

From paper and pencil to mobile phone photo note-taking among Tanzanian university students: Extent, motives and impact on learning

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ABSTRACT

This study examined the extent, motives and impact of mobile phone photo note-taking on students' learning at Dar es Salaam University College of Education (DUCE) in Tanzania. It employed the mixed methods approach. A sample of 310 respondents was drawn using a multi stage sampling technique which involved stratified random sampling at the first stage and convenient sampling at the second stage. Questionnaires and interviews were used to obtain data for the study. The findings revealed that mobile photo note-taking was a common practice at DUCE. The time consuming nature of handwritten notes, Speedy lecturing, easy access to notes, peer and technological influence were claimed to be the motives behind students' fondness to the practice. It was also revealed that the distraction of concentration, impairment of handwriting skills and speed, poor attendance to the lecture sessions, and distortion of students' ability to compose and organize their own work were the impact of the practice. The study recommends that the University should create better teaching and learning environment to allow university students to use variables and multiple note-taking methods for best results underlying each method.

Keywords: *paper and pencil, mobile phone, mobile phone photo note-taking, student learning.*

INTRODUCTION

The teaching and learning process at university level involves a myriad of academic duties. Of the many duties, note-taking is a significant component of formal classroom teaching and learning process (Stacy & Cain, 2015). It is an essential means by which university students acquire information from textbooks, lectures, tutorials, and seminar presentations and use them for reflection and recalling in the future (Boch, 2005; Nguyen, 2006; Schoen, 2012). For decades, paper and pencil has been a popular note-taking method among university students in many countries, both in the global North and South (Reimer, Brimhall, Cao, O'Reilly, 2009). This method has been proposed to improve students' concentration, understanding, handwriting and develop their vocabularies to mention but a few (William & Eggert, 2002; Nguyen, 2006). Reimer et al., (2009) add that the major benefit of the method is the flexibility and the ability to incorporate many different formats and special notations.

It is argued further that paper and pencil note-taking promotes the students' ability to translate classroom information and reproduce it in a personally meaningful way (Roediger, Gallo & Garcia, 2002). Admittedly, students who take more course notes during class lectures are reported to have improved retention and in general are high performers on examinations compared to their counterpart (William & Eggert, 2002; Castello & Monereo, 2005; Burns, 2006). Commenting on the critical role of the very note-taking method, Stacy and Cain (2015) opine that note-taking should not become an art lost to the ages of recorded class lectures and pre-filled handouts. They argued further that without the valuable skills of listening and taking notes, students might become incompetent practitioner, incapable of listening, reading, organising, integrating and utilizing information.

However, with fabulous advances in modern technology, in particular the proliferation of smart phones, in many countries and Tanzania in particular, university students rely heavily on smart phones to complete several academic tasks (Reimer et al., 2009; Mtega et al., 2012; Anzai et al., 2013; Kafyulilo, 2014; Rabiou et al., 2016). Smart phones have virtually revolutionized and redefined the way students interact, create, share and exchange information as well as their methods of learning (Avraamidou, 2008; Blumstock & Eagle, 2010). These devices are currently altering students from the traditional paper and pencil note-taking to a digital note-taking method referred to in this paper as “*mobile phone photo note-taking*” at an alarming pace (Washull, 2001; McCrudden, Schraw, Hartley, & Kiewra, 2004).

At the Dar es Salaam University College of Education (DUCE) the practice of students using their smart phones’ cameras to take photos of lecture slides, text books, announcements and handouts is becoming increasingly apparent. However, despite the conspicuous uptake of this new note-taking method, there is a paucity of empirical studies in Tanzania that have primarily focused on the practice. Thus, there is less certainty about the extent, causes and impact of mobile phone photo note-taking method on students’ learning. Therefore, this study examined the extent, motives behind and impact of mobile phone photo note-taking among university students. Specifically, the study attempted to answer the following research questions: What is the extent of mobile phone photo note-taking among university students? Does mobile phone photo note-taking vary according to students’ sex and years of study? What is it that motivates students to engage in mobile phone photo note-taking? What impact does mobile phone photo note-taking have on students’ learning?

METHODOLOGY

The study employed a mixed methods approach and a concurrent triangulation design (Creswell & Plano, 2007; Creswell, 2009; 2014 & Yin, 2009). Since it is a ‘problem-driven’ approach concerned specifically with providing practical solutions to real-world problems Denscombe (2007, p. 109); Sharlene (2010); Creswell (2014), the approach allowed better understanding of the problem under scrutiny than either approach would have been used alone. The study population was comprised of 5281 students and 208 lecturers from DUCE. Specifically, a sample size of 310 respondents was obtained. In which 300 were students selected from the first, second and third years of study and 10 were lecturers. The sample size of 300 was representative of the students’ population in line with Krejcie and Morgan (1970) table for determining sample size. Likewise, the sample size of 10 lecturers was obtained after the point of data saturation was reached (Patton, 2015). A multi stage sampling technique involving stratified random sampling and convenient sampling procedures was employed to obtain the respondents. At the first stage, stratified random sampling based on academic years of study and sex was adopted for choosing 100 students from each academic year for questionnaires. At the second stage, the convenient sampling was employed to obtain 24 students among those who filled questionnaires to participate in Focus Group Discussions (FGDs). Convenient sampling was also employed to obtain 10 lecturers.

The study triangulated questionnaires, Focus Group Discussions (FGDs), and interviews in data collection. A set of 300 open and closed ended questionnaires was administered to obtain data from students. Specifically, questionnaires provided data student’s demographic information, the extent to which university students engage in mobile phone photo note-taking, the motives behind the practice, and its impact on students’ learning. To ensure confidentiality the questionnaires contained no field to indicate the respondents’ personal identities such as names and/or registration number. Likewise, questionnaires were administered and collected immediately, this ensured recovery of all 300 dully filled questionnaires. Likewise, in order to complement and validate the information obtained through questionnaires, three separate FGDs each comprising

of 8 students from each academic year was conducted. On the other hand, interviews were used to seek information from university lecturers particularly on the motives behind students' engagement on mobile phone photo note-taking and its impact on students learning. Data were analysed in accordance with each approach, whereas quantitative data were analysed with the aid of the Statistical Packages for Social Sciences (SPSS) program version 21 and were presented in frequencies and percentages. A t-test was performed to test the variation of mobile phone photo note-taking by students' sex and year of study. The qualitative data were subjected to thematic analysis involving six concurrent stages including; Data familiarisation, generation of initial code, searching for themes, reviewing themes, defining and naming themes, and report writing (Braun & Clarke, 2006).

FINDINGS AND DISCUSSION

The extent of mobile phone photo note-taking among university students

Using a 5 point Likert scale ranging from 'Very often (5), Often (4), occasionally (3), rarely (2), and Never (1), respondent students were required to show the extent to which they engage in mobile phone photo note-taking. The findings are summarized in the Table 1.1 below.

Table 1.1: The extent of mobile phone photo note-taking among students

How often do you engage in mobile photo note taking?	Frequency (N)	Response (%)	Total
Very Often	77	25.7	25.7
Often	60	20.0	20.0
Occasionally	47	15.7	15.7
Rarely	80	26.6	26.6
Never	36	12.0	12.0
Total	300	100	100

The results from Table 1.1 above, show that 25.7% of students engage in mobile phone photo note-taking very often, 20% often, 15.7% occasionally, and 26.6 % rarely while 12% indicated never engaged in the practice. Based on the findings, it can generally be argued that mobile phone photo note-taking is a common practice among most students at DUCE. In line with this finding Reimer et al., (2009) claimed that the proliferation of mobile phone technology has made students to rely heavily on smart phones to complete several academic tasks. The paradigm shift of note-taking could have been done anonymously by students without knowing that over reliance on the practice could have an adverse impact on their learning process including losing their handwriting skills and cognitive abilities. Speaking on the importance of paper and pencil note-taking, Stacy & Cain (2005) opine that note-taking should not become an art lost to the ages of recorded class lectures and pre-filled handouts.

Variation of mobile phone photo note-taking by students' years of study and sex

The study also inquired to establish whether or not there was any variation on student engagement in mobile phone photo note-taking based on years of study (see table 1.2) and sex (see table 1.3).

Table1.2: Mobile phone photo note-taking by years of study

Number of respondent students = 300, 100 @ year

Item	First year response	Second year	Third year
Very often	33(33%)	18 (18%)	36 (36%)
Often	10 (10%)	21 (21%)	29 (29%)
Occasionally	15(19%)	20 (20%)	12 (12%)
Rarely	39 (39%)	27 (27%)	14 (14%)
Never	13 (13%)	14 (14%)	9 (9%)
Total	100 (100%)	100 (100%)	100 (100%)

From the Table 1.2: the results indicated that 23% of the first year students, 18% of the second year students and 36% of the third year students engaged in mobile phone photo note-taking very often. Also, 10% of the first year students, 21% of the second year students and 29% of the third year students engaged in the practice often, while 19% of the first year students, 20% of the second year students and 12% of the third year students occasionally engaged in the practice. The results indicated further that 39% of the first year students, 27% of the second year students and 14% of the third year students rarely engaged in the practice. Finally, it was revealed that 13% of the first year students, 14% of the second year students and 9% of the third year students never engaged in the practice. From these findings, it is evident that there is an incremental engagement in mobile phone photo note-taking with students' years of study. Generally, there was a slight engagement in the practice among the first year students compared to subsequent years. This could be attributed to the lack of experience on the use of mobile phone for note-taking since the use of mobile phones among students at primary and secondary schools in Tanzania banned. Moreover, it might be attributed to lack of exposure to what is taking place at the college. This situation then could also be the reason to why they still cling to paper and pencil, which is a common note-taking method among students in the fore mentioned levels.

Variation of mobile phone photo note-taking based on students' sex

Table 1.3: Mobile phone photo note-taking based on students' sex

Number of respondent students = 300, 100 @ year.

Item	Male	Female	Total
Very often	48(32%)	29(19.3%)	77
Often	23(15.3%)	37(24.7%)	60
Occasionally	19(20.7%)	28(18.7%)	47
Rarely	44(29.3%)	36(24.8%)	80
Never	16(10.7%)	20(13.3%)	36
Total	150(100%)	150(100%)	300

From the Table 1.3: the results show that 32% of male students and 19.3% of female students engaged in mobile photo note-taking very often. Also, 15.3% of male students and 24% of female

engaged in the practice often, while 20.7% of male students' and 18.7% female students occasionally engaged in the practice. The results indicated further that 29.3% of male students and 24.8% of female students rarely engaged in the practice. Finally, it was revealed that 10.7% of male students and 13.3% of female students never engaged in the practice. However, when a *t- test* was performed; the results showed that on average female students showed higher engagement in mobile phone photo note-taking than male students. However, the noted difference was not significant whereby Mean for female was 1.70 the Standard Deviation was 1.259 and the SE was .126 while Mean for male was 1.63, the Standard Deviation was 1.178 and the SE was .118, $t=.218 >0.5$. From these findings, it can generally be deduced that both male and female students engage in the practice.

The Motives behind Mobile Phone Photo Note-taking among Students

The study also inquired on the motives behind students' engagement in mobile phone photo note-taking. A five Likert scale questionnaire ranging from 'strongly agree to strongly disagree' was used to generate information related to this objective. However, during analysis a cumulative approach was used. The responses were classified into three groups, namely; 'agree' (including strongly agree, and agree), 'disagree' (including strongly disagree, and disagree), and 'not sure'. The findings are summarized in the Table 2 below.

Table 2: Motives behind mobile phone photo note-taking among students

Reasons	SA	A	NS	SD	D
Speedy lecturing	168(56%)	94 (31.3%)	10(3.3%)	22(7.3%)	6(2%)
Language problem	42(14%)	65(21.7%)	87(29%)	30(10%)	76(25.3%)
Easy organization of work	99(33%)	103(34.3%)	37(12.3%)	33(11%)	28(9.3%)
Time consuming nature of handwriting	80(26.7%)	110(36.7%)	40(13.3%)	26(8.7%)	44(14.7%)
Students' laziness	61(20.3%)	61(20.3%)	63(21%)	50(16.7%)	65(21.7%)
Easier access to information	137(45.7%)	99(33%)	31(10.3%)	14(4.7%)	19(6.3%)
Financial Limitation	83(27.7%)	60(20%)	53(17.7%)	46(15.3%)	58(19.3%)
Peer influence	72(24%)	76(25.3%)	67(22.3%)	29(9.7%)	56(18.7%)
The influence of technology	112(37.3%)	93(31%)	49(16.3%)	22(7.3%)	24(8%)
Technological problems related to audio visual devices used for lecturing	96(32%)	76(25.3%)	48(16%)	34(11.3%)	46(15.3%)

The results from the Table 2 above indicated that 87.3% of students agreed that their engagement in mobile phone photo note-taking was due to speedy lecturing, about 9.3% disagreed and 3.3% were not sure. From the results, it is obvious that high lecturing speed is the most influencing reason behind students' engagement in the practice. During the FGDs, the majority of students argued that mobile phone photo note-taking was a viable means for them to capture lecture notes from speedy course lecturers who were striving to cover the course modules. Arguing on this a third year female student admitted:

What most of our lecturers care is having all the modules covered and nothing else... as such their speed during lecture is so high that the moment you prepare a notebook, about five to ten slides have already gone... unless you take photos you will have nothing taken...

Claims made by students were acknowledged by most of the interviewee lecturers. They admitted that sometimes they were forced to lecture at a faster rate so as to cover all the modules due to limited time. This finding supports the assertion made by Pilate et al (2005) that note takers are constrained by the rate of speech of the lecturer. From this finding, it is obvious that lecturer's fast speed makes it extremely difficult for students to grasp the lecture content and write it down before lecturers move on to the next part. Thus, it is important for university lecturers to regulate their lecturing speed in order for students to grasp the lecture content as it is spoken.

Also the results show that 35.7% of the respondents attributed mobile phone photo note-taking to the language problem among students. The result show that 35.3% disagreed while 29% of the respondents were not sure. Based on the findings, it is evident that language problem as a cause of mobile phone photo note-taking is a contending issue that has divided opinion among students. There was a slight difference between those who agreed with the statement and those who disagreed. The FGDs revealed divide opinions on the language of instruction among study participants. Admittedly, one student had this to say:

Some, of course instructors use difficulty English vocabularies such that it is difficult to grasp the message unless you take a photo or video and review it later... (A second year female student)

Arguing against the aforesaid quote, another student had this to say:

Unless you have gone through public primary schools, English language is not a problem. To me English language is not a problem since it has been the medium of instruction since I was in primary school... (A third year male student)

The divided opinions among students might be a result of the existing variation in the medium of instruction between public and private primary schools in the country. In Tanzania, Swahili is the main medium of instruction in public primary schools, while English is the main medium of instruction in private primary schools (MoEC, 1995; MoEVT, 2014). Thus, the vast majority of public school graduates enter secondary schools with low competency in English (Haki Elimu, 2015), the experience which continues to affect their academic journey even at university level as compared to their counterparts. From the finding above, it can be concluded that during lectures, course lecturers should consider the learners' language background and try at their level best to use simple and clear English as possible so that even students from poor English background can have an opportunity to produce their own notes.

More findings revealed that a total of 67.3% of respondents agreed that they engage in mobile phone photo note-taking because it helps them to organize their work, 20% disagreed while 12% were not sure. In the FGDs majority of students believed that taking photos was easier for them as it helped them to make summary of lectures and organise materials from lecture in a meaningful way at their own time. Commenting on this a third year male student asserted:

It is quite difficult to summarise and organise all materials provided during the lecture, however what I do with my mobile phone is just taking photos of PowerPoint slides and pay attention to the lecturer... after the lecture I open my photos and organise materials in the way I prefer...

The finding is somehow conflicting with the argument by Peverly (2006) who argued that despite the relative ease computer use may encourage students to produce more notes than they would with pen and paper. There is a high risk for them to reproduce the instructor's notes word for word rather than taking notes in their own words. On the other hand, it concurs with Mang and Wardley

(2012) that tablet computers decrease the need to carry more cumbersome laptop, and supports the organisation of notes.

The time consuming nature of the handwritten notes was also mentioned as a reason for students to resort to the practice. This was agreed upon by 63.4% of respondents, and disagreed by 23.4%, while 13.3% were not sure. Similarly, during FGDs most students admitted that composing their own notes from lectures was time consuming and tiresome. The findings might be an expression that the majority of university students lack note-taking skills such that they consume much time writing everything they hear rather than using their mental resource to make a summary. The fact that universities aim at preparing competent practitioners it is important for students to be encouraged to produce their own notes regardless of how tiresome the process is. Accentuating on this, Stacy and Cain (2015) cautioned that note-taking should not become an art lost to the ages of recorded class lectures. Because without the valuable skills of listening and taking notes, students might become ineffectual practitioners, incapable of organising, integrating and utilising information. Based on the finding, it can generally be argued that any device and/or application that simply allows students to copy and paste instructor's notes without including their own written words is less much productive and must be discouraged.

It was further indicated that laziness among students is a reason for them to rely on mobile phone photo note-taking. In this 40.6% of students agreed, 37.7% disagreed and 21% were not sure. Though there was a slight difference between those who agreed and their counterparts, it can generally be concluded that there is laxity among most of the students in taking-notes. In the interviews, all lecturers admitted that most of the students were lazy not only in taking notes but also in most of academic issues. Consider the following quote from a female lecturer:

Nowadays students rely on spoon feeding...they do not compose their own notes instead they ask for handouts from teachers. It is laziness that indulge them on photo note-taking...

In a similar vein a male lecturer admitted:

I always see a number of students in my class chatting during lecture sessions instead of taking notes. This is simply because of laziness and lack of self-awareness...

Laziness in any state of affairs has an implication in performance. This is to say if students feel lazy in writing notes they are likely not immersing themselves fully in a subject in order to learn. The situation does not entail kinaesthetic learning where students engage in physical activities including learning rather than listening to lectures. 'Doing' including writing, helps students to gain a better understanding of the material. It also allows students to experiment with trial and error issues such as spelling, it allows students to learn from their mistakes, and in doing so it gives them an opportunity in being conversant and competent in their language of instructions.

Easier access to information was among the reasons for students' engagement in mobile phone photo note-taking. This was agreed upon by 78.7% of respondents, while 11% disagreed and 10.3% were not sure. During the FGDs respondent students admitted that they preferred mobile phone photo note-taking as it allows them to access the learning materials easily and ubiquitously without a need of carrying a bulk of exercise books. Consider the following quote:

I prefer photo note-taking because I can easily access and read my notes wherever even in the church... This is impossible with handwritten notes that require one to carry a bulk of exercise books... (2nd year male student)

The argument concurs with Stacy and Cain (2015) that tablet computers eliminate the cost of printing and reduce the amount of paper one has to carry. From the findings, it is obvious that most students are fond of mobile phone photo note-taking at the expense of other note-taking methods as they believe that it is the easiest way for them to access the learning materials. However, the findings might be suggesting that the majority of students are blind of the many educational potentials of the paper and pencil note-taking method.

Of all the respondents, 47.7% agreed with the statement that financial limitation was a source for them to engage in mobile photo note-taking, 34.6% disagreed while 17.7% were not sure. The finding implies that due to the financial problem majority of students resort to mobile phone photo note-taking. Clarifying on this, during FGDs most students claimed that they were allocated scanty amount of loans to cover the cost of their studies and some had no any loans allocated. Thus, it was impossible for them to afford purchasing stationery for each course. But with a single mobile phone they could photo and store materials for all the courses. Similar to the students' claims, Mang and Wardley (2012) admitted that tablet computers may reduce the cost of printing and the amount of paper one has to carry.

More findings from the table also indicates that 49.3% of students agreed that their engagement in mobile phone photo note-taking was due to peer influence, 28.4% disagreed while 22.3% were not sure. These findings were supported by those from FGDs where it was uncovered that a majority of students' engaged in the practice as they were influenced by their peers and nothing else. Some of the students were quoted:

I normally used to take handwritten notes, though more often I failed to cope with some lecturers speed. My roommate who is now in third year advised me to use my phone camera to capture lecture notes... Ever since I find things run smoothly (A second year male student)

In favour of the aforementioned quote another student admitted:

I saw most of my friends taking photos and sometimes video recorded the fast speaking lecturers and review at their own time later. I found it interesting and helpful to me, therefore I had no option rather than adopting the same... (First year female student)

The foregoing excerpts suggest that without considering its effects students cling to social approval and neglect the traditional paper and pencil note-taking method to look up-to-date. This situation might imperil students' learning if measures are not taken.

The data in the Table 2.1 also revealed that the influence of mobile phone technology was among the causes of students' engagement in mobile phone photo note-taking. The respondents, 68.3% agreed, 15.3% disagreed while 16.3% were not sure. During the FGDs most of the students reported that with a mobile phone photo they can have all course lectures and other related materials with them ubiquitously, as such, it was even easier for them to retrieve the materials and revise even without carrying a bulk of exercise books.

Mobile photo note-taking is potential for our learning because previously we used to carry handbags full of a bulk of exercise books and reference books. But with innovation all these are stored in a single portable device like this that enable you access all course material even in a commuter bus... (Third year male student).

This finding suggests that most students forego composing their own notes completely, believing that mobile phones can do it all. The fact that educators play a leadership role in guiding and

shaping students, it is imperative for them to instruct students on the benefits and effects of the devices.

Students also agreed that problems related to audio visual devices used during lectures were the reason for them to engage in mobile phone photo note-taking. This was agreed upon by 57.3% of respondent students, 27.3% disagreed and 16% were not sure. During FGDs most students contended that they resorted to mobile phone photo note-taking because of inadequacy and frequent technical problems of audio visual devices in lecture theatres. They claimed that microphones and projectors were sometimes not working properly such that it makes it difficult for them to see and hear what the lecturers deliver. This reason was supported by almost all the interviewee lecturers. Consider the following assertions:

It is true that shortage and the technical problems of our devices in lecture rooms attract most of students to engage in photo taking... The failure of microphones, PowerPoint display and even speakers, especially in the new lecture theatre C that contain more than one thousand students is a common phenomenon (A female lecturer)

Consequently, another one commented:

I am having a class of one thousand and five hundred students in the new lecture theatre C with only two working PowerPoint display sheets. It is likely that students will find a viable alternative way, including taking photos... (A male lecturer)

The finding, implies that unless technical problems of audio visual devices are addressed note-taking will become an art lost to the ages of recorded class lectures. Universities will therefore, produce incompetent practitioners incapable of listening, reading, organising, integrating and utilizing information (Stacy & Cain, 2005).

Nonetheless, it was reported during FGDs that disabilities were another factor that motivated some students to engage in mobile phone photo note-taking. It was reported that some students had vision and hearing impairments such that they could not grasp the lectures. Therefore, taking photos and videos through their devices helped them cope with their fellow. Stressing on this it was put thus:

Unless I sit in the front seat I cannot see clearly what is displayed in the power point. The fact that many of us scramble for the very seats I normally find myself either at back or at the middle seats. The only way for me to have lecture notes is to take photos or video record the whole lecture (First year male student)

Another student remarked:

Effective note-taking go hand in hand with effective listening. I am having hearing problem that's why I prefer mobile phone photo note-taking (Third male year student).

From the findings it could be argued that students engage in mobile phone photo note-taking due to the number of reasons, among others, were: disability, problems with the used technology, lecturers speed, poor influences, laziness, language problems to mention a few.

The Impact of Mobile Phone Photo Note-taking on Students' Learning

The study also examined the impact of mobile phone photo note-taking. A five Likert scale questionnaires ranging from 'strongly agree to strongly disagree' were used to generate information related to this objective. However, during analysis a cumulative approach was used. The five Likert scale was combined into three groups, namely; 'agree' (including strongly agree, and agree), 'disagree' (including strongly disagree, and disagree), and 'not sure'. The findings are summarized in table 3.

Table 3: The perceived impact of mobile phone photo note-taking on students' learning

Impact	SA	A	NS	SD	D
It hinders students' concentration	89(29.9%)	97(32.6%)	49(16.4%)	19(6.4%)	44(14.7%)
It hinders students' retention	59(19.8%)	102(34.2%)	60(20.1%)	12(4.0%)	65(21.8%)
It affects students hand writing skills and speed	61(20.5%)	75(25.2%)	64(21.5%)	33(11.1%)	65(21.8%)
It hampers acquisition of new vocabularies among students	64(21.5%)	84(28.2%)	46(15.4%)	25(8.4%)	79(26.5%)
It limits the students' ability to organize work	60(20.1%)	85(28.5%)	80(26.8%)	27(9.1%)	46(15.4%)
There is a high risk of losing notes	92(30.9%)	95(31.9%)	52(17.4%)	15(5%)	44(14.8%)
It affects students' attendance	85(28.3%)	94(31.5%)	37(12.4%)	33(11.1%)	49(16.4%)

Looking at the data presented in the Table 3 above, it is evident that the majority of students, 62.5% agreed that mobile phone photo note-taking have had an adverse impact on students' concentration in the classroom, 21.1% of students disagreed while 16.4% were not sure. From this finding, it is clear that mobile photo note taking impinge students' concentration during lessons. During FGDs majority of students admitted that students who take photos normally did not concentrate on what teachers deliver. Affirming on this some students put it thus:

Most students who take photos do not concentrate on lectures. Once they take a photo they start chatting or talking with their fellows while waiting for a new lecture slides... (A second year female student)

Arguing consistently to the aforementioned another student added:

I have been taking photo notes since I was in first year...sincerely very few students who take lecture photos concentrate on what is being delivered. More often the concentration is only drawn to capturing slide photos and chatting... (A third year male student)

The foregoing finding would support Tindell and Bohlander (2011) who reported that mobile phone became a serious distraction device in college classrooms as students interacted with their phones between one and five times during class such that even attentive students missed concentration of lectures. It is also in line with the assertions made by William and Eggert (2002); Nguyen (2006) that note-taking improve students' concentration, understanding and performance. It also favours the observation made by End et al., (2010) that students in cell phones ringing condition perform significantly worse on quiz items due to lack of concentration.

Moreover, data in Table 3.1 indicate that 54% of students agreed that mobile photo note-taking hinders students' retention, 25.8% disagreed while 20.1% were not sure. The findings imply that mobile phone photo note-taking adversely affects students' ability to retain the lesson delivered by their teachers. A similar observation was made in an interview with lecturers who acknowledged that the practice affects students' retention and recalling capability because of poor concentration to what teachers deliver. Also Tindell and Bohlander (2011) reported that mobile phones do take a toll on college students' cognitive capabilities. Their attention spans have shortened so drastically that the majority have become dependent on the devices for everything and they resist reading anything longer than a social media posting. The findings parallel with the finding by Bui et al., (2013), that pen and paper note-taking assists in learning and long-term retention. Cementing on this one lecturer had this to say:

Concentration and retention are two sides of the same coin... the moment one concentrate and take lecture-notes the more the likelihood of retaining and remembering... it is obvious that over reliance of our students on photos negatively affect their retention capability...

The findings also revealed that 47.5% of students agreed that mobile phone photo-note-taking has an adverse effect on students' handwriting skills and speed, 22.9% of students disagreed while 11.1 of students were not sure. During the FGDs majority of students reported that mobile phone photo note-taking has affected their handwriting as well as their handwriting speed, such that more often they have been failing to complete answering questions during the tests and university examinations. A similar observation was made by one lecturer who attributed the increased number of the student's failure to complete questions in tests and examinations to low speed due to overreliance on mobile photo. The assertion below approves:

Following the innovation of computers and mobile phones most of the students and even we lecturers rarely engage in handwriting. Over reliance on these devices has severely affected our handwriting and speed as well. It is common for the student not to complete examination questions simply because of low speed...

In line with this finding Lami (2011) claimed that a remarkable decline in the writing abilities of students due to excessive engagement in tweeting, face booking and texting. He also revealed that most students did not capitalize words and punctuate sentences properly. They also abbreviated longer words for simplification purposes. For example IDK for I don't know, BTW, for by the way and the like. This finding implies that unless measures are taken, students' ability to produce their own notes and comprehend content during class and in other educational contexts will be entirely reduced.

The data also revealed that 49.6% of students agreed that mobile phone photo note-taking limits students' ability to compose and organize their work in good order, 26.8 % were not sure while 24.5% disagreed with the statement. From the data shown in the Table 3.1 it signifies that majority of respondents both students and lecturers believe that mobile phone photo reduces

students' ability to compose and organize their work. This finding supports the assertion made by Kiewra et al (1991) that taking handwritten notes promote the students' ability to translate classroom information and reproduce it in a personally meaningful way. Consequently, End et al., (2010) uncovered that students in cell phone ringing classes were unable to correctly record information from the lecture. It is, therefore, important for students to be encouraged to take their own notes because the act of note-taking help them in generating and semantic processing the information and strengthening the internal connections between ideas (Schoen, 2012). The process also broadens their ability to make connections between idea units and allow them to apply their gained knowledge to the novel context.

Furthermore, the majority of students, 62.8% agreed that with mobile phone photo note-taking, there is a high risk of students to lose all the learning materials owing to the loss or destruction of the device. Only 19.8% of students disagreed with the statement while 17.4% were not sure. It was revealed during the FGDs that a good number of students had experienced the loss of all the learning materials, including the notes they served in the mobile phone when their devices were stolen, destructed and sometimes they accidentally erased the files. Speaking bitterly one student remarked:

I shall never rely on mobile photo note taking in my entire life here. I had photos and videos of all course lectures stored in my phone such that I did not see the need of having handwritten summaries... I was totally confused when my phone was lost just two weeks before the beginning of the university examinations... (A third year female student)

Another student added:

Frankly speaking, I am one of the best photographers [a smile] but the fact that I know how risky it is to rely on photos, normally I take photos and make a summarize in my notebook immediately after lectures...last year I accidentally erased all the files in my phone and I could never restore them... (A third year male student)

A similar observation was reported by an interviewee lecturer as put it thus:

Mobile phones are stolen every day so it is very risky for students to rely on photos rather than own hand written notes because once the phone is lost so does everything stored on it...

The foregoing quotes imply that there is a high risk for students to lose all the materials stored in mobile phones than those in notebooks. Thus, students have to compose their own notes during lectures instead of relying entirely on photo note-taking.

Accordingly, 59.8% of students agreed that mobile phone photo note-taking had an adverse impact on students' attendance to lectures, 19.7% disagreed while 17.4% were not sure. It was reported during FGDs that the proliferation of mobile phone photo note-taking has propelled student's absenteeism. The majority of students were reported not to attend lecture sessions hoping that they can access the notes and even videos of such lectures through the established WhatsApp groups. In the interview with lecturers, most of them acknowledged that in some class sessions students' attendance was a tongue-tied. However, they did not directly attribute the practice of mobile phone photo note-taking.

Apart from the items indicated in the questionnaire, it was reported during FGDs that mobile phone photo note-taking contributed greatly to prevalence of theft of mobile phones and the teaching and learning materials especially towards tests and examination period. Responses from students revealed that students who rely on photos more often steal their colleague materials as they find themselves without any reference materials. This was put clear by the following students:

Normally, theft of exercise books and even mobile phones at the college is rampant as we approach to the tests and examinations. This is because our fellows who never take-notes during lectures find themselves without reference materials for preparation (second year female student).

Another student reported:

I hate mobile phone photo note-taking because it facilitates the theft of notebooks by the time we are preparing for the university examinations. Some students do not write during lectures finally they find it impossible to access the materials stored in the devices, especially when the battery charge is down and there is power cut off.

It was revealed during FGDs that mobile phone photo note-taking propelled cheating among students especially during tests and assignments. All students agreed that some of the mobile phone photo note-takers used their devices to search for the answers despite the fact that university examination regulations forbid. It was reported that such students normally hide the devices in a way that invigilators cannot realise and secretly download the materials relevant to the test. Cheating through mobile phones has been reported across several studies (Tindell & Bohlander, 2011; Urassa, 2012; Kihwele & Bali, 2013; Abraka, 2015; Msuya, 2015). In favour of this finding a third year male student confirmed:

It is hard to believe that despite strict university examination regulations and tight invigilation some students enter an examination room with the phones during tests and search for answers from the taken photos... ha-ha some people are courageous.

Consequently, in the interviews, most lecturers claimed that mobile phone photo note-taking had an adverse impact on student's cognitive and critical thinking abilities. They argued that photo note-taking made most students inattentive in class as a result, the resort to memorization and reproduction of PowerPoint slides during assignments, test and examinations. This finding supports the findings by Stacy and Cain (2015). In their study on note-taking and handouts in the digital age, they came across instructors who claimed that once students were provided with handouts, they did not pay attention in class and they resort to claiming copies of the PowerPoint handouts. Consider also the comment given by the lecturers:

At university level, we expect students to build critical thinking and the ability to answer questions in their own words. Unfortunately, this is not the case with the innovation of photo note-taking as students reproduce instructor's notes in tests and assignment...

Arguing consistently, another lecturer commented:

Photo note-taking has prompted claiming rather than critical thinking among students. Nowadays students reproduce word for word when we assign them assignments, test and even during examinations...they can't even paraphrase...

Drawn from the aforesaid, it is true that critical thinking is one of the essential skills a university student should possess. Such skills are likely to be developed through paper and pencil note-taking as the method involves enormous mental processes—concentration in the lectures, understanding and analysing the content, identifying main ideas to note down, and organise the physical writing. Thus, students should understand that composing own notes are imperative for their learning.

CONCLUSIONS AND RECOMMENDATIONS

From the findings, it is obvious that mobile phone note taking is regular occurrence among students at DUCE, with an incremental increase from year one to third year. The study also revealed that the practice does not significantly differ based on students' sex. A number of reasons have been revealed on the motives behind this practice, including, students' laziness, the speed of the lecturers, peer influences, disability and availability of technology among others. The study also uncovered a number of impact associated with the practice. It was reported that the practice affects students' cognitive and critical thinking abilities, hand writing speed and skills, and concentration during lecture sessions. Worse enough students reported the risk of losing all the stored materials upon the loss of the device. Based on the findings the study recommends for the need to educate students on the importance of paper and pencil note-taking method so that they don't fall prey to such risks. There should also be a creation of conducive environment that will allow students to use various note taking methods for better utilization of the advantages of each method while simultaneously minimising the negative impact. Consequently, the college management should ensure that lecture theatres are equipped with adequate and properly working audio visual devices.

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