Exploring learners' experiences with mobile technology: Academic uses and barriers

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Abstract: In an increasingly digital era, mobile technology has become an integral part of our daily lives, permeating various aspects, including education. with their portable nature and wide range of functionalities, mobile devices offer new opportunities for learners to access information, collaborate with peers, and engage in interactive learning experiences. This article investigates university learners' experiences with mobile technology, as well as their perceived barriers to such experiences in the context of English language learning. The study employs a mixed-methods approach, comprising surveys and interviews to investigate students' practices and barriers related to using mobile technology for language learning. The quantitative stage involves a sample of 142 participants, while the qualitative stage focuses on a subset of 16 participants selected for representation and diversity. The findings show extensive reliance of students on their devices for on-campus and off-campus learning activities, including chatting with AI models, social networking, app-based learning, and watching course-related videos. Furthermore, several barriers pertaining to the device, the teacher, and the learner were identified as obstacles to the effective use of mobile technology for academic purposes. Overall, this study stresses the potential of mobile devices for language learning and offers valuable insights into how students use them. Language teachers and researchers can utilize these findings to maximize the benefits of mobile technology while mitigating its drawbacks.

Keywords: *Academic purposes, Barriers, Experiences, Mobile technology.*

1. Introduction

Due to advances in information and communication technologies (ICTs), there has been a significant change in the learning environment, entailing the mobility of three elements: the learner, the device, and the information. Such mobility has marked the beginning of a new age of learning, namely mobile learning, characterized by greater flexibility in delivering course content and in meeting students' needs and interests beyond the barriers of time and space—a phenomenon that can be labeled as the 'Anytime-Anywhere Era'. This idea is supported by similar studies in the field, including Marunevich, et al. [1] and Zheng, et al. [2], which highlight the benefits of mobile technology in language learning. For instance, Marunevich, et al. [1] found that alongside enhancing student-teacher relationships (the social dimension), mobile learning increased students' motivation and engagement (the psychological dimension), while Zheng, et al. [2] reported that the mobile self-regulated learning approach significantly enhanced students' learning achievements and self-regulated learning skills (the academic and strategic dimensions). However, some studies reported either mixed or negative results. For instance, Stockwell [3] found that the use of handheld devices did not necessarily result in better language learning outcomes than traditional classroom-based instruction. In the same vein, Lepp, et al. [4] revealed that increased mobile device use was associated with decreased academic performance, suggesting a need to raise awareness among students and teachers about the potential academic risks associated with high-frequency device use. Nevertheless,

integrating mobile technology in language learning programs and services can lead to positive outcomes for students. Given this, many universities and institutions have been integrating mobile technology into their programs and services, as this technology has been numerously proven to enhance student grades, facilitate communication, and make students intrinsically motivated [5, 6]. After introducing the topic, the main objective of this study is to investigate learners' experiences with mobile technology as well as their perceived challenges to such experiences. Therefore, this general objective can be further divided into two specific aims: (i) to examine the ways learners use their handheld devices to learn English on and off campus; and (ii) to explore the barriers learners face while using mobile devices to learn English. Based on these objectives, the study attempts to answer two important questions:

- In what way do university learners utilize their handheld devices to learn English, both on campus and off campus?
- Based on their experiences, what are the barriers that university learners attribute to learning with mobile technology?

2. Literature Review

2.1. On Defining Mobile Learning

Mobile learning, or m-learning, is a context in which the learner engages, alone or with others, to access educational material. In so doing, they either consume or produce knowledge, for example, through listening to a podcast, recording a presentation, or collaborating in learning. Mobile learning can also be identified by the devices that are held in the hands—such as smartphones, tablets, and laptops—and which transcend temporal and spatial limits, ensuring seamless learning [7-9]. Similarly, Pachler, et al. [10] provide a more comprehensive definition of mobile learning, mentioning that the term involves the nomadicity of three closely related elements: the gadget, the learner, and the learning materials. Done with the definition of mobile learning, let us move on to its importance. According to Wagner [11], it is undeniable that using handheld devices for learning should be recognized as valuable. The same idea is reiterated by Motiwalla [12] who found that m-learning is profitable and an effective supplemental component to conventional learning. The concept presented is that mobile learning does not replace traditional learning but instead supports it and complements it in a hand-in-hand approach. Not only that, but mobile learning is highly effective in teaching learners through a toy-joy approach [13]. In other words, though mobile devices are primarily designed for "playing", they can be effectively leveraged for learning, an approach that is likely to bring about more excitement and inventiveness in the classroom [14].

2.2. Modalities of Mobile Learning

According to Sinha and Sinha [15] there are two different modalities to how learners engage with e-/m-learning: push learning and pull learning. In push learning, content is delivered to the learner by the teacher or an organization, while in pull learning, the learner actively seeks out content or resources, such as apps and websites. Besides, training learners to leverage their devices for an effective learning experience entails training the teachers on how to use the language learning apps technically and pedagogically. As a result, when learners understand the functioning of an app as well as the added value of using it, they can employ it more efficiently. In the same vein, Viberg and Grönlund [16] emphasized the prevalence of two approaches to mobile learning, namely content-based approaches and design-based methodologies. First, studies that are content-based are concerned with a viewpoint that prioritizes the development of activities and learning content. These studies center on language learning that takes place in formal settings and view mobile devices as media for that kind of learning. The second approach to mobile learning highlights two components: Design matters and students' needs. Therefore, studies within this perspective target the development of learning materials for both mobile devices and text-based elements. That said, design-associated perspectives are more oriented

towards mobile language learning that is informal and incidental. According to Petersen and Divitini [17], *"Little or no emphasis is given to providing learning support where the learner can interact with other learners or parties that can support the learning process"* (p.169). To sum up, studies that are focused on design differ from content-related studies, as Petersen and Divitini [17] note, in that they emphasize less a conventional learning model where the learning material is pushed to the students by a mediator (third-party directed learning) than a way of learning where students take the initiative and responsibility of pulling their portion of learning (self-directed learning) based on their needs, interests, and circumstances.

2.3. Affordances of Mobile Learning

In Europe, Attewell [18] conducted a mobile learning project on young adults to explore the impact of handheld devices on the degree and nature of their enthusiasm for learning and further learning. The main findings of this project indicated that mobile learning: (i) improves students' literacy skills; (ii) develops independent and collaborative learning; (iii) helps students identify areas in which they need assistance and support; (iv) helps students learn at their convenience since learning is no longer confined to the classroom; (v) and raises the learner's self-confidence, and self-esteem as it enables them to choose how, when, where, and with whom to learn. In the American context, upon conducting a scientific study on students from three US universities that integrate mobile technology in their courses, Gikas and Grant [19] reported four main advantages of using mobile devices for learning purposes. Firstly, there was immediate access to information; thus, students were capable, through their devices, of accessing the course content quickly. They were also able to retrieve documents and submit assignments efficiently, regardless of time or space. The second advantage that was identified with using mobile technology was communication, in that students used their devices to learn with and from their peers, as well as to communicate with the teacher. Besides, they were able to share their thoughts and feelings with their classmates via social media tools. Thirdly, there was the benefit of diversified learning, meaning that students dealt with the course in many ways, namely texting, recording audio and video clips, and participating in discussions. This interactivity benefited the learners as they became more engaged and more productive. The fourth and last advantage to the use of mobile technology for academic purposes was situated learning, as learning was based on authentic problems, and takes place in 'real' situations. One example of this was students capturing information and posting it while 'fresh' on the internet through social networking sites, such as Facebook, YouTube, and the like.

2.4. Challenges of Mobile Learning

With that in mind, mobile learning has also some limitations that render its implementation in the domain of education, at least shortly, somewhat difficult. According to many studies, some of the challenges that still face m-learning are as follows:

- Technical problems: Mobile devices are limited in terms of size, storage, battery life, software compatibility, adding applications, and network speed [20].
- Affective issues: Mobile devices can be a source of distraction as students may use these devices solely for entertaining activities, such as gaming, watching films, or chatting with friends, rather than for learning purposes [19].
- Security and health concerns: Mobile devices can easily be lost, damaged, or stolen, which is an obstacle, especially for students from low-income backgrounds. The user's health might also be endangered due to constant radiation exposure [21].
- Financial constraints: the costs related to the implementation of m-learning, i.e., infrastructure, equipment, maintenance, etc. Barker, et al. [22] can negatively impact the feasibility of integrating mobile technology into educational settings.

- Ethical issues: hesitating mentalities as teachers and parents fear the potential use of handheld technology by students for cheating, plagiarizing, cyberbullying, and watching inappropriate content, among others [23].
- Pedagogical issues: the absence of a standard mobile learning theory is a problem that acts as a roadblock to an effective design, pedagogy, and assessment of new applications for academic purposes [20].

In the same vein, Naismith, et al. [24] highlighted five issues that need to be dealt with when considering utilizing mobile technology in an educational setting. Firstly, there is the issue of context, which means that, as mobile technology facilitates access to data about the learner's personal space, this may clash with his or her wish for anonymity and privacy. Secondly, there is the aspect of mobility, in that mobile technology transcends time and space, which also allows for engagement in activities that are unrelated to the instructor's plan or the curriculum. The third challenge is sustainable learning, entailing reliable handheld devices being provided to learners to capture lifelong experiences. Fourthly, there is the problem of digression, suggesting that students may abandon the use of the technology, or misuse it for chatting or gaming, rather than for learning purposes. Finally, comes the issue of control, indicating that students prefer taking control of their technologies, which could misalign with the policy and curriculum of their school or university.

3. Methodology

3.1. Research Design

This study employs a mixed-methods design. Therefore, both subjective and objective elements are combined to explore students' use of their devices for academic purposes. The reason behind mixing the two approaches is to understand learning from diverse viewpoints, harness complementary strengths, and mitigate the potential limitations associated with a sole approach [25]. This study also relies on one-time surveys, collecting data on snapshot occasions. Hence, since this study is mixed methods in its approach, the data resulting from conducting the survey-based process is addressed before the transcription and analysis of the interviews, which act as a humanizing aspect of the study [26].

This study was divided into two stages. In the first stage, the purpose was to look into the ways students utilize their mobile devices to learn English on and off campus. For this reason, quantitative data was collected from a sample of 142 properly filled-out forms. In the second/qualitative stage, two objectives were targeted: to elicit more in-depth insight into how students leverage their devices to learn English; and to explore the barriers students perceive as hindering their learning experience. To achieve this, a subset of the survey's sample (=16) was selected, taking into account the factors of age, gender, and level of study.

3.2. Sample and Sampling

The population sample that I have chosen for this study is students from the English department at the University of Sidi Mohamed Ben Abdellah (USMBA), in Morocco. Hence, a total of 142 participants were recruited for this study. The participants were informed that they were free to participate or quit at any time and that both the in-person survey and interview instruments were anonymous. The study was conducted using a non-probability sampling method, namely purposive sampling. This means that the participants were selected purposefully, based on two criteria: smartphone ownership and willingness to take part in the study. Purposive sampling was chosen as it is a shortcut to participants who are most likely to generate the type of information the author is seeking [27, 28].

Table 1.
The demographics of the samples.

Criteria of distribution	Survey sample (=142)		Interview sample (=16)	
	Frequency	Percentage	Frequency	Percentage
a. Gender				

• Male	62	43.7 %	07	43.7 %
• Female	80	56.3 %	09	56.2 %
b. Age				
• Under 22	87	61.3 %	10	62.5 %
• 22 & above	55	38.7 %	06	37.5 %
c. Level of Education				
• Bachelor's level	95	66.9 %	08	50.0 %
• Master's level	47	33.1 %	08	50.0 %

3.3. Data Collection

The data collection process was composed of two phases. In the first phase, data was collected through the use of the survey instrument, following the quantitative aspect of this study. Hence, in this phase, in-person questionnaires were handed out to a sample of 142 students to fill out. The survey instrument comprised three sections: Background information, technology ownership, and device academic uses. The initial section targeted background information, collecting data about learners' gender, age, and level of education. In Section Two, participants were asked dichotomous questions about their ownership of technologies, such as tablets, laptops, and internet connection. In the third section, a 5-option scale was used to investigate eight academic uses of mobile devices among learners of English on and off campus. The suggested academic uses included information seeking, social networking, note-taking, content creation, watching course-related videos, learning through apps, listening to educational materials, and chatting with AI models. In the second phase, interviews were held with selected, volunteer students (=16). Specifically, semi-structured interviews were chosen, as they allow, on one hand, participants to express freely their thoughts and feelings, and, on the other hand, interviewers to modify the sequence of questions, exclude, clarify, or adapt inquiries as necessary to improve the process of data collection. As noted earlier, the role of the interview instrument in this study was to humanize the participants who hide behind quantitative data as well as gain insight into the study's research problem as a whole. The interview protocol was conducted face-to-face and on a one-to-one basis. To suit the participants' needs, interviews were designed to last half an hour maximum. The interviewees (=16) were informed about the topic under study, the rationale behind it, as well as the different questions of the interview instrument. It is worth noting that all participants were asked if they consented to be recorded; otherwise, notes were taken down detailing the responses of those who objected. The semi-structured interviews addressed the ways students utilize mobile technology to learn as well as their perceived barriers to interacting academically with this technology. The interview instrument comprised questions about students' acquaintance and experiences with mobile learning.

3.4. Instrument and Data Quality

The survey instrument was validated for both reliability and validity. Cronbach's alpha indicated reliability with a good score of 0.77 for all survey items. Concerning validity, three experienced colleagues reviewed the instrument, leading to clearer questions and an improved design. A pilot test ensured students had no issues with comprehension or clarity. The interview instrument was also authenticated for trustworthiness and rigor. To ensure this, member checks were conducted by verifying transcripts with participants, peer debriefing was carried out with my co-authors to approve categories/themes, and an audit trail documented the data collection process as well as how decisions were made throughout the study.

3.5. Data Analysis

In line with the research design as well as the methods of data collection in this study, I relied on two of the most commonly used methods in data analysis: (i) Statistical Package for the Social Sciences (SPSS), for dealing with the numerical component of this study; (ii) and content analysis, for

interpreting the meanings that lie behind and beneath the processed numbers. I chose the SPSS software since it is accurate, simple, and easy to use. Concerning content analysis, I relied on this method to analyze the interview transcripts, in search of meanings within words, and for the sake of, as highlighted by Braun and Clarke (2006), identifying, analyzing, and reporting patterns within the data.

3.6. Ethical Considerations

In this study, three ethical issues were considered: (i) voluntary participation; (ii) informed consent; and (iii) confidentiality and anonymity. Concerning voluntary participation, no participant was forced to take part in any of the two stages of this study. All the students who participated did so freely and were constantly reminded throughout the study of their right to opt-out if they wanted. As pertains to informed consent, only those who expressed their consent completed the questionnaire after being informed of the study's purpose, topic, and scope. Likewise, participants confirmed their consent before the interview and were asked to approve the audio recording; otherwise, notes were taken down detailing their responses. Last, throughout the study, confidentiality and anonymity were carefully maintained by assigning unique codes and using pseudonyms instead of real identities. Data was securely stored, and all potential identifiers were removed. Confidentiality procedures were strictly followed and communicated to each of the participants. Furthermore, the study's findings were reported accurately and objectively, and data was neither falsified nor misrepresented.

4. Results

4.1. Research Question 1

In what way do university students utilize their handheld devices to learn English, both on campus and off campus?

In response to this question, I used two instruments: the questionnaire and the interviews. I opted for mixing these two methods to gain insight into how students use their devices to learn English. Given that, the questionnaire acted as the skeleton in this case, and the interview instrument as the flesh, or as put by Twenge [26] *"The survey data are always the gold standard; the interviews and essays illustrate that data and do not in any way replace it. They are, however, a path to humanizing the young people behind the data."*

4.1.1. Quantitative Analysis

To quantify participants' responses, a 5-option scale was used to explore the ways students use their handheld devices to learn English. The scale includes five options: 'Never,' 'Sometimes,' 'Often,' 'Usually,' and 'Always,' assigned values from 1 to 5, respectively. Participants were asked to respond to eight statements related to different academic uses of the device, using this scale. Statistics about the rated items are presented in Table 2.

Table 2.
Frequencies of students' academic uses of the mobile device.

Academic uses of the device	Never	Sometimes	Often	Usually	Always	Mean	Rank
1. for communicating and networking via social media sites.	0 (0.0%)	0 (0.0%)	6 (4.2%)	12 (8.4%)	124 (87.3%)	4.83	2
2. for listening to educational podcasts.	49 (34. 5%)	10 (7.0%)	21 (14.8%)	19 (13.4%)	43 (30.3%)	2.98	8
3. for watching course-related videos via YouTube, TikTok, etc.	13 (9.2%)	11 (7.7%)	20 (14.1%)	27 (19.0%)	71 (50.0%)	3.93	5
4. for creating content (e.g., using Word, Excel, PowerPoint)	21 (14.8%)	12 (8.5%)	16 (11.3%)	22 (15.5%)	71 (50.0%)	3.77	6
5. for chatting with AI models, such as ChatGPT.	0 (0.0%)	0 (0.0%)	6 (4.2%)	11 (7.7%)	125 (88.8%)	4.84	1
6. for taking notes (scan, record, type, etc.)	23 (16.2%)	14 (9.9%)	19 (13.4%)	22 (15.5%)	64 (45.1%)	3.63	7
7. for engaging in app-based learning (=	7	8	9	24	94	4.34	3

| language learning apps). | (4.9%) | (5. 6%) | (6.3%) | (16.9%) | (66.2%) | | |
| 8. for information seeking (fact-checking; dictionary; translation). | 13 (9.2%) | 9 (6.3%) | 16 (11.3%) | 24 (16.9%) | 80 (56.3%) | 4.05 | 4 |

As highlighted in Table 2, there are various levels of students' engagement with the suggested academic uses of mobile technology. As such, mobile devices are mostly used among students for chatting with AI models such as ChatGPT (M=4.84), in that 88.8% of respondents reported that they 'always' use their devices to seek help from AI chatbots. This high percentage suggests a strong inclination toward leveraging the capabilities of AI, or at least some of them, for academic purposes. The second most frequent use was for communicating (M=4.83) via social networking sites (SNS), with 87.3% of students acknowledging 'always' utilizing their devices for this purpose. This indicates the importance of social networking, especially via communities of practice that thrive in SNS, in students' academic lives. Regarding app-based learning, it ranked third (M=4.34), with two-thirds of students stating 'always' utilizing their devices for learning through apps. This reflects the current trend among university students of leveraging mobile apps for language learning, particularly in the context of the national reform of higher education aimed at enhancing the language skills of Moroccan university students through the platform of Rosetta Stone. For information seeking (M=4.05), 73.2% of the students admitted using their mobile devices either 'always' (=56.3%) or 'usually' (16.9%) for fact-checking, dictionary use, and translation. This suggests the crucial role of mobile technology in empowering students to engage in learning practices, such as googling information, clarifying meanings, and translating words and ideas. The fifth most prevalent way students academically use their devices is for watching course-related videos (M=3.93), suggesting that 69% of students at least 'usually' engage in learning course-related materials on platforms like YouTube and TikTok. This indicates a growing preference among students in general for supplementing classroom learning with customized learning, visual learning, and microlearning. As for the activity of content creation—using Word, Excel, and PowerPoint (M=3.77)—only half of the students reported 'always' engaging in it, highlighting that a smaller segment of students use their devices for productive academic work, compared to those using mobile technology for receptive academic tasks. Taking notes, including scanning and recording was ranked seventh (M=3.63), with only 45.1% of the students 'always' using their devices for this purpose, indicating variability in students' digital note-taking habits, and how open teachers are toward the growing in-class use of the device. Last, the lowest mean score was for using a mobile device to listen to educational podcasts (M = 2.98), with 34. 5% never engaged in such an activity, and only 30.3% of respondents 'always' using their devices for it. This suggests that mobile devices are less utilized for auditory learning, which may be attributed to the fact that Moroccan schools and universities traditionally place less emphasis on teaching or assessing listening skills.

4.1.2. Qualitative Analysis

To gain a deeper understanding of the quantitative data related to the second research question in this study, content analysis was employed, as suggested by Creswell [29]. Field notes were reviewed and organized, categories and themes were identified, a narrative was constructed, and findings were reported. Regarding participants' use of handheld devices, three categories, covering, each, two themes, were identified. The themes within each category will thereafter be dealt with and illustrated with excerpts from interviews transcripts.

4.1.3. On-Campus Learning

Based on participants' answers, students use mobile devices for two main aspects of their on-campus learning, including note-taking and referencing. To begin with, many students reported using their devices chiefly to scan slides or record lectures. As one participant said, *" We use our smartphone in class, when we are allowed to of course, but only to scan what is on the screen or the whiteboard,"* adding, *"I personally also record important lectures, especially when they include information that is not in the handouts."* Another

student noted, *"I sometimes use Evernote to take lecture notes,"* highlighting the importance of such apps in storing information for later use, especially during test/exam preparation sessions.

In addition to note-taking, students also use their mobile devices for quick referencing and fact-checking during lectures and class discussions. A student said, *"I use my smartphone to check important information or to look up difficult words."* Another student explained, *"It's efficient for quickly seeking immediate answers to challenging questions. Also, if a teacher mentions a concept I find difficult, I can use my phone to clarify it on the spot, striking while the iron is hot."* These learning practices suggest how mobile devices are leveraged among students for real-time access to information and active participation during lectures and discussions. That said, some teachers implement bans on mobile devices in class to prevent—as they say—some side effects of device use, including, distraction, disruption, and cheating.

4.1.4. Off-Campus Learning

As with on-campus learning, analysis of students' transcripts showed two main ways in which students academically utilize their devices off-campus: at-home learning and on-the-go listening. For at-home learning, students' study habits are characterized by a preference for laptops (over smartphones) and an increasing reliance on advanced tools like ChatGPT. One student mentioned, *"For homework, I always use my laptop because the keyboard is larger to type and the screen is bigger to read."* When asked about the use of ChatGPT in their assignments, participants revealed that they, *"find it very helpful,"* especially in *"generating ideas,"* *"editing work,"* and *"explaining concepts."* Though it sometimes gives, *"misleading answers."* This trend highlights the growing popularity of AI-driven tools among students and the need for teachers to 'befriend' these newcomers, instead of viewing them as a threat.

In addition to leveraging them for at-home learning, many students also reported frequently utilizing their smartphones for on-the-go listening. Hence, whether taking the bus or even walking, they make use of commute times to accomplish tasks using their phones. As one student noted, *"I use my smartphone on my way to the faculty to listen to English podcasts, as an escape from the stress and monotony of travel and to stay in touch with my studies."* Another student added, *"I often use my phone to listen to recorded lectures or to the news in English, especially in transit. It's very useful for someone like me who grasps information better when it is auditory."* This flexibility suggests students' inclination to seek alternative ways of learning that transcend the regular timetable and the walls of the classroom.

4.15. Communication

Based on students' interviews, mobile devices play a key role in fostering both student-student and teacher-student communication. Students frequently use SNS to build communities of practice, through which they can discuss lessons and share resources. As one student stated, *"I always communicate with my classmates through our WhatsApp group and sometimes also via our Facebook group."* adding, *"We help each other with homework and discuss what we had as classwork."* Another student noted, *"We share documents and videos using WhatsApp. It's very motivating and fun and gives us a sense of unity."* In addition to their academic added value, these platforms, when responsibly utilized, can foster many of 21st-century skills, such as communication, collaboration, digital literacy, and social skills.

However, communication with teachers is highly dependent on their availability on the digital channels. While some teachers are easy to reach via email and SNS, others are not. One participant shared, *"Some of our teachers are admins of our WhatsApp and Facebook groups, so I find it easier to contact them."* Conversely, other students disagreed, with one participant claiming that *"Not all our teachers are available online,"* and another adding, *"and even some of those who share their emails with us and respond are often late to do so, especially via Gmail."* These quotes highlight the need for improved availability and responsiveness from teachers to enhance student-teacher communication, in terms of timeliness of the feedback, flexibility of the interaction, and increased engagement from both parties.

4.2. Research Question 2

Based on their experiences, what barriers do university students attribute to learning with mobile technology?

To answer Question 3, I relied solely on content analysis, as my focus is more on words and meanings rather than on numbers and statistics [30]. Therefore, three categories and ten themes emerged during the analysis of responses documenting students' perceptions of the barriers that they face while engaging with mobile technology. In what follows, I present the emergent themes, supported by excerpts from the interview transcripts.

4.2.1. Device Limitations

While analyzing participants' responses, three device-related limitations/themes emerged: screen size and storage issues, performance and network problems, and financial concerns. On screen size and storage, all participants identified small screen size as a serious barrier to utilizing smartphones to accomplish learning tasks, such as reading and typing. One student mentioned, *"My phone's screen is too small that it is eye-straining to read long texts and type out my notes."* Limited storage was also a significant issue, with another student explaining, *"My phone keeps telling me to free up space to download new apps or files, which is frustrating."* This frustration is justified, as simple tasks like reading/typing texts and downloading coursework can be nerve-racking, especially when racing against the clock. In addition to that, participants also highlighted performance and network issues as obstacles to learning with mobile devices. Many found that smartphones were insufficient for editing documents or participating in online learning. A student stated, *"My phone can't access online resources. It takes a long time to download anything, which disrupts my work."* Network speed was another concern. One student mentioned, *"My internet connection repeatedly disconnects, forcing me each time to redo the work!"* These problems can undermine the quality of work, and increase stress levels, leading to delays in completing important tasks. Furthermore, money concerns can be a real hindrance to students' willingness to embrace mobile learning. As such, many respondents showed their willingness to engage in any m-learning initiative if it is inclusive of institutional support. One student revealed, *"Not all students can buy the newest smartphones or pay for the services associated with it."* Another student noted, *"Many of us are living on a tight budget, so if they are set to implement this project, are they going to help us with the fees of the device, the Wi-Fi, and the online resources?"* This is a legitimate question that needs to be addressed by policymakers before implementing any m-learning project to ensure that students are motivated and engaged.

4.2.2. Teacher-Related Challenges

The analysis of students' answers indicated two main barriers about teachers' attitudes toward educational technology: hesitancy to use mobile technology and lack of training in the effective use of such technology for academic purposes. As we mentioned earlier, many respondents mentioned the decision of many teachers to implement bans on the use of mobile devices in class. They are also frustrated when some teachers are not integrating technology into their teaching practices. A respondent commented, *"You know what is disappointing? With all these advanced technologies that surround us, some teachers do not use them!"* This hesitancy to use technology, though reduced in scope, according to the interview transcripts, may not only frustrate students and limit their engagement but might also leave universities unprepared for emergencies. In addition to teachers' hesitancy to use technology in education, there is also the issue of lack of training in the teachers' utilization of ICT in teaching. This can stem from either the insufficiency of professional development programs or teachers' incapacity to add training to their existing responsibilities. A student explained, *"It's a pity that some of our teachers, though they don't deny its affordances, still can't fully adopt technology in their lessons."* Another student added, *"There are many teachers who claim to use technology in their teaching; yet, they only use basic tools, such as PowerPoint slides."* All in all, a lack of training in technology adoption for teachers can result in

inequitable access to resources for students, leading in turn to their reduced competitiveness in the job market.

4.2.3. Learner-Related Obstacles

From the analysis of students' transcripts, three learner-related barriers emerged concerning the academic use of mobile devices. The three identified barriers are: addiction, distraction, and cheating/plagiarism. The overwhelming majority of participants, especially girls, admitted growing helplessly attached to their devices. One of them shared, *"I find it hard to not scroll through my phone, even during class sessions."* Another student noted, *"I can't stop checking WhatsApp, Facebook, and Instagram, even in bed, to the point of falling asleep with my face on the screen,"* adding, *"I know it's a bad habit, but I just can't disconnect!"* This device dependency affects negatively students' physical and mental health, trapping them in a loop—of escape, fatigue, lack of rest, and reduced productivity—that is difficult to break. Distraction is the second learner-related issue that students identified as a barrier to the academic use of mobile technology. A student stated, *"Smartphones are such a distraction, in that you start with trying to do your homework and end up on social media."* Another student shared, *"There are some of our classmates who instead of taking notes or at least listening to what the teacher is lecturing about, are sometimes seen furtively scrolling through their phones."* Distraction is not an issue to overlook. If not promptly dealt with, it can lead to more serious problems, such as procrastination, low performance, anxiety, and feelings of isolation. Last, all students agreed that the use of mobile devices for cheating and plagiarizing is a significant barrier to the effective use of educational mobile technology. One student said with disappointment, *"I've never seen a student cheating in exams, but if that happens, I think it'd be unfair for those who prepared hard for the exam to see some students cheat and finally get the grade!"* This is the case on campus because the strict penalties and rigorous monitoring implemented by the university act as an effective deterrent against cheating. Off-campus, however, many students admitted falling into the trap of plagiarism. As one student mentioned, *"It's tempting to just relax and let ChatGPT do all the work, but many of those who plagiarize are caught as teachers at our university easily detect AI-generated content."* While 'cheating in exams' is easy to control and eradicate, plagiarism can sometimes go unnoticed, hence the need for preventive and curative measures to eradicate this *'virus'* from our academic settings.

5. Discussion

The first question in this study investigated the ways students utilize educational mobile technology on and off campus. This question was addressed both quantitatively and qualitatively. To begin with, quantitative findings suggested that university students used their mobile devices mostly for chatting with AI models, and social networking. This matches findings from former studies, stressing the importance of mobile devices, especially when used for communicative and collaborative purposes [19, 31, 32]. Also, students' deep interest in learning through apps highlights the increasing importance of such linguistic platforms [33] as they offer learners many unique interactive features [34]. Besides, using devices frequently for googling, referencing, and watching course-related materials demonstrates that mobile learning can be useful for academic and complementary information seeking [35, 36]. That said, the low prevalence among students of digital note-taking and listening to educational podcasts reflects, both the in-class restrictions on device use and the emphasis on visual—rather than auditory—learners in Moroccan classrooms [37, 38]. Having tackled quantitative results, I now shift the focus to qualitative findings. These suggest that the academic uses of the device can be classified into on-campus learning, off-campus learning, and communication. First, according to participants, smartphones are frequently used on-campus for scanning, recording, and referencing information, underscoring their utility in the immediate access to course materials [33, 37]. However, smartphones are often banned from classroom use, which according to Anshari, et al. [39] is a requirement unless students abide by the rules of their in-class use. Second, in off-campus settings, students typically prefer laptops—to smartphones—for assignments [40] and are increasingly dependent on ChatGPT to assist with

homework tasks [41]. Students also utilize their devices to access podcasts and other educational audio materials, making the most of their leisure time [19]. Third and last, mobile devices are predominantly used for peer-to-peer communication through SNS for their promotion of a collaborative learning environment [37, 38]. That said, digital interaction with teachers remains a challenge, suggesting the need for improved availability from some teachers to enhance student-teacher communication. Having completed the first question, the second question of this research sheds light on the challenges that students face while employing their devices to learn. Analysis of students' responses revealed three types of barriers, pertaining to the device, the teacher, or the learner. First, students highlighted screen size and storage issues, performance and network problems, as well as financial concerns as device limitations. These findings are consistent with existing literature, which indicates that issues with small screens and performance are serious hindrances in educational settings [19, 20, 42]. Also, although mobile technology offers affordances, such as learning anytime and anywhere [43, 44] these merits are often eclipsed by major limitations like restricted functionality and its insufficiency for academic learning [40, 45]. Furthermore, financial issues aggravate these problems, as the costs for devices, apps, and internet packages can limit students' access to online resources, ultimately leading to their demotivation [40, 46]. Honestly speaking, the USMBA university is currently helping with free access to open educational resources (OER) as well as to linguistic platforms like Rosetta Stone; however, more efforts can be leveraged to financially help students, at least with discounts, to acquire better devices and reliable internet connectivity. In addition to device limitations, interviewees also highlighted two major teacher-related problems, namely hesitancy to use technology and lack of training in leveraging it for educational purposes. These findings match existing literature, suggesting that teachers' practices can sometimes be an obstacle to the effective integration of technology. It is important to note that teachers often, out of fear of students' unethical use of phones, ban the in-class use of the device [19, 47]. More importantly, the apprehension teachers may have about embracing technology as well as the insufficiency of their technical skills can keep change from reaching their teaching practices [48, 49]. Most importantly, even teachers who use technology often restrict its use to basic tools like slides and videos, instead of exploring more innovative ways [50] such as adaptive learning software and the flipped classroom model. Overall, to change the status quo, opting for professional development programs (PDPs)—preferably online ones—is crucial for enhancing teachers' technical skills as well as students' engagement, ultimately maximizing learning outcomes [49, 51]. Finished with device- and teacher-related limitations, analysis of students' responses also suggested three challenges—including device addiction, distraction, and cheating/plagiarism—that pertain to learners themselves in their interaction with mobile technology. Nearly all participants admitted being excessively dependent on their devices, negatively affecting them psychologically, mentally, and socially [32, 52, 53]. Besides, distraction was a major concern of device use, with phones often diverting students' focus from studying to off-task activities, thus disrupting their attention and by extension their academic productivity [32, 54]. Mobile devices are sometimes also used unethically by some students to either cheat during exams or plagiarize by passing off AI-/ChatGPT-generated work as their own [55]. This misuse is alarming as it raises important concerns regarding the thin line separating the moral use of the device from its unethical utilization. As we have seen, device dependency, disruption, as well as cheating/plagiarism pose significant challenges to the potential implementation of a MALL-based program in tertiary education. With that in mind, universities can address these issues by fostering responsible device use, integrating plagiarism detection software, and providing mental health support to students, among others.

6. Conclusion

This research uncovered how Moroccan university students utilize their handheld devices for learning English both on and off campus. The outcomes indicated that mobile devices are widely used among students for chatting with AI models, social networking, engaging in app-based learning, seeking information, and watching course-related videos; and are moderately used for content creation,

note-taking, and listening to educational podcasts. The findings also indicated (i) that for on-campus learning, smartphones are frequently used for basic note-taking and quick fact-checking; (ii) that for off-campus learning, students are increasingly dependent on ChatGPT to assist with assignments and use smartphones to listen to podcasts on the go; and (iii) that while devices facilitate communication among peers via social networking sites, the ease of interaction with teachers depends on individual teachers' accessibility. Furthermore, this study explored barriers that university learners attribute to learning with mobile technology. Participants' responses highlighted several challenges, including (a) device limitations, namely screen size, storage capacity, network speed, and financial issues; (b) teacher-related challenges such as hesitancy to embrace technology and lack of training; and (c) learner-related obstacles, including device addiction, distraction, plagiarism, and cheating. However, as with any research, this study has some limitations. To start, the focus on only one institution may impact the applicability of the findings. Future research could include a wider range of regions and/or institutions. Another limitation is the sample size, which may not adequately reflect the diversity of the target population. Expanding the sample size and participant diversity in future studies may lead to more reliable outcomes. The results of this study underscore several implications. First, universities should capitalize on students' high engagement with AI tools, app-based learning, and social networking by integrating these tools more effectively into the curriculum. Second, addressing technical and financial barriers by assisting with better devices and stable internet access is central to enhancing students' overall learning experience. Third, the findings highlight the need for online professional development programs to overcome resistance to change and improve teachers' abilities in ICT integration. Lastly, there is an urgent need to establish initiatives and practices that promote mindful and ethical uses of devices and provide mental health support to those who need it.

Data Availability Statement:
The data that support the findings of this study are available upon request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Transparency:
The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Ethics Statement:
Ethical review and approval were not required for this study on human participants in accordance with local legislation and institutional requirements. Participants provided written informed consent to participate in both the survey and interview phases of the study.

Authors' contributions:
Dr. Mohammed Moubtassime, Dr. Latifa Belfakir, and Mr. Mohamed Essafi contributed equally to this study. All authors read and approved the final manuscript.

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References

[1]   O. Marunevich, V. Kolmakova, I. Odaruyk, and D. Shalkov, "E-learning and M-learning as tools for enhancing teaching and learning in higher education: A case study of Russia," *In SHS Web of Conferences*, vol. 110, p. 03007, 2021. https://doi.org/10.1051/shsconf/202111003007

[2]   L. Zheng, X. Li, and F. Chen, "Effects of a mobile self-regulated learning approach on students' learning achievements and self-regulated learning skills," *Innovations in Education and Teaching International*, vol. 55, no. 6, pp. 616-624, 2018. https://doi.org/10.1080/14703297.2016.1259080

[3]   G. Stockwell, "Using mobile phones for vocabulary activities: Examining the effect of platform," *Language Learning & Technology*, vol. 14, no. 2, pp. 95-110, 2010. https://doi.org/10.10125/44216

[4]   A. Lepp, J. E. Barkley, and A. C. Karpinski, "The relationship between cell phone use and academic performance in a sample of US college students," *Sage Open*, vol. 5, no. 1, p. 2158244015573169, 2015. https://doi.org/10.1177/2158244015573169

[5]   J. C. M. Chambi *et al.*, "Perceived motivational effects of mobile learning technique to higher education students: An exploratory study," *World Journal of English Language*, vol. 13, no. 3, pp. 210-210, 2023. https://doi.org/10.5430/wjel.v13n3p210

[6]   O. Dorofeyeva, L. Iliichuk, T. Melnyk, S. Taratuta, and K. Tulin, "The use of mobile applications in higher education institutions to enhance the quality of the educational process," *Revista Amazonía Investiga*, vol. 13, no. 78, pp. 162-176, 2024. https://doi.org/10.34069/ai/2024.78.06.14

[7]   L. Carvalho and M. J. Ferreira, "Mobile devices in school in teaching/learning process-the roadmap," in *EDULEARN15 Proceedings*, *IATED*, 2015, pp. 4623-4634.

[8]   S. Geddes, "Mobile learning in the 21st century: Benefit for learners," *Knowledge Tree E-Journal*, vol. 30, no. 3, pp. 214-228, 2004. https://doi.org/10.17781/P002384

[9]   M. Haghshenas and K. Jeddi, "Using Mobile devices to improve learning technologies," *International Journal of Innovative Technology and Research*, vol. 1, pp. 519-523, 2013.

[10]   N. Pachler, B. Bachmair, and J. Cook, *Mobile learning: Structures, agency, practices*. Springer Science & Business Media. file:///C:/Users/DELL/Downloads/18-36-PB.pdf, 2009.

[11]   E. D. Wagner, "Enabling mobile learning," *EDUCAUSE Review*, vol. 40, no. 3, pp. 41-42, 2005.

[12]   L. F. Motiwalla, "Mobile learning: A framework and evaluation," *Computers & Education*, vol. 49, no. 3, pp. 581-596, 2007. https://doi.org/10.1016/j.compedu.2005.10.011

[13]   D. A. Kolb, *Experiential learning: Experience as the source of learning and development*. FT Press. https://www.pdfdrive.com/experiential-learning-experience-as-the-source-of-learning-and-development-e158320821.html, 2014.

[14]   L.-H. Wong and C.-K. Looi, "What seams do we remove in mobile-assisted seamless learning? A critical review of the literature," *Computers & Education*, vol. 57, no. 4, pp. 2364-2381, 2011. https://doi.org/10.1016/j.compedu.2011.06.007

[15]   B. C. Sinha and H. S. Sinha, *A critical analysis of push, pull, bottleneck, and road ahead of e-learning in India*. Reshaping Entrepreneurial Education Within an Industry 4.0 Context, IGI Global, 2024.

[16]   O. Viberg and Å. Grönlund, "Mobile-assisted language learning: A literature review," presented at the 11th World Conference on Mobile and Contextual Learning. https://www.researchgate.net/publication/277832223Mobile_Assisted_Language_Learning_A_Literature_Review, 2012.

[17]   S. A. Petersen and M. Divitini, "Language learning: From individual learners to communities," presented at the IEEE International Workshop on Wireless and Mobile Technologies in Education (WMTE'05), IEEE, 2005.

[18]   J. Attewell, "Mobile technologies and learning," *London: Learning and Skills Development Agency*, vol. 2, no. 4, pp. 44-75, 2005.

[19]   J. Gikas and M. M. Grant, "Mobile computing devices in higher education: Student perspectives on learning with cellphones, smartphones & social media," *The Internet and Higher Education*, vol. 19, pp. 18-26, 2013. https://doi.org/10.1016/j.iheduc.2013.06.002

[20]   C. Shuler, *Pockets of potential: Using mobile technologies to promote children's learning*. New York: The Joan Ganz Cooney Center at Sesame Workshop, 2009.

[21]   A. Kukulska-Hulme, "Mobile usability in educational contexts: What have we learnt?," *The International Review of Research in Open and Distributed Learning*, vol. 8, no. 2, 2007. https://doi.org/10.19173/irrodl.v8i2.356

[22]   A. Barker, G. Krull, and B. Mallinson, "A proposed theoretical model for m-learning adoption in developing countries," in *Proceedings of mLearn 2005 (4th World Conference on Mobile Learning*, 2005.

[23]   Q. Wang, W. Chen, and Y. Liang, "The effects of social media on college students," *Journal of Educational Technology Development and Exchange*, vol. 4, no. 1, pp. 1-14, 2011.

[24]   L. Naismith, P. Lonsdale, G. Vavoula, and M. Sharples, *NESTA Futurelab Report 11: Literature review in mobile technologies and learning*. Bristol, UK: Nesta Futurelab, 2004.

[25]   J. W. Creswell and V. L. P. Clark, *Designing and conducting mixed methods research*. Sage Publications. https://doc1.bibliothek.li/acd/FLMF050277.pdf, 2017.

[26]   J. M. Twenge, *iGen: Why today's super-connected kids are growing up less rebellious, more tolerant, less happy—and completely unprepared for adulthood—and what that means for the rest of us*. New York: Atria Books. https://www.pdfdrive.com/igen-why-todays-super-connected-kids-are-growing-up-less-rebellious-e187817981.html, 2017.

[27]   A. Bryman, *Social research methods*. Oxford University Press. https://ktpu.kpi.ua/wp-content/uploads/2014/02/social-research-methods-alan-bryman.pdf, 2016.

[28]   S. Campbell *et al.*, "Purposive sampling: Complex or simple? Research case examples," *Journal of research in Nursing*, vol. 25, no. 8, pp. 652-661, 2020. https://doi.org/10.1177/1744987120927206

[29]   J. W. Creswell, *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage Publications. http://www.mim.ac.mw/books/John%20W.%20Creswell's%20Research%20Design%203rd%20Ed.pdf, 2003.

[30]   J. W. Creswell, *Qualitative inquiry & research design: Choosing among five approaches*. SAGE Publications. http://www.ceil-conicet.gov.ar/wp-content/uploads/2018/04/CRESWELLQualitative-Inquiry-and-Research-Design-Creswell.pdf, 2013.

[31]   P. A. Kirschner and A. C. Karpinski, "Facebook® and academic performance," *Computers in Human Behavior*, vol. 26, no. 6, pp. 1237-1245, 2010. https://doi.org/10.1016/j.chb.2010.03.024

[32]   I. M. Schnitman, "College students' perceptions of the use of mobile devices during lessons," Retrieved: https://sevenpublicacoes.com.br/index.php/editora/article/view/2166. [Accessed 2023.

[33]   M. E. Hossain and S. Z. Ahmed, "Academic use of smartphones by university students: A developing country perspective," *The Electronic Library*, vol. 34, no. 4, pp. 651-665, 2016.

[34]   M. Essafi, L. Belfakir, and M. Moubtassime, "Investigating mobile-assisted language learning apps: Babbel, Memrise, and Duolingo as a case study," *Journal of Curriculum and Teaching*, vol. 13, no. 2, p. 197, 2024. https://doi.org/10.5430/jct.v13n2p197

[35]   S. F. Ng, N. S. I. C. Hassan, N. H. M. Nor, and N. A. A. Malek, "The relationship between smartphone use and academic performance: A case of students in a Malaysian tertiary institution," *Malaysian Online Journal of Educational Technology*, vol. 5, no. 4, pp. 58-70, 2017. https://doi.org/https://eric.ed.gov/?id=EJ1156718

[36]   C. R. Bomhold, "Educational use of smart phone technology: A survey of mobile phone application use by undergraduate university students," *Program*, vol. 47, no. 4, pp. 424-436, 2013.

[37]   H. M. Alfawareh and S. Jusoh, "Smartphones usage among university students: Najran University case," *International Journal of Academic Research*, vol. 6, no. 2, 2014.

[38]   A. S. Al-Harrasi and A. H. Al-Badi, "The impact of social networking: A study of the influence of smartphones on college students," *Contemporary Issues in Education Research*, vol. 7, no. 2, pp. 129-136, 2014.

[39]   M. Anshari, M. N. Almunawar, M. Shahrill, D. K. Wicaksono, and M. Huda, "Smartphones usage in the classrooms: Learning aid or interference?," *Education and Information Technologies*, vol. 22, pp. 3063-3079, 2017. https://doi.org/10.1007/s10639-017-9572-7

[40]   N. Nikpeyma, M. Zolfaghari, and A. Mohammadi, "Barriers and facilitators of using mobile devices as an educational tool by nursing students: A qualitative research," *BMC Nursing*, vol. 20, pp. 1-11, 2021. https://doi.org/https://link.springer.com/article/10.1186/s12912-021-00750-9

[41]   J. R. Liling and S. A. Aklani, "Analysis of ChatGPT usage to support student lecture assignments," *Fasilkom Journal*, vol. 13, no. 3, pp. 599-604, 2023. https://doi.org/10.37859/jf.v13i3.6254

[42]   A. Rockey, J. Cohn, and S. Eastman, "Reducing access barriers: Exploring student smartphone use across higher education institutions," *Journal of Educational Research and Practice*, vol. 13, no. 1, pp. 285-303, 2023. https://doi.org/https://eric.ed.gov/?id=EJ1403597

[43]   M. Ally, "Mobile learning: from research to practice to Impact Education," *Learning and Teaching in Higher Education: Gulf Perspectives*, vol. 10, no. 2, pp. 3-12, 2013. https://doi.org/10.18538/lthe.v10.n2.140

[44]   O. Barden and M. Bygroves, "'I wouldn't be able to graduate if it wasn't for my mobile phone.'The affordances of mobile devices in the construction of complex academic texts," *Innovations in Education and Teaching International*, vol. 55, no. 5, pp. 555-565, 2018. https://doi.org/10.1080/14703297.2017.1322996

[45]   B. Eschenbrenner and F. F.-H. Nah, "Learning through mobile devices: leveraging affordances as facilitators of engagement," *International Journal of Mobile Learning and Organisation*, vol. 13, no. 2, pp. 152-170, 2019. https://doi.org/10.1504/IJMLO.2019.098193

[46]   D. O'Doherty, M. Dromey, J. Lougheed, A. Hannigan, J. Last, and D. McGrath, "Barriers and solutions to online learning in medical education—an integrative review," *BMC Medical Education*, vol. 18, pp. 1-11, 2018. https://doi.org/10.1186/s12909-018-1240-0

[47]   R. Christensen and G. Knezek, "Readiness for integrating mobile learning in the classroom: Challenges, preferences and possibilities," *Computers in Human Behavior*, vol. 76, pp. 112-121, 2017. https://doi.org/10.1016/j.chb.2017.07.014

[48]   B. Bai and C. K. Lo, "The barriers of technology integration in Hong Kong primary school English education: Preliminary findings and recommendations for future practices," *International Journal of Languages, Literature and Linguistics*, vol. 4, no. 4, pp. 290-297, 2018. https://doi.org/10.18178/IJLLL.2018.4.4.189

[49]   A. Triplett and W. J. Triplett, "Barriers to using mobile devices in the classroom," *Cybersecurity and Innovative Technology Journal*, vol. 1, no. 1, pp. 30-36, 2023.

[50]   K. Woodman, "Educational paradox: The hidden obstacles to the integration of mobile phones in the language classroom," *Research Papers in Language Teaching and Learning*, vol. 5, no. 1, pp. 110-122, 2014.

[51]   C. D. Epp, K. Phirangee, A. Després-Bedward, and L. Wang, "Resourceful instructors and students: Overcoming barriers to integrating mobile tools," *IAmLearning: Mobilizing and Supporting Educator Practice*, 2017.

[52]   Z. Qu, "The impact of cell phone dependence on college students' mental health and adjustment strategies in the context of big data," *Applied Mathematics and Nonlinear Sciences*, vol. 9, no. 1, 2024. https://doi.org/10.2478/amns-2024-1999

[53]   B. Smith, "Study: Cell-phone use leads to lower GPA, more stress and anxiety," Retrieved: http://www.redorbit.com/news/health/1113022165/college-student-cell-phone-smartphoneuse-lower-gpa-higher-anxiety-stress-levels-120613. [Accessed 2013.

[54]   J. N. Alson and L. V. Misagal, "Smart phones usage among college students," *IMPACT: International Journal of Research in Engineering & Technology*, vol. 4, no. 3, pp. 63-70, 2016.

[55]   D. Yan, "Impact of ChatGPT on learners in a L2 writing practicum: An exploratory investigation," *Education and Information Technologies*, vol. 28, no. 11, pp. 13943-13967, 2023.

Appendix 1. The Survey Tool
Exploring Learners' Experiences with Mobile Technology: Academic Uses and Barriers
The questionnaire investigates students' experiences with mobile devices. You are thus requested to answer the questions as honestly as possible. Your identity will remain confidential.

1- Please select your gender: Male ☐ Female ☐

2- Please select your age range: Under 22 ☐ 22 and above ☐

3- Please select your university level: Bachelor's level ☐ Master's level ☐

4a. Do you own a smartphone? Yes ☐ No ☐

   4b. Do you own a laptop? Yes ☐ No ☐

5a. Do you have a WI-FI connection? Yes ☐ No ☐

 5b. Do you have a 4G connection? Yes ☐ No ☐

6. How often do you use your mobile device in the following ways?

I use my mobile device for learning purposes, including…	Never	Sometimes	Often	Usually	Always
6a. for communicating and networking via social media sites.					
6b. for listening to educational podcasts.					
6c. for watching course-related videos via YouTube, TikTok, etc.					
6d. for creating content (e.g., using Word, Excel, PowerPoint).					
6e. for chatting with AI models, such as ChatGPT.					
6f. for taking notes (scan, record, type, etc.).					
6g. for engaging in app-based learning (=language learning apps).					
6h. for information seeking (fact-checking; dictionary; translation).					

Appendix 2.
The Interview Tool

   → Please define mobile learning…

   1. What is it?

   2. What is it NOT?

   3. What is its added value?

   → In what way do you use your mobile device…

   4. to learn on campus?

   5. to learn off campus?

   6. to communicate with teachers and peers?

   → What difficulties are you facing while learning with a mobile device,

   7. in relation to the device itself (device limitations)?

   8. in relation to the teacher (teacher-related challenges)?

   9. in relation to yourself as a user (learner-related obstacles)?

   → 10. Is there anything you want to change or add?

Exploring Learners' Experiences with Mobile Technology: Academic Uses and Barriers

1. Reliability Statistics

1.1. Academic Uses' Scale

Reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.732	0.754	8

Case processing summary

		N	%
Cases	Valid	142	100.0
	Excluded[a]	0	0.0
	Total	142	100.0

a. Listwise deletion based on all variables in the procedure.

Summary item statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of items
Item means	4.047	2.979	4.838	1.859	1.624	.389	8

Item-total statistics

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
6a. for communicating and networking via social media sites.	27.54	33.030	.358	0.969	0.727
6b. for listening to educational podcasts.	29.39	22.411	.629	0.450	0.654
6c. for watching course-related videos via YouTube, TikTok, etc.	28.44	28.192	.370	0.262	0.716
6d. for creating content (e.g., using Word, Excel, PowerPoint).	28.60	23.249	.672	0.836	.644
6e. for chatting with AI models, such as ChatGPT.	27.54	32.931	.381	0.970	0.726
6f. for taking notes (scan, record, type, etc.).	28.74	24.052	.592	0.822	0.665
6g. for engaging in app-based learning (= language learning apps).	28.04	29.680	.343	0.213	0.720
6h. for information seeking (fact-checking; dictionary; translation).	28.32	30.405	.208	0.132	0.748

1.2. All Survey Scales

Reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.767	0.790	14

Case Processing Summary

		N	%
Cases	Valid	142	100.0
	Excluded[a]	0	.0
	Total	142	100.0

a. Listwise deletion based on all variables in the procedure.

Scale Statistics

Mean	Variance	Std. deviation	N of items
39.04	48.055	6.932	14

Summary item statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of items
Item Means	2.789	0.725	4.838	4.113	6.670	2.531	14

Item-total statistics

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
1. Select your gender	37.48	47.939	-0.019	0.108	0.776
2. Select you age	37.65	42.724	0.797	0.860	0.738

3. Select your university level	37.71	43.356	0.720	0.799	0.743
4b. Do you own a laptop?	38.32	46.842	0.165	0.409	0.768
5a. Do you have a WIFI connection?	38.29	46.377	0.253	0.448	0.764
5b. Do you have a 4G connection?	38.13	47.322	0.163	0.128	0.768
6a. for communicating and networking via social media sites.	34.21	45.487	0.365	0.971	0.759
6b. for listening to educational podcasts.	36.06	32.414	0.671	0.612	0.715
6c. for watching course-related videos via YouTube, TikTok, etc.	35.11	39.888	0.379	0.329	0.756
6d. for creating content (e.g., using Word, Excel, PowerPoint).	35.27	34.013	0.675	0.865	0.714
6e. for chatting with AI models, such as ChatGPT.	34.20	45.384	0.386	0.971	0.758
6f. for taking notes (scan, record, type, etc.).	35.41	35.222	0.582	0.835	0.729
6g. for engaging in app-based learning (= language learning apps).	34.70	41.586	0.354	0.250	0.756
6h. for information seeking (fact-checking; dictionary; translation).	34.99	41.950	0.252	0.199	0.771

2. Academic Uses of the Device

2.1. Descriptives

Descriptive statistics					
	N	Minimum	Maximum	Mean	Std. deviation
6a. for communicating and networking via social media sites.	142	3	5	4.83	.476
6b. for listening to educational podcasts.	142	1	5	2.98	1.678
6c. for watching course-related videos via YouTube, TikTok, etc.	142	1	5	3.93	1.335
6d. for creating content (e.g., using Word, Excel, PowerPoint).	142	1	5	3.77	1.499
6e. for chatting with AI models, such as ChatGPT.	142	3	5	4.84	.471
6f. for taking notes (scan, record, type, etc.).	142	1	5	3.63	1.523
6g. for engaging in app-based learning (= language learning apps).	142	1	5	4.34	1.135
6h. for information seeking (fact-checking; dictionary; translation).	142	1	5	4.05	1.328
Valid N (listwise)	142				

2.2. Frequencies

Statistics

		6a. for communicating and networking via social media sites.	6b. for listening to educational podcasts.	6c. for watching course-related videos via YouTube, TikTok, etc.	6d. for creating content (e.g., using Word, Excel, PowerPoint).	6e. for chatting with AI models, such as ChatGPT.	6f. for taking notes (scan, record, type, etc.).	6g. for engaging in app-based learning (= language learning apps).	6h. for information seeking (fact-checking; dictionary; translation).
N	Valid	142	142	142	142	142	142	142	142
	Missing	0	0	0	0	0	0	0	0
Mean		4.83	2.98	3.93	3.77	4.84	3.63	4.34	4.05
Std. Deviation		.476	1.678	1.335	1.499	.471	1.523	1.135	1.328
Variance		.227	2.815	1.782	2.247	.222	2.319	1.289	1.764

6a. for communicating and networking via social media sites.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Often	6	4.2	4.2	4.2
	Usually	12	8.5	8.5	12.7
	Always	124	87.3	87.3	100.0
	Total	142	100.0	100.0	

6b. for listening to educational podcasts.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	never	49	34.5	34.5	34.5
	Sometimes	10	7.0	7.0	41.5
	Often	21	14.8	14.8	56.3
	Usually	19	13.4	13.4	69.7
	Always	43	30.3	30.3	100.0
	Total	142	100.0	100.0	

6c. for watching course-related videos via YouTube, TikTok, etc.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Never	13	9.2	9.2	9.2
	Sometimes	11	7.7	7.7	16.9
	Often	20	14.1	14.1	31.0
	Usually	27	19.0	19.0	50.0
	Always	71	50.0	50.0	100.0
	Total	142	100.0	100.0	

6d. for creating content (e.g., using Word, Excel, PowerPoint).

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Never	21	14.8	14.8	14.8
	Sometimes	12	8.5	8.5	23.2
	Often	16	11.3	11.3	34.5
	Usually	22	15.5	15.5	50.0
	Always	71	50.0	50.0	100.0
	Total	142	100.0	100.0	

6e. for chatting with AI models, such as ChatGPT.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Often	6	4.2	4.2	4.2
	Usually	11	7.7	7.7	12.0
	Always	125	88.0	88.0	100.0
	Total	142	100.0	100.0	

6f. for taking notes (Scan, record, type, etc.).

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Never	23	16.2	16.2	16.2
	Sometimes	14	9.9	9.9	26.1
	Often	19	13.4	13.4	39.4
	Usually	22	15.5	15.5	54.9
	Always	64	45.1	45.1	100.0
	Total	142	100.0	100.0	

6g. for engaging in app-based learning (= Language learning apps).

		Frequency	Percent	Valid Percent	Cumulative percent
Valid	Never	7	4.9	4.9	4.9
	Sometimes	8	5.6	5.6	10.6
	Often	9	6.3	6.3	16.9
	Usually	24	16.9	16.9	33.8
	Always	94	66.2	66.2	100.0
	Total	142	100.0	100.0	

6h. for information seeking (Fact-checking; dictionary; translation).

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Never	13	9.2	9.2	9.2
	Sometimes	9	6.3	6.3	15.5
	Often	16	11.3	11.3	26.8
	Usually	24	16.9	16.9	43.7
	Always	80	56.3	56.3	100.0
	Total	142	100.0	100.0	