Pre-Service Teachers' Use of Smartphone in Learning: A Case Study at Foso College of Education

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*Abstract :*The use of smartphones to facilitate teaching and learning is very essential in this information era. It is for this reason that Foso College of Education, AssinFoso permits its pre-service teachers to own and use smartphones to support their learning. This study was on the ownership and use of smartphones among first year pre-service teachers of Foso College of Education. The purpose of this study was to find out whether pre-service teachers own smartphone, and for those who do, what they are primarily used for. In this case study, 210 first year pre-service teachers were randomly selected and asked to complete a questionnaire. The study showed that, majority of the first year pre-service teachers own smartphones and memory cards can be plugged into their smartphones. Again the results showed that, more females own smartphones than the males. While the most popular use of smartphone was for making calls, the least popular use of smartphone was for creating and editing of documents among first year pre-service teachers. From the findings of this study, it is recommended that, there should be policy by the college in collaboration with the government to assist pre-service teachers to own smartphones and encourage pre-service teachers to primarily use smartphones to support their studies.

*Key Words:*Smartphone, pre-service teachers, teaching and learning.

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I. INTRODUCTION

In this modern era, learning takes place by using different means like the calculator, computer, social media and open resources. So, in the twenty first century people and students learn not only by using face-to-face tutorials, chalkboard learning but, they concentrate on using different ICT tools that enhance their understanding of concepts in learning. Again, laptops, tablets and smartphones are used to support communication both in and out of classroom. These ICT tools are also used to assist and enhance students learning at all levels of education. According to Agyei and Benning (2014), the introduction of open source software and use of instructional technology for pre-service teachers can assist pre-service teachers to develop their attitude towards the use of technology in both teaching and learning.

In Ghana, a lot of adult citizens including pre-service teachers own a smartphone which is used for various purposes like making calls, sending text messages etc. Smartphones and other mobile digital devices such as tablets can be useful didactic resources for developing subjects understanding in both face-to-face and distance studies in colleges. Students may use smartphones as instrument conducive to educational and personal interaction, fostering relationship among students and their teachers (Bedall-Hill, 2010; Chayko, 2008; Franklin, 2011; Johnson, Adams Becker, Estrada & Freeman, 2014; Oulasvirta, Wahlstrom& Ericsson, 2011; UNESCO, 2013; Vázquez-Cano, 2014). Considering the significance of ICT tools which includes the use of smartphones in learning, Ministry of Education in Ghana has developed a policy of integrating ICT to support teaching and learning at all levels of education (Agyei&Voogt, 2011). To implement the ICT policy, the Ghana government distributed some laptops to some teachers and some tertiary institutions also distributed tablets to some pre-service teachers for the purpose of supporting teaching and learning. So now the question is that, with the availability of smartphones in Ghana do learners own and use smartphones to assist their learning in the college?

The use of smartphones has advantages for teaching profession. In the teaching and learning processes, smartphones can be used to take note, take photos as evidence, keep documents, and access the internet for learning resources by both teachers and students From the literature available, though many research have been conducted on the use of ICT for teaching and learning purposes, not much has been dedicated to the use of smartphones in teaching and learning in Ghana. Therefore, this attracted the attention of the researcher to investigate the use of smartphones in teaching and learning among first year pre-service teachers, to examine the extent to which they are taking advantage of such ICT tool in their learning and whether pre-service teachers will be using smartphones to assist in-school teaching practice and as in-service teachers. Some smartphones have slots that memory cards or micro SD cards can be plugged into and this increases the storage space available on the smartphones. The increase of storage space help to store more resources at a time and information on memory cards or micro SD cards can also be read using different ICT tools.

The literature available on the use of smart ICT tools show that, smartphone technology has unquestioned potential to be used as a learning tool in and out of the classroom by teachers and pre-service teachers alike. Also, the increasing capabilities of smartphones position them as the technology of choice, replacing personal computers, for many users, especially college students.

As such, the use of these devices must be contemplated on as an inevitable learning tool available to students in higher education (Yu & Conway, 2012). Smartphones are increasingly ever present, penetrating and transforming everyday practices and spaces. The regular activities of smartphones comes in different formats like text and with mini videos, micro blogging applications and social networks such as Facebook, WhatsApp etc. Smartphones have become powerful instrument in academic, people's social and work life but not that they are tools for communication. Therefore, educational institutions in developed and developing countries are now trying to adopt different teaching methods and perspectives through the use of smartphones in the learning process (Johnson, Adams Becker, Estrada & Freeman 2014; UNESCO, 2013; Vázquez-Cano, 2014). Mobile technologies are playing an increasingly important role in college students' academic lives. Devices such as smartphones, tablets, and e-book readers connect users to the world instantly, increasing accessibility to information and enabling users to interact with each other. The use of mobile technology such as smartphone for teaching and learning has become a rapidly evolving area of educational research in different countries (Collins, 1996; Dyson, Litchfild, Lawrence, Raban, &Leijdekkers, 2009; Frohberg, Göth, &Schwabe, 2009; Johnson, Means, &Khey, 2013; Vavoula, Pachler, &KukulskaHulme, 2009; Vázquez-Cano, 2014). In addition, smartphones are currently seen as one of the most suitable platforms for mobile learning purposes (Woodill, 2011; Asabere, Enguah& Mends-Brew, 2012).

In Foso College of Education, pre-service teachers are not banned from owning and using smartphone in the college except using it for pornographic and criminal deals. Also, the college has Wi-Fi network that broadcast to cover the entire campus and the halls of residence of the pre-service teachers. Considering the benefits of using smartphones in teaching and learning process and the kind of support that pre-service teachers can get from the use of smartphones in teaching and learning in both on-campus and off-campus practices, this study sought to explore whether first year pre-service teachers of Foso College of Education own and use smartphones to support their studies in the college.

III.   RESEARCH METHODOLOGY

This study was conducted at Foso College of Education with the aim of exploring the ownership and use of smartphones by first year pre-service teachers. Firstly, case study was used to find out whether pre-service teachers own smartphones, and if they own memory card (SD card or micro SD card) and that memory card is plugged into the smartphone and secondly, what those who own smartphones use them for.The population for this study was 328 first year pre-service teachers. The population consists of 213 (65%) males and 115 (35%) females. 210 pre-service teachers were sampled using computer generated random numbers. Pre-service teachers whose index number corresponded to computer generated numbers were selected as the sample. The sample consists of 134 (63.8%) males and 76 (36.2%) females.The sampled pre-service teachers were given questionnaire to complete. Questionnaire was used because, it is an effective means of measuring behaviour and preference at a relatively low cost (Mclead, 2014). The questionnaire was grouped into three parts; the first part sort the gender of the pre-service teachers, part two asked pre-service teachers to select their use of smartphone, if they own one and asked whether pre-service teachers own memory card (SD card or micro SD card) that can be plugged into the smartphone and finally, the third part asked pre-service teachers whether they store resources that support their learning on the smartphone.The data obtained from the pre-service teachers were computed into SPSS and analysed using frequency distribution tables and percentages.

IV. RESULTS AND DISCUSSION

4.1 Results
4.1.1 Ownership of Smartphone
The pre-service teachers are permitted to own and use smartphone to support their studies for both on-campus and off-campus learning of the college with no restriction. It is expected that pre-service teacher would own a smartphone and use it to assist their learning. Pre-service teachers' ownership of smartphone is popular as shown in Table 4.1.

Table 4.1: Ownership of Smartphone

Item		Frequency	Percent (%)
Own smartphone	No	49	23.3
	Yes	161	76.7
	Total	210	100

From Table 4.1, 161 (76.7%) pre-service teachers own smartphones in Foso College of Education. This suggests that majority of the pre-service teachers own smartphones on campus.

To check the possibility of pre-service teachers ownership of memory card (SD card or micro SD card) and that they are plugged into the smartphone, cross tabulation was done between the ownership of memory card (SD card or micro SD card) that are plugged into smartphone and the ownership of smartphone . The result is presented in Table 4.2. Cross tabulation indicated that, quite a number of pre-service teachers own smartphones and memory cards and memory cards are plugged into the smartphones.

Table 4.2: Cross Tabulation of Ownership of Smartphone and Memory card that are Plugged into Smartphone

Item		Ownership of Memory card (SD card or micro SD card) that are plugged into your smartphone						Total
		No	Percent (%)	Yes	Percent (%)	Don't Know	Percent (%)	
Own smartphone	No	16	27.1	33	22.1	0	0.0	49
	Yes	43	72.9	116	77.9	2	100.0	161
Total		59	100	149	100	2	100	210

Table 4.2 reveals that, 116 (77.9%) pre-service teachers own smartphones and memory card (SD card or micro SD) and that memory cards are plugged into their smartphones. Almost 73%, that is 43 (72.9%) pre-service teachers own smartphones and do not own memory card (SD card or micro SD) and also memory cards cannot be plugged into their smartphones. This indicates that, majority of the pre-service teachers who own smartphones also own memory card (SD card or micro SD) and memory card is plugged into their smartphone. This also indicates that, pre-service teachers have sufficient storage devices to store useful resources for their studies.

The ownership of smartphone was cross-tabulated with gender to check the possibility of ownership by sex. The result is presented in Table 4.3 and the result suggests that, ownership of smartphone is popular among females than the male counterparts.

Table 4.3: Ownership of Smartphone by Gender

Item		Gender				Total
		Female	Percent (%)	Male	Percent (%)	
Own Smartphone	No	12	15.8	37	27.6	49
	Yes	64	84.2	97	72.4	161
Total		76	100	134	100	210

Table 4.3 indicates that, 97 (72.4%) male pre-service teachers own smartphones whiles 64 (84.2%) female pre-service teachers own smartphones at Foso College of Education. This shows that, majority of the female pre-service teachers own smartphones than the male counterpart pre-service teachers.

4.1.2 Uses of Smartphone

To answer the question on what pre-service teachers use their smartphones for, the pre-service teachers were asked to select from pre-defined list of uses, all the uses that apply to them. The responses are presented in Table 4.4.

Table 4.4: Uses of Smartphone

Item		Frequency	Percent (%)
Use smartphone to make calls	No	10	4.8
	Yes	200	95.2
	Total	210	100
Use smartphone to text messages	No	38	18.1
	Yes	172	81.9
	Total	210	100
Use smartphone to send e-mails	No	69	32.9
	Yes	141	67.1
	Total	210	100
Use smartphone to access internet	No	29	13.8
	Yes	181	86.2
	Total	210	100
Use smartphone to take videos and photos	No	34	16.2
	Yes	176	83.8
	Total	210	100
Use smartphone to read documents	No	66	31.4
	Yes	144	68.6
	Total	210	100
Use smartphone to create and edit documents	No	93	44.3
	Yes	117	55.7
	Total	210	100
Use smartphone to store useful resources for your teacher training study	No	71	33.8
	Yes	139	66.2
	Total	210	100

Table 4.4 indicates that, 210 pre-service teachers use smartphone for various purposes in campus of Foso College of Education. It can also be seen that, 200 (95.2%) pre-service teachers use smartphone to make calls, 181 (86.2%) pre-service teachers use smartphones to access internet and 176 (83.8%) pre-service teachers use smartphone to take videos and photos. These are the most popular usage of smartphones. Again, Table 4.4 shows that, 141 (67.1%) pre-service teachers use smartphones to send e-mails, 139 (66.2%) pre-service teachers use smartphones to store useful resources for their teacher training studies and 117 (55.7%) pre-service teachers use smartphones to create and edit documents are the least popular use of smartphones. This suggests that, the first year pre-service teachers of Foso College of Education mostly use smartphones to make calls, access internet and take videos and photos than the use of smartphones to store useful resources for their teacher training studies or create and edit documents. Again, it indicates that, smartphones are used to make calls, access internet, take videos and photos, send text messages, read documents, send e-mails, store useful resources for their studies and create and edit documents in the order of popular use.

In order check on the use of smartphones against gender, cross-tabulation was done. The responses in Table 5.5 shows that, many of the male pre-service teachers use smartphones to perform pre-defined activities than the female counterpart.

Table 5.5: Use of Smartphone by Gender

Item				Gender		Total
				Female	Male	
Use smartphone to make calls	No		Frequency	6	4	10
			Percent (%)	60.0	40.0	100
	Yes		Frequency	70	130	200
			Percent (%)	35.0	65.0	100
	Total		Frequency	76	134	210
			Percent (%)	36.2	63.8	100
Use smartphone to text messages	No		Frequency	14	24	38
			Percent (%)	36.8	63.2	100
	Yes		Frequency	62	110	172
			Percent (%)	36.0	64.0	100
	Total		Frequency	76	134	210
			Percent (%)	36.2	63.8	100
Use smartphone to send e-mails	No		Frequency	25	44	69
			Percent (%)	36.2	63.8	100
	Yes		Frequency	51	90	141
			Percent (%)	36.2	63.8	100
	Total		Frequency	76	134	210
			Percent (%)	36.2	63.8	100
Use smartphone to access internet	No		Frequency	7	22	29
			Percent (%)	24.1	75.9	100
	Yes		Frequency	69	112	181
			Percent (%)	38.1	61.9	100
	Total		Frequency	76	134	210
			Percent (%)	36.2	63.8	100
Use smartphone to take videos and photos	No		Frequency	14	20	34
			Percent (%)	41.2	58.8	100
	Yes		Frequency	62	114	176
			Percent (%)	35.2	64.8	100
	Total		Frequency	76	134	210
			Percent (%)	36.2	63.8	100
Use smartphone to read documents	No		Frequency	28	38	66
			Percent (%)	42.4	57.6	100
	Yes		Frequency	48	96	144
			Percent (%)	33.3	66.7	100
	Total		Frequency	76	134	210
			Percent (%)	36.2	63.8	100
Use smartphone to create and edit documents	No		Frequency	43	50	93
			Percent (%)	46.2	53.8	100
	Yes		Frequency	33	84	117
			Percent (%)	28.2	71.8	100
	Total		Frequency	76	134	210
			Percent (%)	36.2	63.8	100
Use smartphone to keep useful resources for your	No		Frequency	25	46	71

study		Percent (%)	35.2	64.8	100
	Yes	Frequency	51	88	139
		Percent (%)	36.7	63.3	100
	Total	Frequency	76	134	210
		Percent (%)	36.2	63.8	100

Table 5.5 shows that, out of the 139 pre-service teachers who use smartphones to store useful resources for their studies, 88 (63.3%) are males and 51 (36.3%) are females, out of 117 pre-service teachers who use smartphones to create and edit documents, 84 (71.8%) and 33 (28.2%) are males and females respectively. Again, out of 181 pre-service teachers who use smartphones to access internet, 112 (61.9%) are males and 69 (38.1%) are females, out of 141 pre-service teachers who use smartphones to send e-mails, 90 (63.8%) are males and 51 (36.2%) are females and out of 200 pre-service teachers who use smartphones to make calls, 130 (65%) are males and 70 (35%) are females. This result suggests that, there is little number of male and female pre-service teachers who use smartphone to support their studies at Foso College of Education.

4.2 Discussion

Foso College of Education allows pre-service teachers to own and use smartphones on campus to support teaching and learning both in and out of the college. ICT device such as smartphones allow users like pre-service teachers connect to the world instantly, increasing accessibility to information and enabling users to interact with each other. Again in teaching, smartphones can be used to take notes, photos, videos, keep documents etc.

From the results, majority (76.7%) of the first year pre-service teachers own smartphones on campus. Also the results show that, many (77.9%) of the first year pre-service teachers of Foso College of Education own smartphones and own Memory cards or SD cards and the memory cards are plugged into their smartphones. This indicates that, most of the pre-service teachers have smartphones with additional storage device that can be used to store useful resources or documents to support learning and useful resources stored on the memory cards can also be read using another smartphone or using different smart ICT tools. Moreover, the results pointed out that there are more (84.2%) first year female pre-service teachers who own smartphones than the (72.4%) first year male pre-service teacher counterparts in Foso College of Education.

With respect to the uses of smartphones owned by pre-service teachers in first year the result suggests that, majority of the pre-service teachers popularly (95.2%) use smartphones to make calls, (86.2%) use smartphones to access internet and (83.8%) use smartphones to take videos and photos. The result again shows that, minority of the first year pre-service teachers popularly use smartphones to store useful resources for their teacher training studies or create and edit documents. Also, the result indicates that first year pre-service teachers use smartphones on campus of Foso College of Education to make calls, access internet, take videos and photos, send text messages, read documents, send e-mails, store useful resources for their studies and create and edit documents in order of popular use. This result suggests that, most of the first year pre-service teachers do not use the smartphones to store, create and edit documents that support their learning and that first year pre-service teachers will not have the attitude of using smartphones to support teaching and learning when pre-service teachers become in-service teachers. This result also suggests that, many of the first year pre-service teachers in Foso College of Education will only rely on note taking in classrooms, read the few available books at the library and books provided by the college for their studies more than they use smartphones to download and read documents from tons of open learning resources to support their studies both in and outside the campus. This result again suggests that, the first year pre-service teachers will not have wide scope of knowledge to enrich their pedagogical content knowledge.

From the result, it can be seen that (63.8%) males and (36.2%) females of first year pre-service teachers who use smartphones to support their studies in Foso College of Education. This result also suggests that, there are few first year pre-service teachers who have taken advantage of smartphones to support their studies by accessing the internet and storing useful resources, creating and editing documents (UNESCO, 2013; Vázquez-Cano, 2014) and not relying only on their books available at the library and books the college provides to them. However, with the few first year pre-service teachers of Foso College of Education who use smartphones to support their studies, there are less female pre-service teachers than the male pre-service teachers who use smartphones to support their studies. This result also shows that, there are more male pre-service teachers who go beyond their classroom notes and read books available to them than the female pre-service teacher counterpart that have taken advantage of the smartphones and use them to access the internet, store useful resources and create and edit documents to support their studies.

V. CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

5.1 Conclusions

Pre-service teachers are the next generations of teachers who must own smartphones and use in order to succeed in this technological era. The use of smartphones to facilitate classroom instruction is the norm, because smartphones can be used to assist all people at their work places and life including the classrooms. First year pre-service teachers of Foso College of Education may not effectively be able to apply the use of smartphones in their classrooms, because majority of the pre-service teachers do not use smartphones to support their own learning. The concern is, because they have not cultivated the habit of using

smartphones to support their learning, they may not see the need to use smartphones to facilitate teaching and learning in their classrooms. There are more females than males among first year pre-service teachers who own smartphones, but there are many male than female pre-service teachers who use smartphones to support their own learning. However, both male and female pre-service teachers do not primarily use smartphones to support their studies.

5.2 Implications

The non-possession and non-use of smartphones to support learning have negative implications. First, the pre-service teachers do not consult any other learning resource than the teaching notes they take during their lessons, lecture notes provided by the tutors and the few books available at the library that are sometimes difficult to locate. The pre-service teachers' sources for learning may not enable them read about current issues and gain sufficient information regarding their subject of studies as a result they are not likely to possess rich subject-matter content knowledge. Therefore, their scope of learning is narrow. The danger is that in their own practice as teachers they will not direct their pupils to use information and communication technology for learning. Second, the pre-service teachers do not and will not get the motivation to use ICT tools like smartphones to access the tons of educational resources available on the internet to enhance their teaching and learning as pre-service and when they become in-service teachers.

5.3 Recommendations

Based on the findings of this study, the following recommendations were made:

a. There should be policy by the college in collaboration with the government to assist pre-service teachers to own smartphones and encourage pre-service teachers to primarily use smartphones to support their studies.

b. The college should have policy for tutors to use ICT tool like smartphones to facilitate their teaching and learning.

c. Smartphone use in the classroom during actual delivery of lesson should be encouraged.

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