of HP 10bII+ and only addresses student’s questions related to HP 10bII+. If a student prefers to use another type of financial calculator, the student is responsible for learning how to use the selected calculator.

Owing to chip shortages stemming from supply chain disruptions caused by the COVID-19 pandemic, many students were unable to purchase an HP 10bII+ financial calculator at major retailers or local stores in 2022. The instructor offered students the option to use an HP 10bII+ financial calculator app on their mobile devices as a possible alternative. The app can be used on an Apple device, such as iPhone or iPad, or an Android device. The price of the app is much cheaper than a HP 10bII+ financial calculator. Between two options, the instructor recommended an HP 10bII+ financial calculator as a better option for this online graduate-level accounting course. The rationale is that purchasing an HP 10bII+ financial calculator is straightforward. Unlike an app, students do not need to worry about an app download, installation and software upgrades. On the contrary, the app option can provide students more flexibility in choosing their learning tool at a much cheaper price. Both the HP 10bII+ financial calculator and the financial calculator app solutions were covered in prerecorded lecture videos made by the instructor. In the instructor’s lecture videos, there were step-by-step explanations about how to use the HP 10bII+ financial calculator and the app.
Many accounting education studies use the survey method to analyze student perceptions about learning effectiveness and course evaluation (Du, 2015; Opdecam and Everaert, 2012; Wen, 2021, 2023; Wen and Wang, 2022). Therefore, following prior literature, a survey method is used for this study to measure and assess students’ perceived learning outcomes, teaching effectiveness and course satisfaction.

The survey data is collected through the Individual Development and Educational Assessment (IDEA) Student Rating System. This system was developed by Kansas State University and used as a normalized tool to evaluate learning outcomes, teaching effectiveness and course satisfaction (IDEA Student Rating of Instruction, 2024). The authors collected data from two classes of the same online graduate-level accounting course taught by the same instructor in fall 2021 and fall 2022, respectively. The fall 2021 class is used as a control group (without the option of the app). The fall 2022 class is designated as a special treatment group (with the option of the app) or the experimental group.

The participation of IDEA survey course evaluation is voluntary. Students received about 1% of total grade as extra-bonus credit to participate in the IDEA Survey. This leads to 24 (20) responses from the fall 2021 (fall 2022) class. In addition to standardized questions, 16 additional survey questions are used to evaluate student perceptions about the app learning in fall 2022. The additional questionnaire questions are based on previous research and the author’s teaching experiences. Several questions are adjusted from Braun and Sellers (2012) questionnaire.

### Results

A survey-based study is designed as quasi-experimental research to compare student evaluations from fall 2021 to fall 2022. The first survey was conducted among 33 students who took the class in fall 2021. In total, 24 out of 33 of them responded. The response rate is 73%. The second survey was conducted among 26 students who took the class in the fall of 2022. In total, 20 out of 26 students responded to all questions in the IDEA Survey. The participation rate is 77%.

Table 1 shows students’ overall perceptions about the course. It reveals that most students believe that they have devoted more effort to academic work than other students as the mean score for the question “as a rule, I put forth more effort than other students on academic work” is 3.79 on a five-level scale in fall 2021 and is 3.65 in fall 2022. The results of two independent samples one-tailed $t$-test on the summary data with a calculator on epitools.com show no statistically significant difference: $t = 0.64$, $df = 42$ and $p = 0.26$ (Sergeant, 2023). Most students indicate that they have relevant backgrounds for the course from their working knowledge in accounting. The mean value of student background for this course’s requirements is 3.54 in fall 2021 and slightly higher in fall 2022 at 3.65. The difference is not statistically significant: $t = 0.35$, $df = 42$ and $p = 0.36$. The mean value of the instructor evaluation is 4.67 in fall 2021 and 4.65 in fall 2022. The difference is not statistically

<table>
<thead>
<tr>
<th>Survey question</th>
<th>Fall 2021</th>
<th>Fall 2022</th>
<th>$t$-stat ($p$-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>As a rule, I put forth more effort than other students on academic work</td>
<td>3.79</td>
<td>3.65</td>
<td>0.64 (0.26)</td>
</tr>
<tr>
<td>My background prepared me well for this course’s requirements</td>
<td>3.54</td>
<td>3.65</td>
<td>0.35 (0.36)</td>
</tr>
<tr>
<td>Overall, I rate this instructor an excellent teacher</td>
<td>4.67</td>
<td>4.65</td>
<td>0.11 (0.48)</td>
</tr>
<tr>
<td>Overall, I rate this course as excellent</td>
<td>4.46</td>
<td>4.45</td>
<td>0.06 (0.48)</td>
</tr>
</tbody>
</table>

**Source:** Authors’ own work
significant: $t = 0.11, df = 42$ and $p = 0.46$. The mean score of the overall course evaluation remains relatively stable, with a slight decline from 4.46 in the fall 2021 to 4.45 in the fall 2022. The difference is not statistically significant: $t = 0.06, df = 42$ and $p = 0.48$. The overall course evaluation scores presented in Table 1 indicate that the incorporation of app learning effectively counteracts the adverse impact stemming from the shortage of financial calculators. Therefore, the overall course evaluations are consistent across both classes.

Table 2 presents students’ explicit viewpoints regarding the use of the mobile app. When responding to the question “which financial calculator tool did you use for this online accounting course?”, 5 out of 20 respondents (25% of the respondents) selected “HP 10bII+”. A total of 8 out of 20 respondents (40% of the respondents) selected the “10bII+ financial calculator” application (app) for an Apple device, and 1 out of 20 respondents (5% of the respondents) selected the “10bII+ financial calculator” app for an Android device. Out of 20 respondents, 1 (5% of the respondents) selected “both HP 10bII+ calculator and app”. Out of 20 respondents, 5 (25% of the respondents) selected “other financial calculator”. A large proportion (50%) of the students voluntarily used the 10bII+ financial calculator application (app) for their study. Although some students did not select the designated financial calculator app, it appears that many of them still have had some kind of experience with other comparable apps. Only 4 out of 20 students selected “never” to the question “how often do you use a financial calculator app for this course when solving time value of money problems?”. These findings suggest that students lean toward using financial calculator apps for their problem-solving needs.

When students responded to the question “the use of a financial calculator app increased my mobile learning, which indicates I had more learning through personal portable electronic devices”, only 1 out of 20 respondents (5% of the respondents) chose “strongly disagree”. Out of 20, 10 respondents (50% of the respondents) selected “neither agree nor disagree”. Out of 20 respondents, 5 (25% of the respondents) opted “agree”. Out of 20 respondents, 4 (20% of the respondents) selected “strongly agree”. The mean is 3.55 and the standard deviation is 0.97. The mean rating of the question “the use of a financial calculator app helped me improve my academic performance” is 3.65 and the standard deviation is 0.96. The mean rating of the question “the use of a financial calculator app improved my satisfaction about this course” is 3.55 and the standard deviation is 1.07. Putting together, these findings provide evidence that students view this mobile app as a helpful tool in their online learning.

<table>
<thead>
<tr>
<th>Survey question</th>
<th>Fall 2022</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Q.1 Which financial calculator tool did you use for this online accounting</td>
<td>2.65</td>
<td>1.53</td>
<td></td>
</tr>
<tr>
<td>course?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q.2 How often do you use a financial calculator app for this course when solving time value of money problems?</td>
<td>2.70</td>
<td>1.35</td>
<td></td>
</tr>
<tr>
<td>Q.3 To what extent has a financial calculator app helped you prepare for time value of money assignments?</td>
<td>2.90</td>
<td>1.37</td>
<td></td>
</tr>
<tr>
<td>Q.4 The use of a financial calculator app increased my active learning</td>
<td>3.35</td>
<td>1.11</td>
<td></td>
</tr>
<tr>
<td>Q.5 The use of a financial calculator app increased my mobile learning, which indicates I had more learning through personal portable electronic devices</td>
<td>3.55</td>
<td>0.97</td>
<td></td>
</tr>
<tr>
<td>Q.6 The online lecture videos of showing how to use a financial calculator app provided by an instructor increased my interactive learning</td>
<td>3.70</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>Q.7 The use of a financial calculator app helped me improve my academic performance</td>
<td>3.65</td>
<td>0.96</td>
<td></td>
</tr>
<tr>
<td>Q.8 The use of a financial calculator app improved my satisfaction about this course</td>
<td>3.55</td>
<td>1.07</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>3.26</td>
<td>1.14</td>
<td></td>
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Source: Authors’ own work
In addition to Table 2, Table 3 further demonstrates students’ perceived impact of the designated mobile app on learning. The mean rating of the question “as a result of having a financial calculator app, I learned the course material better than I would have otherwise” is 3.55, according to a five-point measuring scale. The mean rating of the question “the use of a financial calculator app had a positive impact on my time value of money assignment grades” is 3.8. The mean rating of the question “how helpful or unhelpful is the use of a financial calculator app to demonstrate how to solve problems in an online learning environment?” is 3.75. Furthermore, the mean rating of the question “as a result of having a financial calculator app, I was more engaged in this online class than I would have been otherwise” is 3.5. The mean rating of the question “I prefer a financial calculator app to a financial calculator in online courses” is 3.4. The mean value of the question “what is your overall rating of having a financial calculator app” is 3.3. To summarize, students believe that the designated financial calculator app improves their online learning experience and performance.

When ranking among factors that lead students to favor the use of a financial calculator app, five out of 20 respondents (25% of the respondents) selected “affordability”. Out of 20, 5 respondents (25% of the respondents) selected “easy to use”. Out of 20 respondents, 4 (20% of the respondents) selected “mobility to enhance learning”. Out of 20 respondents, 4 (20% of the respondents) selected “easy to purchase”. A total of 2 out of 20 respondents (10% of the respondents) selected “reliability of app quality”. When evaluating the overall rating of the usefulness of a financial calculator app, 17 out of 20 respondents (85% of the respondents) selected “good” or “very good” or “excellent”.

**Discussion and conclusion**

Although student evaluations for the instructor and course do not change much, students report that the use of a mobile app improves their academic performance and overall satisfaction in an online learning environment. Students specifically report that the use of a financial calculator app had a positive impact on their time value of money assignment grades. This study identifies the key factors that contribute to shaping students’ perceptions.

<table>
<thead>
<tr>
<th>Survey question</th>
<th>Fall 2022 Mean (SD)</th>
</tr>
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<tbody>
<tr>
<td>Q.1 I prefer a financial calculator app to a financial calculator in online courses</td>
<td>3.40 (0.92)</td>
</tr>
<tr>
<td>Q.2 As a result of having a financial calculator app, I was more engaged in this online class than I would have otherwise</td>
<td>3.50 (0.97)</td>
</tr>
<tr>
<td>Q.3 As a result of having a financial calculator app, I learned the course material better than I would have otherwise</td>
<td>3.55 (1.16)</td>
</tr>
<tr>
<td>Q.4 As a result of having a financial calculator app, I gained experience in completing deliverables under time pressure</td>
<td>3.60 (1.07)</td>
</tr>
<tr>
<td>Q.5 The use of a financial calculator app had a positive impact on my time value of money assignment grades</td>
<td>3.80 (0.81)</td>
</tr>
<tr>
<td>Q.6 How helpful or unhelpful is the use of a financial calculator app to demonstrate how to solve problems in online learning environment?</td>
<td>3.75 (0.89)</td>
</tr>
<tr>
<td>Q.7 Which following factor made you prefer to use a financial calculator app?</td>
<td>2.65 (1.31)</td>
</tr>
<tr>
<td>Q.8 What is your overall rating of having a financial calculator app?</td>
<td>3.30 (1.00)</td>
</tr>
<tr>
<td>Average</td>
<td>3.44 (1.02)</td>
</tr>
</tbody>
</table>

**Source:** Authors’ own work

**Table 3.** Descriptive statistics of students’ perceived learning impact of an app
This research has significant practical implications for educators and practitioners. First, all students in this study are nontraditional working professionals for their continuing graduate-level higher education to get an MBA degree. Students respond that the “affordability” of mobile apps and “easy to use” are two top priorities, which implies online students are more price sensitive while caring more about the functionality of learning tools. In line with prior quality assurance in education research (e.g. Istijanto, 2022; Pandey and Panda, 2023), the identification of these factors facilitates quality assurance in higher education. Instructors should recommend and adopt the reasonably-priced apps in their classes. In addition, instructors should take into account the learning curve associated with using a designated mobile app. Online instructors need to minimize technical disruptions that could impact the quality of education. Students describe “mobility to enhance learning” and “easy to purchase” as two second-tier important factors. Surprisingly, students report that the “reliability of app quality” is the least important factor influencing students’ decisions to use apps for learning.

In this study, reducing the educational cost of course materials to add more value to students while using user-friendly learning tools to increase students’ capability is viewed as one important aspect of quality (Harvey and Stensaker, 2008; Kleijnen et al., 2013). According to the instructor’s experience, some students were not willing to purchase a financial calculator for just one- or two-week learning study during a short seven-week accelerated online course. They chose to use the time value of money tables or Excel spreadsheets on their computers to meet their learning demand, which created some difficulty for the instructor to assess the learning quality. The adoption of a reasonably priced app on their mobile devices would increase the probability of using similar financial calculator learning tools, which is consistent with the purpose of strengthening quality assurance in learning.

Second, instructors can enhance the learning process of the mobile app by creating tailored lecture notes and videos, offering practical examples and clear guidance. For nontraditional students without academic study for an extended period, these specially developed materials are crucial in guiding them step-by-step through the app learning process, which in turn can affect students’ overall learning experience. Third, instructors can create and integrate real-world practice problems for app learning. In this study, the author developed many real-world practice problems and some detailed app solutions when teaching relevant course materials, such as choosing to lease or buy a car, computing monthly mortgage payment and calculating effective credit card interest rates. By using an app to solve these practical problems on their mobile devices, students are more motivated and interested in applying accounting and financial theories and knowledge into making real-life decisions. The mobility of using an app on their mobile devices can provide more flexibility for students, thus enhancing students’ active learning.

Finally, this study presents valuable insights for small to midsize online graduate programs offered by higher institutions. The research findings of this study provide potential teaching strategies to enhance online students’ learning satisfaction, such as the adoption of mobile apps. The integration of mobile apps into the learning process could serve as a state-of-the-art technology approach that faculty members might implement to mitigate the continuously increasing educational costs for students and provide them with a more enhanced and interactive mobile learning experience. Although a smaller sample size limits the generalizability, the findings of this study still can provide important implications for other disciplines and sectors in seeking to enhance the learning effectiveness of online education. Instructors at different disciplines may consider adopting discipline-specific apps in their face-to-face or online teaching to improve student engagement and satisfaction. Finally, the use of mobile apps in education has the potential to serve as an environmentally friendly measure, mitigating overconsumption and pollution if widely promoted.
References


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