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## THE APPLICATION OF COMPUTER LITERACY SKILLS AFTER COMPLETION OF THE COURSE IN THE FIRST YEAR

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### Abstract:

This paper investigates whether there is a difference or in fact a way in which one can ensure that the skills being taught through a computer literacy course during a student's first year of studies are indeed retained and reused throughout their studies to ensure that the university deliver a high quality graduate who can enter the work environment without any technological disadvantages and thus breaching the gap of technologically disadvantaged and computer literate graduates. The research done for this paper does indicate that to some extent, students are retaining some of the skills they were taught during their computer literacy subjects.

**Keywords:** Computer literacy, Ms Excel, Retention, Skills

### I. INTRODUCTION

Looking at the required skills in the "job market", computer literacy is becoming a necessity and almost compulsory. We live in a time where we assume everybody can work on a computer or some kind of technology. When we teach someone how a new cell phone works for example, we tend to become impatient and then, after a while, rather take the specific device from them and perform the specific request or task ourselves. Gibbs & McKinnon (2009) acknowledged that we are moving into an era where graduates are expected to be computer literate, and in fact are expected to be quality end-users in the workplace. Bartholomew (2004:324) noted that "*employers want productive, self-motivated employees who know how to use a computer as a tool to solve problems.*"

Shannon (2008), as well as Nash (2009) state that one error educators seem to be making all over the globe today is to assume that the new generation of students, those born after 1980, are all computer literate. We assume students are technologically "advanced" and thus quality end users once they start in the industry (Gibbs & McKinnon, 2009) and that even the employers will make the same assumption that graduates will be computer literate. Even though this generation are familiar with technology such as the internet or playing computer games and using the internet to blog all their friends, this does not mean that these students have any computer or technical skills required for educational and professional requirements. Bartholomew (2004) highlights that students might think they are computer literate when they can win a computer game with their friends, or even know how to use spell-check in an Ms Word document. Nash (2009) continues by saying that first year students are not equipped with the computer skills which are required for tertiary studies. Computer skills required does not necessarily include being a programming guru or a technical genius, but rather the user's ability in using certain day-to-day applications (Nash, 2009; Bartholomew, 2004) and thus enhancing his/her performance.

The question which now starts to emerge is where should they have obtained these skills? Higher education institutions in South Africa attract students from all over the globe with different educational, social and cultural backgrounds (Coates, 2005). Due to this diverse group of students, there is not a large portion that is computer literate. This could be contributed to the fact that Africa is seen as a “poor” continent and in many of the homes the biggest concern for the population is survival; to ensure that there is enough food and running water, and not to ensure that everybody has a telephone or a computer to work on. Nash (2009) confirmed this by acknowledging that the biggest portion of students who do not have adequate computer skills are African students and that one of the recommendations are specific training and intervention especially for African students.

Talja (2005) describes IT skills as a necessity to be able to survive in today’s modern job and economy and even studies. Thus, for students studying at a tertiary educational institute, one would prefer for them to at least gain some level of computer literacy during their studies. Dednam (2009) acknowledge the fact that computer literacy is a necessity in tertiary institutions as the number of students starting their studies each year’s level of computer literacy are not increasing as expected but are in fact decreasing. Shannon (2008) also mentions that the majority of students do not have the overall technical skills as was expected.

Dednam (2009) looked at the necessity of still including computer literacy as a module for new students due to the fact that we are supposedly living in a digital age. She recognized that more of today’s students do indeed have practical experience with computers and will be able to become productive in the use thereof, however, there are still also students entering the university structures with inadequate technology preparation, as Nash (2009) also discovered.

Dednam (2009)’s studied the number of computer literate students at a tertiary University in South Africa. Her study showed the decrease in computer literate students in Table 1. Interestingly, that from 2002 to 2008, there was only a 12.3% increase in students who were computer illiterate even though the number of students starting increased tremendously.

Table 1.: The number of students who did the basic computer literacy module during 2002 – 2008 (Excluding students who got exemption or recognition) – Dednam, 2009, 25

<b>Year</b>	<b>Did the basic computer literacy module</b>	<b>Passed the exemption test</b>	<b>Number who did not pass exemption</b>	<b>Percentage who did not pass exemption</b>
<b>2002</b>	1297	370	927	71.5%
<b>2003</b>	1375	206	1169	85.0%
<b>2004</b>	1643	347	1296	78.9%
<b>2005</b>	1970	474	1496	75.9%
<b>2006</b>	2110	483	1627	77.1%
<b>2007</b>	1965	311	1654	84.2%
<b>2008</b>	2245	364	1881	83.8%

One would assume if a student completed his first year of computer literacy that they are now technology advanced or at least equipped to be able to use these functions in the future. However, there seems to be a problem with the time gap from when computer literacy is taught, and when the students are actually starting to use these software applications or technology to start their career in the industry. Bartholomew (2004) confirms this by saying that the skills learned should somehow be retained throughout the studies of the students. Coates (2005) states that one cannot fully understand how students spend their time outside class and thus one cannot manage the full student experience. This also means that even though students are taught what and how to perform certain functions during their computer literacy course, they do not necessarily spend time in practicing these skills and thus in turn, there is in fact no control over knowledge gained by these students. This is important for this paper as it will not find someone to blame but identify if students managed to gain true skills or just learnt how to use the F1 help key without learning something.

## II. PROBLEM STATEMENT

When a student starts his/her studies at the University of Pretoria, one of their compulsory subjects is computer literacy. During this course, students will be introduced to computers as well as certain software packages which they will encounter throughout their studies and especially when they start their career. These packages include Ms Word, Ms Excel, MS Power point and MS Access. Students will then over their first semester of their first year of studies attend a two hour practical class weekly.

The skills these students have obtained during their computer literacy course in their first year have to be used in various different subjects throughout their studies, and thus by the time students start with the Advanced Ms Excel course in the second semester of their second year, they should have developed and mastered their Ms Excel skills obtained during the first year computer literacy course. Bartholomew (2004) says that these skills should be retained after it has been obtained. When she conducted a study with organizations to request which aspect of computer literacy they see as highly important, 93 percent of the respondents said that Spreadsheets skills, thus MS Excel, are important for graduates to have when they start their career.

However, these students can either not remember basic Ms Excel functions or they can only use Ms Excel by using the F1 Help key to such an extent that they do not understand and realize what the functions are that they are using in Ms Excel. This is in spite of the fact that the skills obtained from the computer literacy course have to be implemented and used during all of the subjects they have to take throughout their studies. Bartholomew (2004) also picked up this trend and realized that student's retention is required throughout various subjects as some students were not able to perform the basic problem solving tasks given to them. This forced certain faculties to perform remediation before expecting the students to solve these problems. She also noted that computer literacy levels should be assessed throughout their academic program. Shannon (2008:9) confirms this by acknowledging that there is a need to support the development of these skills throughout their studies and thus various subjects, and this "*should be a wake-up call for universities.*" These skills are not necessarily repeated in various subjects and thus some of the skills obtained during the first year of studies, have to in fact be regained and retrained when they are required to use these skills during the rest of their studies and then ultimately when they start to work. (Shannon, 2008; Kim & Keith, 1994)

This paper has taken into account that the skills gained during their first year of study should be supported throughout the student's studies in various subjects and uses the notion made by Bartholomew to assess computer literacy through a student's academic program. This paper will focus on a group of second year students required to take up a course presenting Advanced Ms Excel and will later focus only on the financial students studying BCom Accounting Sciences, BCom Financial Management and BCom Internal Auditing. During their second semester of their second year of study, these students have to take a module called Advanced Ms Excel 2007: A

problem-solving approach, called INF264. During this module students are introduced to use advanced Excel formulas, pivot tables and graphs to solve certain financial problems. Although it is noted that students should be assessed on all areas of computer literacy, this paper will only focus on Ms Excel skills.

The following research questions were investigated:

Q1. Are the skills obtained during their first year of studies, being retained throughout their various subjects during their studies?

Q2. Is there a difference in the outcomes of the skills obtained in the first year and the courses taken during later years of study?

Q3. How do students spend their time outside class and where do students go to obtain help especially in Ms Excel?

### **III. RESEARCH CONTEXT**

The computer literacy course that focus on Ms Excel is presented during the first semester of the first year at a university (CIL) and thus there is at least a minimum gap of 12 months from where the skills were obtained, until they were tested again in the second year Advanced Ms Excel course. For some students who wrote and passed the exemption test during the first month of the first year of their studies, there is an 18 month gap. Although these students passed the exemption test, only a 50% is required to pass the test. Coates (2005) noted that student progress are only measured as successful if they passed with a 50%, just barely. This is a problem as it does not measure the quality of the student's academic performance, but allow them to pass without mastering their computer literacy skills.

Students were evaluated over a period of two years to determine the impact that the time gap had on their knowledge of Ms Excel. Two groups of students were used during this analysis, the group of 2009 consisted of 648 students when starting their second year and thus did their computer literacy in 2008 whereas the 2010 groups' computer literacy course where taken in 2009, the 2010 group consisted of 634 students. The lecturer has decided to have these students write an Ms Excel refresher test during their first practical contact session and this test counts 5% of their semester mark. These tests consist of 20 basic Ms Excel questions taken from their computer literacy textbook. During 2009, the students were allowed to use Ms Excel to help them to answer the questions. During 2010 students wrote the same test, the questions were moved around and one of the calculations were changed, but this time the students were not allowed to use Ms Excel to help them answer these questions.

After completion of the course, the 2010 group had to complete a survey which helps the researchers to gain a better understanding of their background, their current IT "habits" as well as an indication of their exposure to Excel during their studies up to their INF course. The survey was made available to the entire 2010 group, and out of the possible 634 students, 542 responses was obtained. This was due to a bonus mark which the students could obtain by completing the entire survey.

This paper will examine the pass rate of a computer literacy course during the first year of studies at a higher education institute and how these students performed during their second semester of their second year, when they needed to apply the skills they obtained. This paper will also focus specifically on the MS Excel 2007 application during an advanced Ms Excel course for second year financial students. This paper will then look at the results obtained from the survey to see if the results obtained during their assessments are indeed a true reflection of the retention of their skills.

## IV. ANALYSIS

Q1. Are the skills obtained during their first year of studies, being retained throughout their various subjects during their studies?

When evaluating the marks of what the students' obtained during their first year in Computer literacy, CIL, and their Excel refresher test in their second year subject, INF, there does not seem to be such a significant difference. Figure 1 show the comparison between the Excel marks obtained during their CIL subject as well as their second year INF subject.

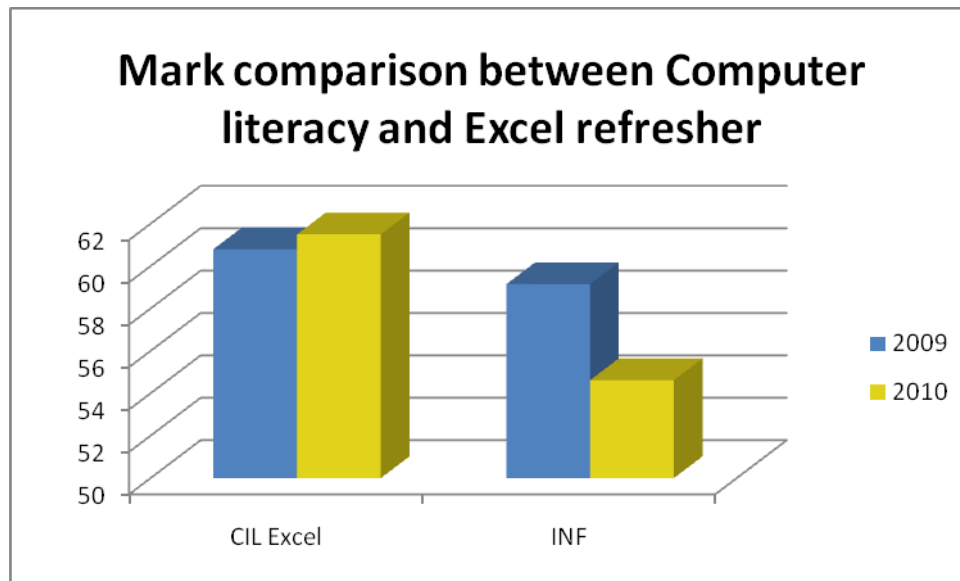


Figure 1: Comparison between CIL and INF264

If one looks at the INF part of the diagram, the following become evident. In 2009 Ms Excel were used to assist the students when writing their Ms Excel refresher test and in 2010, they had to answer the questions without using the Ms Excel application, there were a 4.5% drop in average which was less than was expected. This indicated that students did not have such a high reliance on the Help function and their basic skills obtained during their first year CIL course, were retained.

If one compares the CIL results with the INF results in 2009, they clearly indicated that the students, who did CIL in 2008, could indeed remember and recall their Excel skills when tested again in 2009 as there is only a 1.65% difference in the final results. However, 2010 looks a bit different. The CIL average for the students used in this study was 61.5% in 2009, when tested again in 2010 during the INF test, the average was 54.62%, resulting in a drop of 6.8%.

As there were a difference in the INF tests over the period 2009 and 2010, one would assume that students who were allowed to use the Help function did indeed managed to perform a little bit better, but when comparing the CIL and INF results, one can clearly see a drop in the results and this could be due to two factors, firstly being that students know how to use Ms Excel but they could perform better when allowed to practically "experience" the application in questions. The second factor which could have an effect in the results which dropped with almost 7% could be that students can vaguely remember the Ms Excel functions but they did not necessarily use Ms Excel again during their studies. However, when analyzing the results obtained from the survey of the 2010 group, this seems to be a contradicting result. Of the 542 respondents, 430 indicated that was indeed used during some of their other subjects up to date. Figure 2 indicates the response. When asking them if they can indicate the subjects in which they used Ms Excel

before, 5 first year subjects were mentioned, ranging from statistics to accounting and one second year subject was mentioned. This raise alarm bells because if this was indeed the case, and the skills were indeed developed there should not be a 7% drop in final results during the Ms Excel test. One would have to investigate the syllabus of these subjects which use Ms Excel and see which functionalities these subjects introduce and develop. And thus the reason for the second research question.

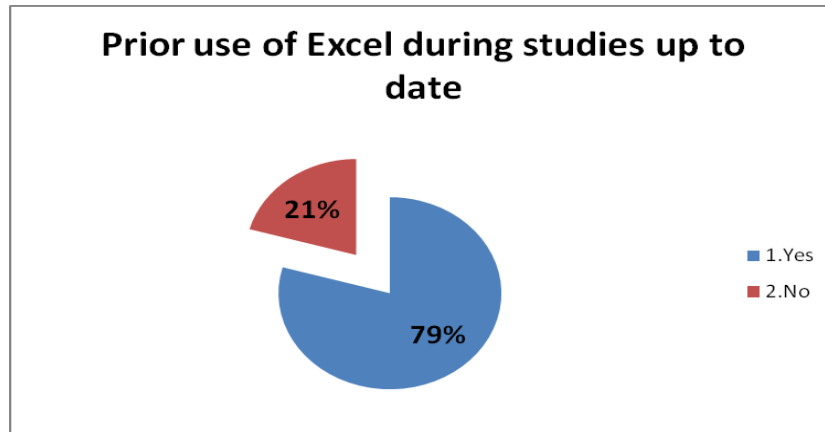


Figure 2. Prior use of Ms Excel

Q2. Is there a difference in the outcomes of the skills obtained in the first year and the courses taken during later years of study?

As this course, INF is only presented to second year financial students; the researchers had to investigate if there is a difference in the type of student and the types of courses and if certain courses seem to be retaining Ms Excel skills more than other. Both the CIL and the INF results were then grouped per course, and this indicated something significant. Figure 3 indicates the marks received per course in both CIL and INF. Indicating that the three "mayor" financial related courses, being BCom Accounting Sciences, BCom Internal Auditing and BCom Financial Management in fact showed the lowest marks of all the students taking INF.

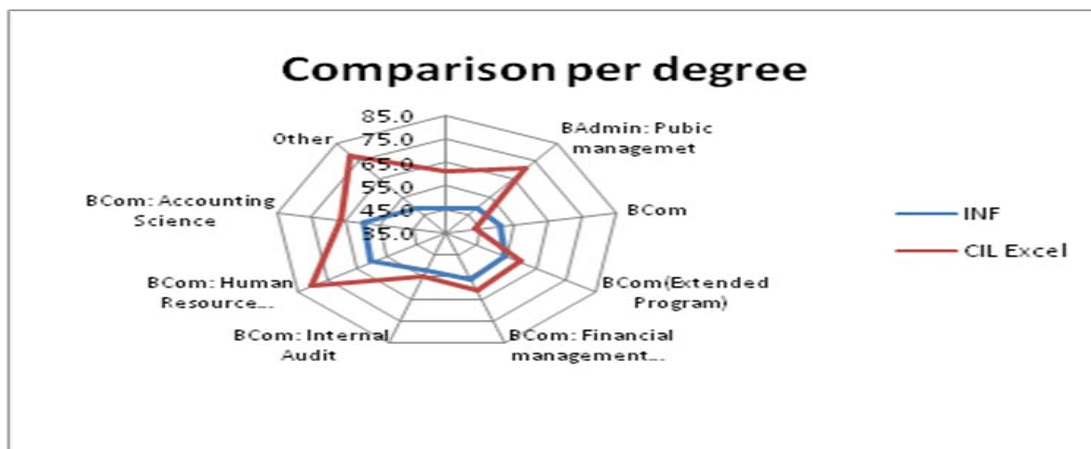


Figure 3: Comparison per degree

Taking this into consideration, another comparison was made to see in which subject or assessments these three degrees did indeed receive the lowest marks, Figure 4. At this stage the CIL final mark is also indicated however this mark also includes Ms Word, Ms Access and Ms Power point questions. Internal Auditing students scored the lowest in all three criteria and this seems strange as one would think that the Auditing students should have analyzed and audited certain datasets. Again, the only way in which this can be clarified would be to conduct further research to see why this is the trend.

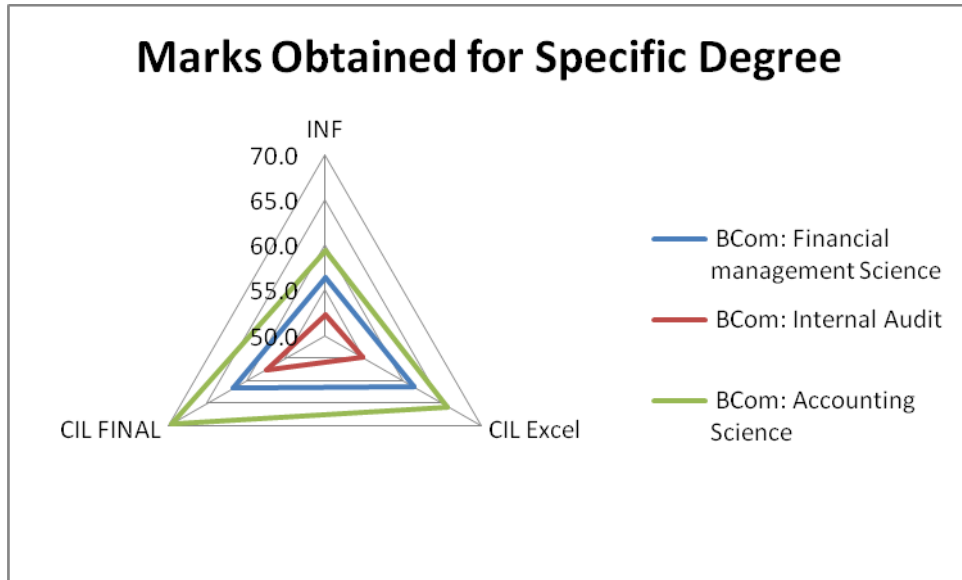


Figure 4: Marks obtained for specific degree

When including the final marks for both the entire CIL course as well as the INF course, it clearly shows that the students who are struggling the most are the BCom Financial Management as well as the BCom Internal Audit students, visible from Figure 5 below. This is rather strange and one would thus assume that these students might not have sufficient access to computers currently? Although all students do have access to the labs in which they take their practical classes, they might not have access after hours at home to complete assignments etc.



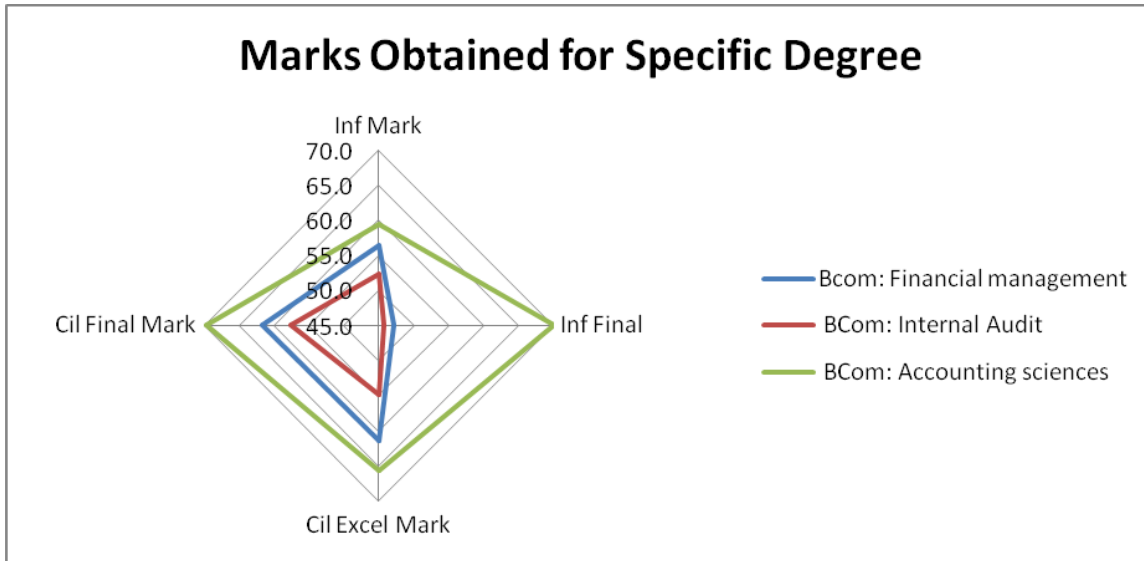


Figure 5: Final marks obtained for specific degree

After the completion of the course with the 2010 group, the students had to indicate if they indeed do have access to computers at home. Figure 6 indicates that the biggest group of students who do not have access, is the BCom: Financial Management Science group. 74% of the Internal Auditing students do have access to computer at home. One would have to investigate why specifically the Internal Auditing students are achieving the lowest marks even though most of them do have access to computers after hours.

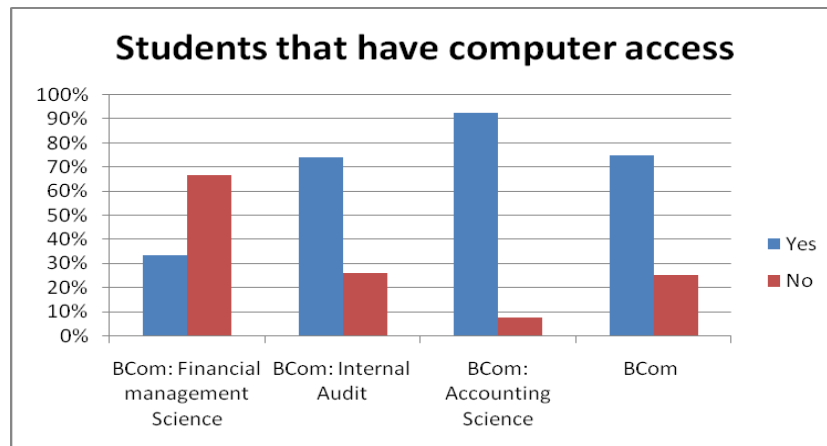


Figure 6. Computer access at home

This raise the concern as mentioned by Coates (2005) where one cannot understand how students spend their time outside class and thus one cannot blame a specific degree for average or lower than average results. Question 3 will try and see how students spend their time on computers as well as how and where they obtain assistance when required.

Q3. How do students spend their time outside class and where do students go to obtain help especially in Ms Excel?

Students were asked what their primary need for using a computer was; they could type in any answer. The majority answers were, in no particular order:

- Assignments
- E-Learning system
- Internet
- Listening to music
- Networking
- Social networking
- Watching videos

Students were also asked how many times per week they work on a computer, Figure 7 gave a clear indication that 58% of students work on a computer more than 5 times a week. There is thus no reason why students cannot be forced by some kind of assignment or subject to utilize this time spend on a computer better and more focused towards their studies. It is still however a matter of how.

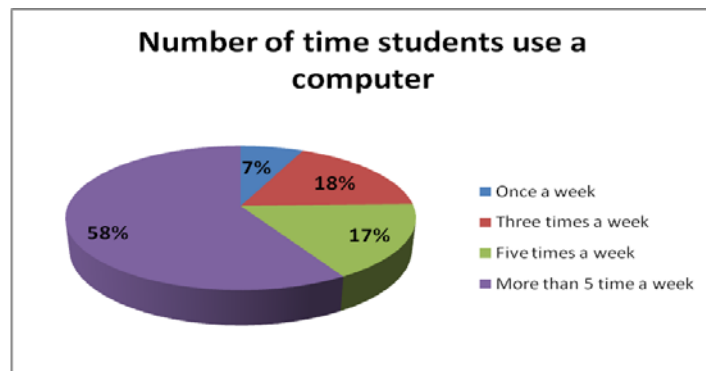


Figure 7. Number of time students use a computer per week

It is obviously no surprise that 95.7% of the respondents do have Facebook accounts. It could be a dangerous assumptions but one could assume that most of the time spend on a computer is on some kind of social networking site, mainly Facebook. Students are social “creatures” and thus it should be no surprise that students seek help, especially asked where they obtain help in Ms Excel, Figure 8 clearly indicate that 64% of students seek help from a friend.

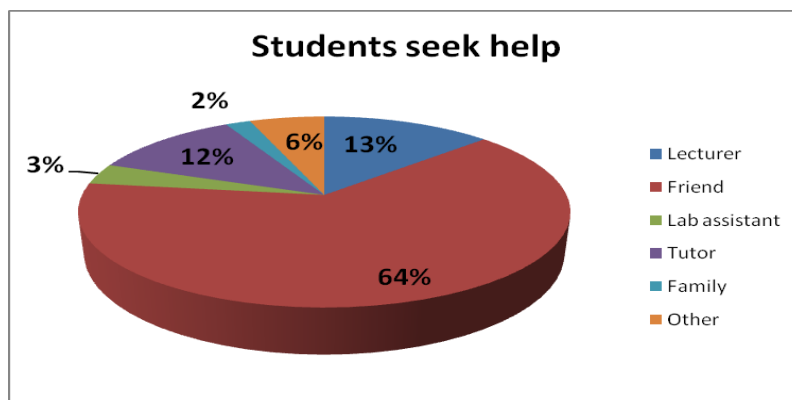


Figure 7. Students seek help

These results raise a dangerous but unavoidable can of worms, should the academic world not adapt and rather see how social networking and group “teaching” by your fellow students can help improve and assist the teaching of certain critical skills?

## V. RECOMMENDATION

One has to also realize that there seems to be a need to focus more on the BCom Financial Management as well as the Internal Audit students as it seems like these students are struggling not as much with the CIL course, but rather with the advanced skills being taught during the entire INF subject. It is recommended that these students are grouped into practical classes together with the stronger students as it is clear that students are more comfortable to ask a friend than to ask the lecturer. One would have to investigate the possibility of using group assignments and assessments on some kind of social discussion board to help enhance and ensure that students obtain skills during their studies and not merely learn the theory without application skills. Future studies should be done per subject to see how academics can make better use of applying the use of computers during their assignments and perhaps enhancing the assessments to be more projects based and not necessarily written. This might help to enhance the learning experience of students.

## VI. CONCLUSION

This paper has investigated whether there is a difference or in fact a way in which one can ensure that the skills being taught through a computer literacy course during a student's first year of studies are indeed retained and reused throughout their studies to ensure that the university deliver a high quality graduate who can enter the work environment without any technological disadvantages and thus breaching the gap of technologically disadvantaged and computer literate graduates.

It does seem that to some extent, students are retaining some of the skills they were taught during their computer literacy subjects as was recommended by Bartholomew (2004). However, it does seem that one cannot look at the global results per group but one has to investigate per course being studied, what each course's recommendation would be in terms of the levels of computer literacy. In this area, computer literacy will have to be broken down into the various applications being taught as Bartholomew (2004) recognized, application include word processing, spreadsheets, database and presentation software. After identifying what the recommended applications are according to the various departments, one would then have to investigate each subject included in that specific course to see if these applications are indeed used throughout the student's studies. As these subjects are indeed using Ms Excel, the intensity of these skills has to be investigated and ensure it is indeed applicable for these student's future careers. This should ensure that students are being forced to retain the skills which they acquired during their studies and in the end, be the productive, self motivated and high-quality end-users which is required from the “big-bad, business world”. (Gibbs & McKinnon, 2009; Bartholomew, 2004)

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