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The Use of Mobile Learning of Physics Teachers in Secondary Schools in Mogadishu Somalia

Dr. Shuaib Abdullahi Salad*

Head of Primary Teacher Training Department, Somalia National University
Email: shuaip1@hotmail.com

Abstract

This research evaluates the percentage of physics teacher's use of mobile learning in Secondary schools in Mogadishu, Somalia, which are official teachers in the public and private secondary schools. The research was used in a theoretical and an empirical evaluation. The theoretical evaluation was based on the experience of the researcher in teaching physics in the secondary schools in Mogadishu, and expertise the use of educational technology mobile learning. The empirical evaluation was based on data collected from 50 physics teachers at different secondary schools in Mogadishu in the form of questionnaires and classroom observation. The frequencies, the percent and the bar diagrams to represent the data of the study, and the chi-squares test for analysis. The results of the evaluation show that the physics teachers' usage of the mobile learning is really weak in Mogadishu, Somalia. The researcher recommends the physics teachers to seek online for the Educational technology, mobile learning or be assigned to in-service workshops devoted about its advantages.

Keywords: Mobile learning; physics; physics teachers; teaching; learning.

1. Introduction

1.1 Background of the study

Cell phones were once considered a distraction in the classroom. While that still remains true, educators have slowly found that phones can be turned into learning tools. Phones have evolved over the years into powerful teaching aids that, when used appropriately, can improve learning outcomes [1]. The use of mobile devices in education all over the world is increasing. These mobile devices, such as laptop computers and cell phones, are revolutionizing education and transforming traditional classroom-based learning and teaching into anytime and anywhere education. Even though, most educators, and parents, have been doubtful about the value of mobile devices as a resource for learning [2-3].

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* Corresponding author.

The number of projects exploring the potential of mobile phone-facilitated MLearning in the developing world is steadily growing, spurred in part by the use of mobile technology in the educational sector in the developed world which has expanded from short-term trials on a small scale to large-scale integration. However, there remains a lack of analysis that brings together the findings of the rising number of MLearning projects in the developing world [4].

Many researchers emphasized on using mobiles in education "the authors in [5] claim that".as interest in mobile learning grows, the term is increasingly interpreted in different ways, depending on the theoretical view of the speaker or the context in question. Similarly they suggest that learning has always had a "mobile" character, and therefore there is a need to establish a difference between what is called "mobile learning" nowadays, and how it was regarded traditionally. Other authors such as [6], so as to explain the use of educational strategies which include mobile technology, review the opinions associated with the evolution and definition of m-learning. Ramírez emphasizes the importance of this type of learning if we are to take advantage ofmodern technology so as to create a more efficient learning experience [7]. highlight the importance of the context of m-learning, in terms of how learners relate and interact with their environment. For these authors, learning occurs in different places - including the classroom – but they explain how it is altered and shaped by several factors: the learning space, the time period, the themes which are dealt with and the technology it utilizes. From this position, mobile learning can be understood as an evolution of e learning [8].

In a truth like this, we find ourselves asking if the mobile learning can be given a real chance in the educational process. In addition, we may ask if the physics teachers in Somalia know the M-learning and use it to support students' learning or they are weakening its potential role by ignoring it. The antecedent studies and articles showed that many believe that the M-learning has high potential in education; however, due to different reasons and circumstances, it still has a long road full of obstacles to vanquish.

1.2 Purpose of the Study

The study evaluates the use of mobile learning of Physics Teachers in Secondary schools in Mogadishu Somalia., from both a theoretical and empirical perspective, and provides suggestions about how to improve the teacher's use of Education technology, mobile learning for the particular conditions in the Mogadishu secondary schools teachers. The overall aim, then, is to help make physics teaching and learning in the Mogadishu, Somalia become more interesting and effective.

1.3 Significance of the Study

1 – It benefits curriculum planners and developers in the Ministry of Education Culture and Higher Education; to take on a project for mobile education, supports the teaching and learning of the physics teachers, with the launch of software and applications in the electronic stores help learning and teaching physics in Somalia.

2 – Encourage secondary stage students to activate mobile learning devices (smart phones and tablets) they own; download applications that are available in electronic stores that support teaching and learning Physics, and take advantage of them at any time and in any place where wireless networks are available (Wifi, 3G, 4G).

3 – Assist in changing traditional teaching and learning in the local community to mobile teaching and learning, that enable teachers and supervisors in the field of teaching Physics to get an effective education, and helps them access to the world of mobile teaching, and evaluate the performance of their students in light of the extent that they benefit from its advantages.

1.4 Research Questions

1) What is the percentage of physics teachers in Somalia is familiar with about the M-learning?

2) Along with those who are aware of the M-learning, what percentage of physics teachers use it in their teaching?

3) Does the highest academic degree held by a physics teacher in Mogadishu Somalia affect his knowledge about the M-learning?

4) Along with those who are aware of the M-learning, does their highest academic degree have an effect on their usage of mobiles in physics teaching?

1.5 Limitations of the Study

This study had three limitations to deal with. First the study was conducted using data only from physics Secondary schools teachers in Mogadishu, Somalia. Second the researcher was unable to distribute the survey by hand to many physics teachers because many of them were living at a distance. For that, the researchers had to come up with an alternative. The alternative turned out to be an online survey that enabled the researchers to reach 50 teachers who formed the sample. In addition, interview data was collected through telephone. While this data was rich and provided ample data for analysis, the telephone interviews did not allow the researcher to notice the facial expressions and body language of participants as they gave their responses.

1.6 Delimitations of the Study

Numerous physics teachers have cooperated with the researcher. They have not only filled the online survey, but they have volunteered sending the link of the survey to their colleagues to fill it. This act has enabled the researcher to reach 50 physics teachers in Mogadishu,. Moreover, this act has positively influenced the accuracy of the results at the end of the study. This study reveals the importance of the teaching to the use of M-Learning. In this study, participants noted that they faced major challenges in not using M-Learning. Many of these challenges centered on a lack of training. Under this condition, the teachers did not appear to be using teaching thought out M-Learning.

2. Literature Review

Over the past two decades there appear to be a paradigmatic shift away from education and training to learning; from teacher-centered to student-centered education; from rote learning to learning as reflection; and from face-

to face to distance and e-learning [9].

One dominant feature of this shift is the innovative application of technology to enhance the delivery of education. The emergence of a new approach to learning characterized e-learning has led to new perspectives on learning presented through different theoretical lenses [10].

The pedagogical potential offered by handheld devices, is one such perspective called m-Learning. Mobile learning, as this is now commonly known has grown as an extension of the elearning frontier from a minor research interest to a set of significant projects in schools, workplaces, museums, cities and rural areas around the world [11].

This wave of interest in the educational potential of handheld technology is seen as a deliberate effort aimed at domesticating mobile devices for educational purposes [12].

Since the term m-learning appear for the first timeslots of research is being done to investigate the cognitive and pedagogical aspects of the usage of mobile devices in education. Investigation had been done also on how useful mobile computing devices could be for reading or for workplace activities [13], on the basis of studying activity theory. Some authors [14] try to give directions to application designers for the areas, where the mobile devices should be most useful, how and why, according to their experiences with children. Other [15] are trying to achieve conclusions by analyzing the theories of adult informal learning. In some papers some interesting positive sides of using new technologies are underlined i.e. the participants are excited and want to try “new” things. Some findings show that introducing new forms of teaching (even if this means just using a standard tool for drawing on a PDA) make students spend more time in working on that subject, comparing to the other subject. Also overall students’ results are becoming better [16]. Meanwhile the new technology gives new chances to students and to teachers to train their ingenuity [17] –students experiment with new tricks and ways to cheat and teachers should meet the challenge. The evaluation and the analyses of m-learning projects until now show mainly positive results. On the other hand there are some doubts if this excitement is, or is not, a temporary side effect. “the authors in [17-18] think that.” PDAs and other mobile devices should be seen more like extension, rather than replace the existing learning tools. Moreover not all kinds of learning content and/or learning activities are appropriate for mobile devices . The future of learning: From eLearning to M-Learning, available online at [19] .

Even though mobiles are very effective for learning when the laptops and desktop computers are unavailable, mobile learning is still relatively new in the educational process [20] .In April 2000, “the authors in [21] indicated that.” about the potentials of the mobile learning [21]. Five years later, “the authors in [22] indicated that.” regardless of the worldwide expansion of mobiles among teachers and students mobile learning has yet to take front seat in teaching and learning despite its potential advantageous in education [22].Four years later, “the authors in [23] indicated that.” through mobile learning, people can interact socially and exchange meanings, information and knowledge. However, they stated that meaningful results can be achieved only if t the mobile learning was properly used “the author [23]”. In 2013, “the authors in [24] pointed out that.” mobile learning can happen at all places. It enables people to learn while walking, eating, sitting or riding a bus/car. Mobile

learning can inspire everyone to learn more, especially those who are not comfortable with the traditional teaching [25]. Finally, "the authors in [26] assured in his paper that." the proper usage of the mobile learning can provide quality education and make a difference in teaching and learning [26]. For that, the researchers picked the mobile learning as the subject this research study [27].

3. Methodology

3.1 Design of the Research

A Quantitative research relies on the collection and analysis of numerical data to describe, explain, predict, or control variables and phenomena of interest [28]. This research, through its quantitative approach, has hunted at determining the understanding of physics teachers in the secondary levels about the mobile learning, and it has undertaken teachers' usage of mobiles in their teaching. Additionally, this research has investigated the effect of the academic degree on usage of mobiles in teaching physics by a sample of 50 physics teachers in Mogadishu Somalia. The physics teachers who formed the sample were randomly selected by the researcher.

3.2 Research Instruments

The researcher has created an online survey. Three items were deliberated. In the first two items, the respondents had to answer by yes or no. The first item was connected to physics teachers' knowledge about the mobile learning. The second item concerned only those who knew about mobile learning. They were asked if they are using the M-learning in their teaching. Finally, the third item was about physics teachers' academic degree: Bachelor degree/Diploma in physics, Masters in physics, Masters in education/didactics of physics, PhD in physics or PhD in education/didactics of physics.

3.3 Data Collection Procedure

The online survey, through the linkage sent by the WhatsApp platform, has allowed the researcher to reach physics teachers in the secondary schools in Mogadishu Somalia. Due to that, the researcher was able to collect data from 50 physics teachers who lived at the Mogadishu Somalia. At the end, the researcher structured the data and imported it for analysis.

Table 8

Survey about Mobile learning	
Questions	
Do you know what the mobile learning is?	Yes ☐ No ☐
Only those who know, do you use mobiles in teaching physics?	Yes ☐ No ☐
What is your highest academic degree?	Bachelor Degree /Diploma in Physics ☐ Masters in Physics ☐ Masters Education/dedactics of Physics ☐ PHD in PHYSICS ☐ PHD in Education/dedactics of Physics ☐

4. Data Analysis

Through the online survey, the data was collected. The researchers imported the data from the Excel Spread Sheet into the Statistical Package for the Social Sciences (SPSS) and analyzed it.

Table 1: Descriptive Statistics for the First Research Question (Frequency and Percent)

Do you know what the mobile learning is?		
	Frequency	Percent
Yes	5	10%
No	45	90%
Total	50	100%

The table above discovered that 45 teachers (90.0%) out of the 50 contributors do not know what mobile learning is, while only 5 teachers (10%) knew about it. These results clearly show that mobile learning has yet to be widely being familiar with as a teaching method in schools by physics teachers in Mogadishu Somalia.

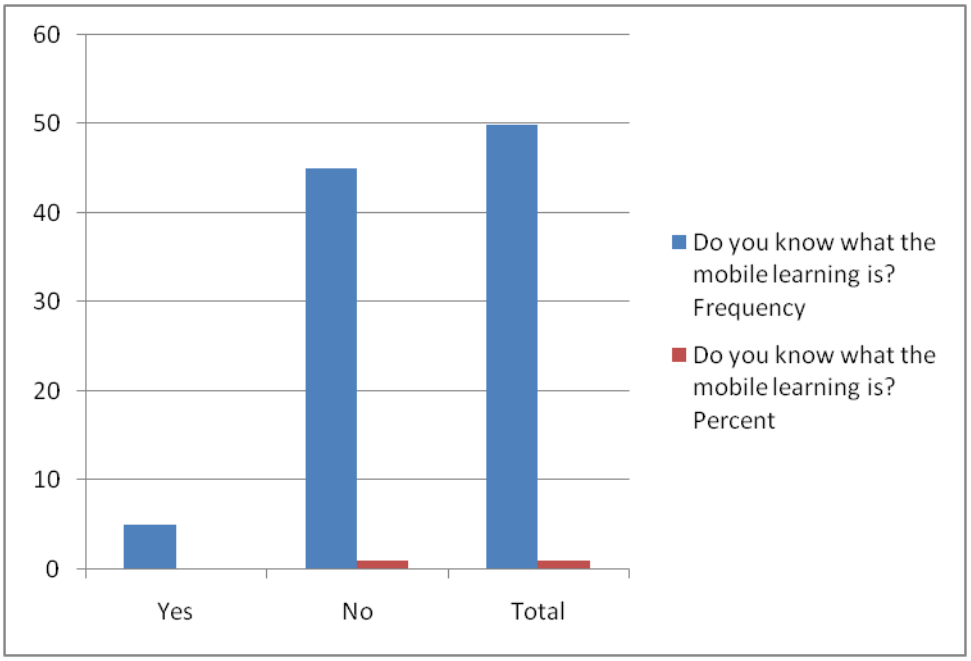

Figure 1: Bar Diagram for the First Question of the Survey

The above diagram shows that mobile learning has yet to be known by physics teachers in Mogadishu Somalia. The number of teachers who do not know about the mobile learning is almost nine times that of those who know about it.

Table 2: Descriptive Statistics for the Second Research Question (Frequency and Percent)

Only for those who know, do you use it in teaching physics?		
	Frequency	Percent
They do not know about the mobile learning, thus they did not answer the question as requested	45	90%
Yes	1	2%
No	4	8%
Total	50	100%

45 physics teachers did not know about the mobile learning. Thus, they did not answer the second question as requested by the researcher. Among the 5 teachers who knew about it, only 1 teacher (2%) admitted that they use it in their teaching, while 4 teachers (8%) do not.

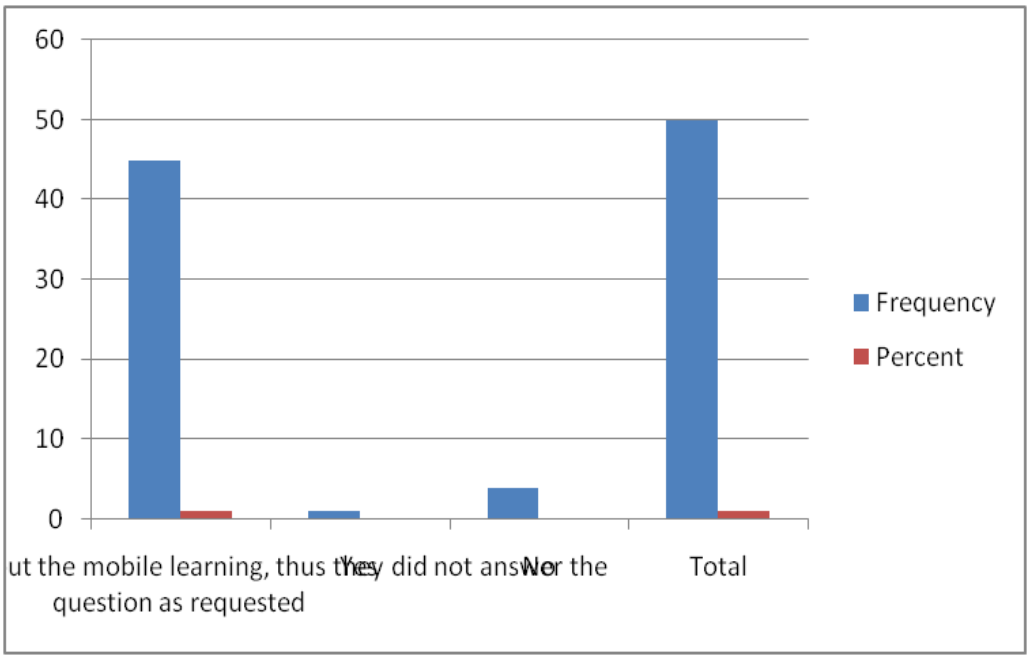

Figure2: Bar Diagram for the Second Question of the Survey

The above diagram clearly shows that usage of the mobile learning in teaching is extremely weak in Mogadishu Somalia. Only 5 teachers know about the mobile learning, 1 out of them use it while the remainder 4 don't. This means that, out of these 5, only 2% use the M-learning in their teaching, while 8% don't.Eventually, a very small part of the teachers who know about mobile learning use it in their teaching of physics.

Table 3: Descriptive Statistics for the Third Research Question (Frequency and Percent)

What is your highest academic degree?		
	Frequency	Percent
Bachelor degree/Diploma in physics	45	90%
Masters in physics	1	2%
Masters in education/didactics of physics	4	8%
PhD in physics	0	0
PhD in education/didactics of physics		
Total	50	100%

The table above shows that most physics teachers, 45 out of 50, hold a Bachelor degree/Diploma in physics. In addition, it shows that the higher the degree, the lower the number of teachers.

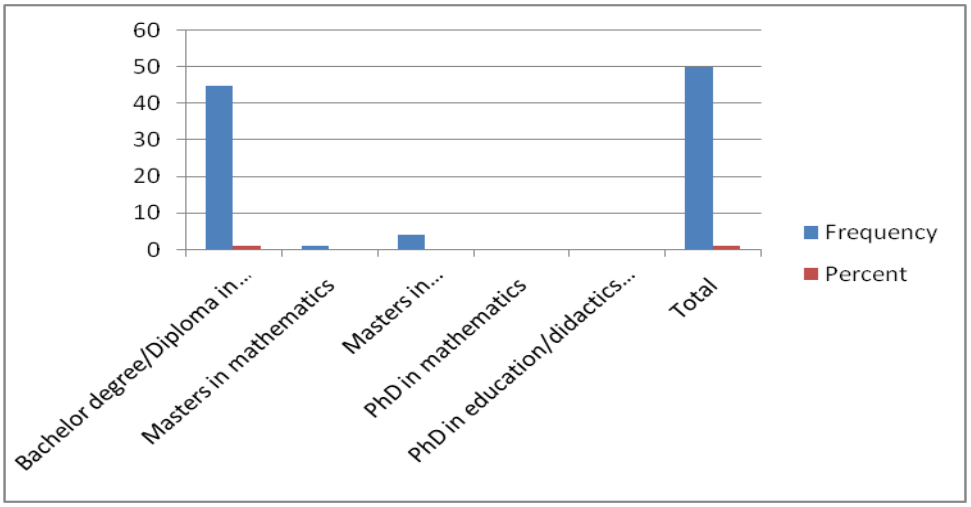

Figure 3: Bar Diagram for the Third Question of the Survey The above diagram shows that most of the physics teachers of the sample of the study did not work on achieving a higher academic degree in physics and, most importantly, in teaching physics.

Table 4: Descriptive Statistics for the First and Third Research Questions (Frequency and Percent)

		Do you know what the mobile learning is?	
		Yes	No
What is your highest academic degree?	Bachelor degree/Diploma in physics	4	40
	Masters in physics	0	0
	Masters in education/didactics of physics	1	5
	PhD in physics	0	0
	PhD in education/didactics of physics	0	0

The table above shows that 40 teachers (90.9%), out of the 44 who hold a bachelor degree/diploma in physics, do not know what is the mobile learning. Concerning those holding a Masters in education/didactics of physics, 5 teachers (83.3%) out of 6 do not know about the mobile leaning. These results show that teachers with a Masters in education/didactics of physics are aware of the mobile learning way more than their colleagues who hold other academic degrees.

Table 5: Results of the Pearson's Chi Square Test on the Effect of teachers' Highest Academic Degree on their Knowledge of the Mobile Learning

Teachers' Knowledge of the Mobile Learning and Academic Degree	Pearson Chi-Square Alfa Value
	What is your highest academic degree?
Do you know what the mobile learning is?	0.0000

According to Morrissette (2014), the Chi-square is used to analyze the data collected by a yes or no survey (Morrissette, 2014).A Chi-square test of independence was calculated to check possible association (if any) between teachers' knowledge of the mobile learning and their highest academic degree. Results showed that there is a significance association between physics teachers' knowledge of the mobile learning and their highest academic degree at the p-level < 0.05. Results of the Chi-square test show that the highest academic degree held by a physics teacher has a significant effect on his knowledge of the mobile learning.

Table 6: Descriptive Statistics for the Second and Third Research Questions (Frequency and Percent)

		Only for those who know, do you use it in teaching physics?		
		They do not know about the mobile learning, thus they did not answer the question as requested	Yes	No
What is your highest academic degree?	Bachelor degree/Diploma in physics	40	1	3
	Masters in physics	0	0	0
	Masters in education/didactics of physics	5	0	1
	PhD in physics	0	0	0
	PhD in education/didactics of physics	0	0	0

The table above shows that, among the 4 teachers who hold a bachelor degree/diploma in physics and know

about mobile learning, only 1 use it in his physics teaching .Among the teacher who hold Masters in education/didactics of physics and know about mobile learning, 0 use it in their physics teaching. In general, only 1 teacher (2%), among the 50 participants, use the mobile learning in their physics teaching, which in turn reflects the weak usage of the M-learning among the physics teachers in Mogadishu Somalia.

Table 7: Results of the Pearson's Chi Square Test on the Effect of teachers' Academic Degree on their Usage of the Mobile Learning

Teachers' Usage of the MobileLearning and Academic Degree	Pearson Chi-Square Alfa Value
	What is your highest academic degree?
Only for those who know, do you use it in teaching physics?	0.135

A Chi-square test of independence was calculated to check possible association (if any) between teachers' usage of the mobile learning and their academic degree. Results showed that there is no significant association between physics teachers' usage of the mobile learning and their highest academic degree at the p-level <0.05. Results of the Chi-square test show that the highest academic degree held by a physics teacher has no significant effect on his usage of the mobile learning.

3. Results and Discussion

results about questions of the research

Based on the order of questions in the questionnaire, a straight forward statistical interpretation was used for ' Q1
to Q4' as summarised below.

Question 1 shows 45 teachers (90.0%) out of the 50 contributors do not know what mobile learning is, while only 5 teachers (10%) knew about it. These results clearly show that mobile learning has yet to be widely being familiar with as a teaching method in schools by physics teachers in Mogadishu Somalia. With reference to question 2 which deals with the percentage of physics teachers use M-learning in their teaching: 45 physics teachers did not know about the mobile learning. Thus, they did not answer the second question as requested by the researcher. Among the 5 teachers who knew about it, only 1 teacher (2%) admitted that they use it in their teaching, while 4 teachers (8%) do not. These results clearly show that there is no awareness of the M-learning, usage of the mobile learning in teaching is extremely weak in Mogadishu Somalia.

Analysed response for Question 3 Frequency and percentage values were calculated to show the highest academic degree held by a physics teacher in Mogadishu Somalia affect his knowledge about the M-learning: 45 out of 50, hold a Bachelor degree/Diploma in physics. In addition, it shows that the higher the degree, the lower the number of teachers. These results clearly show that most of the physics teachers did not work on achieving a higher academic degree in physics and, most importantly, in teaching physics.

Analysed response for Question 4, indicate the follow-ing summarised results Frequency and percentage values were calculated to show those who are aware of the M-learning, does their highest academic degree have an effect on their usage of mobiles in physics teaching: 40 teachers (90.9%), out of the 44 who hold a bachelor degree/diploma in physics, do not know what the mobile learning is. Concerning those holding a Masters in education/didactics of physics, 5 teachers (83.3%) out of 6 do not know about the mobile leaning. These results show that teachers with a Masters in education/didactics of physics are aware of the mobile learning way more than their colleagues who hold other academic degrees.

4. Conclusion

In this study, the researcher have presented that physics teachers' usage of the M-learning is too little in Mogadishu Somalia. 90% of the participants do not know about the M-learning. Many reasons could play a factor in this. Teachers' dependence on the traditional teaching method and their comfort using it could be one of the reasons that prevent them from looking for new found alternatives and changing their techniques in teaching physics. Furthermore, only 1 teacher (2%) out of the 50 participants uses the mobile learning in teaching physics. Among the 5 teachers who know about it, only 20% use the M-learning in their teaching, while 80% don't. These percent reveal the weak and limited usage of the M-learning in teaching physics in Mogadishu Somalia. Then again, it look likes that not so many physics teachers are interested in achieving a masters or a PhD degree in education/teaching physics since the majority of the teachers of the sample hold a bachelor degree/diploma in physics. Results of the Chi-Square Test showed that the highest academic degree has a significant effect of teachers' knowledge of the M-learning and the highest percent of teachers who know about it hold a masters degree in education/didactics of physics. Due to that, the researcher can hypothesize that the highest academic degrees held by a physics teacher in Mogadishu Somalia affect his knowledge about the M-learning. Lastly, based on the results of the Chi-Square Test, the researcher can hypothesize that the highest academic degree does not affect teachers' usage of mobiles in their teaching.

5. Recommendations

1) M- learning still has a lot of obstacles to overcome in education. According to the results of this study, teachers' knowledge of the M-learning is very fragile. For that, teachers could be assigned a comprehensive teacher training programme related to the implementation of m-learning practices in the classroom.

2) Usage of the M-learning in teaching physics is very weak in Mogadishu Somalia. Several schools might be against it. However, the presence of the social media platforms, like WhatsApp, enforces learning through mobiles. Teachers can take advantage of that and network with their students outside the classes. They can put into effect students' learning through this never before seen technology from any place at any time.

3) Physics teachers should not settle down with the bachelor/diploma in physics. On the contrary, a master's in education/didactics of physics can provide them with new teaching techniques they were not aware

of. Through courses, they can be presented to new techniques that can support students' learning of physics.

4) Results of this study exposed that one teacher (2%) out of the 50 participants use the mobile learning in teaching physics. Through the principle sampling technique, future researches could be dedicated to shaping and explicating the methods of usage of the mobile learning in Mogadishu Somalia to enlighten others about its benefits.

5) Upcoming researches should be allocated to determine the disuse of the mobile learning by many physics teachers even those who hold a masters degree in education or didactics of physics. Reasons for that should be determined. Researchers can determine if the teacher himself or the school was the reason behind using the M-learning in teaching.

5) One teacher (2%), among the 50 participants, uses the mobile learning in his physics teaching. Future researches should be assigned to determine how mobile learning is used by some of these teachers to enlighten others about it.

References

[1] B. Loveless. "Using Cell Phones as Learning Tools". Available: https://www.educationcorner.com/cell-phones- learning-tools.html[Dec 09, 2021].

[2]Samira Al Hosni. "mobile learning: enhancing learning through cell phones" .Available: https://www.britannica.com/topic [November 24, 2021].

[3]Samira Al Hosni. "mobile learning: enhancing learning through cell phones) " .Available: International Journal of Management, Information Technology and Engineering (BEST: IJMITE) ISSN (P): 2348-0513, ISSN (E): 2454-471X Vol. 4, Issue 9, Sep 2016, 17-22 © BEST Journals [November 24, 2021].

[4]John, Ahmed, and Laurent. "Using Mobile Phones to Improve Educational Outcomes: An Analysis of Evidence from Asia)".Available: https://files.eric.ed.gov/fulltext/EJ881581.pdf. [November 24, 2021].

[5]Louris and Etekleous ."We need an educationally relevant definition on mobile learning, in mLearn" 2005 4th World conference on mLearning. Conference. 2005: Cape Town: South Africa.

[6]Ramírez."Recursos tecnológicos para el aprendizaje móvil (mlearning) y su relación con los ambientes de educación a distancia: implementaciones e investigaciones. Revista Iberoamericana de Educación a Distancia", 2009. 12(2): p. 57-82.

[7] Sharples,M."Mobile Learning. Small devices, Big Issues, in Technology Enhance Learning.Principles and Products", Springer, Editor. 2009. p. 233-249.

[8]https://www.academia.edu/12244094/Using_Mobile_Devices_In_E_Learning_Programms.[6,2021].

[9]Jarvia, P, Holford, J, Griffin, C."The theory and practice of Learning. London: Kogan Page KeeganD.: The future of learning: From eLearning to mLearning", (2003) available online at http://learning.ericsson.net/leonardo/thebook/book.htm

[10] Conole and Oliver. "Contemporary perspectives in E-Learning research". London: Routledge. 2007.

[11] Sharples. "Big Issues in Mobile Learning: A Report of a workshop by the Kaleidoscope Network of Excellence Mobile Learning Initiative".(2007)

[12]https://www2.le.ac.uk/departments/beyond-distance-research-alliance/projects/wolf/wolf deliverables/LITERATURE%20REVIEW%20ON%20WORKBASED%20MOBIL%20LEARNING%201.pdf

[13]WaycottJ. "An Investigation into the Use of Mobile Computing Devices as Tools for Supporting Learning and Workplace Activities', 5th Human Centred Technology Postgraduate Workshop (HCT-2001), Brighton, UK, September 2001, available online at http://www.cogs.susx.ac.uk/lab/hct/hctw2001/papers/waycott.pd.

[14] Roibás A.C., SánchezI.A. "Design scenarios for m-learning, Proceedings of the European Workshop on Mobile and Contextual Learning", (p. 53-56), Birmingham, UK, June 2002.

[15]RogersT. "Mobile Technologies for Informal Learning – a Theoretical Review of the Literature, Proceedings of the European Workshop on Mobile and Contextual Learning", (p. 19-20), Birmingham, UK, June 2002

[16] DvorakJ. D., BurchananK. "Using Technology to Create and Enhance Collaborative Learning", Proc. of 14th World Conference on Educational Multimedia, Hypermedia and Telecommunications (ED-MEDIA 2002) , Denver, CO, USA, June 2002.

[17]MifsudL."Alternative learning arenas – pedagogical challenges to mobile learning technology in education", Proc. of IEEE International Workshop on Wireless and Mobile Technologies in Education (WMTE 2002) , (p. 112-116), Växjö, Sweden, August 2002.

[17] Kukulska-HulmeA. "Cognitive, Ergonomic and Affective Aspects of PDA Use for Learning, Proceedings of the European Workshop on Mobile and Contextual Learning", (p. 32-33), Birmingham, UK, June 2002.

[18] WaycottJ., ScanlonE., JonesA., "Evaluating the Use of PDAs as Learning and Workplace Tools: An Activity Theory Perspective, Proceedings of the European Workshop on Mobile and Contextual Learning", (p. 34-35), Birmingham, UK, June 2002.

[19] KeeganD. "The future of learning: From eLearning to M-Learning", available online at

http://learning.ericsson.net/leonardo/thebook/book.htm).

[20] MCCONATHA, PRAUL, & LYNCH. "mobile learning in higher education: an empirical assessment of a new educational tool 2008)".Retrieved from Research paper. West Chester University. 15-21:

[21] Sharples. "The Design of Personal Mobile Technologies for Lifelong Learning". Computers & Education, 34, 177-193. 2000.

[22] Wagner."Enabling Mobile Learning". *EDUCAUSE Review, 40*(3), 41-42. 2005, Retrieved February 4, 2022 from https://www.learntechlib.org/p/99141/.

[23] Vavoula and Sharples. "Meeting the Challenges in Evaluating Mobile Learning:3-level Evaluation Framework". International journal of mobile and blended learning, 2009, 1, 2, pp.54-75.

[24] Mehdipour and Zerehkafi "Mobile Learning for Education: Benefits and Challenges". Retrieved from International Journal of Computational Engineering Research, 3(6), 93-101:

[25] Mehdipour, Y., & Zerehkafi, H. "Mobile Learning for Education: Benefits and Challenges".Retrieved from International Journal of Computational Engineering Research, 3(6), 93-101.(2013).

[26] Singh Gure, G. "M-Learning: Implications and Challenges". Retrieved from International Journal of Science and Research (IJSR), 5(12), 2087-2093:(2015).

[27] Mohammad,Naim. "Mathematics Teachers' Knowledge and Usage of the Mobile Learning", A Case Study in Lebanon, - International Journal of Science and Research (IJSR).Avalable at: https://www.researchgate.net/publication/337305100_Mathematics_Teachers%27_Knowledge_and_Usage_of_the_Mobile_Learning_A_Case_Study_in_Lebanon.[2018/01/01]

[28]Gay,Mills,& Airasian, "Educational Research Competencies for Analysis and Applications". Pearson, Columbus P. (*2009*).Avalable at; https://us.sagepub.com/sites/default/files/upm binaries/70019_Mertler_Chapter_7.pdf.