INVESTIGATION OF THE AWARENESS OF RURAL STUDENTS ON M-LEARNING USING SMARTPHONES

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The outbreak of the COVID-19 pandemic has led to a sudden transition from face to face to online teaching and learning practices in various parts of the world. Meanwhile, the level of awareness and adoption of mobile learning (M-learning) by means of smartphones in many rural parts of Africa tends to be considered low. The reasons for this include various factors, such as poor access to internet facilities, a lack of funds, the cost of smartphones, amongst others. This study investigates the level of awareness of South African rural higher institution students (SARHISs) on M-learning using smartphones. A quantitative method was adopted for the study. Convenience sampling was used to select the institution and the 75 respondents who took part in the study. Data were collected by means of a questionnaire, entitled "Smartphone questionnaire (SQ)". The collected data were analysed using the Statistical Package for the Social Sciences (SPSS), Version 25. The findings of the study show that the adoption of M-learning using smartphones by the respondents who are students from the South African Rural Higher Institution (SARHIS) is moderate – a little above the average. Based on the study, it is recommended, that students' awareness should be raised and that M-learning should be supported given the recent transition from onsite to online teaching and learning practices

Keywords: awareness, M-learning, smartphones, Smartphone Questionnaire (SQ), South African rural higher institution students (SARHIS)

1. Introduction

Learning with the aid of technological gadgets and platforms is crucial [1, 2], though in some instances such gadgets and platforms are also considered to be a source of distraction [3, 4]. Meanwhile, owing to factors, such as the cost of technological gadgets, access to internet infrastructure and poor funding, many students and institutions of learning are disadvantaged [5–7]. This is more common and profound in institutions of learning, situated in rural areas, which are commonly described as low income environments [5, 8]. Nevertheless, the roles, played by technology in the teaching and learning environment, are pivotal and cannot be overemphasised. Prior to the COVID-19 pandemic, the extent of technology uses and adaptation for teaching and learning activities through online platforms were minimal compared to what is currently available. During the pandemic, the transition from onsite face-to-face teaching and learning to online teaching and learning has been massive [9]. Suffice to say that the COVID-19 pandemic has necessitated a speedy transition from onsite to online teaching and learning. The transition was necessary to save academic programmes and to ensure that students could continue to learn regardless of the lockdowns that had been declared in different parts of the world as a safety measure to combat COVID-19. However, the sudden transition was done without considering educators' and students' level of awareness of or preparedness for the move from onsite to online teaching and learning [10]. The foregoing suggests that students were forced to adjust to online teaching and learning from the traditional practice of onsite teaching and learning, which they were accustomed to. The following question remains: Are students, especially disadvantaged rural students, aware of technological gadgets that would enable them to participate in teaching and learning activities? The reason for this study was to investigate the awareness of South African rural higher institution students (SARHISs) of M-learning (i.e. mobile learning) using smartphones. Sequel to the foregoing and considering the focus area of the study (South Africa), the need to state a brief overview of the history of education in the country arises.

In the precolonial era, the South African education system was largely an indigenous system, as was the case throughout the African continent. The San, Tsam, Xam and Khoi peoples lived during the Stone Age and taught their offspring the art of hunting, animal skinning, food gathering and food preparation using stone implements [11]. This education system employed symbols, gestures, sign languages, motifs and word of mouth (including proverbs and myths) to instruct children [12]. However, during the colonial era, the indigenous education systems, native to the African continent, were replaced by a colonial system [12].

South Africa is an integral part of Africa and the same happened here too.

2. Literature review

According to [12], the first formal school in South Africa was established by the Dutch East India Company in the Cape in 1658. The school was purposely opened to educate the 170 slaves who had been brought to the Cape by Dutch ships. The Cape was home to the first set of white men in South Africa. The second formal school in South Africa was established for the children of colonists in 1663; the school had 12 pupils. In 1682, the Cape Colony decreed that every slave child younger than 12 years had to attend school daily, while older slave children had to attend school twice a week. Another school for slave children under the age of 12 was established in 1685. In 1714, the governor of the Cape Colony, Governor De Chavonnes, proclaimed the first education ordinance in South Africa. This ordinance prohibited any unapproved person from teaching. Thereafter the first attempt to formalise education in South Africa was made when a four-man committee called "the Scholarchs" was set up to supervise education and ensure strict adherence to the Governor's decree. In addition, the responsibilities of teachers were spelled out and guidelines on school organisation were compiled. A military school was opened by the government of the Cape Colony in 1786, after the native people groups had been divested of their land in 1779.

In 1799, the first school that was open to all Africans was established. Previously the schools in the Cape Colony only accepted a few Khoi and black learners. A school ordinance that removed the responsibility for the management of public education from the church and handed it to the state was proclaimed in 1804 by the Dutch. The ordinance was short-lived as the British took over the Cape Colony from the Dutch in 1806. From 1822 to 1824, English Free Schools were established throughout the Cape Colony; these schools served the poor and were intended to be multiracial (although this status was later compromised). In 1835, Natal's first school was opened and the first teachers' training college was founded at Genadendal, a mission station. The colonial education system led to the creation of a number of schools and agencies that were characterised by various biases, including a race bias. After South Africa's first democratic election in 1994, the first black South African president, Nelson Mandela, appointed Professor Sibusiso Bhengu as South Africa's first black Minister of Education and a nonracial national Department of Education could be established for the first time. In 1997, a Higher Education Division was created and *Education White Paper 3* was published by the Department of Education. These were followed by the Higher Education Act 101 of 1997, which ended years of racism in higher education and was signed into law by President Mandela. 2005 was an historic year for higher education in South Africa as 36 institutions of higher education in the country were merged to create 22 institutions of higher education during that year. The University of Limpopo, Nelson Mandela Metropolitan University, the University of Johannesburg, the Cape Peninsula University of Technology and the Walter Sisulu University for Technology and Science were among the institutions, created by this merger. In the same year, Higher Education South Africa (HESA) was founded when the Association of Vice-Chancellors of South African Universities and the Committee of Technikon Principals merged. The name of the organisation was changed to Universities South Africa (USAf) in 2015. Sequel to the foregoing, the need to do a review from historic education to contemporary in South Africa arises.

Moving from Historic Education to Contemporary Education in South Africa

[13] write that newly democratic South Africa has unmistakeably geared all its education policies towards enhancing access to education opportunities for previously disadvantaged groups. [14] state that since 1994, restructuring in education through education law, curriculum modification, policy development and the adoption of new approaches has been vital in enhancing equality among all races. However, various authors, such as [14–16] amongst others, are of the opinion that South Africa has more hurdles to overcome to improve the education of all its people and to keep abreast of global best practices in education. [14], for example, write that students' results and labour market significance are issues that are still unresolved in the South African education system. [14, 16] also states that "The right to quality education includes having a school where learners are safe to learn and have the adequate infrastructure and facilities to do so, but our research has found that this is not the reality for many learners in the country." Therefore, "For South Africa to comply with both its own constitutional and international human rights obligations with respect to education, major change is needed urgently [14, 16]" Meanwhile, [17] had earlier argued that teaching and learning in South African technical colleges are below par owing to a shortage of appropriate learning support tools that would allow students to thrive in the current learning environment. A review of the work of [18] shows that the education needs of 21st century students are technology defined. [19] states that it is an open secret that ICTs globally play a significant role in altering education and training by facilitating a shift away from traditional teaching and learning methods. [20] write that advancements in information and education technologies trigger educational development; these technologies have a substantial influence on instructors and developers. [21] state that planning active formal and informal education is demanding as a result of continuous and unprecedented changes in technologies, such as the internet and mobile devices. [21] explain that although these innovations are useful and valuable, they bring with them risks, involving the safety of systems and confidentiality. In addition, they lead to ethical issues, such as equity of access to resources. Institutions of learning in South Africa need to make a concerted effort to take advantage of M-learning, while curbing the threats it could pose to the effective delivery of education. However, to achieve this, South African institutions need to know how aware their students are of M-learning using smartphones.

3. The aim and objectives of the study

The aim of this research was to investigate the awareness level of students in the selected South African rural university on M-learning through the use of smartphones.

To accomplish the aim, an attempt is made to proffer answers to the following research questions, guiding the study:

Research Question 1: How aware are students (at a rural university in South Africa) of M-learning using smartphones?

Research Question 2: How well have students (at a rural university in South Africa) harnessed M-learning using their smartphones?

4. Materials and methods

The study followed a quantitative method. [22] and [23], the quantitative method is commonly used in social sciences research; it is useful for the collection of huge data sets that aid the generalisation of results. The target population of the study comprised honours students in the Department of Commercial Sciences at a selected rural institution of higher learning in South Africa. Convenience sampling techniques were adopted for the study. These techniques were used to select the rural institution of higher learning, the department, the student level and the research respondents. [22] and [23] suggest that convenience sampling can be used to select respondents who qualify for participation in the study. It helps to ease the pressure on the researchers who conduct a study, as the participants or respondents are conveniently selected. In this study, convenience sampling was used based on convenience and easy access to potential students.

A questionnaire was used for data collection. The questionnaire, entitled "Smartphone questionnaire (SQ)", was designed by the researcher. The SQ consisted of two sections, section A and section B. Section A was used to collect information about the demography of respondents. Section B was used to collect information about respondents' views on the subject matter (i.e. their awareness of mobile learning by means of smartphones). Section B of the questionnaire was designed using a five-point Likert scale, *viz.* strongly agree, agree, indifferent, disagree and strongly disagree. "Indifferent" was used to imply undecided or neutral. It is noteworthy, that there were 83 students, pursuing a Bachelor of Honours degree in the participating Department of Commercial Sciences at the time of the study. The researchers sought the consent of the potential respondents prior to administering the questionnaires to all 83 students. However, only 75 completed questionnaires were returned and analysed.

The Statistical Package for the Social Sciences (SPSS), Version 25, was used to analyse the collected data. Mean and standard deviation were used in the analysis.

5. Result

The results of an analysis of the data based on the relevant research questions follow.

An analysis of the demographic information, obtained from respondents, is presented first.

Table 1 shows the gender distribution of the respondents in the study. 38.7 % of the 75 respondents were male and 61.3 % were female, therefore there were more female than male respondents in the study.

Table 2 shows the socio-economic status of respondents in the study. 13.3 % of the respondents indicated that they enjoyed a high socio-economic status; 60 % were from a middle level socio-economic class; and 26.7 % had a low socio-economic status. Therefore, most of the respondents in the study were from a middle level socio-economic background.

Table 1

Gender distribution of respondents

Category	Frequency	Percentage	Cumulative percentage
Male	29	38.7	38.7
Female	46	61.3	100.0
Total	75	100.0	

Table 1

Socio-economic status of respondents

Category	Frequency	Percentage	Cumulative percentage
High	10	13.3	13.3
Middle	45	60.0	73.3
Low	20	26.7	100.0
Total	75	100.0	

Table 3 shows the highest qualifications of respondents' parents/guardians/sponsors. 34.7 % of the respondents indicated that their parents/ guardians/sponsors did not have a matric certificate; 13.3 % of parents/guardians/sponsors had a matric certificate (or National Senior Certificate); 5.3 % had an NQF certificate; 12 % had a diploma; and 20 % had a postgraduate degree.

Therefore, most of the respondents' parents/guardians/sponsors did not matriculate.

Table 4 summarises the skills levels of respondents' parents/guardians/sponsors. 25.3 % of the respondents' parents/guardians/sponsors were unskilled workers; 25.3 % of parents/guardians/sponsors were semiskilled workers; 14.7 % were skilled workers; and 34.7 % were professionals. Therefore, most of the parents/ guardians/sponsors of respondents in the study were professionals.

Research Question 1: How aware are students (at a rural university in South Africa) of M-learning using smartphones?

Table 2

Highest qualification of respondents' parents/guardians/sponsors

Category	Frequency	Percentage	Cumulative percentage
No Matriculation	26	34.7	34.7
Matric/National Senior Certificate	10	13.3	48.0
NQF certificate	4	5.3	53.3
Diploma	9	12.0	65.3
Degree	15	20.0	85.3
Postgraduate degree	11	14.7	100.0
Total	75	100.0	

Table 4

Skills levels of respondents' parents/guardians/sponsors

Category	Frequency	Percentage	Cumulative percentage
Unskilled worker	19	25.3	25.3
Semiskilled worker	19	25.3	50.7
Skilled worker	11	14.7	65.3
Professional	26	34.7	100.0
Total	75	100.0	

Table 5 summarises the respondents' level of awareness of M-learning using smartphones. A five-point Likert scale, viz. strongly agree, agree, indifferent, disagree and strongly disagree, was used in the SQ, therefore the normative mean for this study was 3. Consequently, every variable with a mean less than 3 was low; those with a mean slightly above 3 were moderate; and those with a mean of 4 and above were high. Seven variables in the SQ represented the respondents' level of awareness of M-learning using smartphones. Most of the respondents provided answers to these seven variables, as can be seen in the number of responses – only two of the variables had a mean of less than 4. Therefore, the respondents' level of awareness of M-learning using smartphones was high.

Research Question 2: How well have students (at a rural university in South Africa) harnessed M-learning using their smartphones?

To answer this question, mean and standard deviation were used to explore the extent, to which the students in the selected rural South African university has adopted M-learning using their smartphones.

Table 5

Respondents' level of awareness of M-learning using a smartphone

Statement/Variable	N	Normative mean	Study mean	Standard deviation	Decision on awareness
Smartphones are a new class of mobile phones, used by the selected rural institution of higher learning to render integrated services; they facilitate communication, computing, banking, online shopping and access to news sources.	75	3	4.45	0.576	High
A smartphone is a portable computer that can be used by the selected rural university because it can do much more than make phone calls; in fact, it can replace a laptop or desktop.	75	3	4.01	0.893	High
A smartphone is a mobile phone with cutting-edge features and functions that include games, picture display, video viewing, direction-finding, audio/video replay and recording, mailing, social networking and browsing the internet.	75	3	4.44	0.620	High
A smartphone had a mini keyboard that allows students at the selected university to read and edit using computer functions, such as MSOffice programs, an address book, e-mail and a calendar.	74	3	4.16	0.811	High
Smartphones facilitate easy and convenient shopping, which is another benefit, enjoyed by students at the selected rural university.	75	3	3.87	0.949	Moderate
Smartphones enable students at the institution involved to remain connected at all times.	72	3	4.39	0.832	High
Smartphones can be used to engage students in the learning process and to motivate them.	73	3	3.59	1.211	Moderate

Table 6 is a summary of the respondents' level of adoption of M-learning using their smartphones. A five-point Likert scale, viz. strongly agree, agree, indifferent, disagree and strongly disagree, was used in the SQ, therefore the normative mean for this study was 3. Thus, each variable with a mean of less than 3 was low; those with mean slightly above 3 were moderate; and those with a mean of four and above were high. Five variables in the SQ represented the respondents' level of adoption of M-learning using their smartphones. Most of the respondents responded to these five variables, as can be seen in the number of responses – only two of the variables had a mean greater than 4 and three of the variables had means slightly above the normative mean of 3. Therefore, the respondents adopted M-learning using their smartphones moderately well.

Table 6

Respondents' level of adoption of M-learning using their smartphones

Statement/Variable	N	Normative mean	Mean	Standard deviation	Decision on adoption
WPS Office (formally called Kingsoft Office) is an application that allows me to view, edit and share text documents, spreadsheets and presentations directly on my smartphone.	75	3	4.19	0.800	Highly well
Gmail is a mobile application that allows me to view, respond to and send e-mails to my colleagues and educators whenever and wherever.	75	3	4.63	0.693	Highly well
I use the Notepad application on my smartphone to take down notes during classroom lectures.	75	3	3.51	1.120	Moderately well
I have a voice recording application on my smartphone, and I use it to record lectures and group discussions.	72	3	3.92	1.071	Moderately well
I use the Mindbody mobile application to take multiple fitness classes like yoga, Pilates, barre or CrossFit classes.	73	3	3.23	1.196	Moderately well

6. Discussion

In answer to the first research question ("How aware are students [at a rural university in South Africa] of M-learning using smartphones?"), the research has shown that the students' level of awareness of M-learning using smartphones is high. In other words, students are very aware that smartphones are mobile gadgets that make learning possible. This result confirms the findings of the work of [24], which states that **students** in the selected rural institution of higher learning in South Africa view smartphones as a useful tool for their learning; as well as findings by [25], who says that students in the selected rural institution of higher learning view smartphones as tools that play an important role in their learning. This high level of awareness cannot be separated from the immense benefits that smartphones offer, as revealed in the first research objective of this study.

The answer to the second research question ("How well have students [at a rural university in South Africa] harnessed M-learning using their smartphones?') is that students have adopted M-learning using their smartphones moderately well; in fact, their adoption of smartphones for the purposes of M-learning is a little above the average. [24] reports that students at a rural institution of higher learning in South Africa regard smartphones as distractive in lecture halls, therefore they prefer to use their smartphones for academic purposes outside the learning environment. [24] findings explain why students adopt M-learning by means of smartphones only moderately well despite high levels of impact and awareness.

The study was limited to the use of quantitative data, collected from selected South African rural higher institution students (SARHISs), pursuing a Bachelor of Commerce honours degree, therefore the findings of the study should not be generalised to diverse populations.

It is suggested, that similar studies be conducted using two or more rural institutions of higher learning within and outside South Africa.

7. Conclusion

The study investigated awareness of M-learning using smartphones among South African rural higher institution students (SARHISs). The study was guided by two research questions: How aware are students (at a rural university in South Africa) of M-learning using smartphones? How well have students (at a rural university in South Africa) harnessed M-learning using their smartphones? The analysis of the data, collected following the research questions, guiding the study, shows that:

– Students at the selected rural institution of higher learning are not totally ignorant, yet they need to be better informed, especially considering the sudden transition from onsite to online teaching and learning during the COVID-19 pandemic.

– Students tend to be moderately involved in M-learning. This is based on their responses to the research items, analysed and presented in table 6.

Based on the findings of the study, it is recommended that

– SARHISs should be made more aware of the role that smartphones can play in ensuring M-learning.

– In addition, students should be encouraged to adopt and use smartphones for M-learning.

This can be achieved through regular teaching and learning activities that require the use of .

smartphones. Note, however, that educators first need to be sensitised and encouraged to adopt and include M-learning practices in order to assist their students adequately

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