

The teachers' ban or permission of smartphone use in Algerian secondary school classrooms

Khabbab Meziane Cherif¹[0000-0003-1869-447X],
Lahcene Azzouz¹[0000-0001-5460-3518], Ahmed Bendania²[0000-0002-4706-9203],
and Salim Djaballah¹[0000-0003-1640-5056]

¹ National Institute for Research in Education,
BP 193, Industrial Zone, Oued Romane, El Achour, Algiers, Algeria
khabbab1988@gmail.com, la.azzouz@lagh-univ.dz, salimdjaballah2@gmail.com

² King Fahd University of Petroleum and Minerals,
Academic Belt Rd., Dhahran, 31261, Saudi Arabia
abendania@kfupm.edu.sa

<https://kbs.kfupm.edu.sa/profile/dr-ahmed-bendania>

Abstract. Over the past few years, smartphones have grown exponentially in popularity, especially in education. As part of a new pedagogical trend, many educational institutions are integrating smartphones into the classroom as a learning tool. This paper investigates students' different use of smartphones during lessons, both with and without their teacher's permission. The study also examines the duration of smartphone use by students in these two cases. A quantitative research design was employed, and data from a random sample of 195 students in the Setif district (east of Algeria) was collected using a questionnaire. The data was analyzed using descriptive statistics in SPSS v26. The findings revealed that 97.4% of students own a smartphone, and 77% use it daily for more than three hours. Only 27.2% of teachers allow their students to use smartphones during lessons. The findings also indicated that 60% of learners spent more than 10 minutes using their smartphones during lessons without the teacher's permission for non-educational purposes. Additionally, 23% of learners spent more than 10 minutes using their smartphones during lessons with the teacher's permission for educational purposes. The study concluded that there is a link between the amount of time learners spend on their smartphones in classrooms and teacher decisions. Learners use their smartphones more for non-educational purposes if the teacher does not allow them to use them for educational purposes. The most important recommendation is to understand how students use and think about their smartphones.

Keywords: technology devices · smartphone · teachers · learners · secondary schools

1 Introduction

The end of the 20th century and the beginning of the 21st century have been marked by the emergence of numerous technological innovations that have al-

tered the dynamics of the world. The smartphone is one of the most prominent, significantly transforming how people interact and communicate. Furthermore, advancements in the phone industry have turned smartphones into multifunctional devices, becoming an integral part of everyday life for individuals worldwide. Statistics indicate smartphone subscriptions worldwide have reached 6 billion and 973 million users [37].

The smartphone is a pivotal technological tool that plays a vital role in the present era, as individuals utilize it for various daily activities. It stands out as one of the most effective tools in life, including education. Wali and Omaid [42] emphasized its significance as an educational tool, facilitating the learning process. According to Kalogiannakis and Papadakis [22], smartphone technology represents one of the essential applications in modern technologies and has been widely adopted in education. Its extensive usage and learners' high capacity to utilize it make it an invaluable resource [44]. College students repeatedly use technological tools, particularly mobile phones and laptops, to seek and verify new information or knowledge, as they offer comprehensive support. These tools greatly assist students in their daily and academic lives.

Conversely, Huang and Yu [18] reported that computing devices, in all their forms, have transcended their role as mere platforms for task performance. They have witnessed accelerated usability, processing power, connectivity, and flexibility advancements. With their versatility, mobile phones are crucial to enabling students to acquire new knowledge. Consequently, the combination of features found in current mobile phones provides functionality akin to that of computers and opens up vast horizons for mobile learning and education. Mobile phone technology has been recognized for its potential to provide students with access to academic content and facilitate communication and interaction in the classroom [2, 34]. Teachers can leverage these technologies to motivate students and foster their curiosity in classroom learning and participation [12]. Moreover, mobile phone technology offers an environment that promotes self-directed learning, aligning with the goals of 21st-century education systems. One of the key advantages of mobile phones in education is their ability to assist students in locating learning resources and utilizing educational applications at any time and from any location [19].

The global COVID-19 pandemic has witnessed a significant increase in the use of smartphones in the classroom [5]. However, despite this trend, many teachers oppose using mobile phones in education and enforce strict prohibitions on their usage during lessons [42]. Concerns have been raised that smartphones can disrupt student learning [33], leading to their exclusion from the classroom environment. Some teachers continue to perceive smartphones as distractions that divert students' attention from educational activities, resulting in their complete prohibition. As a result, teachers often exhibit a reluctance to embrace smartphones as educational tools. It is essential to acknowledge that teachers' perceptions regarding smartphone use vary. O'Bannon and Thomas [28] discovered that older teachers were less supportive of learning through smartphones than their younger counterparts, as reported by Hossain [17]. While teachers

recognize the inherent value of mobile phones for learning, they also believe that learners often misuse them.

Furthermore, Thomas et al. [39] identified several obstacles teachers face in implementing smartphone-based teaching, including the instability of wireless communications. Teachers also noted adverse effects on students' studies, such as distractions and exposure to inappropriate online content. Similarly, Jie and Sunze [20] found that university professors do not view smartphone technology as a challenge; instead, they perceive psychological anxiety and the expansion of their educational roles as the real challenges.

Teachers' perceptions regarding smartphone usage represent an epistemological obstacle that limits integration within academic departments. However, integrating information and communication technologies into educational programs dramatically depends on teachers' willingness to embrace these technologies. Singh and Chan [35] emphasize the importance of teachers adopting digital technology to enhance knowledge delivery rather than viewing it as a replacement or hindrance to their work. In his study, Hossain [17] indicated that teachers perceive smartphones as inherently beneficial for learning; however, learners tend to misuse them. Thus, their acceptance of technological tools is crucial in effectively incorporating digital technology into education.

Despite the variation in attitudes and the resistance of some teachers to utilize smartphones in the classroom, this study aims to identify the different uses of smartphones by learners in the classroom and the time spent with them. Secondly, there is a difference in the use of smartphones by learners when their teachers allow or do not allow them to use them. To achieve this objective, we will ask the following research questions:

1. How long time do learners spend with their smartphones in the classroom?
2. For what purpose do learners use their smartphones when their teachers allow them to use them in the classroom?
3. What do learners use their smartphones for when their teachers don't allow them to use them in the classroom?

By exploring these questions, this study aims to illuminate smartphones' educational potential and provide valuable insights to educators, policymakers, and stakeholders regarding their integration into the Algerian educational system.

2 Smartphones in education

Within the broader learning context, mobile devices support various learning approaches, including individual learning, location-based learning, collaborative learning, and informal learning [7]. Concerning the self-learning aspect, a study by Lee et al. [24] highlighted how mobile learning features provide opportunities to facilitate learner-centred learning activities. Furthermore, Diacopoulos and Crompton [10] revealed that mobile learning enables learners to access information anytime and anywhere, leading to improved academic performance and increased motivation. Therefore, mobile learning facilitates the sharing of

ideas, information, knowledge, expertise, and experiences among students and enhances collaborative work and the completion of group projects and tasks through internet-connected mobile devices. Further, Sung et al. [36] indicate that mobile devices such as laptops, personal digital assistants, and mobile phones have become a learning tool with great potential in both classrooms and outdoor learning.

Studies have consistently demonstrated a high adoption rate regarding the percentage of smartphone use among students. For instance, Thomas and Muñoz [38] conducted a study involving 628 high school students in the United States, revealing that 90.7% of students used their smartphones to complete homework assignments. Similarly, Azzouz et al. [3] conducted a study on 593 Algerian high school students, indicating that 97.43% of students owned smartphones, which they utilized for various purposes, mainly engaging in discussions with colleagues through social networking sites. This highlights the potential of smartphones to aid the learning process.

Secondly, to assess students' familiarity with smartphone usage, particularly those from technologically rich environments, Baig et al. [4] argued that smartphones are employed as educational companions across various disciplines, including healthcare, languages, engineering, and education. Reeves et al. [32] employed mobile devices as instructional tools to improve cooperative and collaborative work among students, improving their academic performance, particularly in mathematics. Affalo et al. [1] often mentioned smartphone technology as a valuable tool for promoting active learning in the literature. Han and Yi [15] studied the effect of smartphone usage on learning activities and academic performance among secondary school students, finding that students familiar with smartphone usage achieved higher academic performance than their peers. Furthermore, Fansury et al. [11] suggested that smartphones can be effectively used to facilitate and access all types of learning activities, a development they attributed to the significant advancements in smartphone technology in the 2020s. According to Fuchs [13], smartphone use enhances active experiences, critical thinking, and reflective experiences in the learning process. Gan and Blackrishnan's [14] review highlighted several studies emphasizing the value and effectiveness of smartphone technology in classroom settings.

3 Methodology

3.1 Data collection and sample

As the study's objective was to study the various uses of smartphones for educational and personal purposes in the classroom, the research employed a quantitative approach with descriptive exploratory research. Participants in this study were high school learners in Setif district in the east region of Algeria. We randomly chose a sample consisting $N = 232$ learners. Several learners did not respond or failed to complete the questionnaire. As a consequence, researchers were able to obtain 195 valid questionnaires. All learners are in the third-year

high schools. Of the 195 participating learners, 131 (67.2%) were female, and 64 (32.8%) were male.

3.2 Instrument development

Since this study was exploratory research, the researcher saw the survey design to be the best research design for this study. Thus, we used the technique of gathering information by questionnaires. The authors developed the questionnaire based on a literature review and our knowledge of technological tools in education. The questionnaire content can be categorized as follows: the first part had six questions used to gather data: daily time spent using smartphones, time spent using smartphones in school and in classes, and did teachers allow you to use smartphones in classes. The second part had 6 Likert scaled three points (Always, Sometimes to Never) questions which asked learners to identify the non-educational purpose of the smartphone; it is defined as when learners spend their time using their smartphones in the classroom “during the lesson”, to communicate with classmates or receive or sent a message in social network site or sent fun videos, such as in response to questions like “I use my smartphone to call or text my classmates”. The third part had 6 Likert-scaled three-point (Always, Sometimes to Never) questions, which asked learners to identify the educational purpose of smartphones. It means that students spend their time using their smartphones to search for information or using educational applications that will help them learn, such as in response to questions like this “I use my smartphone to search information – googling”, or like “looking up words in a dictionary” or “I use my smartphone to read my school e-books”. Content validity was established using experts ($n = 3$) in the field of education who reviewed the questionnaire individually and marked information they felt was unclear or inappropriate. The questionnaire was modified according to evaluation feedback provided by experts. Additionally, the questionnaire was distributed to third-year high school learners ($n = 35$) to check the reliability.

3.3 Reliability

The reliability of the questionnaire was checked using Cronbach’s alpha calculation of SPSS v28. Cronbach’s alpha for the first six items of the questionnaire is $\alpha = 0.761$, and the second 7 items acquired a score of $\alpha = 0.777$. The results are shown in table 1.

Table 1. Reliability of the questionnaire.

Variable	Number of item	Cronbach’s alpha
Non-educational purpose	6	0.761
Educational purpose	7	0.777

3.4 Data analysis

The data obtained through a questionnaire was analyzed by SPSS v28 using descriptive statistics, finding the mean scores, standard deviation, frequency, and percentage of the questionnaire items.

4 Findings

The first part referred to how many learners own a smartphone that is used daily. We concluded that the vast majority of learners – 190 (97.4%) – owned smartphones, and 150 (77%) learners spent more than three hours every day with their smartphone connected to the internet (table 2).

Table 2. Own smartphone & daily time spent with smartphone.

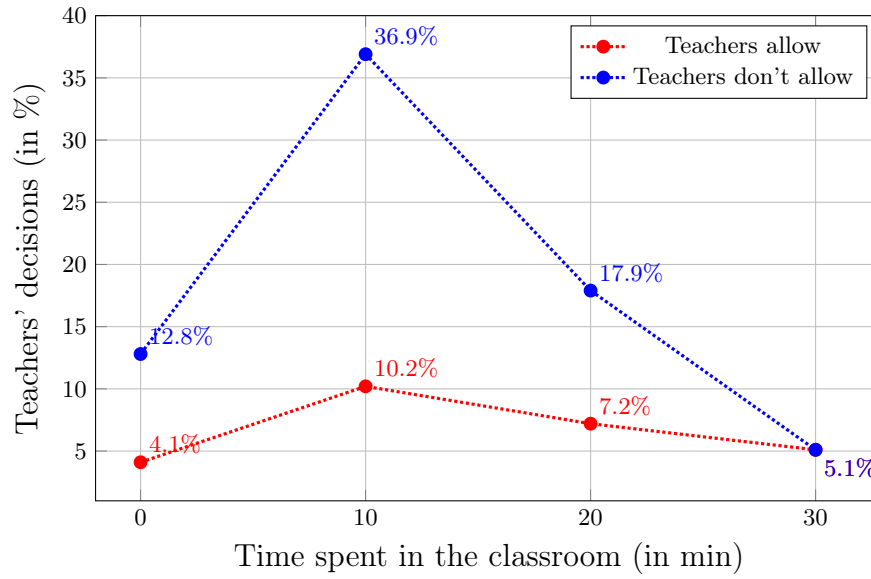
Question	Answer	Frequency	%
Do you have own smartphone?	Yes	190	97.4
	No	5	2.6
How much time is spent with your smartphone on the internet?	1 hour	17	8.7
	2 hours	28	14.4
	3 hours	84	43.1
	4 hours	12	6.2
	5 hours	22	11.3
	6 hours	8	4.1
	8 hours	24	12.3

We find that the vast majority of teachers – 142 (72.8%) – prohibit their learners from using smartphones in the classroom “during the lesson” in Algerian high schools. However, the paradox that the question of whether learners use their smartphones despite prohibition was answered with a “Yes” in 83.1% of the sample ($N = 162$). Also, 47.2% learners spent 10 minutes on their smartphones in the classroom “during the lesson”; in general, 83.1% learners spent more than 10 minutes on their smartphones in the classroom (table 3).

It is evident that learners, despite prohibition, use their phones during lessons, so we may ask the question, what for? We want to know for what purpose learners use their smartphones. To answer this, we focus on two aspects: 1) if teachers allow learners to use smartphones and 2) if they do not allow them for “Educational purposes & Non-educational purposes”. First, the results indicate that 60% of learners spent more than 10 minutes using their smartphone. At the same time, their teachers do not allow them, whilst 23% of learners spent more than 10 minutes using their smartphone with teachers’ permission, whereas 12.8% learners “teachers don’t allow” and 4.2% learners “teachers allow” but they don’t use their smartphone in the classroom during the lesson (figure 1).

Table 3. The use of smartphone in the classroom “during the lesson”.

Question	Answer	Frequency	%
Does your teacher allow the use of smartphone in classroom “during the lesson”?	Yes	53	27.2
	No	142	72.8
Have you used your smartphone in the classroom “during the lesson”?	Yes	162	83.1
	No	33	16.9
How much time spent on your smartphone in classroom “during the lesson”?	0 min	33	16.9
	10 min	92	47.2
	20 min	50	25.6
	> 30 min	20	10.3

**Fig. 1.** Time spent using a smartphone when “teachers allow or don’t allow” in the classroom.

4.1 The use of smartphones in classroom “teachers allow or don’t allow” for non-educational purposes

The learners were asked questions about using smartphones for non-educational purposes (without and with teachers’ permission to use them in the classroom). As shown in figure 2, the first part is non-educational use when teachers allow them to use smartphones. We noticed that the vast majority of learners reported using smartphones to check the clock/time and check notifications received – all of which were reported by 84.9% of learners. While 56.6% reported that they send/receive messages to their classmates, less than 42% reported that they check social network sites, send/receive fun videos to their classmates and take

pictures & record short videos. In the second part (no-educational use when teachers don't allow them to use smartphones), 92.9%

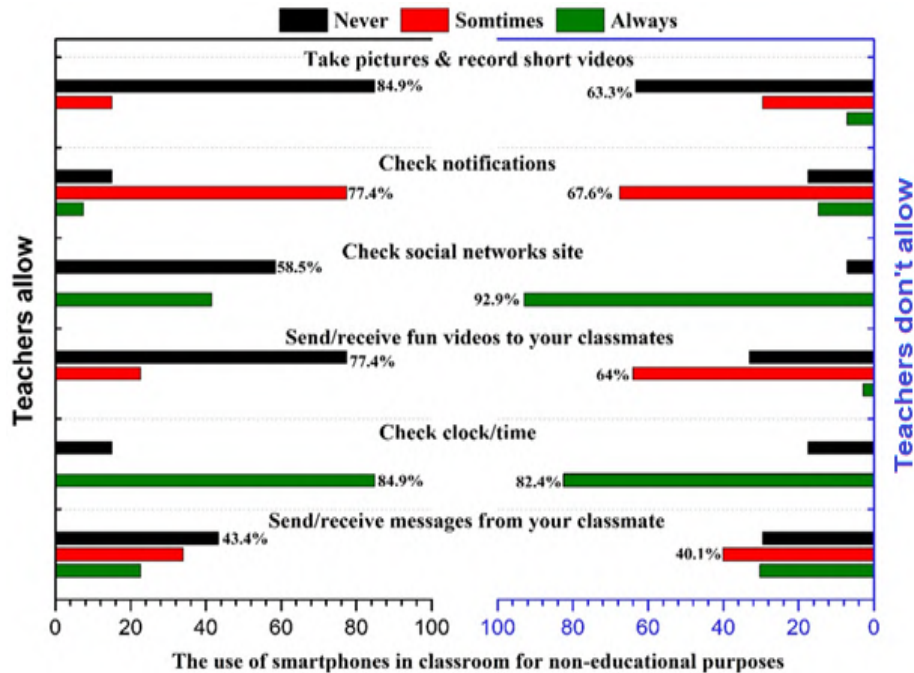


Fig. 2. Using smartphones in the classroom “teachers allow or don't allow” for non-educational purposes.

4.2 The use of smartphones in classroom “teachers allow or don't allow” for educational purposes

In the following figure, we discuss using smartphones for educational purposes (without and with teachers' permission in the classroom). As shown in figure 3, the first part is educational use when teachers allow them to use smartphones. 92.4% and 84.9% of learners reported using their smartphone to search information from the internet – googling – and take a picture of lessons from the board. In contrast, 81.1 % of learners reported using their smartphones to use dictionaries and view maps and educational apps to read scholarly e-books. We have 73.6% of learners reported that they use a calculator. It is noteworthy that less than 6% of learners use their smartphones to take notes. In the second part (educational use when teachers don't allow them to use smartphones), 82.4% of learners reported using their smartphone to take a picture of the lessons from

the board. In contrast, 11.3% of learners reported using their smartphone to use a dictionary, less than 3% of learners used their smartphone to use a calculator, and approximately 18% reported that they search information from the internet –googling, view maps and educational apps (figure 3).

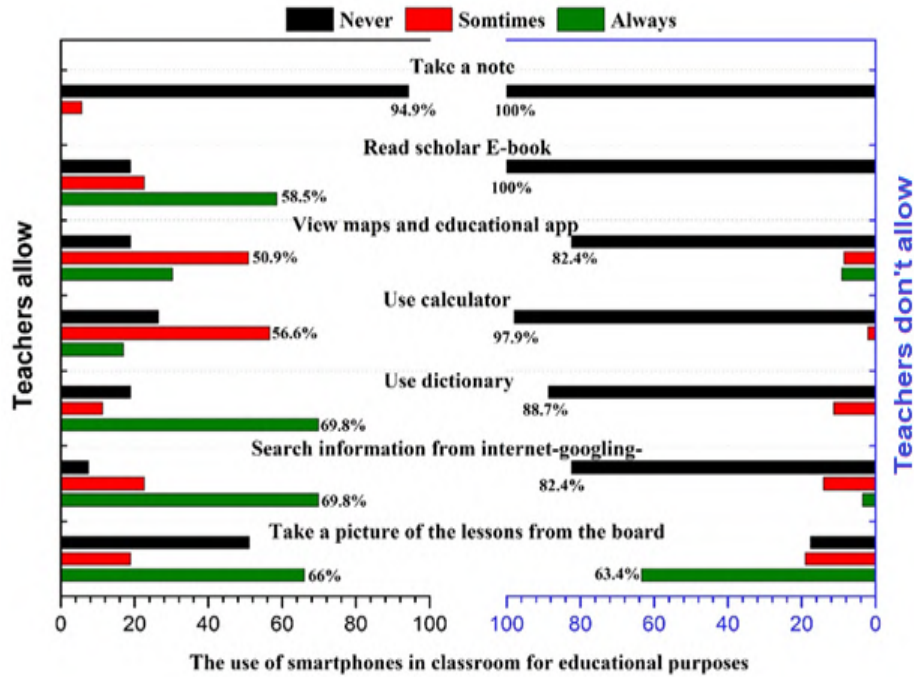


Fig. 3. Using smartphones in the classroom “teachers allow or don’t allow” for educational purposes.

5 Discussion

5.1 Learners’ smartphone usage statistics

We found that the vast majority of learners owned smartphones 97.4% and 82.9% learners spent less than five hours every day with their smartphone connected to the internet, and 27.7% spent more than 4 hours a day, which is a lot. This result is similar to many studies results in Algeria [26] and in many other countries [16, 31], which indicates that smartphone usage is a worldwide phenomenon. However, learners born in this technology era are all the time with their smartphone, but they have to pay attention because [31] defined addiction as using a smartphone for more than 4 hours per day. Suppose learners spend at

least 4 hours daily on their smartphones for non-educational purposes. In that case, they are not only using this tool for communication but also for checking social networking sites and watching videos. In other words, 83% of learners used smartphones less than 5 hours a day. This means that if we want to reach a learner, we would most likely find them on the internet using their smartphone, so we need to exploit this fact in education by reducing their fun time to educational purposes because smartphones can influence the learning process. As a result, in 2012, UNESCO asserted that mobile devices were positioned to influence education and learning like personal computers never did due to their ubiquity and portability [43].

5.2 The relationship between teacher's decision and the purpose of smartphone use by learners

The results indicate that 83.1% learners spend more than 10 minutes using their smartphones in the classroom “during the lesson” for various reasons, including both educational and non-educational purposes. We noticed that learners spent more time in no-educational use when teachers don't allow them to use their smartphones (figure 2), while less percentage of learners use their smartphones for no-educational use when teachers allow them to use them, which means that there are a relation between teachers decision “allow or don't allow” and the time of use smartphone in classroom, we all know everything forbidden is desirable. For this, we find that more than 80% learners are tempted to check their social network sites and check clocks and notifications, while 70% send/receive messages from their classmates, which means that learners engage in unrelated online activities instead of focusing on educational content.

In other parts, when teachers allow learners to use a smartphone, we find that more than 80% of learners reported that they use their smartphone to search for information from the internet – googling – and take pictures of lessons from the board, use a dictionary and view map and the educational app also to read scholar e-books, and approximate 75% of learners reported that use calculator. Many studies reported that learners benefit from smartphones in terms of access to a wide range of educational information [25, 29]. However, what is important to notice is that when teachers don't allow learners to use smartphones, we find only 82.4% of learners use their smartphones to take pictures of the lessons from the board. Less than 20% of learners reported using their smartphone to use a dictionary, use a calculator, search for information from the internet – googling, view maps and educational apps (figure 3).

If we analyze learners' use of smartphones, we may arrive at the conclusion that most of the time, they not only check social networks and send/receive messages (non-educational use, as teachers think) but also gather information and use dictionaries and calculators (educational use). There is a complex interplay between learners' smartphone use in the classroom and teachers' decisions. The purpose of this study was to emphasize this relationship. When teachers prohibit students from using smartphones during class, they often engage with them covertly, defying their teachers' stance. Similarly, Kuznekoff and Titsworth

[23] found that students who were not allowed to use phones in class actually used them more discreetly, disrupting their focus. We found that their usage is primarily non-educational.

In contrast, when teachers allow learners to use smartphones but set clear guidelines for when and how they can be used, learners are more likely to exhibit self-regulation and use their phones for educational purposes. This is supported by a study conducted by Chen et al. [6], which found that students are more responsible when given the freedom to use smartphones within boundaries. This relationship underscores the importance of not just prohibiting or allowing smartphone use but rather implementing structured guidelines that balance the educational benefits of technology with the potential distractions it poses in the learning environment.

According to these results, we believe that our schools need a flexible policy that may range from actively encouraging the use of smartphones in the curriculum to complete prohibition or partial bans of smartphones in the classroom. Generally, this policy approach involves a specific set of restrictions on use, which may include specific exemptions for certain tasks decided upon by the teacher. Teachers need to establish clear rules and promote responsible usage, guiding learners in using smartphones for educational purposes while minimizing unnecessary distractions during class time. All in all, our schools need rules about smartphone use that depend on teachers' decisions, and a classroom-specific smartphone policy is determined by each teacher [21, 30, 40, 41]. Sometimes, learners are not permitted to use smartphones during the lesson unless specifically required for educational purposes at the discretion of the teacher, which may vary by the lesson or subject. Because our learners are so attached to their smartphones, we need teachers' permission to use smartphones in education. Furthermore, it is crucial to understand the relationship between teachers' decisions and learners' behaviours concerning smartphone use in order to foster an environment where learners are encouraged to use technology responsibly and with purpose. We conclude that the quality of teaching and learning depends on the role of teachers, while smartphones or any other technology tool, as Clark [8] points out, will never affect education. "He saw the medium as a means, a vehicle for instruction, but that the essence of learning remained—thankfully—in the hands of the teacher" [9, p. 13]. It is important to note that while smartphones can be valuable tools for learning, their use in the classroom should align with the teacher's policies and contribute positively to the educational environment. Teachers should set guidelines for smartphone use in the classroom to minimize distractions and promote a focused learning environment.

6 Conclusion

Smartphones are earning traction in schools both around the world and in our country, but it is important to adapt their use in secondary school classrooms. Smartphones can be valuable educational tools, but they are also capable of distracting and disrupting the learning environment. Adopting local educational

policies and regulations regarding smartphone use in Algerian schools can provide insight into the teachers' and learners' attitudes and practices. So, we need rules to govern how we use technology in our educational system. Educational policies in our country need to establish effective management strategies, such as clear usage policies and guidelines on the proper use of smartphones in education. Smartphones should be purposefully integrated into the curriculum since they and Internet connections are becoming increasingly indispensable in schools.

Furthermore, the acceptance of ICT tools, in general, depends largely on psychological factors [27], which is why our teachers need psychological and pedagogical preservice training to accept smartphones as educational tools in their classrooms. Many of our teachers do not realize how powerful smartphones can be for collaborative learning and creating motivating learning environments. Teachers must find the "key" to integrating smartphones with instructional strategies and ingeniously match their unique features to the resolution of specific pedagogic challenges. Finally, sometimes, we do not know how to use smartphones in our learning process, especially in the classroom, even though they seem like a possible solution. Therefore, teachers and students must work collaboratively to create an environment where smartphones enhance rather than hinder learning. By balancing the benefits and drawbacks of smartphone use, schools can foster a productive educational atmosphere that prepares students for the digital age while maintaining focus and academic integrity.

7 Limitations of the study

This study addresses a gap in the literature on high school students' use of smartphones in the classroom. It contributes to our overall understanding of the classroom integration of these devices, but there are some limitations. One limitation is the questionnaire results, where some answers by learners may not be accurate. The ability to generalize the findings is limited by the study's population, which is more than 3 million. The sample of learners is small and was selected from only one district. A large population from different districts or regions (urban, semi-urban) of Algeria could render differing results. These limitations necessitate further research. In addition to this study, we propose some additional studies:

- The use and impact of smartphones in classrooms across different countries could provide valuable insights into best practices and potential pitfalls.
- A study of the duration of smartphone use in classrooms according to academic subject matter.
- A study of smartphone usage in urban versus rural Algerian schools could illuminate specific challenges and opportunities.
- A study on the effectiveness of teacher training programs on integrating smartphones into education can lead to better professional development programs.
- A study of how teachers' attitudes towards smartphone use change with experience and training can provide insight into future policies and programs.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data availability

The data supporting this study's findings are not openly available due to sensitivity reasons (human data) but are available from the corresponding author upon reasonable request.

Statements and declarations

Conflict of interest: The authors declare that they have no competing interests.

Ethics approval: The authors declare that the work is written with due consideration of ethical standards.

Informed consent: All the participants have given their written informed consent.

Consent for publication: All the participants have given their consent for the publication of the research results.

References

- [1] Aflalo, E., Zana, L., Huri, T.: The interactive whiteboard in primary school science and interaction. *Interactive Learning Environments* **26**(4), 525–538 (2018), <https://doi.org/10.1080/10494820.2017.1367695>
- [2] Andyani, H., Setyosari, P., Wiyono, B.B., Djatmika, E.T.: Does Technological Pedagogical Content Knowledge Impact on the Use of ICT In Pedagogy? *International Journal of Emerging Technologies in Learning (iJET)* **15**(03), 126–139 (Feb 2020), <https://doi.org/10.3991/ijet.v15i03.11690>
- [3] Azzouz, L., Boulbazine, M., Meziane Cherif, K.: The Use of Social Network sites by students in Algerian high Schools “Diagnostic research”. *Educ recherche* **11**(3), 168–189 (Dec 2021), URL <https://www.asjp.cerist.dz/en/article/174985>
- [4] Baig, M.M., GholamHosseini, H., Connolly, M.J.: Mobile healthcare applications: system design review, critical issues and challenges. *Australasian Physical & Engineering Sciences in Medicine* **38**(1), 23–38 (Mar 2015), ISSN 1879-5447, <https://doi.org/10.1007/s13246-014-0315-4>
- [5] Bautista-Vallejo, J.M., Hernández-Carrera, R.M., Moreno-Rodriguez, R., Lopez-Bastias, J.L.: Improvement of Memory and Motivation in Language Learning in Primary Education through the Interactive Digital Whiteboard (IDW): The Future in a Post-Pandemic Period. *Sustainability* **12**(19), 8109 (2020), ISSN 2071-1050, <https://doi.org/10.3390/su12198109>

- [6] Chen, J., Liang, Y., Mai, C., Zhong, X., Qu, C.: General Deficit in Inhibitory Control of Excessive Smartphone Users: Evidence from an Event-Related Potential Study. *Frontiers in Psychology* **7** (2016), ISSN 1664-1078, <https://doi.org/10.3389/fpsyg.2016.00511>
- [7] Cheon, J., Lee, S., Crooks, S.M., Song, J.: An investigation of mobile learning readiness in higher education based on the theory of planned behavior. *Computers & Education* **59**(3), 1054–1064 (2012), ISSN 0360-1315, <https://doi.org/10.1016/j.compedu.2012.04.015>
- [8] Clark, R.E.: Media will never influence learning. *Educational Technology Research and Development* **42**(2), 21–29 (Jun 1994), ISSN 1556-6501, <https://doi.org/10.1007/BF02299088>
- [9] De Bruyckere, P., Kirschner, P.A., Hulshof, C.D.: Technology in Education: What Teachers Should Know. *American Educator* **40**(1), 12–18, 43 (2016), URL https://www.aft.org/ae/spring2016/debruyckere_kirschner_hulshof
- [10] Diapopoulos, M.M., Crompton, H.: A systematic review of mobile learning in social studies. *Computers & Education* **154**, 103911 (2020), ISSN 0360-1315, <https://doi.org/10.1016/j.compedu.2020.103911>
- [11] Fansury, A.H., Januarty, R., Rahman, A.W., Syawal: Digital Content for Millennial Generations: Teaching the English Foreign Language Learner on COVID-19 Pandemic. *Journal of Southwest Jiaotong University* **55**(3) (2020), ISSN 0258-2724, <https://doi.org/10.35741/issn.0258-2724.55.3.40>
- [12] Ferguson, J.M., Oigara, J.N.: iPads in the Classroom: What do Teachers Think? *International Journal of Information and Communication Technology Education* **13**(4), 74–86 (Oct 2017), ISSN 1550-1337, <https://doi.org/10.4018/ijicte.2017100106>
- [13] Fuchs, K.: Preparing Students for Success in a Changing World: The Role of Virtual Whiteboards in the Modern Classroom. *Education Quarterly Reviews* **4**(1), 151–158 (Mar 2021), ISSN 2621-5799, <https://doi.org/10.31014/aior.1993.04.01.182>
- [14] Gan, C.L., Balakrishnan, V.: Mobile Technology in the Classroom: What Drives Student-Lecturer Interactions? *International Journal of Human-Computer Interaction* **34**(7), 666–679 (2018), <https://doi.org/10.1080/10447318.2017.1380970>
- [15] Han, S., Yi, Y.J.: How does the smartphone usage of college students affect academic performance? *Journal of Computer Assisted Learning* **35**(1), 13–22 (2019), <https://doi.org/10.1111/jcal.12306>
- [16] Hassinger-Das, B., Dore, R.A., Aloisi, K., Hossain, M., Pearce, M., Pattera, M.: Children’s Reality Status Judgments of Digital Media: Implications for a COVID-19 World and Beyond. *Frontiers in Psychology* **11** (2020), ISSN 1664-1078, <https://doi.org/10.3389/fpsyg.2020.570068>
- [17] Hossain, M.M.: Impact of Mobile Phone Usage on Academic Performance. *World Scientific News* **118**, 164–180 (2019), URL <https://www.researchgate.net/publication/330410485>
- [18] Huang, R.T., Yu, C.L.: Exploring the impact of self-management of learning and personal learning initiative on mobile language learning: A moderated

- mediation model. *Australasian Journal of Educational Technology* **35**(3), 118–131 (Jun 2019), <https://doi.org/10.14742/ajet.4188>
- [19] Huang, Y.M., Chiu, P.S.: The effectiveness of a meaningful learning-based evaluation model for context-aware mobile learning. *British Journal of Educational Technology* **46**(2), 437–447 (2015), <https://doi.org/10.1111/bjet.12147>
- [20] Jie, Z., Sunze, Y.: Investigating pedagogical challenges of mobile technology to English teaching. *Interactive Learning Environments* **31**(5), 2767–2779 (2023), <https://doi.org/10.1080/10494820.2021.1903933>
- [21] Johnstone, G.: Smartphones in High Schools: Dumb Idea? Project Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Public Policy, Simon Fraser University (2019), URL <https://theses.lib.sfu.ca/file/thesis/5226>
- [22] Kalogiannakis, M., Papadakis, S.: Evaluating pre-service kindergarten teachers' intention to adopt and use tablets into teaching practice for natural sciences. *International Journal of Mobile Learning and Organisation* **13**(1), 113–127 (2019), <https://doi.org/10.1504/IJMLO.2019.096479>
- [23] Kuznekoff, J.H., Titsworth, S.: The Impact of Mobile Phone Usage on Student Learning. *Communication Education* **62**(3), 233–252 (2013), <https://doi.org/10.1080/03634523.2013.767917>
- [24] Lee, S.J., Lee, C., Lee, C.: Smartphone Addiction and Application Usage In Korean Adolescents: Effects of Mediation Strategies. *Social Behavior and Personality: an international journal* **44**(9), 1525–1534 (2016), ISSN 0301-2212, <https://doi.org/10.2224/sbp.2016.44.9.1525>
- [25] Mahyoob, M.: Challenges of e-Learning during the COVID-19 Pandemic Experienced by EFL Learners. *Arab World English Journal* **11**(4), 351–362 (Dec 2020), ISSN 2229-9327, <https://doi.org/10.24093/awej/vol11no4.23>
- [26] Meziane Cherif, K., Azzouz, L., Bendania, A.: Algerian secondary school students' preferences for the use of YouTube in their informal learning. *Educational Technology Quarterly* **2024**(2), 120–134 (Jun 2024), <https://doi.org/10.55056/etq.697>
- [27] Namesztovszki, Z.: A tanítók megváltozott szerepköre az információs társadalomban. In: Géza, C. (ed.) *A tanítóképzés jövőképe: A II. nemzetközi tudományos konferencián elhangzott munkák gyűjteménye*, Forum Könyvkiadó, Újvidéki Egyetem Magyar Tannyelvű Tanítóképző Kar, Újvidék, Szabadka, Szerbia (2009)
- [28] O'Bannon, B.W., Thomas, K.: Teacher perceptions of using mobile phones in the classroom: Age matters! *Computers & Education* **74**, 15–25 (2014), ISSN 0360-1315, <https://doi.org/10.1016/j.compedu.2014.01.006>
- [29] Palaigeorgiou, G., Grammatikopoulou, A.: Benefits, barriers and prerequisites for Web 2.0 learning activities in the classroom: The view of Greek pioneer teachers. *Interactive Technology and Smart Education* **13**(1), 2–18 (Apr 2016), ISSN 1741-5659, <https://doi.org/10.1108/itse-09-2015-0028>
- [30] Peel District School Board: Empowering Modern Learners (2024), URL <https://www.peelschools.org/empowering-modern-learners>

- [31] Peng, Y., Zhou, H., Zhang, B., Mao, H., Hu, R., Jiang, H.: Perceived stress and mobile phone addiction among college students during the 2019 coronavirus disease: The mediating roles of rumination and the moderating role of self-control. *Personality and Individual Differences* **185**, 111222 (2022), ISSN 0191-8869, <https://doi.org/10.1016/j.paid.2021.111222>
- [32] Reeves, J.L., Gunter, G.A., Lacey, C.: Mobile Learning in Pre-Kindergarten: Using Student Feedback to Inform Practice. *Educational Technology & Society* **20**(1), 37–44 (2017), URL <https://www.proquest.com/openview/fl5765c06f1e1478c77e3bc259aa6e94/1>
- [33] Robb, M., Shellenbarger, T.: Using Technology to Promote Mobile Learning: Engaging Students With Cell Phones in the Classroom. *Nurse Educator* **37**(6), 258–261 (Nov 2012), ISSN 0363-3624, <https://doi.org/10.1097/nne.0b013e31826f27da>
- [34] Sánchez-Cruzado, C., Santiago Campión, R., Sánchez-Compañá, M.T.: Teacher Digital Literacy: The Indisputable Challenge after COVID-19. *Sustainability* **13**(4), 1858 (2021), ISSN 2071-1050, <https://doi.org/10.3390/su13041858>
- [35] Singh, T.K.R., Chan, S.: Teacher Readiness on ICT Integration in Teaching-Learning: A Malaysian Case Study. *International Journal of Asian Social Science* **4**(7), 874–885 (Jul 2014)
- [36] Sung, Y.T., Chang, K.E., Liu, T.C.: The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis. *Computers & Education* **94**, 252–275 (2016), ISSN 0360-1315, <https://doi.org/10.1016/j.compedu.2015.11.008>
- [37] Taylor, P.: Smartphone mobile network subscriptions worldwide 2016-2028 (May 2024), URL <https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/>
- [38] Thomas, K., Muñoz, M.A.: Hold the Phone! High School Students' Perceptions of Mobile Phone Integration in the Classroom. *American Secondary Education* **44**(3), 19–37 (2016), ISSN 00031003, 23269618, URL <http://www.jstor.org/stable/45147885>
- [39] Thomas, K.M., O'Bannon, B.W., Bolton, N.: Cell Phones in the Classroom: Teachers' Perspectives of Inclusion, Benefits, and Barriers. *Computers in the Schools* **30**(4), 295–308 (2013), <https://doi.org/10.1080/07380569.2013.844637>
- [40] Toronto District School Board: Technology (2024), URL <https://www.tdsb.on.ca/High-School/Your-School-Day/Technology>
- [41] Vancouver School Board: Administrative Procedures Manual: Administrative Procedure 350 – District Student Code of Conduct (2024), URL https://media.vsb.bc.ca/media/Default/medialib/ap_350_district_student_code_of_conduct.693b6920650.pdf
- [42] Wali, A.Z., Omaid, M.E.: The Use of Smartphones as an Educational Tool in the Classroom: Lecturers' Perceptions. *International Journal of Emerging Technologies in Learning (iJET)* **15**(16), 238–247 (Aug 2020), <https://doi.org/10.3991/ijet.v15i16.14179>

- [43] West, M.: Turning on mobile learning: global themes. UNESCO Working Paper Series on Mobile Learning, United Nations Educational, Scientific and Cultural Organization, Paris (2012), URL <https://unesdoc.unesco.org/ark:/48223/pf0000216451>
- [44] Yu, F.: Mobile/Smartphone Use in Higher Education. In: Rao, M. (ed.) 2012 Southwest Decision Sciences Institute Conference, pp. 831–839 (2012), URL http://swdsi.org/swdsi2012/proceedings_2012/papers/Papers/PA144.pdf