

NEW FRONTIER OF EDUCATION: IMPACT OF SMARTPHONES ON STUDENT'S PERFORMANCE

Neha Yadav & Sakshi Gupta

Assistant Professor, Rukmini Devi Institute of Advance Studies, New Delhi

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ABSTRACT

“Mobile is a global platform that today supports two-thirds of the world’s population, delivering the connectivity and infrastructure that is powering new digital economies and addressing socio-economic challenges,” said Mats Granryd, GSMA director general. The usage of Internet-enabled mobile phones is a 21st-century experience which covers various operations. The use of wireless technology by college students has become increasingly relevant to their academic lives. Smartphones have added great potential by enabling an increase in the use of social networking and in the number of hours spent on such sites. The main objective of this research is to study the impact of smartphones on the performance of students. Following an exploratory approach, a systematic review of the relevant studies has been done to provide an integrated view of the fragmented literature. Research propositions have been proposed to enhance understanding the impact of smartphone uses on students. Student’s performance reviewed with the variables such as learning, creativity & innovation and sharing & collaboration. Automated insights from R Studio have been used for analysis of literature.

KEYWORDS: *Smartphone, Performance, Students, Learning, Creativity and Innovation*

INTRODUCTION

Educational methods in today’s world should be dynamic and continuously adapt to an ever-changing social environment. Information and communication technology (ICT) has been a critical component of teaching and learning in higher education over the last few decades.

Today, education progress simultaneously with the advancement of science and cannot be separated from the advancement of technology and communication. There are various numbers of technology and communication devices that can facilitate educators in their instruction, either as a teaching aid or medium used in the learning process. If observed from the advance of technology, education can be developed in various ways, including learning by using electronic media such as internet, television, to the use of smartphones.

As the rapid increase of the times and technology, mobile phones or handphone that not only has the function as the sender of a text message but also as a device for the long-distance conversation. Mobile phones now have varied functions, ranging from the emergence of music player application, camera, up to the application that makes it easy to surf in the cyberspace or internet. The cellphone performs many of the functions of a computer, typically having an Internet access, touchscreen interface, and an operating system capable of running downloaded apps. are called a smartphone. The smartphone can be named as a mini computer because it has the function as a computer in its mini version and is portable.

Smartphone allows the 21st Century student to engage in a learning environment while being mobile. Educational applications (i.e. apps) assist students in accessing interfaces to virtual classrooms, researching specific subject matter and much more. This allows the student to have ownership and autonomy in their learning process.

Based on the study conducted by Barakati (2011), smartphones were used not only as a communication tool, or just to keep up with technology, but it could be used to learn and improve students' skills. Dijey suggested that teachers should motivate the student in increasing the use of smartphones in English language learning and apply the use of smartphones by utilizing existing applications to the classroom, so as to improve students' ability to learn English in a more innovative and fun way. The study was focused on learning the English language, but the same method can also be done in another area of learning. Smartphone offers distinct websites, social account, and social network, or internet that can be used to assist students in comprehending the concept of management, as well as to enhance their ardor for learning, and to enhance their knowledge in a more flexible and pleasant way.

Woodcock (2012) stated that various aspects of the lives the students who have smartphones, changes; they begin to operate this gadget for expanding their learning experience. Smartphones use in learning that can guide students to become more attentive to the benefits and advantages, such as the ease of learning anywhere and anytime, as well as can motivate students in learning activities.

Mobile wireless technologies are an interesting and very recent addition to higher education. Their power to change the way of educating people is mind baffling. Mobile wireless technology is the new edge for teaching and learning in institutions of higher education. Currently and in the near future many educational opportunities are made possible because of m-technologies' Its unique characteristics and positive impacts identified in higher education will continue to grow and will become the learning environment of choice (Sang Hyum Kim, Clif Mims, and Kerry P. Holmes, 2014). This research will discuss the relationships between Smartphone usage and the effect on student's performance.

LITERATURE REVIEW

This review deals with the relevant literature, to provide deeper insights and a clearer path and parameters to the research particularly on Smartphone usage by students.

Herrington (2009) discussed how smartphones were used to collect video, image and audio data for creating digital narratives or stories for use as curriculum resources. Oksman, (2010) stressed that in addition to new media, traditional media such as newspapers, radio and television are also made available on the smartphone through the Internet. Nortcliffe et. al. (2015) discussed the tutor use of smartphone audio apps for giving intrinsic and extrinsic feedback and found that students appreciated the feedback given this way.

Smartphones put powerful, user-owned computing devices into the pockets of students and academic staff. The student ownership of these multifunctional mobile devices is growing exponentially (Dixit et al., 2011); whilst ways of making use of smartphones in higher education have been explored since they first became available in 2007, building upon interest and innovation in the use of mobile technologies for learning (Traxler, 2007).

The use of mobile phone among secondary school students had the significant relationship with their academic performance (Enyi Uko Jairus, Upelle Uko Christian, Agada John Ogwuche , Ominyi Ida Thomas , Taiyol Tyavlum .T. ,

Eru John Ode , Ekpo Steve .O. , Adoga Isaac Agama (2017), Hassan Mamoud Abuhassna& Ibrahim Mohammed Hamad Amin (2014) and Nasser, R. (2014).

Zahid Amin, Ahmad Mansoor, Syed Rabeet Hussain and Faisal Hashmat (2016) indicated that the effect of social media can be positive as in this study closely determined the real effect of social media sites. Haruna Rabiou Aisha Indo Muhammed and Yunusa Umaru, Ph.D. Hadiza Tukur Ahmed (2016) revealed that mobile phone usage significantly influence academic performance among male and female senior secondary school students ($t = 6.113$, $P = 0.02$), the age difference was not a significant factor in mobile phone usage on academic performance.

The use of the smartphone for educational purposes has increased many folds among Indian youths. Online video lectures and e-books are emerging trends among learners. The birth of high-speed internet access and its availability on recently evolved smartphones has opened several new avenues for learning (Manoj Kumer, 2011). Mobile devices are everywhere and mobile learning has emerged as a potential educational environment (N. Eteokleous¹, and D. Ktoridou², 2001)

The development of wireless technologies like mobiles evolving into smartphones has generated a significant amount of excitement among practitioners and academics as it results in shifting the academic environment from traditional settings to mobile learning (m-learning) settings (Sang Hyum Kim, Clif Mims, and Kerry P. Holmes, 2006).

Mobile phones have already overtaken landline phones in numbers and may make the latter obsolete just as mobiles are gradually making public phones little used and cost ineffective to maintain. Hybrid phones that can serve both mobile and landline functions have been in the market for a while. Technology use in education is becoming an increasingly important part of higher and professional education (Wernet, Olliges, & Delicath, 2000; & Almekhlafi, 2006, 2006). Further, another study also indicated that Kuwait HE students are very familiar with mobile devices and its applications and that the students have positive perceptions of m-learning, and believe that video-based social media applications enhance the teaching and learning process (Rana AlHajri, Salah Al-Sharhan, Ahmed Al-Hunaiyyan, 2017). The use of mobile devices and emerging technology in the new learning environments allow students to achieve more in their educational process. The students will be keen on the new learning options provided by the mobile technologies. The m- learning environment will provide new study opportunities for the students which strengthen the flexibility of being able to study at any time and any place (Ligi B, Dr. B. William Dharma Raja, 2017).

Abdellah Ibrahim Mohammed Elfeky & Thouqan Saleem Yakoub Masadeh (2016) found that mobile learning had a quite significant effect on both students' academic achievement and conversational skills. Froese, et al. (2012) employed a self-report survey to assess students' cell phone activity in classes and their expectations of the effects of such activity on learning outcomes.

Several advantages to increased cell phone usage which includes phones being used as teaching and learning tools to benefit the students by being able to teach to the different learning styles (Dr. Gayle R. Jesse, 2015 and Yao-Ting Sung , Kuo-En Chang & Tzu-Chien Liu, 2015). ICT seems to have a profound impact on the process of learning in higher education by offering new possibilities for learners (Adel Ben Youssef and Mounir Dahmani, 2010 and Idris GÖKSU, Bünyamin ATICI, 2013).

Technology not only gives learners the opportunity to control their own learning process but also provides them with ready access to a vast amount of information over which the teacher has no control (Lam & Lawrence, 2002). Mobile phones used by educational institutions to send messages such as examination results to students, acknowledging their popularity with young people. The researchers feel that we have yet to see all what the mobile phone can do and what people will do with it (Niranjala D. Weerakkody, 2008).

One hundred twelve students in an introductory survey course in sociology were given the opportunity to use a wireless product developed by Hot Lava Software for the purpose of assisting them in preparation for two scheduled exams. Both practice and review questions were made available on Smart Phones, Web-enabled phones, PDAs and other Internet-capable mobile devices via Learning Mobile Author. Forty-two of the 112 students in the class chose to access these data via their personal devices and their responses were collected and recorded. The results of their performance, as indicated by a final grade in the course, were compared to the outcomes for those students who chose not to use the M-Learning tool. Students using the software demonstrated a higher level of knowledge of the subject matter covered in the course when compared to students choosing not to use the tools (Douglas Mcconotha, Matt Praul, Michael J. Lynch, 2008). Using LMS on mobile devices is the learning platform for the future learning environment as all the participants expressed their enjoyment of learning away from the classroom with the help of their mobile devices and LMS. (Nadire Cavus, 2010). The teachers of the 21st Century both at schools and colleges are integrating technology in their classroom activities. They use a variety of technologies to promote students' learning. Most teachers expressed positive experiences with technology integration training, increased their use of technology in the classroom, and used technology more creatively. In addition, the teachers integrate technology in their classes with different degrees and effectiveness in spite of the barriers that hinder such integration. Also in order to increase effective technology integration, both male and female teachers recommend the following: (1) regular professional development workshops, (2) enhancing curriculum with technology-enhanced materials such as CDs and videos, (3) increasing collaboration between schools across the country, and (4) giving enough freedom for teachers in the selection and coverage of curriculum materials (Abdurrahman Ghaleb Almekhlafi and Farouq Ahmad Almeqdadi, 2010). Mobile phones have a potential of improving the teaching and learning processes as the tools are cheap compared to other ICTs which can be used for teaching and learning (Mtega, P.W. et al., 2012).

The use of mobile phones has enhanced e-learning. No Doubt dependency on mobile phones is increasing due to its unique features. Mobile phones are not considered as a device for communication alone but it is considered a media for entertainment (Mahender Kumar Beniwal¹, Arpita Sharma², 2013). Access to Smartphone provides its users with an opportunity of having distance education available all time irrespective to their location, Smartphones make it easier for students and teachers to collaborate, Students can keep themselves up to date in case of any leave or emergency and also provides the society with a portion of educational and learning resources (Muhammad Sarwar, 2013). Attitudinal differences exist among the cell phone users. People have various feelings and attitudes toward cell phone usage, students' nowadays use the devices for a variety of purposes: to help them feel safe, for financial benefits, to manage time efficiently, to keep in touch with friends and family members, et al." (Kumiko Aoki and Edward J. Downes, 2003). It is being witnessed that there is a positive reaction to the new trend learning environment. The pace at which the mobile

subscribers are growing in India, it is evident that mobile phone usage in education is here to stay. While not a magic potion for the educational system in our country, the smartphones could be one way to engage and motivate student learning (Manoj Kumar, 2011). Apart from communication, most of the students prefer alarm in their mobiles (Sadaf Nawaaz, Zahoor Ahmad, 2012). A study conducted (David Odom, 2012) revealed significant differences in student motivation scores between the control group and experimental group with the students using mobile phones scoring higher on motivation to learn. In addition, a significant difference was found between groups on affective scores with students using mobile phones scoring higher. The sociometric scores indicated no negative impact on social interaction. The qualitative portion of the study found that students using mobile phones were more interested and excited to learn than students without mobile phones. Youth leaders and educators should consider using mobile phones to motivate students. In addition, when developing a Bible study curriculum for youth, designers should give special attention to options for the use of mobile phones (David Odom, 2012).

The positive effects are that it helps students to improve their knowledge and social skills by 1) increasing student activity in creating and sharing information, 2) asking for academic assistance and support, and 3) providing a good way to release student pressure. In the same way, “the social networking sites are virtual study halls for a wired generation” (Dyer & Columbia, 2010). [Tiene \(2000\)](#) showed that “written communication on cyberspace enables students to take part in discussions at a time convenient to them and articulate their ideas in more carefully thought-out and structured ways.” [Deng and Tavares \(2015\)](#) concluded that “web-based discussions can contribute to the development of students’ reflective ability and critical thinking skills.”

Smartphone within and without the classroom makes it easier for students and teachers to collaborate. Students on sick leave or with health issues or miss school for other reasons would be able to attend class through their Smartphone and keep up with their work, rather than falling behind due to unanticipated circumstances (Kara, 2012).

Maguth (2013) further contends that smartphones hold many capabilities as computers. These functions include using text messaging to search and translate, sending out free notices to students and parents, and making PowerPoint presentations interactive.

Lenhart, Smith, and Zickuhr, (2011) Recent Pew Internet and American Life Survey said that 30 percent use their cell phones to follow local news and 42 percent use their phones for weather updates. These devices are giving highly mobile citizens the ability to access information and communication. Tindell and Bohlander (2012) observed that text messages can be sent directly to students’ phones informing them of the source of the emergency and instructions on how to respond.

Dean, (2010) Ryerson University students’ experience and expectancy with their mobile library site, “searching for articles, reading electronic Books, checking out books, and contacting librarian or getting research help” were students’ top future request. It further stressed that text messaging and e-mailing are two of the most commonly used functions on smartphones among college students, followed by reading news, watching videos and reading books.

The authors noted also that teachers should offer class hours on social media. Researchers have tackled different methods and ways where social networking could be utilized in education. These methods included gaining more vocabulary and writing skills ([Yunus et al., 2013](#)), exchanging assignments, discussions, and resources with fellow

students ([Asad et al., 2012](#)), formulating group discussions, communicating, and exchanging ideas with fellow students ([Salvation and Adzharuddin, 2014](#)). Other benefits involve teachers being able to share course-related materials with their students, create student groups, collaborate on projects, providing peer support and facilitating teaching ([English and Duncan-Howell, 2008](#)).

The studies made in the past suggests to provide information and create awareness among decision makers and education practitioners about the impacts of mobile technology on social life and education outcomes among university students. The positive effects of mobile phones in education are communication is easier, keeps one busy and avoid boredom, a source of useful information and new ideas, storing educational materials, sharing information and also scanning academic materials. (Dr. Mercy Wanja Njagi¹, Mr. Edward Njagi Silas², 2016).

Young people use cell phones for a variety of communication, news and entertainment needs. Additionally, they consider cell phones as personal items and use them to store private content, maintain privacy and have private conversations. In short, Smartphones fulfill the demand for immediate access to social worlds (Dr. Asoke Nath, Sneha Mukherjee, 2015). There is a great connection between age, gender and marital status on the addiction towards the use of smartphones in Universities and colleges in large in relation to the academic performance (Lusekelo Kibona, Juma Mdimu Rugina, 2015). The study carried out at Guangzhou's University revealed that the results find that improved learning effectiveness and efficiency and mobility are the major factors which insist the students use the mobile device for formal and informal learning. It was observed that students use the mobile device for reading and searching, sharing, discussion and learning (Wong, Chun Hung Hugo, 2015).

RESEARCH METHODOLOGY

The study adopted review research and in particular exploratory research design. An extensive analysis of the existing literature on the impact of the smartphone on academic performance has been done. Research papers have been retrieved from various national and international journals. Various related keywords such as a smartphone; academic performance, students, learning, creativity, innovation, and combinations of these were used to locate the relevant studies for analysis.

R Studio software has been used for preliminary analysis of literature. R Studio is a software package that allows users to import, sort and analyze text documents, spreadsheets, databases, documents, and PDFs. The results provided by R Studio 11 have been summarized in the next section of the paper.

FINDINGS AND DISCUSSIONS

Eventy research papers on the impact of the smartphone on student's performance have been analyzed with the help of Word frequency query of R Studio software, looking for most 25 frequently used words and their synonyms. The results are presented below in the form of a word cloud.



Figure 1: Word Cloud of Most Frequently Used Words

The following table shows the twenty-five most frequently use they have been used in the literature.

Table 1: Twenty-Five Most Frequently Used Words in the Literature

Word	Length	Count	Weighted Percentage (%)
mobile	6	7488	1.86
learning	8	5063	1.26
students	8	3551	0.88
social	6	2903	0.72
use	3	2867	0.71
phone	5	2801	0.69
phones	6	1841	0.46
research	8	1813	0.45
study	5	1750	0.43
education	9	1749	0.43
technology	10	1650	0.41
media	5	1619	0.40
using	5	1418	0.35
information	11	1305	0.32
also	4	1250	0.31
devices	7	1231	0.31
student	7	1205	0.30
used	4	1202	0.30
communication	13	1138	0.28
time	4	1029	0.26
online	6	1017	0.25
new	3	1014	0.25
one	3	1005	0.25
http	4	985	0.24
data	4	978	0.24

Plot 1: shows the twenty most frequently used words in the literature.

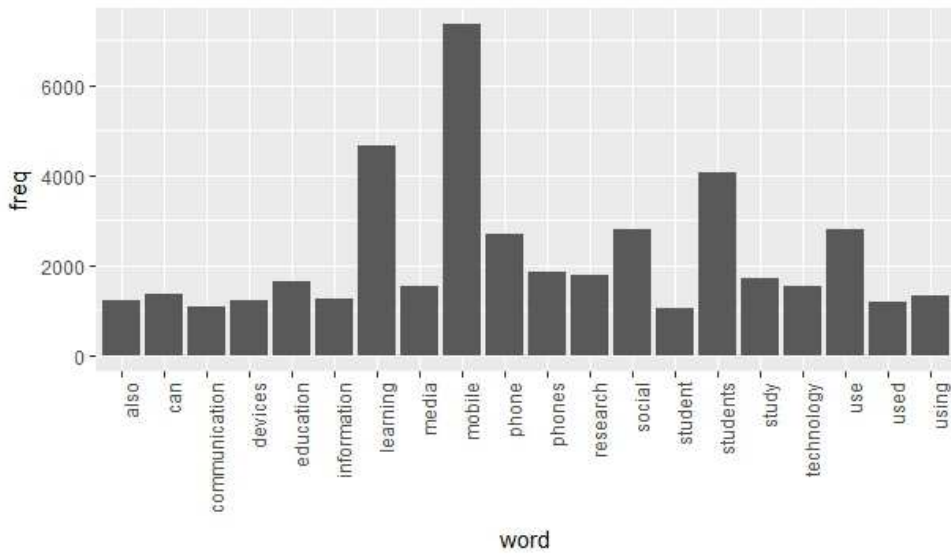
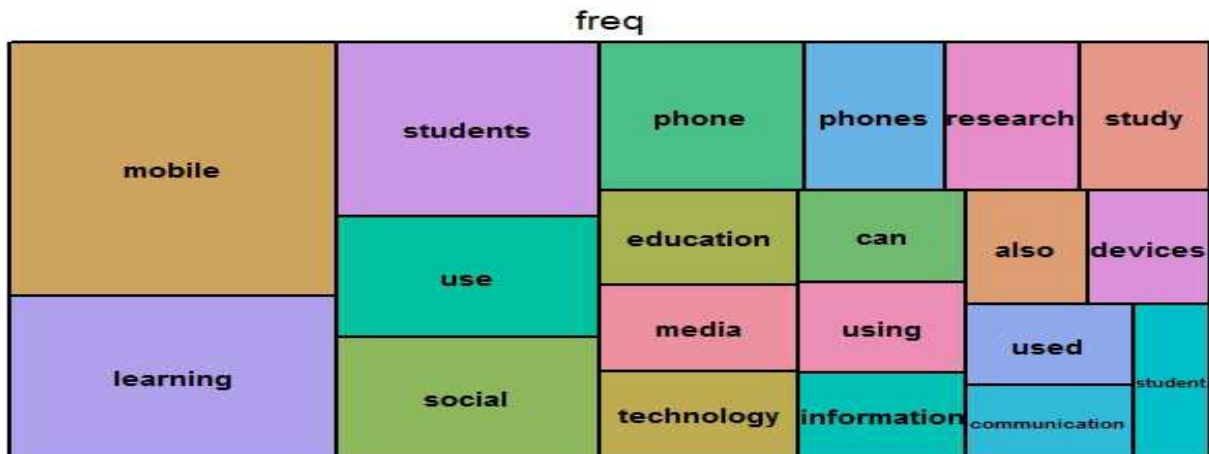


Figure 1: Twenty Most Frequently Used Words in the Literature

According to the results of this query, the top three words are mobile, learning and students which actually sums up and reinforces the central idea of the literature studied.

R Studio software also presented the results in the form of word tree in the below table, which shows the frequency of the words of the literature review.

Table 2: Word Tree



CONCLUSIONS

The 21st Century student depends on technology to engage them in the educational process and for the same, learning through smartphone stands out to be a good example for them. The finding shows that smartphones assist students to organize course materials, assignments, reinforce learning objectives, and better interact with others. Smartphone permits to use the digital textbook, and access to thousands of digital reads on their smartphones (Edudemic, 2012). The

ability for these devices to be mobile has offered new teaching and learning possibilities for teachers and students (Hutchison, A., Beschoner, B., and Schmidt-Crawford, D.,2012). Smartphones could make learning easier and fast without the time and place constraints. On the other part, the mobility that Mobile Learning depends upon could allow students to easily interact and discuss the learning topics with colleagues or instructor anytime and anywhere. Besides, mobile learning contributed to the support of the interactive characteristics of learning and teaching environment making students' role more effective through the active interaction with the teaching/learning materials via smartphones. Another important element in the success of students learning via Mobile Learning was the various opportunities and occasions through which learners were allowed to access and make use of a large amount of information available on the Internet for the sake of educational assignments and enhance the performance of students.

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