American Journal of Education and Technology (AJET)

Using mobile devices for learning in a teacher training distance education programme: The case of an in-service programme in Lesotho

M. Z. Mphunyane[1*], M. M. E. Ntšohi[2]

ABSTRACT

The use of technology for teaching and learning has become common over time. The onset of Covid-19 in the year 2020 and its impact on education systems, in a few subsequent years, made the situation even dire for schools and institutions that had not explored this approach to teaching and learning for reasons that include autonomy on the part of the educators. The use of mobile devices has even proved to be a necessity, especially for situations where learning must happen on the go, particularly for higher education students who study part-time and are in full-time jobs. This paper reports on students' perceptions and experiences on the use of mobile devices for learning in one part-time Education programme offered through a blended mode of instruction. Data were collected using a structured questionnaire that included both close-ended and open-ended items. The quantitative data from the close-ended questions was analysed statistically, while the qualitative data from open-ended questions was thematically analysed. Key findings include benefits, challenges and preferences of use of the mobile devices with various tools which include the university Learning Management System, some Google apps and social media for learning.

INTRODUCTION

Research indicates that advancements in the development of technological devices have brought about an increase in the use of technology to enhance teaching and learning (Odabas & Kahramanoglu, 2023) with approaches to teaching and learning that are hybrid (Haleem *et al.*, 2022). Research also indicates an increase in the use of online learning to enhance classroom activity with a positive impact on both attitude and performance on the learners (Ekanayake & Wishart, 2014). The institution reported in this study has a teaching and learning platform based on Sakai learning management system (Sakai LMS). It also has facilities for students to access the internet, while on campus, mostly through wireless connection, although it is not clear whether these facilities are sufficient for the entire students' population. It is also not clear how distant learners manage their learning, which happens mostly online across the country, including lowlands, foothills and highlands areas, while they are off campus. The prevalence of Covid-19 brought with it disruptions in the way teaching and learning activities were traditionally carried out in educational settings (Makafane & Chere-Masupa, 2022; Makumane & Mpungose, 2022) which also affected even the local teacher training institutions. The in-service Bachelor of Education (Primary) (B.Ed. Prim) programme at the institution reported in this study, had previously been offered face-to-face in block sessions, and had to shift to a fully distance learning mode and later to a blend of mostly distance learning and a reduced face-to-face on-campus block sessions per year. While use of mobile devices may seem to be relevant and impactful though with differing levels from time to time (Odabas & Kahramanoglu, 2023), such use has its

own merits and challenges, hence the need to study the benefits that may be derived, challenges encountered, and support structures needed for effective use of mobile devices for learning by students in this institution. Literature indicates there is need for more studies on the use of mobile devices for learning, in less developed countries of Africa, as such studies are predominant in powerhouses such as South Africa and Nigeria (Kaisara & Bwalya, 2022).

The aim of the study is to investigate how distance education students in one HE institution perceive use of mobile devices for teaching and learning and find out the challenges they face in their use of the mobile devices while studying away from campus. this aim is addressed through the following research questions:

1. What are the students' views about the benefits of using mobile devices for learning?

2. What are the students' experiences on the use of mobile devices for learning?

3. What university support structures exist for students when they learn both from campus and remotely?

LITERATURE REVIEW
Distance learning

Distance education is characterised by students mainly learning on their own and having to organise their own study times and habits. However, these flexible study times may be limited by scheduled virtual meeting times with facilitators and/or discussion sessions with colleagues. This mode of learning requires high levels of discipline from the students for effective learning and success in their studies. Distance learning, particularly in-service learning, greatly benefits most students as they have the

1 Science Education Department, National University of Lesotho, P.O. Roma, 180, Lesotho
2 Centre for Teaching and Learning, National University of Lesotho, P.O. Roma, 180, Lesotho
* Corresponding author's e-mail: mzmphunyane@gmail.com

opportunity to improve their knowledge and skills as well as their qualification and ultimately their performance at work, without having to resign from their employ.

The target group in this research is a selection of students who were initially taught in traditional face-to-face sessions in blocks, but later shifted to a blend of distance learning with on-campus face-to-face sessions in the form of blocks. Due to the prevalence of COVID-19, there had to be a shift in the mode of delivery to a case where the programme was then offered at a distance and fully online. This then brought in more demand on the use of technology, the educational technology, hence putting students on mobile learning.

In order to succeed in their studies, students need to attend classes and access study materials and additional information from the internet and from sharing with other students. They need to be able to compile their own notes and be in touch with their peers for communication and collaborative learning activities. They should also be able carry out assessment tasks as given and organised by course facilitators, and submit them for marking. Students also need to be able to track their own progress in learning, they should be able to access feedback on assessments (Delcker *et al.*, 2016). It is therefore important that students need to be able to use and operate their mobile devices efficiently for effective learning in digital environments. They need to have access to mobile devices that can display information in a manner and quality that enhances their learning.

Mobile learning and Mobile devices

Different researchers define mobile learning differently. Winter (2006) in Park (2011) conceptualises mobile learning as "mediated learning through mobile technology" while Petrova and Li (2009) define mobile learning as "an ubiquitous learning activity occurring through person-to-person communication using a mobile device which is supported by an appropriate mobile technology, user interface and a pedagogical approach". These definitions highlight the use of mobile devices as a key tool and approach. El-Hussein and Cronje (2010) emphasise mobility of the tool and the learner and define mobile learning as "any type of learning that takes place in learning environments and spaces that take account of the mobility of technology, mobility of learners, and mobility of learning". For the three definitions cited here, what is apparent is that the learning happens through use of technological devices that permit students to learn anywhere, and at any time, as the devices are small enough to be carried around. The most commonly used mobile devices include smartphones, tablets, cell phones and laptops (Alioon & Delialioglu, 2015).

Technological attributes and pedagogical affordances of mobile devices

There are technological attributes and pedagogical affordances provided by the mobile devices. The attributes include portability, and as Ally and Tsinakos

(2014) put it, "they are always available, always connected, and all are packed with auxiliary features"; they have the ability to support face-to-face communication, and are even getting cheaper. Odabas and Kahramanoglu (2023) concur by indicating that mobile technologies possess characteristics such as portability and ease of distribution, thus leading to their potential to serve as valuable educational resources. The features that mobile devices have enable learners to engage with authentic contexts through a variety of multimedia elements, including sounds, videos, animations, pictures, and text (Odabas & Kahramanoglu, 2023).

It is because of the characteristic features associated with the mobile devices that the devices have become so appropriate for enhancing communication in educational settings. The very feature of mobility allows communication between course facilitators and students, and amongst students themselves. Asynchronous and synchronous learning opportunities may be created quite easily and effectively through use of mobile devices. These technologies become very useful in the search for more information using the internet, for sharing information on platforms such as emails, WhatsApp, network chats and discussions, and accessing course learning materials, and other academic communication through Institutional Learning Management systems (LMS). These devices, according to Rodríguez-Arancón *et al.* (2013), can "offer learning opportunities that are: spontaneous, informal, contextual, portable, ubiquitous, pervasive, and personal" (Kukulska-Hulme *et al*, 2011). Students can learn successfully anywhere, while walking along streets, travelling in a bus, carrying out some other activity outside the learning space; they can access information more spontaneously, at their own convenience. The feature of mobility helps students to learn across locations (Cross *et al.*, 2019).

The devices have functionalities for producing artefacts, expressing and presenting innovative creations of students' own making. Students can create audio and video clips of events or situations. Large computations may be carried out very quickly and accurately using these movable handheld computers.

Challenges associated with distance learning through mobile devices

Research indicates that while there are numerous benefits from the use of mobile devices for learning in Higher education (Sophonhiranrak, 2021), there are also challenges that are associated with such usage. Unavailable or failing internet connection (Makumane & Mpungose, 2022) is found to be one such challenge; students, particularly those in distance education, are usually from all over the physical space, and usually face challenges of internet connectivity, and do not have any connection to wifi. The other challenge involves access to computers; in some cases in-service students may not have much access to computers away from their workspace, and be limited only to their mobile devices, and for some, small

cell phones with very small screens and limited capacity to store downloadable instructional material and other resources. Such challenges may also be viewed from the perspective of a digital divide (Makumane & Mpungose, 2022; Makumane *et al.*, 2023) where some students may have devices with capabilities to support their learning while others just have devices which are very basic and cannot do much to support learning. In some instances, students may have to travel long distances to access the internet and thus only be able to read emails at cyber-cafes. Another challenge that students may face is the distractive factor of mobile devices. This requires students to possess high levels of discipline, otherwise students may find themselves entertaining social conversations during times that they allocated to study. Because students know they are not in face-to-face contact with course facilitators, they may choose not to participate in online lesson discussions (Cross *et al.*, 2019). Lack of competence and confidence in the use of technologies, including mobile devices, to their maximum potential (Mafa & Govender, 2023) may lead students to getting lost in their digital learning spaces, wherein they may not be able to move swiftly between the interfaces or windows, thus a lot of study time may end up not being used efficiently. Phillip (2017) indicates that while technology would have been developed in idealized conditions of smooth use of devices and running of software, the reality in the classrooms is far different from what happens in the real world.

Conceptual Framework

The conceptual framework used was guided by the characteristics (Ozdamli, 2011; Mehdipour, 2013) and challenges (Bidin, 2013; Elias, 2011) described below, which are associated with the use of mobile devices to support learning. Characteristic features of mobile devices include the following:

● High portability and availability of the devices which allows use anywhere and whenever;

● Individual use allowing use by one user at a time;

● Unobstructive use means that technology can be used without it being overly noticeable;

● Use for communication, interaction and collaboration.

Challenges associated with use of mobile devices for learning relate to variability, connectivity and battery life.

Variability of the devices may pose challenges on access to instructional materials as some devices may not have capacity to accommodate large-sized files (documents, videos or audio files). Furthermore, the issues of connectivity are related to expense in terms of purchase of data for connecting to networks, and how available is such a network considering the topography of the country. Lastly, battery life may waste away at a rate dependent on activities students work on using the device, be it educational or private.

MATERIALS AND METHODOLOGY

The study followed a combination of quantitative and qualitative data collection and analysis methods. Data was collected through a survey using a questionnaire comprising closed ended and open-ended questions/ statements. The target group comprised students from all four study levels of the B.Ed.Prim programme of the Faculty of Education. The questionnaire was administered through Google Forms. This questionnaire was adapted from the resource Technology-Enabled Learning Implementation Handbook (Kirkwood & Price, 2016). One hundred and three (103) participants out of 372 responded to the questionnaire. The questionnaire had statements on students' experiences and views in using mobile devices for learning, the possible challenges of use of the mobile devices and information about university infrastructure that could relate to the use of mobile devices such as internet connectivity. Statistical methods (descriptive statistics) were used to analyse data from the close-ended statements while thematic approach was used to analyse data from the open-ended statements.

RESULTS AND DISCUSSION

Participants' general information

The participants came from all years of study, years 1 up to 4. There were almost twice as many female participants as males (67 to 34), while two participants did not indicate their gender. The ages of participants ranged from 26 to over 41 years, while the majority (46.6%) was in the age group 36-40. The majority of participants came from either highlands (41.7%) or lowlands (39.8%), and only 19% came from the foothills of the country. Table 1 represents the distribution of participants per category.

Table 1: Distribution of participants per category of the given attributes

Attribute	Year of study				Age				Gender				School location		
Category	Year 1	Year 2	Year 3	Year 4	26 – 30	31-35	36 – 40	≥ 41	No Response	Female	Male	Prefernottosay	Foothills	highlands	Lowlands
Frequency	26	31	13	33	7	27	48	21	1	67	34	1	19	43	41
Percentage	25.2	30.1	12.6	32.0	6.8	26.2	46.6	20.4	1.0	65.0	33.0	1.0	18.4	41.7	39.8

Devices used by students
Among the devices used by the participants, the smartphones were most popular (94.2%), while the desktop computers, laptops and tablets were each used by less than 3% of the participants.

Table 2: The devices used by the participants for studying in their programme (BEdPrim)

	Frequency	Percent	Valid Percent	Cumulative Percent
Desktop Computer	2	1.9	1.9	1.9
Laptop	3	2.9	2.9	4.9
Smartphone	97	94.2	94.2	99.0
Tablet (or iPad)	1	1.0	1.0	100.0
Total	103	100.0	100.0	

Benefits of using mobile devices for learning
Most of the participants either agreed or strongly agreed to the usefulness of mobile devices for learning either on campus or off campus.
Several benefits were pointed out by the participants. The majority indicated they use their mobile devices to communicate with lecturers or classmates.
They also indicated they can access study materials, and join discussion groups with mobile devices.
They use mobile devices to download or to access audio/video materials for lessons they missed or for lessons they attended, where the intention would be to use these materials to revise the content learnt. Several studies attest to these findings by pointing to some benefits that include breaking barriers in learning, providing hybrid approach to teaching and learning, and communicating with students and assessing them in real time, as just a few of the benefits (Haleem *et al.*, 2022).

Experiences on use of mobile devices
Students' experiences on use of mobile devices reported here involve access to the devices and the internet, platforms used for learning (messaging tools, social media tools and LMS), and their competencies in use of mobile devices with various tools for learning. Challenges associated with use of the devices and support structures for learning are also reported.

Access to devices and the internet
Of the four devices, desktop, laptop, tablet, smartphone, the smartphone appeared to be the most popular (N=88; 85.4%) device owned by the participants.

Table 3: Access to devices

B1. Do you own any of these devices? [Smartphone]	Value
No response	7
No	2
No, and I do not plan to buy one before I complete my studies	1
No, but I plan to buy one before I complete my studies	5
Yes	88
Total	**103**

A large number of participants (95.1%) claimed they mostly use smartphones for learning in their programme. Most participants (97.1%) also use this device to access the internet. The majority of the participants (86.4%) indicated they used the internet daily, while slightly over half of the participants (61.2%) claimed they did not have a connection to Wi-Fi while on campus.

Platforms used for learning
The students indicated they have used meetings or conferences platforms that include Microsoft Teams, Google Meet, Zoom and WhatsApp group call, with WhatsApp group calls as the most used. Other platforms included Facebook, Google Scholar, YouTube.
The tools accessed, though not very frequently, on the institution's LMS included Announcements, Resources, Assignments, Tests and Quizzes, Chat Room, Forums, Gradebook and Lessons tools. The participants rated themselves as either 'poor' or 'fair' in knowledge of use of these tools indicating likelihood that these tools may not be used effectively for learning.

Competencies on use of mobile devices for learning
A slight majority of participants rated themselves from poor to fair to neutral in the following aspects of use of the institution's LMS tools: accessing the LMS, downloading materials from the LMS, uploading materials into the LMS, using LMS to discuss and submitting assignments through the LMS. Slightly more than half also indicated they could use Word, email and search the internet on their mobile devices to either a small extent, or satisfactorily. Slightly less than half (44.7%) of the participants indicated they had a challenge working with PowerPoint and Excel.

The challenges encountered in using mobile devices for learning
Most of the participants indicated they accessed the internet from home, and about two-thirds indicated they did not access Wi-Fi when they were on campus.
The other common challenges according to participants included expenses on data.
"network is a massive challenge because I access it on the mountain [sic] and the means of charging the phone is also a challenge because I use solar panels to charge".

[Location: Highlands] Although the main service providers have made efforts to make network connection accessible throughout the country, there are still some areas where the connection still fails, especially on days with bad weather.

"In bad weather conditions like clouds, rain and snowfall, l do not have access to use my phone because I am living in rural areas where we use solar for charging phone. So, when there is no sun I do not charge my phone. On other days [there is] no VCL [Vodacom Lesotho] network". [Location: Highlands]

Electricity connection to some villages is still a challenge according to some students. They indicated it is difficult for them to charge their devices. Some depend on the solar system to charge devices.

"Charging mobile phones is a problem where there's no electricity" [Location: foothills].

The size of the device was reported a challenge when writing an assignment. This refers to the size of the screen and the keypads for typing.

"Typing is a big challenge and writing tests".

This therefore means using these devices for written work by the students becomes a challenge particularly timed work such as writing assignments and tests.

Support structures to enhance students' learning

There was generally minimal support from lecturers on use of devices. A few cases included:

"He showed us how to use Google Meet"

"They usually give us more time to submit especially during bad weather".

On the question of support by the institution, slightly more than half (n=59) of the participants indicated that no support had been provided. Some participants expressed the support given in the following way

"It [the institution] once train[ed] first year students many years ago"

"[we were] once offer[ed] IT people to guide us".

Participants suggested ways of support that could benefit effective use of mobile devices for learning. These include preferred teaching approaches; resources lecturers can use and the need for students to be trained on applications they are expected to use.

"If Google Meet or Zoom are used it should be recorded by a lecturer so that in case of unavailable network or closure of mobile phone due to shut down of a battery in some area a student could listen to missed classes".

Some participants mentioned they need support with data for internet connection.

"Be helped with data like full-time students".

The participants suggested training students on manipulating their devices.

"Orientate B.Ed.-Primary students to usage of mobile devices, I mean applications that are used, how to use them, how to download them".

This refers to training that could be provided by the institution at various levels as support on how to obtain and use some of the software for learning purposes.

Discussion

Various authors have documented the benefits of using mobile devices for learning (Cross *et al.*, 2019; Kearney & Maher, 2019). A study carried out in Croatia (Kljunić & Vukovac, 2015) indicates more use of m-learning activities on smartphones compared to tablets, which is a finding confirmed by the current study, though carried out in a different country and context.

The participants in the current study either agreed or strongly agreed to the usefulness of various technology tools which include those that enable access to study materials and discussions through mobile devices. Many participants indicated they have access to mobile devices and the internet almost daily through mobile devices. The case of access for the participants differs from the one reported for secondary school learners by Makumane and Mpungose (2022) where the digital divide among the learners in their study appeared to be prevalent. The two situations differ for reasons that include an obvious one that participants in the current study were working Inservice teachers, access was mostly through personal devices whether they were off campus, at their workplaces or homes or on campus when they attended face-to-face classes. However, Philip (2017) points to a possible challenge with the expectations that students buy their own up-to-date and compatible devices for learning as this requires a serious budget for many students. The reason being that not every device may be suitable in terms of functions required for use in eLearning; one example being small screen devices (Hinze *et al.*, 2023).

Participants indicated they used a variety of platforms that include institutional LMS, Google Scholar, Facebook, and WhatsApp on their mobile devices for learning. Research has shown benefits of these platforms which include promotion of distance learning through creating and managing groups by using the tools such as the social learning platforms (Haleem *et al*, 2022). While participants indicated they use the institution's LMS on their mobile devices for learning, the majority indicated they use the following tools, available in the University LMS, even though not very frequently. These tools are Announcements, Resources, Assignments, Tests and Quizzes, Chat Room, Forums, Gradebook and Lessons tools.

The participants rated themselves from poor to fair on use of mobile devices for learning and this indicates they need support in this area. The key support the students reported they needed is training on use of the devices including various features and applications of the various mobile devices. Lecturers could also provide part of support in use of the devices, although this is still a tricky area for some lecturers as they still have to develop their own competencies and confidence with the use of particularly the mobile devices, adopting them for effective pedagogical approaches (Kearney & Maher, 2019) especially for distance learning. The needed support may also include frequent deployment of features possessed by the devices, by engaging students with learning materials that require use of mobile

devices. Examples include resources such as audio clips and videos created from various learning materials. Shuja *et al.* (2019) argue that mobile learning is in demand to provide flexible learning that is discussion-oriented to the learners. Students can also be supported through provision of reliable means of access to internet, such as wifi at convenient places while on campus. This would enable reliable connection to the online platforms and websites for seamless learning. To achieve this the institution may negotiate reasonable data rates with the local service providers for access to internet connection both on campus and off campus.

CONCLUSION

This study has established that while mobile devices are beneficial for learning, especially for students who learn mostly from a distance, their usage has some challenges. The perceptions and experiences of the participants indicate varied use of mobile devices with different technological resources, which include institutional LMS, some Google applications, and social media platforms. Students' support on aspects which include basic use of devices, means of connecting to the internet are key to effective usage of the devices for learning. One of the highlights is the need for further probing into the approaches used by the lecturers to have their students use their mobile devices with the tools mentioned for learning and how they may work around keeping their students motivated and interested to use their devices amidst challenges pointed out by this study.

REFERENCES

Alioon, Y., & Delialioglu, O. (2015). A Frame for the Literature on M-learning. *4th World Conference on Educational Technology Researches, WCETR Procedia - Social and Behavioral Sciences 182,* 127 – 135

Cross, S., Sharples, M., Healing, G., & Ellis, J. (2019). Distance Learners' Use of Handheld Technologies: Mobile Learning Activity, Changing Study Habits, and the 'Place' of Anywhere Learning. *International Review of Research in Open and Distributed Learning, 20*(2). https://doi.org/10.19173/irrodl.v20i2.4040

Delcker, J., Honal, A., & Ifenthaler, D. (2016). Mobile Device Usage in Higher Education. *13th International Conference on Cognition and Exploratory Learning in Digital Age (CELDA).*

Ekanayake, S. Y., & Wishart, J. (2014). Integrating mobile phones into teaching and learning: A case study of teacher training through professional development workshops. *BJET, 46*(1). https://doi.org/10.1111/bjet.12131

Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers, 3,* 275-285. https://doi.org/10.1016/j.susoc.2022.05.004

Hinze, A., Vanderschantz, N., Timpany, C., Cunningham, S. J., Saravani, S. J., & Wilkinson, C. (2023). A Study of

Mobile App Use for Teaching and Research in Higher Education. *Technology, Knowledge and Learning, 28*,1271–1299. https://doi.org/10.1007/s10758-022-09599-6

Kaisara, G., & Bwalya, K. J. (2022). Trends in Mobile Learning Research in sub-Saharan Africa: A Systematic Literature Review. *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 18*(2), 231-244.

Kearney, M., & Maher, D. (2019). Mobile learning in pre-service teacher education: Examining the use of professional learning networks. *Australasian Journal of Educational Technology, 35*(1). https://doi.org/10.14742/ajet.4073

Kirkwood, A., & Price, L. (2016). *Technology-Enabled Learning Implementation (TELI) Handbook.* Commonwealth of Learning (COL).

Kljunić, J., & Vukovac, D. P. (2015). A survey on usage of mobile devices for learning among tertiary students in Croatia. *Proceedings of the 26th Central European Conference on Information and Intelligent Systems* (pp. 97–104). Faculty of Organization and Informatics, University of Zagreb.

Mafa, K. R., & Govender, W. G., (2022). In-Service Science Teacher's Perceptions Towards the Use of Information Communication Technology Tools in Teaching and Learning in a COVID-19 Environment. *E-Journal of Humanities Arts and Social Sciences (EHASS), 3*(8), 310-322. https://doi.org/10.38159/ehass.2022383

Makumane, M. A., Mataka, T. W., Sengai, W., & Ngcobo, S. (2023). Neutralising the digital divide: is blended learning a viable solution? *International Journal of Research in Business and Social Science, 12*(7), 511-522. https://doi.org/10.20525/ijrbs.v12i7.2740

Makumane, M., & Mpungose, C. B. (2022). Digital Divide: Secondary School Learners' Experiences of Using Educational Technologies. *Alternation Interdisciplinary Journal for the Study of the Arts and Humanities in Southern Africa, 39*(Special Edition), 214–238. https://doi.org/10.29086/2519-5476/2022/sp39a10

Odabas, C., & Kahramanoglu, R. (2023). Analyzing the effects of mobile devices on student achievement: A wide-ranging meta-analysis. *International Online Journal of Educational Sciences, 15*(5), 1018-1034. https://doi.org/10.153 45/iojes.2023.05.009

Park, Y. (2011). A Pedagogical Framework for Mobile Learning: Categorizing Educational Applications of Mobile Technologies into Four Types. *International Review of Research in Open and Distance Learning, 12*(2). https://doi.org/10.19173/irrodl.v12i2.791

Petrova, K., & Li, C. (2009). Focus and setting in mobile learning research: A review of the literature. *Communications of the IBIMA, 10*(26), 219-226. https://hdl.handle.net/10292/2527

Philip, T. M. (2017). Learning with mobile technologies: Considering the challenges, commitments, and quandaries. *Communications of the ACM, 60*(3), 34-36. https://doi.org/10.1145/2976735

Rodríguez-Arancón, P., Arús, J., & Calle, C. (2013). The use of current mobile learning applications in EFL. *Procedia - Social and Behavioral Sciences, 103*(0), 1189-1196. https://doi.org/10.1016/j.sbspro.2013.10.446

Sophonhiranrak, S. (2021) Features, barriers, and influencing factors of mobile learning in higher education: *A systematic review. Helyon, 7*(4). https://doi.org/10.1016/j.heliyon.2021.e06696

Shuja, A., Qureshi, I. A., Schaeffer, D. M., & Zareen, M. (2019). Effect of m-learning on students' academic performance mediated by facilitation discourse and flexibility. Knowledge Management & E-Learning: *An International Journal, 11*(2), 158–200. https://doi.org/10.34105/j.kmel.2019.11.009