



The use of social media as a means of
improving the quantity and quality of the pass rate in
Computer Programming at FET colleges in the

Western Cape

By

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ABSTRACT

The aim of this research was to investigate the use of social media (SM) in improving the quantity and quality of passes in computer programming in South Africa's Further Education and Training (FET) colleges. The study addresses the high learner failure rates in computer programming at National Certificate (Vocational) (NCV) level 3. A preliminary investigation identified that increased lecturer contact time with the students could positively affect the quantity and quality of passes in computer programming. The social medium of Facebook (FB) was studied to assess whether it could enhance contact time with students.

In investigating factors affecting computer programming passes at the College of Cape Town, the study identified how SM technologies can assist in increasing contact time for students outside normal college time. Four groups on FB were created to allow learners to ask questions, interact with the lecturer and peers on the subject. A mixed approach was employed using qualitative and quantitative data. Test scores for previous years (2011) were compared to current (2012) test scores for the NCV 3 learners. Statistical functions calculated the average passes and total number of passes. Furthermore, a total of thirty questionnaires were used to check the learners' perceptions toward the use of SM outside the class to enhance performance..

More lecturer contact time on FB for one student group scored better in terms of the quantity and quality of passes. The groups using FB (with more practice time or more technical contact time) produced results which were far better than in previous years (2010 and 2011). The fourth group using FB for more peer interaction also did fairly well with an increase at the end of the year (2012) of 35% pass in programming at level 3 - up from 30% in 2011. It is the researcher's view that, once internet access is evenly spread, it has the potential to increase performance in subjects like computer programming. A further look at the certification of level 4 learners for programming subjects indicated an improvement could be possible by the introduction of SM at level 3 - where much of the bottleneck lies.

As this research was limited to a single FET college it cannot be generalised. Further research spread across various FET colleges countrywide will serve to confirm these findings and determine new insights into the whole process of using SM to improve passes in computer programming at NCV level 3.. The practical recommendation is that FB should be used for this stated purpose. In respect of academic recommendations, the researcher intends to implement the same study with learners at level two and level four.

KEY WORDS

Further Education and Training (FET); National Certificate Vocational (NCV); Quality, Quantity; Contact time; Performance; Test scores



DECLARATION

I declare that this research entitled *The use of social media as a means of improving the quantity and quality of the pass rate in computer programming at FET colleges in the Western Cape* is my own work; that it has not been submitted for any degree or examination in any other university; and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Full name.....

Date.....

Signed.....



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LIST OF ABBREVIATIONS

FB	FaceBook
FET	Further Education and Training
IT	Information Technology
IS	Information System
ISAT	Integrated Summative Assessment Task
ICASS	Internal Continuous Assessment
LCT group	Lecturer Contact Time
MRT	Media Richness Theory
NCV	National Certificate (Vocational)
PCT group	Practice Contact Time
POE	Portfolio of Evidence
PRCT group	Peer Contact Time
SEBD	Social, Emotional and Behavioural Difficulties
SLT	Social Learning Theory
SM	Social Media
SNS	Social Network Sites
SPT	Social Presence Theory
TAM	Technology Acceptance Model
TCT group	Technical Contact Time



LIST OF FIGURES

Figure 1: The community of inquiry model (Garrison & Anderson, 2003).....	14
Figure 2: Original TAM by Davis (1989) cited by Lederer, Maupin, Sena and Zhuang (2000).....	17
Figure 3: Hinge point.....	28
Figure 4: Evidence-Based Learning (adapted from Hattie, 2009).....	29
Figure 5: Stages in action research.....	39
Figure 6: Forced Field Analysis on performance of students.....	46
Figure 7: Results of the baseline theory test.....	52
Figure 8: Comparative analysis on number of learners who passed the baseline test and theory test 1	54
Figure 9: September results group average percentage passes.....	55
Figure 10: Summary of test scores for POE from the four groups.....	57
Figure 11: Demographic patterns for each group.....	59



LIST OF TABLES

Table 1: Strength and weaknesses of surveys	36
Table 2: Summary of research design	49
Table 3: Average class percentages for formative test 1.....	52
Table 4: Average percentage pass per group for test 1	53
Table 5: Average group percentages.....	56
Table 6: Summary of responses from the questionnaire (closed questions).....	61



CONTENTS

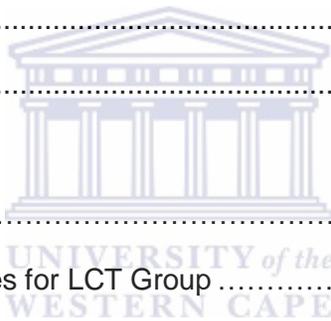
ABSTRACT	ii
KEYWORDS.....	iii
LIST OF ABBREVIATIONS.....	vi
LIST OF FIGURES.....	vii
LIST OF TABLES.....	ix
CHAPTER ONE: INTRODUCTION	1
1.1 Background to research problem	1
1.2 Statement of research problem.....	3
1.3 Research objectives.....	3
1.4 Research question	4
1.4.1 Research sub-questions.....	4
1.5 Justification.....	4
1.6 Brief literature review findings	5
1.7 Research design and methodology	5
1.8 Findings	6
1.9 Significance of the study	6
1.10 Contribution of the study	6
1.11 Delineation and limitations of the of the research.....	7
1.12 Ethical considerations	7
1.13 Description of chapters	7
1.14 Chapter summary	8
CHAPTER TWO: LITERATURE REVIEW	9
2.1 Introduction.....	9
2.2 Background literature.....	10

2.3	Definition of SM	11
2.4	Background to Facebook	12
2.5	Learning theories	13
2.5.1	Social Presence Theory (SPT).....	14
2.5.2	Social Learning Theory (SLT).....	15
2.5.3	Media Richness Theory (MRT).....	17
2.6	Factors affecting the quality and quantity of pass rate in computer programming	18
2.7	Use of Facebook to increase contact time with learners	20
2.8	Facebook assistance in learning from an FET college context.....	23
2.9	Specific Learning needs to programming students.....	25
2.10	The effect of Facebook in learning	26
2.11	Factors helping to improve the quantity and quality of computer programming with Facebook.....	27
2.12	Conclusion.....	30
CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY		32
3.1	Introduction.....	32
3.2	Research philosophies.....	33
3.2.1	Positivism.....	33
3.2.2	Interpretivism	34
3.3	Quantitative approach.....	35
3.3.1	Experiments	35
3.3.2	Laboratory experiments.....	35
3.3.3	Surveys.....	36
3.4	Qualitative methods.....	36
3.4.1	Case studies.....	37

3.4.2	Ethnography	38
3.4.3	Action research	38
3.4.4	Grounded Theory	39
3.5	Rationale for choosing Action Research	40
3.6	Sample population	40
3.7	Sampling technique and sample	41
3.8	Data collection instruments	42
3.9	Measurement.....	42
3.9.1	Questionnaire design.....	43
3.9.2	Pilot studies.....	44
3.10	Data Analysis.....	44
3.10.1	Data analysis in qualitative research.....	44
3.11	Validity and reliability of the research instrument	47
3.12	Bias in research	48
3.13	Chapter summary	48
CHAPTER FOUR: FINDINGS.....		50
4.1	Introduction.....	50
4.2	Synopsis of this chapter.....	50
4.3	Findings	51
4.4	Results from the test scores.....	51
4.4.1	Analysis of test scores	53
4.5	Summary of the Portfolio of Evidence group marks.....	57
4.6	Analysis of questionnaire responses	59
4.6.1	Demographic.....	59
4.7	Attitude towards learning resulting from Facebook use	61



4.8	Confidence gained in the subject through learning with Facebook	62
4.9	Role of Facebook in learning programming.....	62
4.10	Analysis of open-ended questions (questions12- 16).....	63
4.11	Summary of results	63
CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS.....		65
5.1	Introduction.....	65
5.2	Achievement of Research Objectives.....	66
5.3	Conclusions	69
5.4	Recommendations	70
5.5	Limitations of the study	70
5.6	Future study.....	71
REFERENCES		73
APPENDICES:		
Appendix I: Consent Form.....		81
Appendix II: Summary of test scores for LCT Group		86
Appendix III: Summary of test scores for PCT Group.....		87
Appendix IV: Summary of test scores for TCT Group.....		88
Appendix V: Summary of test scores for PRCT Group.....		89
Appendix VI: Facebook Group: sample comments.....		90
Appendix VII: Student questionnaire.....		91



CHAPTER ONE: INTRODUCTION

This chapter introduces the background to the study, topic objectives, research statement, justification, scope and significance of the study. The main research question, sub-questions and definition of terms are also presented.

Social media (SM) has been the subject of wide discussion in learning environments over recent years. This has been necessitated by the popularity of the Internet and its wide use in people's lives, particularly those aged approximately between 14 years to 24 years. This has resulted in a step-change in the way lessons and lectures are conducted. SM use has not been limited to the learning environment but has also been used in fields such as marketing. The use of SM in learning outside the official education environment provides fresh opportunities for innovating and modernising learning and training institutions, thus preparing students for the future (Redecker, Ala-Mutka and Punie, 2010). An observation was made that students at the College of Cape Town are using their mobile phones to access SM platforms. This gave an insight into utilisation of social medium of Facebook (FB) out of class to contact students for the purposes of learning.

1.1 BACKGROUND TO RESEARCH PROBLEM

As an educator, one is always interested in improving the student throughput, both in the quality of students leaving the education system, as well as in the number of passes. It was noted in the preliminary research (Dzvapatsva, Whyte and Mitrovic, 2011) that the pass rate for students in computer programming for FET colleges at NCV levels 2, 3 and 4 had begun to drop. This became evident after the introduction of a second examination paper for these levels. An analysis was conducted by the researcher on possible contributory factors. Subject lecturers singled out lack of adequate contact time with learners as one of the priority factors.

Apart from inadequate time dedicated to the subject, the execution of the NCV curriculum is based strictly on two documents, namely, subject guideline and assessment guideline. There are three levels (level 2, 3 and 4) and each level is an exit point. Certification is done after successfully completing NCV level 4. Each level consists of seven subjects, four being core subjects and 3 being fundamental subjects. Computer programming is one of the core subjects for Information Technology (IT) students at each level. A learner has to pass the Internal Continuous Assessments (ICASS) to be able to write the final exam. Learners must have a test and a practical mark for each term, and a September examination from the Department of Education (provincial paper). Together

this comes to seven test scores plus the Internal Summative Assessment Task (ISAT) forms the coursework and accounts for 65% of the final mark. The final exam written at the end of the year accounts for 35% towards the final mark

When the curriculum was introduced, computer programming had only one theory paper at the end of the year. It appears that in 2009, after the introduction of the second paper in which learners have to sit for a four-hour practical examination, no amendments were made to the guidelines. This means that the practical paper is being executed without clear guidelines given and therefore standardisation of the paper becomes very difficult and remains another challenge to the educators/learners. As a result, the execution of the curriculum is then obliged to follow the old subject and assessment guidelines.

In addition to the two above-mentioned issues: no guidelines, no standardisation and the out-dated implementation of the old curriculum, subject timetables were not amended or adjusted to cater for the four-hour practical paper. The already congested curriculum does not cater for learners to have a library/research period. The researcher, as one of the subject lecturers, approached the Information Technology Programme Manager on the issue to check whether additional time could be allocated to programming subjects. The response received was not positive: it emerged that any changes would have a direct impact on time allocated to other subjects. With a current curriculum that does not allow time for learners to conduct sufficient practical work, only one option remained - to conduct a study on using SM as a means of increasing contact time outside normal learning time.

SM can create space for learners to interact with one another and with subject experts on a specially designed programming platform. Preliminary investigations (Dzvapatsva, *et al.*, 2011) done by this researcher revealed that learners needed to communicate with lecturers and their colleagues in a more relaxed way. It was decided, therefore, to explore whether this could be achieved by means of SM. The next task was to identify the appropriate SM. The first observation revealed that learners were using FB as a way of communicating with friends. When asked, learners showed an interest in communicating with their lecturers in this same way, which led to its adoption for this research.

Furthermore, lecturers also noted that learners who were managing to obtain reasonable pass marks were doing so with an average of about 50% which, although acceptable, is a low mark and an issue of some concern to the researcher. Alternatives were viewed in order to improve the quality

and quantity of passes for the subject and again FB was considered worth pursuing for a potential solution. Other researchers have observed that *“another trend supporting the use of social media for knowledge exchange, information and learning purposes, is reflected in the high usage of Internet sites and services to exchange audio-visual content”* (Redecker, *et al.*, 2010:7; Wolpers, Kirschner & Scheffel, 2010:310).

1.2 STATEMENT OF RESEARCH PROBLEM

The extent to which learners are underperforming in the NCV programming subjects at all levels is such that students could be seen as failing the subject. One factor contributing to the stress felt by students was the lack of adequate contact hours dedicated to the subject. This adversely affects the throughput of FET colleges, because learners must then carry over a computer programming subject at each level (Dzvapatsva, *et al.*, 2011).

Not only do FET colleges need to attract more students, they must improve both quality and quantity of passes in the core subjects. The researcher noted that learners who had completed studies at FET colleges were struggling to break through into a programming field in the IT industry. At one of the IT conferences (North South VET ICT Conference)¹ hosted by three FET colleges namely College of Cape, Falsebay and Haugaland Skole of Norway in September 2012 in Cape Town, the message which emerged from the exhibiting companies was that students being produced by FET colleges do not display the quality required by the industry. It should be noted that passing computer programming may not necessarily ensure that FET IT college leavers meet the expectations of the industry. However, the industry expects who attended the North South VET ICT conference in 2012 suggested that passing computer programming or other core subjects like systems analysis and data communications and networking with quality passes in IT field makes a student more equipped to work in the industry. Just to mention a few, Papier (2009) also highlights a lot of factors which colleges need to respond to like curriculum and its delivery. From the preliminary research (Dzvapatsva, *et al.*, 2011), the researcher pointed computer programming as one of the main subject that keeps students struggling at each level and needs special attention.

1.3 RESEARCH OBJECTIVES

The objectives of the research were to:

¹<http://www.amiando.com/northsouth.html?page=762754>

- (i) identify factors affecting quality and quantity of passes in programming;
- (ii) identify how SM technologies can assist in increasing contact time for computer programming students outside normal college time;
- (iii) explain how SM can improve quality and quantity of passes in programming for FET students and
- (iv) investigate how SM can be used to help improve the quality and quantity of computer programming passes for FET students.

1.4 RESEARCH QUESTION

This study aimed to answer the following question:

- 1. *How can SM be used to help improve the quality and quantity of computer programming passes for FET students?***

1.4.1 Research sub-questions

The following sub-questions were asked to answer the main question:

- i. What are the factors affecting quantity and quality of pass rates in the subject?
- ii. How can SM be used by lecturers to increase contact time with learners in the subject?
- iii. How can SM assist with learning in a FET college context?
- iv. What are the specific learning needs of students studying programming?

1.5 JUSTIFICATION

The study highlights the way in which SM may be used to increase learner-lecturer contact time outside normal learning time, so as to improve performance in programming subjects at FET colleges. In view of the criticism of SM learning platforms, the literature reviewed in this study helps to identify educational potential in SM; more specifically Social Network Sites (SNS) such as FB. Although many researchers (Baird and Fisher, 2005; Tseng and Weng, 2010; Hew, 2011) have focused on the use of FB in learning, none of the studies have focused on the use of SM in improving quality and quantity of marks for programming.

According to Hew (2011:8) most of the studies on SM “*have focused on Anglo-American undergraduates . . .and the majority of studies were conducted involving participants from North America (particularly in the USA), followed by Europe (e.g., United Kingdom) and very few from Africa (e.g., South Africa)*”. This research is important as it was conducted in South Africa, unlike earlier research which focused on non-African countries and on undergraduate students. Apart from this, it helps to highlight the way in which lecturers may entice learners out of their comfort zones. The research also helps to identify how SM may be used by lecturers to deal with issues of discipline. This will be elaborated on later in the literature review.

1.6 BRIEF LITERATURE REVIEW FINDINGS

The literature showed that SM medium is a powerful tool for improving performance. According to Barczyk and Duncan (2011) SM plays a major role in sharing ideas and collaborating quicker than before. SM is an application built on ideas and technology foundations of Web 2.0 (Barczyk and Duncan, 2011). The social process narrative discusses the concepts of self-disclosure and self-presentation, a concept which makes FB a powerful tool in improving the quantity and quality of passes in computer programming for FET students. According to Papier (2009), the FET curriculum is of high quality aimed at a particular market, but recruited learners had not been the right sort in terms of ability. During its inception, the targeted students were post-Grade 9 “*thus attracting poorly performing school learners who saw College as an ‘easier’ option, and were woefully under-prepared for the demands of the new curricula, especially with regard to academic reading and writing skills, mathematical and language abilities*” (Papier, 2009:7).

A detailed literature review on this issue is discussed in Chapter Two.

1.7 RESEARCH DESIGN AND METHODOLOGY

The researcher worked with two National Certificate Vocational (NCV) level 3 IT classes studying computer programming as one of the core subjects. Four groups were formed on the FB platform and learners were asked to join the groups to assist them in learning the programming concepts taught in class. The four groups had the same focus but one had more lecturer facilitation; second centred on more practice contact time; third centred on peer contact and the fourth group focused on more technical time. These four groups studying computer programming were created to increase contact time between learners and lecturers at the College of Cape Town, Crawford Campus. The final mark for the subject is a result of 65% coursework mark and 35% exam mark.

For a student to pass he/she must obtain at least 50% after combining the coursework and exam mark. An action research study was conducted at the College of Cape Town; quantitative data was obtained for the study. A comparative analysis was applied on the results of the learners who used FB with lecturer facilitation, compared with those who used FB without facilitation. The table below summarises the research methodology. A total of 30 questionnaires were distributed to all learners who attended extra classes studying programming at NCV level 3. Out of 30, there were 21 which were completed and returned to the researcher.

1.8 FINDINGS

After analysing the data it was quite evident that SM does help to improve performance in terms of quality and quantity of marks for NCV level 3 students. The group that used FB with more lecturer contact time performed better than the other groups that used FB with less lecturer intervention. This is a clear indication that FB works well when there is a lecturer who leads/guides the discussions in the forum. However, the other groups also performed better than before the introduction of FB. The findings were encouraging but they still call for ongoing research of the same type to check the impact of SM on other FET core subjects.

1.9 SIGNIFICANCE OF THE STUDY

The SM environment is dynamic in the sense that its content and facilities are constantly changing. In addition, new SM platforms emerge periodically. New applications pose strong competition to the existing ones; therefore consistent usage of an application may be affected. With the aim to provide a framework for SM to effectively help improve programming students' passes at FET colleges data was collected, analysed and organized to be used for future research on the topic, and to ultimately publish material on this topic. What makes this research valuable is that these contributions offer alternatives to the learning of programming subjects to improve pass rates (and are also possible in other subjects). Therefore, this research could be used as a training tool for business organisations.

1.10 CONTRIBUTION OF THE STUDY

The study contributes to the body of knowledge by providing findings that show some factors contributing to the enhancement in pass rates for computer programming. The research offered a clear picture into the relationship between increased contact time and more practice with improvement in quality and quantity of passes for computer programming. The social medium of FB

helped to build a good learner-lecturer relationship which is vital for any learning context. FB was identified as a tool that makes “*learning fun, with more practical activities such as excursions*” (Papier, 2009:6).

1.11 DELINEATION AND LIMITATIONS OF THE RESEARCH

The study focused only on students studying programming at the FET College of Cape Town. This inevitably limits the generalization of this study and its applicability to other FET colleges. This also poses a geographical limitation; however, the outcomes may be useful to colleges outside these demarcations.

1.12 ETHICAL CONSIDERATIONS

Scientific research invariably involves studying human beings in some or other form. Where research involves the acquisition of material and information provided on the basis of mutual trust, it is essential to protect the rights, interests and sensitivities of those who participate. These considerations are:

- (i) the right to privacy (including the right to refuse to participate in research);
- (ii) the right to anonymity and confidentiality: No users’ names and/or details will be mentioned in this research;
- (iii) the right to full disclosure about the research (informed consent) and
- (iv) the right not to be harmed in any manner (physically, psychologically or emotionally).

It is hereby confirmed and agreed that this researcher undertakes to adhere to the above. In addition, no data and information gathered for this research project will be used outside the University of the Western Cape, nor will it be used for anything other than research purposes.

1.13 DESCRIPTION OF CHAPTERS

This research is composed of the following chapters:

- **Chapter One:** Introduces the research areas such as background to the study, research problem(s), limitations, and the scope of the research.
- **Chapter Two:** The literature review indicates the need for further research and evidence that goes beyond the description and that may contribute to future learning techniques outside

normal teaching/lecturing hours within the SM field. Some related theories in SM such as the Media Richness Theory (MRT), the Social Presence Theory (SPT) and the Social Learning Theory (SLT) are explained. The chapter examines factors affecting performance and the needs of programming students at FET colleges.

- **Chapter Three:**The research design and methodology of the research process is discussed as well as the research plan and the instruments used to collect primary data for analysis purposes.
- **Chapter Four:** Data analysis and findings, as related to the research objectives, are discussed and explained.
- **Chapter Five:**The recommendations and conclusions are presented as a summary of findings in this research. Recommendations for further studies and implications to the organisation are explained. Suggestions are made for best use of SM in an organisation.

1.14 CHAPTER SUMMARY

This chapter presents a brief discussion on the background to the research problem; research questions; research objectives; and justification of the study. SM use in the learning of programming at FET colleges remains a controversial issue as the benefits are yet to be seen.

The lecturer has an important part to play in the effectiveness of SM in achieving the desired outcome in the learning of programming. Many previous studies have focused on the use of technology, but not on contacting learners outside normal learning hours. This research addresses this gap in the literature, and the factors affecting the quality and number of passes in programming.

Irrespective of theories such as social learning, media richness, social presence - to mention only some - very few educators have made progress in using platforms such as FB outside normal learning time for collaborating and engaging with learners. This does not give a true reflection of the potential of SM platforms to achieve improved student performance in passing programming and in other FET subjects in South African colleges.

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents an overview of the associated literature and three main social theories that influence learning through social platforms (the media richness, social learning and social presence theories). Researchers are enthusiastic about understanding how these theories assist in improving performance of FET learners studying programming and so it is important to understand the theories and associated learner behaviour that may result.

It is also critical to understand these theories as it helps the researcher to see how they affect SM adoption and usage. The social learning theories are fundamental in the learning cycle. The associated literature on SM use indicated that learning is a social act; platforms such as FB may be used to improve the quality of students' results at tertiary institutions as well as the number of passes (Dzvapatsva, *et al.*, 2011).

In positioning an informed view of the reasons for some lecturers' reluctance to use SM platforms in their teaching, it is necessary to undertake a rigorous study of some of the prominent theories in education, and also to observe the effects (positive and negative) of SM after its implementation at the College of Cape Town for students studying programming subjects. The three theories mentioned earlier provide a solid foundation for the use of SM platforms in education. The literature from various researchers (Boyd and Ellison, 2008; Bingham and Conner, 2010; Cramer and Hayes, 2010) show that from its inception, FB was designed for university students to share assignments and to collaborate in various ways before it was made available to the general public. This is evidence enough to answer one of the research sub-questions: Can SM be used in learning?

In an attempt to answer the sub-questions, the literature will be presented as,

- definition of SM and the various SM platforms
- background of FB
- learning theories underpinning the study
- factors affecting quality and quantity of pass rates in computer programming
- use of SM to increase contact time with learners
- SM assistance in learning within a FET college context
- specific learning needs of programming students

- effects of SM.

2.2 BACKGROUND LITERATURE

As noted by Jackson, Barbatsis, von Eye, Biocca, Zhoa and Fitzgerald (2003:142) “*the digital revolution has been accompanied by both optimism and pessimism about its ultimate impact on individuals, society and the global community*”. From the educator’s point of view, and on the positive side, is the hope that access to IT, especially SM, will facilitate a more unbiased distribution and sharing of information by students. From a negative point of view, however, critics are of the idea that SM technologies may be disruptive, and that unfair access to these technologies will widen the gap between the ‘haves’ and the ‘have-nots’ (i.e., the digital divide).

Owing to the massive use of mobile technology within the general population, current students are often referred to as ‘Millennials’, ‘Net Generation’ (Smailes and Fontainha, 2011) and ‘Digital Natives’ or ‘Homo Zappiens’ (Kirschner and Karpinski, 2010). Most of these students were born in the 1980s and 1990s, and they are masters of social networks; good at multi-tasking; digitally literate; and they are the first to add any new technology to their catalogue. The ‘Net Generation’ learners were born surrounded by technology (Smailes and Fontainha, 2011). This current generation of learners uses SM heavily, to the extent of going to bed with their cellphones noisily texting or chatting into them. Presumably then, skills gained from collaboration and technology use may be incorporated into their day-to-day learning to achieve positive results.

In addition, the researcher observed that our education systems remain reliant on traditional methods which rarely accommodate these new technologies, while failing to recognize the changes arising from the current generation’s use of mobile technology. Educators should be seeking ways in which to embrace technology for the purposes of improving academic performance, that is, the quality and number of passes in their respective subjects. SM has now become one of the best ways in which to communicate with students outside the classroom; learners use various SM technologies to communicate with friends and educators may just as well join in. Usually, students come to college ‘powered-up’ and supported by the latest technologies available – but often they must leave these at the door, because educators do not use them in classrooms and may even treat new technologies

with suspicion (Roblyer, McDaniel, Webb, Herman and Witty, 2010). Although use of technology such as this may be disruptive at times during lectures, if no acceptable-use policy is put in place, SM will remain an untapped powerful support system to communicate with learners outside the normal teaching hours.

2.3 DEFINITION OF SM

Several definitions have been put forward to define SM; all seem to agree on what it is. All definitions point to the same idea of sharing of and building a community. According to Bingham and Conner (2010:6) SM *“is a set of Internet-based technologies designed to be used by three or more people”*. This is slightly different from cellphones and e-mails. This definition has an important multiple aspect of “three or more people” interaction, sharing and so on. Junco, Heiberger and Loken (2010) define SM as *“a collection of Internet websites, services, and practices that support collaboration, community building, participation, and sharing”*. In the above definition, all web technologies are being described as SM and the above two definitions of it have a common ground - participation and sharing, both of which are considered very important in learning.

Redecker, *et al.* (2010) goes further to list all the internet-based technologies referred to by Bingham and Conner (2010); these are applications for:

- blogging, podcasting and collaborative content (e.g. Wikipedia)
- social networking (e.g., MySpace, FB) multi-media sharing (e.g., Flickr, YouTube), social tagging (e.g., Deli.cio.us)
- social gaming (e.g., Second Life).

In the above definition we notice that the term social media encapsulates a lot of technologies used for interaction and communication. For the purpose of this study the researcher will use the term SM but will focus on only one type of it – FB - which is an example of social network sites.

SM can be defined as *“web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system”* (Boyd and Ellison, 2008:211). Most of the common SM

applications include FB, MySpace, YouTube, +You (googleplus), MXit, Flickr and so on. All these SM require one to have a valid e-mail account to create a profile. Among the minor considerations of accessibility to internet and availability of cellphone contact among learners, the researcher felt FB had a slight advantage among learners as students already made use of this medium. SM, irrespective of geographic distance, allows a certain equality in terms of communication creation and passing on of information. A social networking site² in January 2013 showed that FB was one of the leading SM with 1.1 billion users as of October 2011, which indicates a large scale use of FB. Based on the above figures this researcher wanted to make use of a medium which could help to communicate with and engage learners after normal class time and FB seemed to be the best fit.

2.4 BACKGROUND TO FB

SM has been in existence for quite some time. However, Sixdegrees.com was the first social networking site launched in 1997 followed by other social networks like Livejournal in early 1998, AsiaAvenue in 1999, and later Myspace, Flickr and FB in 2004, (Boyd & Ellison, 2008). According to Mazman and Usluel (2010:445) FB is defined as “*a social utility that helps people share information and communicate more efficiently with their friends, family and co-workers*” (facebook.com). FB started as an internal Harvard university-only social network site. It later expanded to include students from other universities, then to professionals inside corporate networks and later to everyone who has internet access. By October 2011, FB had approximately 1.1 billion active users, which far exceeds the number of users of other platforms. FB allows one to create a personalised profile which allows communication, sharing of photos, creation and joining of groups-of-interest, sending instant messages, playing of games, writing on friend’s walls and so on. All a prospective user needs to have is a valid e-mail address or telephone number to sign up for an account.

Hew (2011) cites four important categories found in FB which are:

- (i) **control elements:** captured in fields such as gender and status;
- (ii) **reference elements:** common reference points like hometown, college attended, schools, residence inter alia;
- (ii) **preference elements:** which are elements that refer to common points of interest like music, soccer teams and any other personal interests and

²<http://www.dreamgrow.com/tag/facebook-statistics/>

(iii) **contact elements:** which holds information like birthdays, relationship status, and preferred screen name.

Once registered, one can invite friends or request to join certain groups or pages of common interest.

Many functions such as games are being added to the platform so enabling users to gain maximum benefits of the medium. According to Mason (2006) as cited in Mazman and Usluel (2010:445) "FB is being considered as an educational tool because of its beneficial qualities such as enabling peer feedback, its appropriate fit with social context, and its interaction tools". According to Mazman and Usluel (2010:447), FB provide members "with intentional or spontaneous learning opportunities by bringing people together around shared interests, exchanging information, sharing ideas, discussing topics, collaborating...". It is in this context that the researcher saw fit to use FB as a way of communicating with students and also to enable social learning.

In trying to understand how knowledge is acquired through SM the researcher looked at three learning theories:

- Social Presence Theory (SPT)
- Social Learning Theory (SLT)
- Media Richness Theory (MRT).

2.5 LEARNING THEORIES

Learning is one of the fundamental terms that we need to define when trying to relate social learning theories. Bingham and Conner (2010:19) define learning as "*the transformative process of taking in information, which when internalized and mixed with what we have experienced, changes what we know and builds on what we can do*". Learning results from the input of ideas, processing, and reflection to ultimately change people's lives.

Recent researches (Tselios, Daskalakis and Papadopoulou, 2011) shows that the main attribute that separates the current learning systems from the old conventional learning environments is the extent of technology usage. Another feature of the current learning system is the shift of control and responsibility to the learners by giving them an opportunity to learn anywhere, anytime. This is believed to have a positive impact on the effectiveness of the learning tools. In the current environment, social theories significantly manipulate the

learning processes and have strengthened the perceptions of the learners towards adoption and use of SM.

2.5.1 Social Presence Theory (SPT)

“Social presence is the degree to which a medium is perceived as conveying the presence of the communicating individuals” (Spencer and Hiltz, 2002:4). The quality or state of ‘being there’ between communicators does affect the effectiveness of a communication medium. Lomicka and Lord (2011) argue that social presence helps to understand how participants convey their messages and how the messages are interpreted by other members of the group. They further postulate that social presence enhances instructional success and encourages greater contentment in the learning process. It is impossible to think that one could create a programming community without some social presence. Development of a community outside the classroom is vital for the effectiveness of the learning process, (Garrison and Anderson, 2003).

In an attempt to assess social presence, Garrison, Anderson and Archer (2000) identified three elements as the cornerstone of educational presence and these are:

- **Cognitive presence** or the ability for the participants to construct meaning and engage in cognitive thinking. Cognitive thinking is very important aspect to learners studying programming as it assists them to solve problems on their own from the discussions held online.
- **Teaching presence** or the ability of the lecturer to design educational material specific for online platforms.
- **Social presence** involves making personal characteristics visible.

All of the three elements are important and have to co-exist to complement one another for the best possible learning and to build a sound educational experience. Figure 1 illustrates the three core elements in learning.

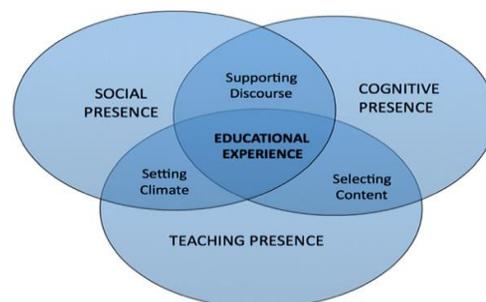
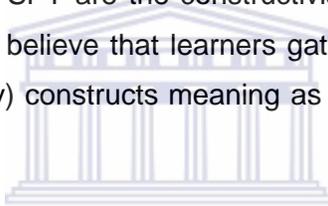


Figure 1: The community of inquiry model (Garrison & Anderson, 2003).

All of these mentioned factors influence how learners relate to other participants involved in the communication. So the most important question is: Can FB “promote effective communication through the development of greater social presence?” (Lomicka and Lord, 2011:50).

The lack of verbal facility, facial expression and tone-of-voice when using FB limits social presence while it furnishes physical presence. When learners participate in on-line discussions, they are able to weigh up how much they feel as compared to when they are present in a face-to-face environment. Proponents of Social Presence Theory (SPT) like Short, Williams and Christie (1976) argue that the non-verbal expressions can be substituted by clear articulation and friendliness encouraged by the lecturer and even other students within the on-line learning group. Therefore, on-line facilitators/lecturers must intentionally structure interaction patterns to overcome the potential lack of social presence of the medium. Proponents of the SPT are the constructivist. Dewey, Piaget and Vigotsky (Huang, 2002) among others, who believe that learners gather facts for themselves - each learner independently (and socially) constructs meaning as they learn via online interaction or group discussions.



Constructivist learning theorists suggest that the qualities of the group discussions through platforms like social networks lead to students acquiring more knowledge than focused learning methods like the traditional face-to-face lectures (Spencer and Hiltz, 2002). This is because direct learning methods are dominated by a lecturer who, in most cases, spends much time giving notes, explaining or giving tasks with less time left for learner engagement. “It is in the social context and its peer interactions that students find useful to construct meaning and knowledge” (Spencer and Hiltz, 2002:4). Interaction through FB allows learners to observe, participate, actively create and convert the patterns through which they construct realities that fit them and which apply to their learning. It is from this context that the researcher finds it useful to understand how SM can be used to improve learner performance. The ability of users to upload files, audio and visual materials increases the social presence.

2.5.2 Social Learning Theory (SLT)

Among others, one of the leading proponents of this theory is Albert Bandura. Bandura’s SLT of (1997) assists in understanding the impact of SM on learning. Given that individuals’

learning outcomes are influenced by their peers, individual learner and situations or environment. The SLT states that people can learn new information and behaviours by observing peers (Yu, Tian, Vogel and Kwok, 2010). Both tacit and explicit knowledge is gained as a result of social interaction through observation, modelling and imitation. Tacit knowledge is the kind of knowledge that is generated through informal conversation whereas explicit knowledge is de-contextualised mostly through formal lectures (Racham and Firpo, 2011). Some of the factors highlighted in their research into observational learning include:

- **Retention:** The ability to store information and retrieve it later is very important in a learning process. Although FB does not offer the option of searching discussed topics, a learner can do a sequential search and retrieve information on his own. However recent studies on big data (Bughin, Chui and Manyika, 2010) are likely to make searching of posted topics easier.
- **Attention:** The ability to listen carefully has a positive effect on observational learning. When learners are having a discussion on their own as peers they are more likely to listen.
- **Motivation:** For one to acquire much knowledge through observational learning there must be a reinforcement that motivates learners. For example the learners who are going to take active participation in the FB discussion of the subject are likely to perform better towards the end of the term or even during class discussions. Once other learners see this they become motivated to take an active part in FB discussions in the hope of also being so rewarded.
- **Repetition:** This involves repeating a learned behaviour. Repetition often leads to skill improvement and perfection. If learners learn a concept through social interaction from peers and repeat the same concepts they will master the concepts.

It is from this view that the researcher finds the SM of FB a useful tool to facilitate social interaction. FB enables social learning through the user's collaboration. Social media, according to Baird and Fisher (2005:20)

“engages the user in the content and allows them to be included as an active participant as they construct a learning landscape rooted in social interaction, knowledge exchange, and optimum cognitive development within their peers”.

The best cognitive growth can be brought about through full social interaction of the learner

with others. Moreover, education is well-organized when learners connect in activities within an accommodating (social) learning environment and when they receive maximum support that is aided by tools. The result of situating learning in a “*collaborative and social learning environment is an increased range of skill, versus what can be attained alone*” Baird and Fisher (2005: 4). Several studies (Spencer and Hiltz, 2002; Boyd and Ellison, 2008; Fovet, 2009; Cain and Policastri, 2011) have focused on SM use by college students but very few have focused on whether the tool(s) assist in improving the quality and quantity of passes in any given subject. In section 2.6 an analysis of FB’s effect on the pass rate is investigated.

2.5.3 Media Richness Theory (MRT)

The MRT theory was put forward by Daft and Lengel in 1984 (Daft and Lengel, 1986). MRT describes the ability of a communication medium to reproduce the information sent by it. According to Suh (1998:296) “*communication media differs in the richness of the information processed*”. The richness of the medium is based on its feedback capability, channels used, language variety, and personal focus. The more a medium incorporates these functions, the richer it is. In that regard, the face-to-face approach is seen as the best medium as it allows instant feedback, (i.e., bi-directional communication of multiple cues such as facial expressions, change in tone, and a person’s mood). Other communication mediums such as telephone, text, and video conference are considered lean. Suh (1998) further postulates that although computer text systems are regarded as lean mediums they are powerful in terms of generating ideas and plans resulting from collaboration and engaging of learners - a view also shared by constructivist theorists like Jerome Bruner in his theory of cognitive development. Liu, Liao and Pratt (2009:601) point out that the recent studies on MRT focuses on “*user satisfaction, which is related to intent to use*”. The usage and adoption of FB can best be described through the Technology Acceptance Model (TAM) (see Figure 2 below) as suggested by Fred Davis in 1986.

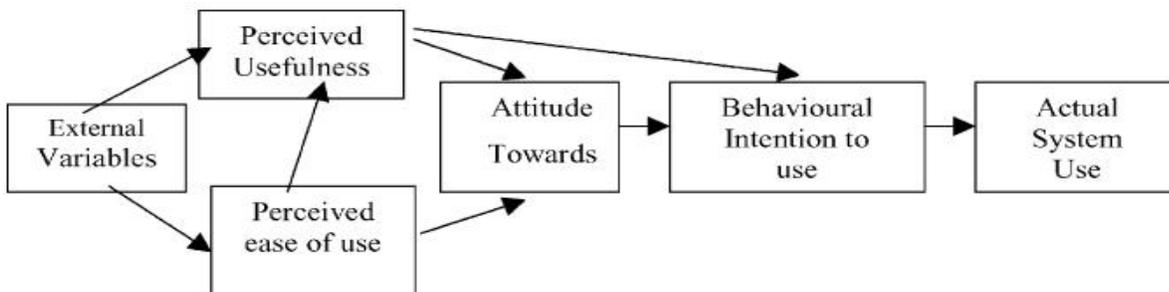


Figure 2: Original TAM by Davis (1986, as cited by Lederer, et al., 2000)

The TAM proposed by Fred Davis in 1986 (above) states that adoption of technology/medium is as a result of perceived usefulness and perceived ease of use. With regard to this study, the analysis of TAM seems to suggest that perceived ease of use and perceived usefulness directly affect learners' attitudes towards technology usage. As stated earlier in this chapter, learners use FB because of a shared perception of its ease of use. This might be in contrast to the earlier belief that computer text systems are the lowest in media richness. Several researchers (Liu, *et al.*, 2009; Spencer and Hiltz, 2002) concur that understanding of media richness assist in explaining the capabilities of SM in learning with a view to improving performance. It will be interesting to observe how the actual use of technology in learning affects the quality and quantity of the pass rate in computer programming.

2.6 FACTORS AFFECTING THE QUALITY AND QUANTITY OF PASS RATE IN COMPUTER PROGRAMMING

It remains one of the core targets for educators to achieve good pass rates in their respective subjects every year. A final pass mark of 50% might be good for throughput alone, but the industry may regard learners with such marks as lacking appropriate programming skills. The researcher noted that a higher grade obtained as a final mark for programming may indicate appropriate programming skills in the subject as it is a sum total of work done throughout the year. Unlike other education systems, where the examination mark is used to determine whether one has passed or not, outcome-based education requires a learner to be constantly working hard as each task contributes to the final mark. Learner performance can, therefore, be viewed in **two** dimensions i.e., **quality** and **quantity** of learner passes. According to Ortiz, Hoyos and López (2004:177) "*academic or scholastic performance is the degree of knowledge and the development of abilities and skills that an individual possesses at a given educational level, and that is generally assessed by assigning a numeric grade*". A learner with a high numeric grade is considered to have passed the subject well. The final mark for learners studying programming is not only obtained from the examination mark but from a combination of all summative tests (both theory and practical) done during the year - and includes the final examination mark. A high numeric grade or symbol indicates a quality achievement.

In general, most students enrolled for FET courses are those who do not perform very well in the academic mainstream and they have a lot of pressure for future expectation as

discussed during North South VET ICT Conference in 2012. Despite this pressure, these students lack motivation and therefore, it remains the lecturer's duty to motivate them first to create a good learning environment. According to Rau, Gao and Wu (2008:2) "*motivational orientation (intrinsic or extrinsic orientated) of students has significant impact on their learning performance*". Intrinsic motivation has been suggested to result in higher quality learning and improved learning strategies.

Quality can be defined as academic excellence especially when a learner has the skill in programming. According to Colby, Witt and Associates (2000:4) in a document published by the United Nations Children's Fund, quality education, among others, are "*outcomes that encompass knowledge, skills and attitudes, and are linked to national goals for education and positive participation in society*". Learners with such skills are competitive which gives them an edge over matriculants as they get absorbed within a programming sector in IT circles. The document further points out that for learners to achieve academically they must attend classes consistently (Colby, *et al.*, 2000). However, skipping lectures is a big challenge with FET students who keep on giving excuses for their absenteeism so that instead of teaching, a lecturer will spend valuable learning time dealing with discipline issues. It is the researcher's hope that contacting learners through FB might assist in motivating students to learn - let alone to attend classes. This observation by the researcher is based on the preliminary study on improved attendance as compared to earlier times before the introduction of FB (Dzvapatsva, *et al.*, 2011).

Family support has been identified by the United Nations Children's Education Fund study made in 2000 to play an important role in producing quality learners. Learners whose parents had a low level of education were identified as more likely to struggle at colleges. This is due to the fact that parental support in learning is minimal as they are less familiar with the systems.

In addition to the above-mentioned factors, other issues affecting quality of passes in computer programming as indicated by some students during a preliminary investigation on the subject include:

- (i) limited contact time between learners and their lecturers (lecturer contact time);
- (ii) lack of enough practice time by the learners (practice contact time);

- (iii) insufficient subject guidance from subject experts (technical contact time)
- and
- (iv) insufficient corroboration with peers (peer contact time).

The learners also seem to have developed a notion that computer programming is difficult and this could have the impact of creating resistance to learning among students. It was observed that this attitude can be reversed through collaboration and engaging the students outside normal learning time. FB provides some advantages to the student by enabling easy access to educational material and assistance from the lecturer.

According to Yu, *et al.*, (2010) SM assists college students to attain social acceptance from peers, adapt to college culture, and directly influences student's learning outcomes. Smalles and Fontainha (2011) further supported the idea that students' success is affected positively by the sense of identification with peers. Their active engagement allows them to have virtual classes and this gives students access to diverse information from multiple sources. Their study also strongly supports the idea of **peer mentoring** as being vital in academic achievement and increasing student retention. Peer mentoring is a technique in which learners of the same age/level assist each other in pursuit of common subjects that affect their day-to-day lives. A preliminary study (Dzvapatsva, *et al.*, 2011) showed that learners seem to understand concepts better that they teach each other rather than those learnt from a lecturer. This could be due to relaxed language usage and individual attention which is absent in face-to-face formal lectures where the facilitators have to conform to rules and regulations of the institution like language policy and so forth.

2.7 USE OF FB TO INCREASE CONTACT TIME WITH LEARNERS

Owing to geographic distance, face-to-face communication or group tasks are a challenge. The face-to-face classroom is a controlled communication event and often teacher-centred, i.e., the teacher and the learners are required to be in class at the same time with the teacher who dictates the pace. Mazer, Murphy and Simonds (2007:4) state that "*a teacher's use of FB is an attempt to communicate with students outside of that controlled environment where teachers can meet students in their territory*". As a result, lecturers and students have to make use of available technology to increase contact learning time. In support of the same point, Cain and Policastri (2011:1) highlight that "*while traditional face-to-face instruction offers numerous advantages for learning, it is constrained by time and space*".

The course modules mostly do not have room for an instructional strategy that includes discussing non-textbook topics. Also expanding course topics may require inviting external guests from the programming sector - which can be a difficulty when it comes to scheduling. External subject experts in programming can provide a unique perspective, but the logistics of inviting them are not always easy. This is when SM can be brought into play to invite them on the FB platform to collaborate with learners.

Spencer and Hiltz (2002:3) state that, "*groups that need to work together on one activity need media that provide communication in real time*". The chat facility that FB provides allows all students and lecturers to communicate in a real-time mode. In support, Ractham and Firpo (2011:3) point out that "*learning not only occurs within the traditional classroom, but students as well as educators also often try to reach out to the abundance of information and knowledge outside the classroom*". FB can also be a good platform for group tasks for homework as students can communicate in a real-time mode.

Spencer and Hiltz (2002) suggest that media synchronicity extends media richness and gives a dynamic time-changing value to it. Media synchronicity is the extent to which the medium is linked with the recipient's communication needs (Spencer and Hiltz, 2002). According to Spencer and Hiltz (2002) FB allows four factors:

- immediacy of feedback
- symbol variety
- rehearse-ability
- reprocess-ability
- parallelism

Immediacy of feedback has been defined as the time between the posting of a question/comment and when the feedback is received. Medium with low immediacy affects communicants' ability to share information. Medium with high immediacy facilitates rapid exchange of information which can result in learning outcomes being achieved. According to Spencer and Hiltz (2002:3) "*symbol variety refers to the ways information can be transmitted by the medium*". Although FB has low symbol variety compared to face-to-face communication due to its limitation of expressing gestures through body language, one can quickly identify that a student is no longer interested or wants to stop the communication.

Parallelism is the number of channels that a medium can use concurrently, (Spencer and Hiltz, 2002). FB allows multiple conversations and through this, learners can share a lot of information which face-to-face lectures may not offer as most of them are lecturer-centred. Spencer and Hiltz (2002:3) states that *“rehearsability in a medium allows the users to compose their response to a received message before transmission”* so that before a comment/response is posted, a student can proof-read and edit before sending to the group. Apart from that, students can refer to posts/comments at a later stage which voice (face-to-face) communication does not offer unless recorded and used as podcasts. FB also allows students to re-read the messages at a later stage (reprocess-ability)

The researcher noted that one of the few inexpensive ways for learners to contact lecturers (or other learners doing the same course at a higher level) would be via the social medium of FB. Lecturers can use podcast to distribute pre-recorded lessons which can be downloaded in MP3 format by students and played back on their iPods. In doing so, students who are able to multi-task can do other tasks while listening to the recorded lecture. However, podcasting is expensive, and FB requires students to have a mobile phone which can connect to the internet. As cited by Spencer and Hiltz (2002:2), through FB, students and lecturers *“who are online at the same time can exchange”* information or communicate with each other until any ambiguity that may have occurred during face-to face lectures is resolved. The advantage of using FB is that learners are assured of getting a quick response through the on-line chat which the medium offers. The inquiry could be at the learner’s pace, in a non-intimidating environment to the learner until the learner is satisfied with the response from the lecturer or from peers. In most cases, by the end of the discussion the learner will have acquired leads to problem-solving or will have been able to access solutions to earlier problems. The SM of FB helps learners to contact lecturers at any time and get instant feedback if the lecturer or their peers are on-line.

In addition, FB can be used to break down participation barriers that happen in the classroom. Learners who feel less privileged economically, socially or morally are less likely to actively participate during class sessions but feel more independent when using FB, (Ractham and Firpo, 2011). However, the literature is silent about learners who feel inferior to technology and who may have a negative response to FB. This researcher intends to investigate this group as the study progresses.

Furthermore, FB can be used as an extension of a physical lecture and reaches out to

students who might not have missed classes (Ractham and Firpo, 2011). However, it must be clearly stated that FB platforms created by lecturers must not be used as substitute for attending class so that lectures are not skipped by students. One of the challenges to this was observed by the researcher (Dzvapatsva, et al., 2011) in that students studying programming, used the FB group they created to circulate a practical assignment given to them in class. Although the lecturer had given this as homework, some went on to retrieve the work done by one of the students and posted it as their submission. This highlights cyber cheating in SM. However, what is important from this type of cheating is to assess whether learning took place.

2.8 FB ASSISTANCE IN LEARNING FROM AN FET COLLEGE CONTEXT

According to Fovet (2009) high school students (the equivalent of our FET learners) have been identified to have Social, Emotional and Behavioural Difficulties (SEBD). The students with SEBDs often think that their behaviour is in fact normal and it is a direct response to bad teaching. Social networks like FB are seen to be of great importance for these students in their adjustment to school and their management of peer associations as their use has been identified as therapeutic and a way for learners to try to identify themselves and reveal their feelings. Mazer, *et al.* (2007) believe that the use of FB can improve the teacher-learner relationship as a result of teacher self-disclosure. Teacher self-disclosure has been identified as effective in achieving positive learning outcomes (Mazer, *et al.*, 2007). Learners perceive that teachers who use FB to communicate with them are doing a good thing, which helps to develop a positive relationship amongst group members.

In addition, learning is a fundamentally social act and human beings are social creatures. Our natural drive to learn together can be facilitated through SM to extend, widen, and deepen our reach. SM helps learners to gain confidence through interaction with fellow students and lecturers in a more social and informal way (Social Influence Theory - Cheung, Chiu and Lee, 2010). From circle time in kindergarten, to study groups in college, sociability has always enhanced the gears of learning. Lecturers at FET colleges can make similar use of SM to get in touch with their learners.

In addition, through participation in SM, learners get to know themselves and how their

peers perceive them in such a way that they can feel more assertive in the learning process. Tseng and Weng (2010) suggests that it helps to improve participation for students who may feel too reserved to engage in the discussion during class time. Several studies have demonstrated the importance of social presence and knowledge-sharing via SM which lead to improved performance (Newberry, 2001; Aragon, 2003 as cited in Tseng and Weng 2010). The sense of identification within peers arising from FB use also positively affects students' success. According to Fovet (2009) SM platforms like FB are widely used by teenagers around their school or college connections which can increase its potential impact on their learning. The researcher has also noted that learners can use SM easily, especially for group assignments given to them as homework.

As cited by Licardi, Ounnas, Pau, Massey, Kinnunen, Lewthwaite, Midy and Sarkar, (2007) SM allows different expressions of the self and this allows a user to manage bias. SM also offers a diverse blend of personalities and can result in agreement within group members which can have a positive impact on learning. Learning through SM media can achieve what traditional teaching approaches often cannot. Vassileva (2008) states that the current crop of students at colleges need quick gratification. Quick gratification is obtained through FB's capability of immediate feedback. It is difficult to teach subjects like programming which require complex knowledge structures and demand a lot of practice within limited time slots allocated for the subject. To deal with this demand the lecturer has to be innovative and incorporate different learning styles to allow the learning of more complex skills. The fact that most of the learners have SEBD's (Fovet, 2009) mean that they need quick constant satisfaction and FB helps to achieve this. Although there could have been other ways of developing these complex programming skills like dry running (coding programmes on paper) of programmes, it becomes easier with SM's quick feedback whereas the traditional ways meant that a learner would only get feedback when they get back to college the following day.

Vassileva (2008) concludes that SM learning platforms become more useful if the work posted is learner-centred and more rewarding. He further notes that 'Digital Natives' are self-centred, purpose driven and should always feel in control. So it remains the duty of the facilitator/lecturer to convince learners to learn, motivate them and reward them accordingly for their achievement. "*The learning platform should allow learners to find the right people and correct puzzle piece of knowledge*" (Vassileva, 2008:202). To do this, Vassileva (2008)

suggests that the learning environment needs to:

- (i) create a feeling of achievement/self actualisation;
- (ii) tie learning more explicitly to social achievement related to status/reputation in the peer group and
- (iii) tie learning more explicitly to social rewards in terms of marks and credentials.

Several ways have been identified that can make learning more gratifying, motivating and which give the learners immediate satisfaction. These include constant feedback as a way to boost feelings of improvement, make tasks game-like mixing challenges with fun, and link individual performance to status in the group. Self-visualisation can be used as a feedback mechanism as it stimulates competition and social comparison. In addition, two types of social comparison have a positive impact as a feedback mechanism. Firstly, upward comparison with best performers in the group motivates other learners as they serve as role model (Vassileva, 2008). This allows peer recognition while learners learn to trust each other in the group. Secondly, downward comparison boosts a learner's self-esteem, feelings of accomplishment and self-confidence (Vassileva, 2008). Social visualisation as a type of feedback encourages group relationship. Social learning platforms become an important way of learning as opposed to *"a problem to be fixed but a trend to be aware of, accept and adapt to"* (Vassileva, 2008:199). Smailes and Fontainha (2011) support the idea that with the explosion of mobile technology, new learning trends are on the rise and often our education system does not realise their capabilities. Educators should embrace technology for the purposes of academic achievement.

2.9 SPECIFIC LEARNING NEEDS TO PROGRAMMING STUDENTS

As stated in the subject guidelines, learners need to acquire knowledge, problem solving skills and attitudes. These attributes are assessed throughout the year using assessment instruments such as projects, tests, assignments, investigations, role-play and case studies. During practical exercises outside the classroom, problems can arise and students need to consult lecturers. Once learners interact with trustworthy experts in the field whose interests are identified in the topics that they post, enquiry-based learning begins and the cycle is repeated a number of times until learners are satisfied with the solution. According to Tseng and Wang (2010: 5) *"results showed that . . . the problem solving online discussion activity is more helpful for students' knowledge construction"*. Students can construct meaning based on discussions that would have taken place on the online platform like FB.

Apart from the above needs, programming students must be equipped with sufficient resources to achieve enough quality passes in the subject. Some of the resources include enough computers, internet facility and textbooks. It is also very important to give individual learners some attention in programming due to the fact that the same problem can be solved differently by all learners. Unlike other theory subjects, e.g., systems analysis, where learners can read notes and produce good passes, lecturers have to take time to look at individual projects. Through SM, learners can overcome problems by posting programme snippets with errors and the lecturer/subject expert corrects them (Dzvapatsva *et al.*, 2011).

Although traditional educators have tried to ban SM, the influx of mobile technology is slowly overpowering their efforts because of its affordability and reach (Boyd and Ellison, 2008). Critics of SM in learning like Gross and Acquisti, 2005; Acquisti and Gross, 2006; Barnes, 2006; all cited by Boyd and Ellison, (2008) present a number of factors against its (SM) use, but remain insufficient in number to block the emerging technology; however, it goes without saying that use of SM platforms like FB is still controversial.



2.10 THE EFFECT OF FB IN LEARNING

The biggest challenge with FB is the educator's lack of control over what the learners post to each other (Smiales and Fontainha, 2011). Although the lecturer, as the administrator of the FB group can delete unwanted posts, the damage it makes before being deleted might be disruptive so it is very important to set up some working rules to give students to follow when using the FB platform. Mazer, *et al.* (2007) highlight the dangers of self-disclosure on the lecturer's part. Mazer, *et al.* (2007) further explained that, although many students view teacher self-disclosure as a helpful relationship, it can be unconstructive as well and professional concerns have been cited by some students in the study as to how they would see their lecturers based on what they post or upload.

Lipka (2007) maintains that students see the FB platform as their domain and may need to express themselves without worrying about what lecturers say. The only way to counter this would be to change a lot of privacy settings so that the lecturer has no access to what students post on their personal accounts. However, by so doing, it tends to reduce the idea of it being a social platform as it become more controlled to an extent that these learners might end up not expressing themselves freely. Lipka (2007) predicts that some students may end up asking for 'some favours' like assignment extensions, swapping classes, being

away from class, and so on, which might not be possible in a face-to-face meeting with the lecturer.

Furthermore, students might attempt to substitute daily lectures with the FB group. One lecturer at the College of Cape Town has cited FB as disruptive, but he gives no convincing evidence. As highlighted in Baird and Fisher (2005) studies, critics of e-learning often characterize on-line classrooms as neutral spaces devoid of human connection, emotion or interaction with instructors or peers. Also, as indicated, SM can facilitate cyber-cheating - a new form of cheating characteristic of social networks.

Cramer and Hayes (2010) identify bullying as another concern on SM (FB) usage. Online bullying can vary from posting a harassing e-mail, chat message or creating web-page or FB groups aimed at making fun of other learners. This could have a negative learning outcome for the student and may lead to depression, poor performance in class and absenteeism.

Banning SM would be fighting a losing battle with the 'Net Generation'. As an educator one could become unpopular adopting such a stance instead of taking advantage of the issue. This has been observed by the researcher during the programming lectures (Dzvapatsva, *et al.*, 2011). Although sticking to the traditional methodology can be good, it is worth trying new technologies to supplement current ones. Preliminary research (Dzvapatsva, *et al.*, 2011) has shown that the social medium of FB helped to increase the pass rate for programming. Other critics of SM suggest that it is a lean medium essentially anti-social and unfriendly. Most of the literature has concentrated on other subjects at university or high schools learning with SM and leaving out discussion of the FET context. Since the quality and quantity of pass rate in computer programming in the context of FET colleges is not explored thus far, this study set out to do so at one of the institutions in the Western Cape.

2.11 FACTORS HELPING TO IMPROVE THE QUANTITY AND QUALITY OF COMPUTER PROGRAMMING WITH FB

The SM of FB facilitates the different types of contact time listed below. Hattie (2009) identified improved performance as a result of direct and indirect processes. Some of the indirect processes include:

- Beliefs
- Motivation and Perceptions

Growth in self-esteem results in courage and determination to address one's weaknesses in learning. Through indirect processes or strategies like FB, the learners gain confidence and self-efficacy from mastering problems. In addition, through platforms like FB a teacher can address low self-efficacy by the students before trying to raise their achievement levels. A fixed mindset of low self-esteem is removed through participation by all students with the result that there is no perceived lower achievement of other students. Hattie (2009) measured different effects using the Barometer of Effectiveness in visible learning. The effects of FB are seen to lie on the zone of desired effects for learning purposes. Any variable with a value of greater than .40 is regarded as a desired effect. The diagram below, Figure 3 shows what Hattie (2009) calls the "hinge point". A chart or gauge on which one can "force a needle" in a suitable position to determine the effects of various variables on learning

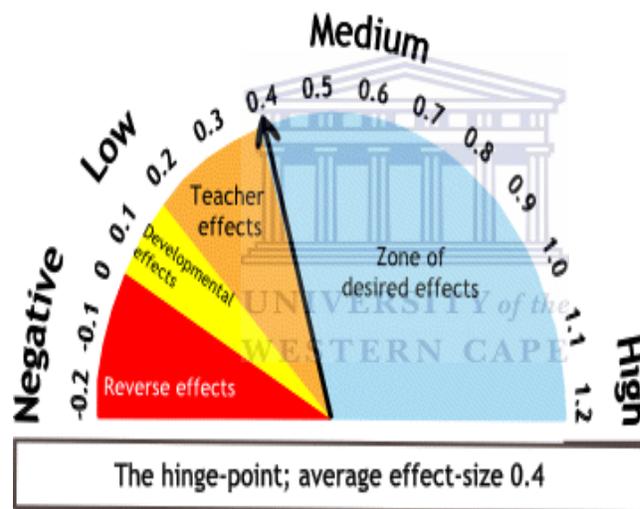


Figure 3: The Hinge point scale (Hattie, 2009)

In his studies (Figure 3) Hattie (2009) identified 138 different effects on student achievement. The teacher-student relationship was identified as one of the factors with a high impact on performance of 0.72 mean and lies in the zone of desired effects. Hattie (2009) on his studies identified the zone of desired effects to be the one which leads to improved performance. The study went on to identify some factors which can bring about the zone of desired effects. Figure 4 (adapted from Hattie, 2009) shows factors that are seen to have direct/indirect impact on improving learner performance.

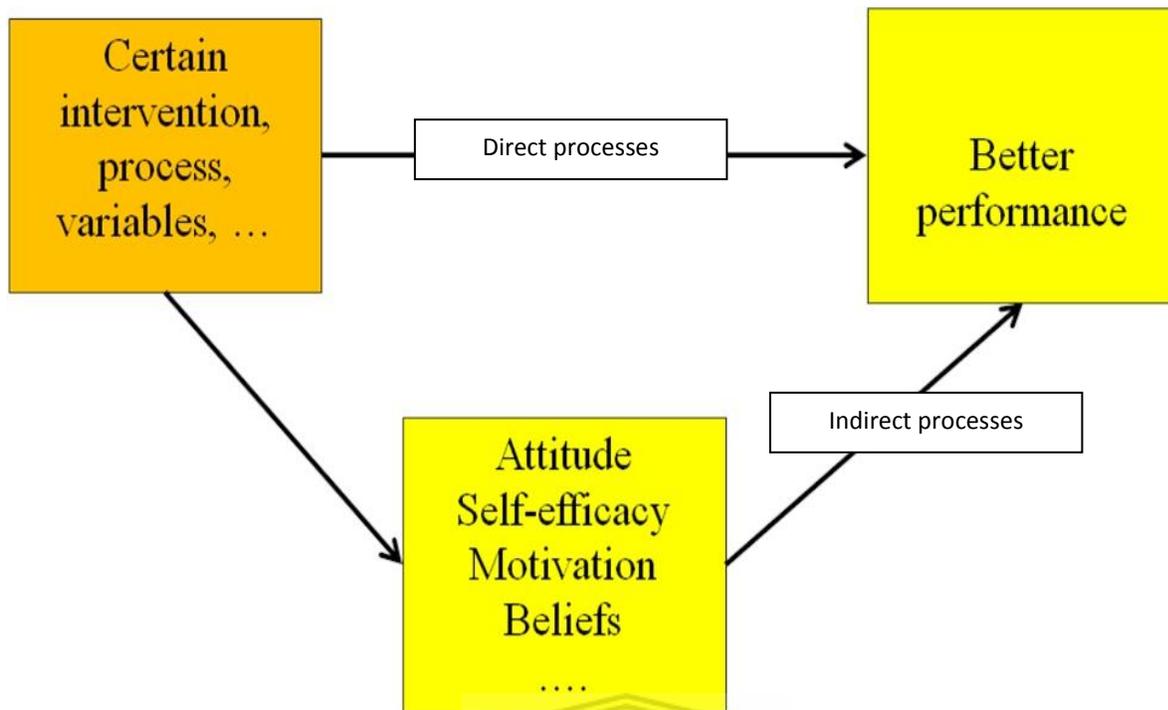


Figure 4: Evidence Based Learning (adapted from Hattie, 2009)

SM has an indirect impact on better performance through changing learners' attitudes, motivating the learners and reducing anxiety. In terms of direct impact FB helps to provide immediate feedback. On the Barometer of Effect, as suggested by Hattie (2009) as shown on Figure 4, some of the examples listed have direct impact on better performance and their respective values:

- homework =.29
- mind maps =.57
- giving feedback =.73
- web based learning=.37
- collaborative versus individual learning =.59.

It appears that giving learners' feedback has the highest direct positive impact on performance. In this regard FB allows the lecturer to give students feedback through instant messaging. Four types of contact time were identified by the researcher as playing a major role in improving quality/quantity of passes through FB and these are identified as:

- **Lecturer contact time (LCT):**This is the contact time between learners and their lecturers. Through FB learners will be able to contact the lecturer at any time regarding programming tasks. The more they get to communicate with lecturers the

more an environment conducive for learning is created. Lecturer contact time helps improve lecture-learner relationships and indirectly improves performance. This has also been observed in studies by Roblyer, *et al.*, (2010)

- **Practice contact time (PRCT):** Lack of enough practice time by the learners (Dzvpatsva, *et al.*, 2011).
- **Technical contact time (TCT):** Although FB can be used to communicate with learners on the subject matter it is important to include videos on the learned subjects. Mixing videos with text becomes a powerful way of teaching.
- **Peer contact time (PCT):** Learners should be able to control their own presentation and not rely on lecturers. It is also a good idea for learners to learn from each other. FB can assist in doing so with limited challenges. Dzvpatsva, *et al.* (2011) suggests that peer contact time enhances peer mentoring through social FB. FB can also facilitate reciprocal teaching and this has an indirect positive impact on learner performance

2.12 CONCLUSION

The use of SM in learning is well documented in the literature. The theories of social presence, social learning and media richness have been explained in most of the literature relevant to the context of this research. The researcher selected them as the basis of the conceptual framework for the study. The researcher identified various forms of SM (wikis, social network sites like FB, MySpace, Edmodo, blogs) from the literature (Boyd and Ellison, 2008; Bingham and Conner, 2010) and selected FB as the most appropriate for use in the study.

This study set out to focus on use of SM to increase contact learning time outside the classroom. Increase in contact time is seen as having a positive impact on learner performance for students studying programming. Although the reviewed literature supported the idea of SM in learning, some studies pointed out that it can be disruptive thus causing a lot of problems. Thus, this research investigated whether FB can be used to extend the contact time between students and lecturers in the context of the programming course.

For that purpose, the literature review findings of (i) Lecturer contact time, (ii) Practice

contact time, (iii) Technical contact time and (iv) Peer contact time and their influence through FB for helping the programming students were tested in the FET sector at College of Cape Town. To provide an answer to the main question of the study: whether quality and quantity of computer programming passes for FET students can be improved, it was necessary to adopt the research design and to select an appropriate research method, which is described in the next chapter



CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter covers research design and methodology. Research methodology is the description of the hypothesis, approach, design, and the justification for data collection that will allow the researcher to discover new knowledge or supplement existing knowledge. According to Leedy (1997: 93) research design is “*the common sense and clear thinking necessary for the management of the entire research endeavour – the complete strategy of attack on the central research problem*”. It therefore follows that the research design is the blueprint from which the research is carried out and measured exercising control against factors that could interfere with the reliability and validity of the research. For the purpose of this study, research methodology is defined as a systematic approach in solving the research problem. The design aspect describes how the instruments are to be constructed for the purposes of data collection. Additionally, research design shows the researcher’s preferences in collecting data for the study. Besides this, there are guidelines for designing a research project which, depending on research variables or concepts, the specialists would agree to be essential research components. In addition, for a study to qualify as a research, the process must have certain features: it must, as far as possible, be guarded or controlled, thorough, systematic, convincing and verifiable, empirical, and critical.

There are two important questions that need to be clearly answered when undertaking research to meet most of its characteristics. Firstly the researcher(s) need(s) to know the methodologies and procedures to be used in the research. Secondly the researcher(s) must be able to justify the use of any selected methodologies. In so doing, it requires one to have a clear understanding of all the methodologies available. The research methodology and procedures for this research were specifically chosen to achieve the research objectives. A mixed method (quantitative and qualitative approach) was used for this research. Evans (2004) as cited by Naicker (2010) in his doctoral thesis argues that using two methods reduces the inadequacies of individual method and, if used together, the two methods (quantitative and qualitative) do complement each other. Bias in research is also considered and put into perspective. The justification for the methodology is presented later in this chapter.

The way in which we do any research may be looked at in terms of the research philosophy

subscribed to, the research strategy used, and also the research instruments used to collect data for answering the research question and the solution. The research question, research objectives, and literature review have been presented in the previous chapters. The intention of this chapter is to:

- (i) discuss research beliefs in relation to other philosophies;
- (ii) give further details about research strategy, including the research methodologies adopted and basis for selection and
- (iii) introduce the research instruments used in the search of research goals.

3.2 RESEARCH PHILOSOPHIES

Research philosophy refers to the organized search for reality, knowledge, values, reason, mind and language. Plato and Aristotle, regarded as the fathers of philosophy used a working definition for the way in which data must be collected, analysed and used or inferred. The three cornerstones of research philosophies are ontology, epistemology and axiology (Leedy and Ormrod, 2010). Ontology is concerned with how people look at reality whilst epistemology is the theory of knowledge and ways of gaining knowledge of social reality. Axiology deals with values (ethics and aesthetics) - how our values affect our way of thinking in the social world. Two main research philosophies have been identified in the Western tradition of science, namely positivism and interpretivism (Weber, 2004).

3.2.1 Positivism

Lacity and Janson (1994) state that *“positivist approaches hold that understanding arises through the identification of non-random variation”*. The most important point here is about occurrence - the more a phenomenon occurs, the more likely it is non-random. Positivist approaches, therefore, require deductive thinking or a top-down approach. Positivists are concerned with coding data, calculating frequencies to check on occurrences so as to test or confirm a hypothesis about the relationships among variables. As cited by Ambert, Adler, Adler, and Detzner, (1995:881), the positivist approach *“leads researchers to utilize methods allowing for the quantification of observations and the accumulation of knowledge using procedures that can be duplicated in order to find rules or patterns of social life”*. Predictions can be made based on previously observed and explained realities and their inter-relationships.

An important aspect of positivism philosophy is how the observer is separate from the

entities that are subject to observation. Some of the common methods of data collection include surveys, experiments, and secondary data analysis. The challenge posed on this paradigm is its assumption that all things are measurable and quantifiable. Critiques of positivism, like Max Horkheimer (1895–1973) argue that it is also difficult to put aside personal preferences in research and it misses a subjective element but a value-free goal is attainable. Through these arguments they claim that it is possible for some variables or constituent parts of reality - initially thought as immeasurable under the positivist paradigm - to have gone unresearched. Although a positivist paradigm assumes objectivity and prescribes formal, quantitative approaches, subjectivity is still very important to text interpretation.

3.2.2 Interpretivism

Interpretivism rejects the positivist idea that people are completely shaped by social factors. Through this philosophy the outcome is not fully predetermined: meaning must be sought within context whilst accommodating multiple meanings. Proponents of this approach like Max Weber (1864-1920) assume that interpretivism is influenced by the meanings people attach to events and actions. Interpretivists, therefore, develop ideas through induction from evidence. In this approach, analysis methods assume that text data is subjective or skewed and requires extraneous information about the originator of the text. Values should be relative - what constitutes accepted or unaccepted behaviour depends upon socialization and may change over time and across cultures and societies. A qualitative method is used in most cases for the research process. Typical methods of data collection include participant observation, in-depth interviews and focus groups.

Positivists reject the goals and assumptions of the interpretative approach. They argue that there is an over-emphasis on subjectivity. The researcher, having looked at both philosophies, decided to adopt a hybrid philosophy that will solve the problem from all angles. Quantitative data in form of test scores was collected and analysed to confirm improvement in the quantity of passes in programming. Qualitative data was collected using a questionnaire to check learner perceptions on SM. The researcher checked on the quality of passes for the current year and compared them with test scores for the previous years. According to Leedy (1997) both approaches are used to collect different data and can be complementary in answering a research question.

3.3 QUANTITATIVE APPROACH

Creswell (1994:41) defines quantitative method as “*an inquiry into social or human problem, based on testing theory composed of variables, measured with numbers and analyzed with statistical procedures, in order to determine the predictive generalizations of the theory hold true*”. The approach uses numbers, statistics, presses an emphasis on measurement, precision, and prediction. Quantitative researchers start with a pre-formed hypothesis to be confirmed or tested. They isolate the relevant variables, control for extraneous variables, collect standardised data from large number of participants which will be analysed and used to test or confirm an original hypothesis. The process usually ends by confirming or invalidating a hypothesis which can be used for future research (Leedy, 1997). Some of the common quantitative approaches are discussed in the next sections 3.3.1 – 3. 3.

3.3.1 Experiments

Leedy (1997) defines an experiment as a study that attempts to manage the whole research condition, apart from certain contribution that then happen to be deduced as the reason for whatever change has resulted in the research process. Fundamental to experiment is control. Experimental research needs to be well planned otherwise the results will be completely invalid.

3.3.2 Laboratory experiments

Laboratory experiments allow the researcher to recognize specific associations between a small number of variables that are studied intensively through a designed laboratory situation using quantitative critical techniques with a view to making generalized statements appropriate to real-life situations. Experiments, however, tend to be isolated from most variables that are found in real-life scenarios.

Field experiments are an extension of laboratory experiments into actual organisations and their real-life situations. Field experiments achieve greater practicality and oppose the degree to which situations can be criticised as artificial (Leedy, 1997). In real life, it is difficult to identify organisations that are prepared to be experimented on and still more difficult to achieve sufficient control to make replication viable. This is because organisations worry about costs and wasting time.

3.3.3 Surveys

The word survey is derived from Latin meaning “to see or to look over or beyond”, Leedy (1997:190). In survey research, a sample of participants or respondents are selected from a population and given a questionnaire to complete face-to-face or online. Surveys can be written, electronic or oral. Quantitative techniques are then used to draw conclusions from this data concerning existing relationships. More variables can be studied at a time as compared to field or laboratory experiments. As cited by Leedy (1997) the major limitation of a survey is its failure to realize insight relating to the causes of, or processes involved in the phenomenon being calculated. In addition, several sources of bias can arise depending on timing of the survey and choice in selecting respondents. Table 1 below shows some strengths and weaknesses of survey technique.

Table 1: Strength and weaknesses of surveys.³

Strength	Weaknesses
Surveys are relatively cheap (especially if they are self-administered).	Not all intended recipients will reply.
Surveys are useful in describing the characteristics of a large population.	It may be difficult for participants to remember information or to say the truth about a controversial question.
Standardised questions are likely to produce standardised responses and makes analysis more easy.	Standardisation of questions limit the responses and might possibly end up missing the intended point.
Further explanations can be given if it is face-to-face unlike other techniques.	Surveys are time consuming . Respondents reply only when they feel like.

It should be noted that the quantitative approach follows more structured guidelines in collecting data that can be used to explain or predict situations (Leedy 1997). Quantitative approach uses deductive reasoning which assist in explaining from general to specific situations. However Leedy (1997) highlighted that quantitative approaches are conducted in a more artificial settings unlike qualitative approaches. The researcher would therefore suggest a technique which uses both approaches- qualitative and quantitative

3.4 QUALITATIVE METHODS

Creswell (1994: 46) defines qualitative study as “*an inquiry process of understanding a*

³ Adapted from <http://writing.colostate.edu/guides/page.cfm?pageid=1421>

social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting". Quantitative methods reflect the world as seen by the participant and focuses on the lived experience of the participant. When reporting, word-to-word quotations are used to find themes and behaviour. Qualitative researchers start with more general questions, collect an extensive amount of verbal data from a smaller number of participants and present findings using words to describe the situation. In certain cases, qualitative research ends up with tentative answers or a hypothesis of what was observed, which becomes a basis for future quantitative studies. In doing so the two methodologies becomes complementary. Inductive analysis is used as a form of reasoning in qualitative research (Leedy, 1977).

Unlike quantitative research, which seeks to explain and give predictions that can be used in generalising places or persons, qualitative approach proponents regard their method as coming to understand how various participants in different social settings construct the world around them. Qualitative study takes a more holistic approach with a special focus in the design of instruments used to collect data. Leedy (1997) argues that it is erroneous to regard qualitative research as a new or modern methodology arising from the fact that quantitative approach is a traditional approach. Leedy (1997) is of the opinion that many inquiries start as qualitative and build up a hypothesis which can be confirmed using quantitative approaches. From the philosophical basis of interpretive research, different categories of interpretive approaches have been identified: phenomenology, ethnography, hermeneutics, case studies, action research and grounded methodology.

3.4.1 Case studies

Leedy (1997:157) define case studies as *"a type of qualitative in which the researcher explores a single entity or phenomenon (the case) bounded by time and activity"*. Gall, Borg and Gall (1996) as cited in Leedy (1997:157) state that "researchers do case studies for one of three reasons: to produce detailed description of a phenomenon, develop possible explanation of it, or evaluate the phenomenon". Case studies can adopt a positivist or interpretivism approach depending on the data collected, methods used to analyse the data collected, or the researcher's approach. Reality can be obtained in greater detail by an observer/researcher, with the example of more variables as compared to experiments and surveys. Data collected from case studies can be in the form of words, physical objects, and images. Quantitative data can also be collected. According to Gall, *et al.*, (1996) three approaches can be used to analyse the data collected from case studies: interpretational

analysis, reflective analysis and structural analysis.

Interpretational analysis looks for themes, patterns, and constructs used to describe a phenomenon. Structural analysis refers to probing the data for patterns inherent in discourse, text or other occurrence. Reflective analysis uses primary intuition and judgment to portray a phenomenon (Leedy 1997).

The greatest weakness of case studies is that they are typically restricted to a single organisation. What happens in one organisation cannot be generalized as organizational cultures differ, thereby affecting outcome. In addition, different researchers may have different explanations of the same data as a result of organisational setup or bias, thus adding research bias into the equation.

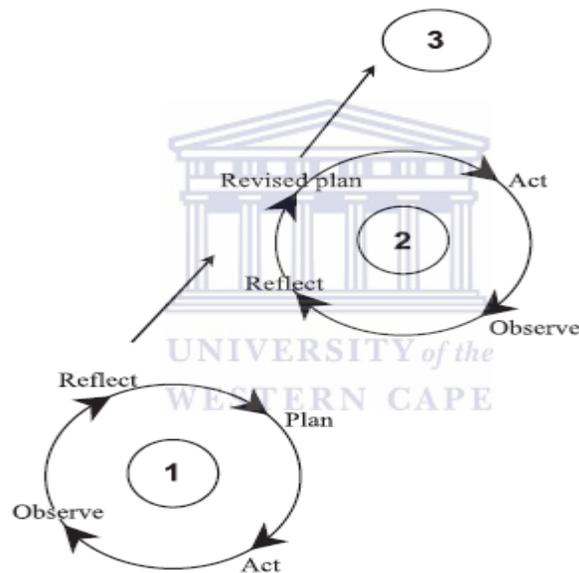
3.4.2 Ethnography

Ethnography was widely used in anthropology studies but is now applied to other disciplines. Ethnography is defined by Creswel (2003) as an inquiry in which “*the researcher studies an intact cultural group in a natural setting during a prolonged period by collecting, primarily, observational data*”. Here the key focus is time and this allows the observer to get used to the setting and be able to collect data in an undisturbed way. Two common data collection techniques can be used and these are participant observation and ethnography interviews. Interviewees are selected purposefully unlike in quantitative sampling methods. A constant comparative method of analysis is used for data to check for new codes against the initial recorded codes or categories.

3.4.3 Action research

Action research is another methodology that can be used in qualitative approaches. Origins of action research are not clear but Altrichter, Kemmis, McTaggart and Zuber-Skerritt (2002) cite Kurt Lewin (1946) although other authors like Collier (1945) were calling for similar action-oriented approaches to research. In action research, the researcher does not merely examine, but also participates enthusiastically - typically by acting as a change agent in relation to some intervention. Leedy (1997) defines action research as an applied study that focuses on finding a solution to a local problem in a local setting. The researcher tries to construct results or a solution that is of practical value to the people or the setting in which the study is being carried out, and at the same time develops theoretical understanding. Altrichter, *et al.* (2002) argue that for research to be called action research it must be

collaborative. The personal principles of the researcher are decisive, since the chance for direct researcher intervention is always there. A working definition for action research used for this study is a systematic group enquiry that is collaborative, self-reflective, important, and undertaken by participants or members in the enquiry. This is more applicable in our situation where we want to solve a real problem of improving low pass marks in programming for FET students. Action research combines strictness and application in moving towards high levels of performance, as well as leading to innovation and making a contribution to knowledge (Bennett and Oliver, 1993). The diagram below (Figure 5) shows some stages in action research. Action research is a practical way of solving problematic situations through collaborating with members. A problem is identified and a solution suggested to be put into practice. The process goes on until a refined solution is reached.



Source: Zuber-Skerritt (2001, p. 15)

Figure 5: Stages in action research.

3.4.4 Grounded Theory

This is a type of qualitative approach developed by Glaser and Strauss (1967). Its main drive is to produce theories regarding social phenomena that is, to develop higher level understanding that is “grounded” in, or resulting from, a orderly analysis of data, (Glaser & Strauss 1967). Grounded theory is suitable when the study of social interaction or experiences aims to explain a progression, not to test or confirm an existing theory. Just like action research, one of the key features of grounded theory is its iterative design, theoretical sampling, and orderly analysis (Leedy 1997).

3.5 RATIONALE FOR CHOOSING ACTION RESEARCH

It has been said that a good research design will not only anticipate and specify the seemingly countless decisions connected with planning and carrying out research process, but will also present a logical basis for these decisions (Manheim, 1977). Choosing an inappropriate research method leads to missing the research objective(s). Although the research used a quantitative approach in analysing test scores, action research is an approach mainly adopted by qualitative researchers. In this regard, the analysis of some open-ended questions from the questionnaire was done using a qualitative approach to check on perception and behaviour that has directly impacted on improved quality in programming. Action research was used throughout in undertaking the study for the reasons to be explained below.

According to Bennett and Oliver (1993) action research, as indicated in the previous section, is concerned with systematic data collection and research leading to action and change. Very few specialists take a systematic approach. The most important aspect of action research is the involvement of key actors in bringing about change. Everyone wants change, so if properly done action research is likely to yield good results. In this case, the researcher, who is also a programming lecturer, and the students are struggling with programming so coming up with an action that is meant to improve their performance is likely to be accepted. Unlike other scientific studies which are meant to enrich the researcher with more knowledge leaving the organization suffering, action research is developmental (Bennett and Oliver, 1993). These researchers further postulate that:

Classical or conventional research can obtain high quality information, and the researcher may be able to make recommendations. However, this research does not generally bring about the commitment and support for solving real problems in a real time frame. Action research can, and does, achieve all these things (Bennett and Oliver, 1993).

It was in this regard that the researcher decided to undertake an action-research approach.

3.6 SAMPLE POPULATION

The sample population of this research comprises a body of people that the researcher wishes to investigate (Hussey and Hussey, 1997). According to Yount (2006: 7-1) a sample population is defined as “*all subjects you want to study*”. All objects that become are in the

study circle becomes the sample population included in the study. For the purpose of this study the sample population consists of FET students studying IT in the Western Cape Province. Yount (2006) further cites that the whole population of significance is generally too large or geographically scattered to study directly. In such cases drawing a sample from a particular population enables the researcher to analyse the sample and make inferences about the population characteristics.

3.7 SAMPLING TECHNIQUE AND SAMPLE

According to Adams, Khan, Raeside and White (2007:88) sampling “*is the process or technique of selecting a suitable sample for the purpose of determining parameters or characteristics of the whole population*”. Saunders, Lewis and Thornhill (2003) suggest that the purpose of sampling is to decrease the quantity of information you have to gather. This is also because of the previously stated reason above that population may be scattered geographically. In this research 60 students studying NCV level 3 IT at the College of Cape Town’s Crawford campus were used as the sample from which the researcher drew his inferences. This sample provides a cross-section of the population being studied. Yount (2006) identified four major types of sampling and these are:

- **Simple random sampling:** where selections are made from a specified and defined population i.e., the frame is known (Adams, *et al.*,2007).
- **Systematic sampling:** which guarantees that units cannot be sampled more than once. This is one in which every K^{th} subject on a listing is chosen for inclusion in the sample where K is the element.
- **Stratified sampling:** which “*permits the researcher to identify sub-groups within a population and create a sample which mirrors these sub-groups by randomly choosing subjects from each stratum*” (Yount, 2006:7-6).
- **Cluster sampling:** where “*a number of clusters which are characterised by heterogeneity in between and homogeneity within*” (Adams, *et al.*, 2007:89). This is more very useful for very large samples.

In this research, stratified sampling was used to obtain the test scores. Almost equal size sample groups were used for the test score analysis. Cluster sampling was used for grouping the students into four different FB groups created by the lecturer. The questionnaires were distributed to a cluster of students who attended the weekend classes. The fact that cluster sampling takes clusters of people rather than individuals makes it a

more probable cross-section of the population as there is reduced bias. Cluster sampling is also cost-effective and the researcher saw it as appropriate due to geographical distance between FET colleges in South Africa - yet alone in the Western Cape.

3.8 DATA COLLECTION INSTRUMENTS

The main data collection techniques used in this research were questionnaires, participant observation, and test scores. The social nature of an information system (IS) led many IS researchers to adopt research approaches that focused primarily on human interpretations and meaning (Walsham, 1995). There is no rigid separation between data collection and analysis and the process is an iterative cycle of data collection as shown in Figure 5. The cycle is repeated and hypothesis is elaborated as the process continues. This is typical for interpretive research as the researcher has to interact directly and intensively with the subject over a period of time. Statistical analysis was used for the student test scores to check on improvement on quantity of passes. A comparison was made for test scores achieved before introduction of FB and after. The interpretivism approach uses different instruments to collect data, some of which include interviews and a questionnaire. On the other hand, positivists' use different methods like surveys to collect quantitative data. In this research, test scores were collected and statistical analysis done on data gathered using a questionnaire.

According to Thomas (2003) a questionnaire is defined as a set of questions which participants are asked to answer. The questions can be open-ended or closed questions depending on the answers to be collected. Questionnaires help to collect participant opinion and facts. Opinion can be attitudes and expressions. Questionnaires are very important in that they can be given to respondents anywhere irrespective of geographical distances. For the closed questions a Likert Scale was used from -3 to +3 (strongly disagree to strongly agree). Likert Scales are useful when evaluating perception, behaviour, attitude, or other phenomena and therefore very appropriate to the present research area (Leedy and Ormrod, 2005).

3.9 MEASUREMENT

The researcher decided to use a questionnaire for the following reasons:

- Since the researcher is also part of study, questionnaires were distributed to all

students who attended the extra class for programming and the researcher explained to the learners where clarity was needed.

- Questionnaires are quick and easy for respondents to tick boxes hence, respondents are more likely to answer all the questions.
- The researcher avoided interviews due to the fact that when used, the respondents may feel hesitant of anonymity when interacting in person with the interviewer.
- The use of questionnaire avoided the bias common in interviews.

3.9.1 Questionnaire design

The most essential process for a researcher to achieve the research objectives in quantitative approach lies in the design of the questionnaire (Thomas, 2003; Lietz, 2008; Leedy, 1997). Consequently, it was thought necessary to formulate suitable questions that the respondents will understand especially for this study, bearing in mind that English is not the respondents' first language.

The questionnaire used in this research was designed to measure the variables mentioned in the literature review. In some cases, some of the pointers were established by the researcher, while some were agreed upon or modified from previous scholars. In other cases, new indicators were added and equated with the previous measures to help improve the explanations of the study model.

The questionnaire was organised into two sections:

Section A: The cover page of introduction to the respondents describing the research, researcher, informed consent, and appreciation for the responses. Biographical information of respondents was also requested.

Section B: This section was designed to get an overview of FB usage in relation to its effect on improving quality in programming. There are 11 closed questions and 5 open-ended questions. In formulating the questionnaire, the following factors were considered as suggested by Leedy (1997):

- **language:** unmistakably clear
- **question:** designed to fulfil specific objectives
- **question length:** questions kept simple and brief
- **question order:** the question sections progressed logically
- **question format:** questions were asked to avoid leading questions and also to

avoid expected answers instead of their own thought

- **complex questions were avoided:** a cognitive approach was taken into consideration
- **indirect rather than direct questions:** were asked for issues that might be very sensitive.

Once the above points are adhered to, it is highly likely that one would get accurate responses as respondents will not struggle to interpret or comprehend. After designing the questionnaire, the researcher must send a pilot questionnaire to get a feel on how respondents are likely to respond.

3.9.2 Pilot studies

It is very important to pilot a questionnaire before putting it into full use. This enables the researcher to have a rough idea on what answers to expect and to check on clarity of the research instrument. A pilot study was carried out with five respondents and these were used in the final results. The main purpose of the pilot questionnaire was to:

- assess the reliability of the research instrument constructed; and
- check time constraints taken to complete the questionnaire.

Piloting allows the researcher to make changes, if needed, to the initial questionnaire and the instrument can be used for the data collection in the research. The researcher distributed 30 questionnaires during the month of September 2012 to all level 3 students who attended the extra class studying computer programming at the College of Cape Town, Crawford campus. The FB group was started in March 2012 just before the first term tests. A comparison of test scores from the time before introduction of FB and after to check on improvements on quantity of passes for the students. The questionnaire section assisted to answer the aspects about the quality of improvements in the subject.

3.10 DATA ANALYSIS

3.10.1 Data analysis in qualitative research

The greatest challenge to the researcher in employing qualitative analysis was in reducing what may seem an overwhelming amount of data collected from observations and open-

ended questionnaire responses. Some of the aims of qualitative analysis as identified by Adams, *et al.*, 2007 (2007:155) are listed below; these include:

- (i) identifying deviants and oddities;
- (ii) comparing theory—detection of conformance (if the scientific method is used);
- (iii) identifying groups—classification;
- (iv) comparing and contrasting groups;
- (v) constructing a model;
- (vi) testing the model—validation and
- (vii) detecting patterns in the data.

According to Adams, *et al.*, (2007) analysis involves an exploration stage (points i and ii); a classification stage (points iii and iv); a conclusion-drawing stage (points iii and v); a representation stage (point vi); and a testing phase (point vii). A number of planning analysis techniques may then be implemented when working with qualitative data. These include cross-tabulation and a framework approach.

Cross Tabulations: When data is collected using the above instruments, the data is summarised in the form of statements onto 'post-its' (Adams, *et al.*, 2007). Different colours may be used for different 'post-its', to represent various groups or themes. Classification is then conducted by grouping related clusters of information, which may then be summarised using count frequencies. Cross-tabulations may be formed to decide on the way in which understanding, views and attitudes of people compare, by different groups, gender, behaviour, opinion and experience, and so on. The information may then be shown on a diagram, summarising and ultimately answering the research questions. However, this method is often criticised for being "*reductionist, forcing quantification and being too positivist*" (Adams, *et al.*, 2007:160).

Framework Approach: This is a more structured technique of analysing qualitative data compared with cross tabulation, which may be too ad hoc (Adams, *et al.*, 2007). This approach has five main stages:

- (i) familiarization - forging a deeper understanding of data; and identifying themes;
- (ii) creating a thematic framework - this involves a thorough scrutiny of the themes; removing of repeating themes and identifying new themes, if any;

- (iii) coding and indexing of data - this involves attaching codes for the purpose of identifying similar theme;
- (iv) charting - the coded data may now be represented using graphs or charts and
- (v) mapping and interpretation - this involves attaching meaning to the charts; providing associations and explanations.

Content Analysis: This involves counting of key words, and analysing the frequencies (Adams, *et al.*, 2007). Content analysis aims at describing contents of the respondents; it comprises six stages. The first stage is to identify the unit of analysis; in most cases this will be an individual, or it may be a geographic place/country. The second stage involves setting categories so that a unit may be placed only under one category. A great challenge posed by this is that different researchers may produce different categories. Coding of the information then follows and then charting followed by the drawing of a conclusion.

Forced Field Analysis: This is a method used to identify positive and negative factors contributing towards success/failure of an objective (Adams, *et al.*, 2007). The diagram below (Figure 6) helps to illustrate this (this has been modified to suit the research topic).

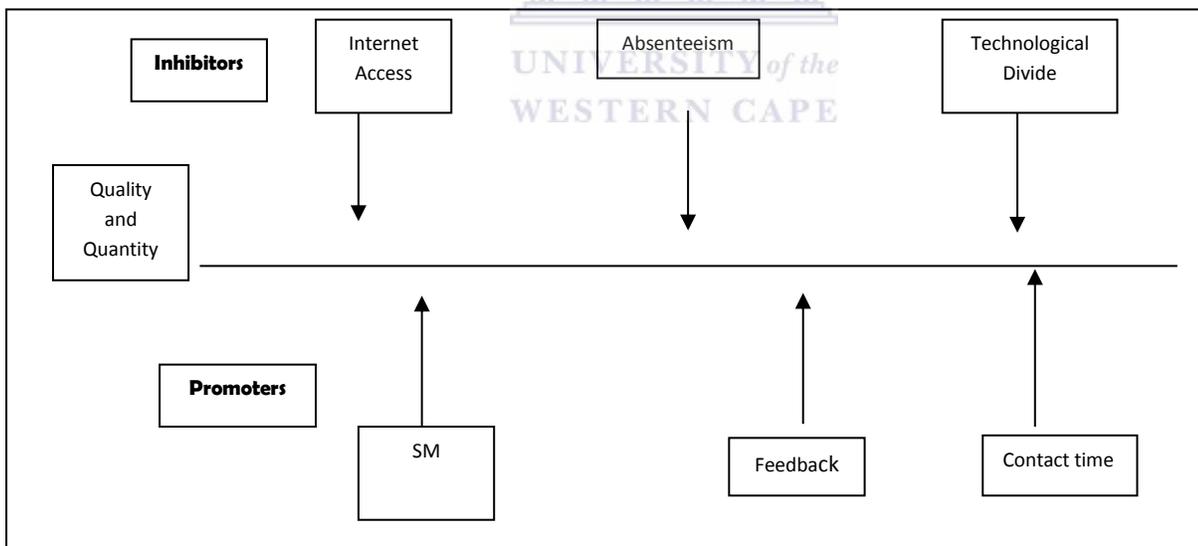


Figure 6: Adapted from Adams, *et al.*, 2007: Forced Field Analysis on performance of the Students

Schematic Diagrams: Schematic diagrams are the best way of illustrating or analysing information collected through interviews. This is a pictorial representation of facts; those factors with more influence are represented by a thick line pointing towards the analysed or researched concept.

Cause and Effect Diagrams: These are similar to schematic diagrams except that they do not represent influence of factors on a target effect using varying line thicknesses (Adams, *et al.*, 2007).

3.11 VALIDITY AND RELIABILITY OF THE RESEARCH INSTRUMENT

Leedy and Omrod (2001: 31) put an emphasis on importance of reliability and validity in measurement instruments as follows:

“The validity and reliability of your measurements influence the extent to which you can learn something about the phenomenon you are studying, the probability that you will obtain statistical significance in your data analysis, and the extent to which you can draw meaningful conclusions from your data.”

Adams, *et al.* (2007:235) define reliability as *“the consistency of the measurement, or, more simply, the degree to which an instrument measures the same way each time it is used under the same conditions with the same subjects”*. This is all about consistency throughout the research and whether the results may be repeated. All questions were derived from the literature review. All questions asked in the questionnaire aimed to check the learners' attitudes to FB, and their perceptions of learning programming, using FB, as well as their behaviour. The questions asked were valid as they addressed the main research question.

Validity involves the degree to which one is measuring what one is supposed to measure; or more simply, the degree of accuracy of the measurement (Adams, *et al.*, 2007). Problems of validity and reliability may be caused by some common biases in research, such as sampling and network biases (Kane and O'Reilly-de Brun, 2001). The researcher is of the assumed opinion that similar results can be obtained if the research is repeated under similar conditions. The researcher did take this into consideration during the design of the research instrument, which was distributed to all learners who were present on the day the questionnaire was issued, irrespective of learners' social status and academic ability. In achieving the research objective and the conceptual model, the questionnaire layout focused on the ease of acceptance by the respondents; it was organised in sections of about eight pages each; and explained as follows:

Section A : Demographic data

Section B: Research questions with 11 closed questions and 5 open-ended questions.

External validity may be the problem in terms of generalizing the results, if there is a reactive

effect in selection of samples. FET in rural areas may produce different results, owing to dissimilar samples/ groups of people with different backgrounds in SM use. However, as the researcher has pointed out, if the internet access is equitable, the generalization of findings will be possible.

3.12 BIAS IN RESEARCH

With regard to the issue of bias in research, Lubbe (2003) states that it is naïve to assert that any form of research, or perhaps human activity generally, is without bias. Even in the physical and life sciences, the researchers' bias is reflected in the subject area, experiment chosen, as well as the way the experiment is conducted. Hence, bias cannot be ruled out but should be recognised and its implications acknowledged and accepted. With regard to research findings Lubbe (2003) warns that it is important that these findings are honestly presented and not produced in such a way as to simply support the opinions or prejudices of the researcher. These guidelines on bias guaranteed that this research was strictly conducted in an acceptable way hence the research results presented in this study are true, reliable, and valid.

3.13 CHAPTER SUMMARY

In this chapter, a comprehensive account of the research philosophy, strategy and methodology for the research is presented. The research makes use of both the qualitative and quantitative approaches, utilising a mixture of participant observation and action research methods. A detailed account of action research has been outlined indicating the choice for the study. While using fewer materials concerning scientific research strategies, an explanation of how the researcher collected and analysed data through action research was clearly outlined. This included an extensive literature review on the subject and the development of an instrument. The findings were presented in the next chapter- Chapter Four. A summary of this chapter is presented in Table 2 on the next page.

Table 2: Summary of research design

Level of decision	Choice
Epistemological and ontological assumptions	Positivism. However the knowledge obtained is through interaction with the society.
Research methodology	Mixed approach method (quantitative and qualitative method).
Research techniques	Participant observation, questionnaires and test scores.
Organization	College of Cape Town- Crawford Campus
Timeline	FB group introduced beginning of March 2012
Subject	Use of SM in improving quality and quantity of pass marks in computer programming at FET colleges

In Chapter Four test scores (before and after the introduction of FB) and a questionnaire were used to collect data. A statistical analysis was done to compare which of the listed variables below had the most improved students. The four variables for each sub-group are:

- more lecturer contact time
- more practice contact time
- more technical contact time
- more peer contact time

The empirical findings of this study are also given in Chapter Four.

CHAPTER FOUR: FINDINGS

4.1 INTRODUCTION

The research design outlined in Chapter Three was used in the collection and analysis of data. The data collected assisted in illustrating the situation that exists for learners with regard to SM use in learning, and also the role it plays in improving quality and the number of passes in programming at FET colleges. The results from the data collected were used to present the conclusion which is found in Chapter Five. The most important rule for all data collection was to report how the data were created and the way in which they came into the possession of the researcher. The data were modelled with variables, units and observations.

4.2 SYNOPSIS OF THIS CHAPTER

This chapter portrays the findings that helped in answering the research question on how to use SM to improve the quality and number of computer programming passes for FET students. The intention of this chapter is to examine the responses collected and the test scores obtained by the students to ascertain the use of the social medium of FB on the pass rate in computer programming. A total of 54 learners from the two programming classes participated in the research (six had withdrawn from the course). To the learners, only two groups were visible; however, the lecturer had split the learners into four groups of 14 learners. The group settings were configured in such a way that the administrator of the group had to allow/approve any new post before being available to all other students. The intention was to check the four variables identified from the preliminary research as having potential for improvement of quantity and quality. The lecturer had split the learners into four separate groups, outlined above as: LCT, PCT, PRCT and TCT.

Quantitative data in the form of test scores from the summative tests (ICASS), ISAT and the September 2012 provincial examination was collected from the 54 students throughout the year. Thirty questionnaires were distributed to all students who attended an extra class during one weekend and 21 responses were received. The learners were given a baseline test in the first term to check their performance. The lecturer then introduced a FB group in learning programming. The lecturer explained in detail to the students the reasons for introducing FB and laid out clear usage policy for the group. All learners were told that the

intention of the FB group was to increase the quality and number of passes in the programming component. Learners expressed great satisfaction with the introduction of the platform; wishing that all other lecturers would implement such initiatives. The group settings were designed in such a way that the learners' privacy was respected. This was to dispel the idea of compromising learner privacy. The lecturer informed the students that no one else would be able to access the platform, except registered users; and only invited guest lecturers after notification to all group members. Test scores for learners studying NCV IT level 3 in programming during the year 2011 were also used for analysis purposes.

4.3 FINDINGS

Descriptive statistics were provided in the form of frequencies, averages and percentages from the test scores, and the information was presented graphically, based on the research samples from the four groups. The collected questionnaires were checked for correctness and completeness. The questionnaire was composed of 5 open-ended and 11 closed questions with responses ranging from "strongly disagree" to "strongly agree". The closed questions comprised responses based on the Likert Scale. Microsoft Excel application was used for analyses and presentation of primary data collected from the questionnaire. Data collected from the four sub-groups was transcribed onto an Excel sheet and analysed by using cross tabulation. The researcher made use of the COUNTIF function to obtain the sum of responses for each question throughout the first eleven questions, which were responded to through the use of the Likert Scale rating. The remaining five open-ended questions were analysed using the content analysis method. The summary of responses for questions 3 to 9 from the two groups is also presented (see Table 5).

4.4 RESULTS FROM THE TEST SCORES

The learners were split into four groups of 14 ($n=14$) students, and given a formative theory test after completing the first topic. Figure 7 shows the number of students from each group who passed.

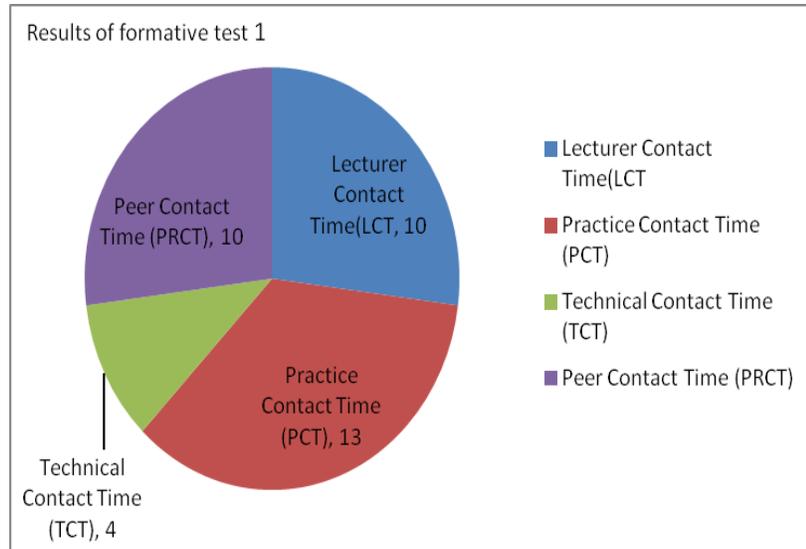


Figure 7: Results of the Baseline Theory Test

After all data were recorded onto a Microsoft Excel spreadsheet, the researcher used the COUNTIF function to calculate the average class percentages and the number of learners who passed each test or practical. The figures collected were then used to check whether the number of passes had increased or decreased. The average percentages for each class were also used to check whether the quality had improved. The observations made during class exercises also helped to check the quality of the programming being implemented.

Two groups, namely, the LCT and PRCT had equal number ($n=10$) of students who passed the test; this being 71% of the group. The PCT group had 13 learners who passed the test; which is a 93% pass of learners from that group. The group with the lowest number of students who passed the test was TCT, with four learners (31% of that group). The groups' average class percentages were also calculated and are shown in Table 3 below.

Table 3: Average class percentages for formative test1

Group	Average class percentages formative theory test
Lecturer Contact Time	52%
Peer Contact Time	69%
Technical Contact Time	47%
Practical Contact Time	58%

Based on the figures shown on Table 3, it is clear that, although students were passing, they were doing so with only slightly higher than average marks. The group with the lowest class average had some students who were repeating; some of these students were not at all serious, imagining themselves to be merely 'completing a process', with the aim of passing. It was interesting to note that two of the brightest students also came from this group. This is a clear indication that the students were not grouped according to ability for the purposes of generalising the results.

The researcher went on to collect test scores from two summative tests and two practical tests, after the introduction of SM for purposes of comparison. In addition, the results from the September provincial examination were recorded. Altogether, the seven test scores made up the Integrated Assessment (ICASS mark reflecting as POE mark on the mark sheet (see index 1, 2, 3 and 4). The ICASS mark contributes 50% of the final mark. The Integrated Summative Assessment Task (ISAT) contributes 15% and the examination mark contributes 35%. Previous experience has shown that students who do not do well in the ICASS are more likely to fail. To be on the safe side, students had to have received an average year mark of 60%. Recently, the Department of Education introduced a policy in which learners who obtain a mark below 50% for the ICASS (POE mark) are to have their results withheld, even if they pass the final exam. This is a way of trying to improve the quality achieved throughout the year; unlike a situation where a student is graded using the final examination only.

4.4.1 ANALYSIS OF TEST SCORES

i. Theory test 1

The results for the first summative test for Term One are shown in Table 4 below.

Table 4: Average percentage pass per group for test1

Group	Average class percentages formative theory test
Lecturer Contact Time(LCT)	52%
Practice Contact Time(PCT)	69%
Technical Contact Time(TCT)	47%
Peer Contact Time (PRCT)	58%

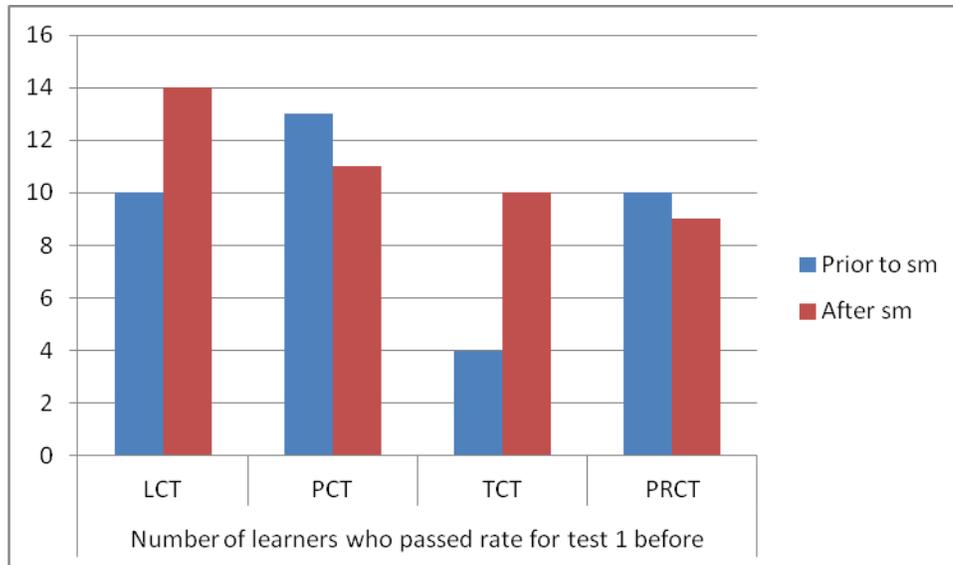


Figure 8: Comparative analysis of number of learners who passed the baseline test and the theory test 1

The two theory tests contribute 20% of the year mark/POE mark. Theory test 1, also known as the March test, is executed at the end of term one; test two, also known as the mid-year examination, is executed at the end of the second term, that is, the beginning of June. Looking at the diagram above (Figure 8), it is clear that SM has greatly affected two groups (LCT and TCT) after its introduction for the first summative test. The group that had SM with more lecturer time had an increase of 15% (class average ascending from 52% to 78%). The significance of this is attributed to the use of SM. Furthermore, the LCT group had a 100% pass rate (n=14). The group that had more practice time through SM, but without great intervention from the lecturer, experienced a decrease in number of students passing from 13 to 11. This could be attributed to more time on the practical side, therefore concentrating less on the aspect of theory, however, the class average for the PCT group improved by 2% (from 69% prior to SM use to 71%). There is a benefit in terms of quality, but the number of passes has dropped. The TCT group also benefited more, having only four learners out of 15 passing the baseline test; receiving 10 passes for the first formative test. This was a remarkable improvement, which the researcher attributed to SM usage. The fourth group (PRCT), had the number of learners passing the test dropping from 10 to eight. This was an interesting group. One of the best students did not join FB, but said that he would always communicate with group members who had joined. When asked, he cited

personal reasons for not joining, but assured the lecturer that he would obtain all information from friends, and would certainly pass all examinations.

ii. Theory test 2

LCT almost maintained the class average per cent, dropping only by four per cent to seventy-four (74%). All learners passed the examination. Class percentage for the TCT group dropped by nine per cent from seventy-one (71% in test one to 62% in test two). The researcher is of the opinion that this may have been as a result of increasing content that they had covered from the beginning of the year to June. Thirteen people passed the test; the lowest mark being a respectable 47%. In the PCT group only seven people passed the examination, with a class average of 50%. There was a drop of three percent from 53% to 50%. The fourth group, PRCT, had a five percent drop in group average from 56% in term1 to 51% in term two. Despite the decrease, the number of learners who passed increased by one from nine to a total of 10.

iii. September examination (provincial examination)

The September examination contributes 30% of the POE mark. It has two papers (theory and practical) which are combined to produce one mark. Figure 9 below shows the average class percentages for each group, for the test scores obtained in the September examination.

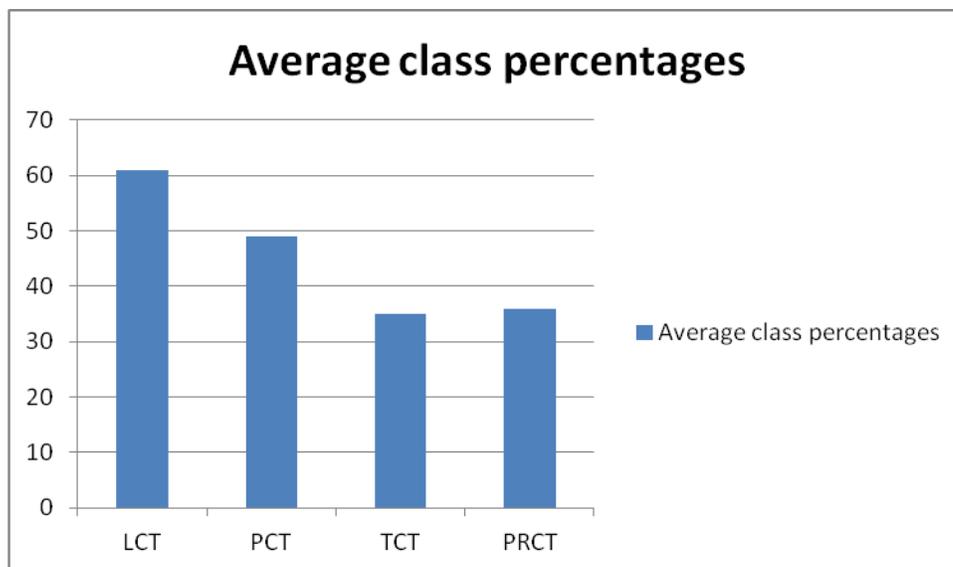


Figure 9: September results group average percentage passes

LCT out-performed all the groups, with a class average of 61%; the highest mark being 84%: an outstanding performance according to college gradings. PCT had a class average of 49%, with a total of nine out of 14 students passing the examination. The TCT group obtained a class average of 35% with only one learner passing the examination, and 12 students failing. One learner from the group did not write the examination, the reason being unknown. She was given 0% instead of 'absent'. This was because she failed to produce satisfactory evidence for her absence from the examination. As per college disciplinary regulations, the lecturer referred the case to the programme manager for academic neglect on the learner's part. PRCT had a group average of 36% with only three learners passing the examination. Two of the learners from the group were among the top students of the subject, one of them receiving 81%; an outstanding performance according to the college standards. The other one obtained 72%. In this group, one student preferred not to write the examination. When questioned, the learner had given up already and was waiting for the next year in which she would repeat the same level.

iv. Practical 1 component

The LCT group had all 14 learners passing the examination; the average group mark was 94%. This was a far better performance compared with what they had achieved in theory test one. The second group (TCT), managed to achieve a 78% average. There was a 7% improvement compared with their theory group average mark. All 14 learners in the group passed the practical -- an indication that the group was strong in the practical component. The third group (PCT), obtained an average mark of 81%; thirteen out of 14 learners passed the practical test. This was the group's best performance in all tests and practicals. The PRCT group had an average mark of 63% with only three learners of a total of 14 failing.

v. Practical 2 component

The group average percentages for practical test two are shown in the table below.

Table 5: Average group percentages

Group	Average percentage
Lecturer Contact Time	64%
Peer Contact Time	58%
Technical Contact Time	49%
Practice Contact Time	37%

All fourteen students from the LCT group passed the test, but the highest score had fallen from 100% in practical one to 80%. The worst performing group was the PRCT, six learners failing to obtain a pass mark of 50%. An observation made showed that performance had dropped from the term one (March test).

4.5 SUMMARY OF PORTIFOLIO OF EVIDENCE GROUP MARKS

The Portfolio of Evidence (POE) file is where all year assessments are kept for the purposes of verification from the Department of Education and shows all year marks for the student. It is important to give count values of the number of passes, because this helps to check on the number of passes from different groups as a result of the introduction of SM. Figure 10 below shows average group percentages and the number of learners who passed from each group out of a total of 14 students.

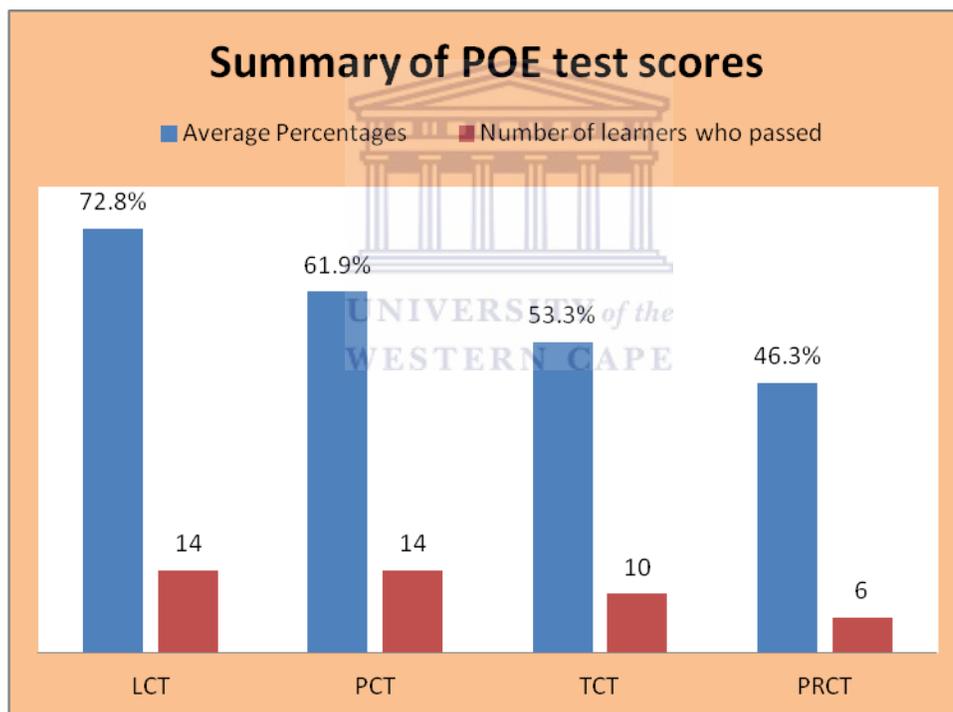


Figure 10 showing summary of group test scores for Portfolio Of Evidence (POE): LCT- More Lecturer Contact Time group, PCT- More Practice Contact Time group; TCT-More Technical Contact Time group; and PRCT- More Peer Contact Time group

An analysis of Figure 10 shows that the overall performance of the LCT group was the best, with all 14 students passing. The lecturer had more influence in the group; one of the students assigned as second administrator was knowledgeable in the programming field due

to his high school programming skills in JAVA (an object oriented programming language) language. Another important observation was that the lowest mark for the group was 64%, which is acceptable, guaranteeing the learner's passing the examination. The student who received 64% will enter the final examination with 32%; needing only 18% from the final examination and the ISAT mark. This is because the POE mark contributes 50% of the final mark. The student with the highest mark (81%) in the group will need at least 9% to pass the examination; this is quite easily achieved, based on the group's overall performance. Apart from the above-mentioned, the quality of programmes produced during group exercises was outstanding. This is significant in improving the number of passes.

The PCT group had all 14 learners passing the examination with a group average percentage of 61,9% which was lower than the LCT group's average mark(72,8%). This is the group that had more practice using SM, but with less lecturer intervention. The lecturer assigned a group member who would pass on small assignments; projects and research; and collaborating with other group members in solving problems. This group did well in practicals, better than in the theory test during the first term than in their theory paper. This is most presumably due to the fact that they concentrated on practical aspect only ignoring the theory part of the subject.

The third group, TCT, used FB mainly to obtain links from other students; mostly learning on their own. The lecturer guided the learners, but with less intervention than with the first group.

The last group (PRCT), used SM with extremely limited guidance from the lecturer, who was mainly the group administrator; he checked to see whether learners were digressing too much, using obscene language, or exposing any unwanted behaviour such as would be out of keeping with the norms of the college. More than half of the group, exactly eight of a total of 14, failed to obtain 50% for the POE - also referred to as year mark) mark: this makes it very difficult to pass the final mark. A student from the group with 46% will enter the finals (November examination) needing at least 27%: a very difficult position to be in. The researcher is convinced that three learners among those who passed preliminary tests have a greater probability of passing in the finals, their POE mark being above 60%. Although two learners from the group did very well, the group's final mark was affected by most learners' receiving very low POE marks. A count shows that 14 learners had a mark considered a failure for the POE result. Forty-two students had passed the summative test,

of a total of 56. This is a great improvement on previous years. For example, in 2010, only eight learners out of 58 students passed; POE marks range from 50% to 58%. In 2011, there were 10 learners of a total of 30 who had a mark equal or above 50%. The average class percentage was 40,3% which is well below the learners of 2012, with 63,9%. Twenty-four learners had a mark which equals to, or is greater than 50%.

In comparison to the other programming class for 2012, the average POE mark was 47,3%, but this is an improvement from the previous year by 7%. It is also important to note that of the number of learners who passed their POE, only two gained above 60%; the remaining eight were in the range of 50% to 59%, which is not good enough to guarantee them a final pass mark. This also might explain the quality and number of passes for the previous years, compared with the current group of learners studying programming in 2012. Final results from the national exam showed an increase of 35% from the 30% pass rate in 2011 to 65% in 2012. Apart from increase in quantity, a number of students had passed the subject with high marks rather than with average pass marks (four students passed with distinctions).

4.6 ANALYSIS OF QUESTIONNAIRE RESPONSES

4.6.1 Demographic

A total of 30 questionnaires were distributed during one weekend class, and 21 were collected. Nine students failed to complete and did not return their questionnaires, which were grouped according to the four SM groups in which they belonged. The researcher also made a gender count for each group. The results are shown in Figure 11 below.

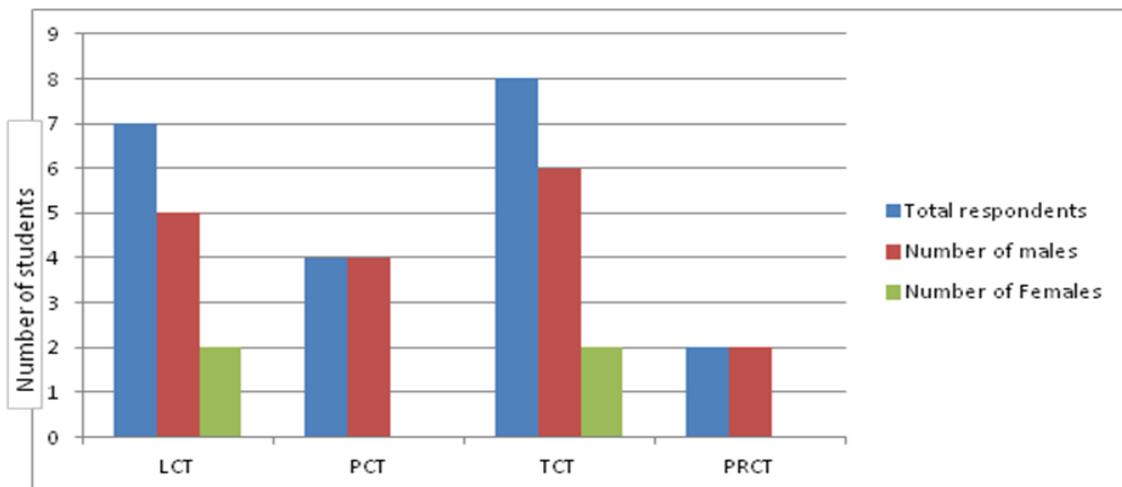


Figure 11: Demographic patterns for each group

While age may be noted as contributing to a learner's success in programming, in terms of the quality and quantity of passes, gender does not signify, however, there seems to be more gender equality in level 2 IT than in the upper levels of 3 and 4.

The LCT and TCT groups had the highest respondents; seven and eight, respectively. PCT had only four respondents, all of whom were male students. The PRCT had two learners who responded; again, all were male students. The attendance of learners from this group was not very good compared with other groups. This may have negatively affected their performance, as seen from the group averages. Their participation in the FB group created was not very active compared with that of other learners. Frequently, a good discussion would end in frivolous conversation, distracting students from their work. Of the 21 students who responded to the questionnaire, eight were between the ages of 20-22; and 10 were between the ages of 17-19; two were 23 years or older; and only one learner was between the ages of 14-16. All of the learners, all except two, live on the Cape Flats with their parents. Only one male student lives alone; another resides at the college. It was interesting that all respondents professed to have the latest mobile phones, such as Blackberry, Nokia N-series, the latest Samsung and Nokia C1 among others, all of which have the capacity to connect to FB. Forty-three per cent of the respondents said that they had internet access at home using a computer, and 47% relied on their mobile phones for connection; but 1% relied on the college for internet use.

In Table 6, a summary of responses from the respondents on FB usage is shown. Responses for questions 3 to 11 are shown using a six-point Likert Scale, rating from "strongly-disagree" to "strongly-agree". The data was then captured on an Excel sheet taking account of each rating. The ratings were as below:

- Strongly Disagree = -2
- Disagree = -1
- Neutral = 0
- Agree = 1
- Strongly Agree = 2

Table 6 shows a summary of responses from the 21 respondents for each question. The questionnaire is in the Appendices (see Appendix VI).

Table 6: Summary of responses from the questionnaire (closed questions)

		Number of Responses				
		SD	D	N	A	SA
Questions	Q3	4	2	4	5	6
	Q4	1	3	9	4	4
	Q5	2	7	5	7	0
	Q6	1	4	4	11	1
	Q7	4	2	8	5	2
	Q8	1	2	3	9	5
	Q9	2	1	6	10	2
	Q10	3	1	6	9	2
	Q11	4	2	7	6	2

Key
SD- Strongly Disagree
D- Disagree
N-Neutral
A-Agree
SA-Strongly Agree

All learners were entered in a different column with their corresponding responses. A summary of responses for each question was then shown at the end of the row. The categories of responses were then analysed in the four main groups: LCT, TCT, PCT and PRCT.

4.7 ATTITUDE TOWARDS LEARNING RESULTING FROM FB USE

Nineteen per cent (n=4) of the respondents strongly agreed that their attitude towards the subject changed for the better after using FB. Another 19% (n=4) agreed that FB changed their attitude towards learning programming; 43% (n=9) were neutral on FB's effect on their attitude. Another 14% (n=3) had a different view of FB usage on attitude to the subject, with only 5% (n=1) strongly against the idea that their attitude towards learning the subject had changed for the better. From these figures, eight respondents agreed and only four disagreed, differing only on the extent of agreement or disagreement. The lecturer noticed an improvement in attendance for programming classes, where in most cases the same learners were absconding from other classes offering other subjects. A further analysis showed that all learners from the LCT group agreed that FB had a positive impact on their attitude towards the subject. Of the four learners who disagreed about this positive impact towards their learning of programming, 3 were from the TCT group and one from the PCT group.

4.8 CONFIDENCE GAINED IN THE SUBJECT THROUGH LEARNING WITH FB

Responses with regard to confidence gained in learning programming came from Question Six. The researcher, as the subject lecturer, observed that learners had developed a notion that programming is a difficult subject. This had adversely affected their confidence in the subject. After the introduction of FB, 57% (n=12) of the respondents said that they had gained sufficient confidence in learning programming. Through their interaction and collaboration, the learners have improved the way in which they communicate and the way in which they respond to questions. In terms of increased confidence gained after using FB, 24% (n= 5) were of the opinion that they did not improve in confidence, and 19% had a neutral perception of gaining better confidence through using FB in the learning of programming. Two of the four learners who were neutral came from the PRCT group, and the remaining two came from the LCT group.

4.9 ROLE OF FB IN LEARNING PROGRAMMING

From the responses, 67% (n=14, 9) agreed with the sentiment that FB helps to increase contact time, which is important in improving the quality and quantity of pass rate for programming. Only 14% did not agree that FB helps to increase the contact time needed for improving the pass rate for the subject. Some 14% (two from PCT and one from LCT) were neutral about FB's impact on increasing contact time to improve their passes for programming. In addition, 57% (n=12), had a neutral view on the impact of feedback they received from FB on subject content. Of the seven respondents from LCT, none of them disapproved the idea of FB to improve relationships with other students; they said that success was easier to achieve through FB compared with traditional methods such as chalk and board. One learner from the LCT group seemed to have negative answers for all responses. The researcher is of the opinion that this learner is critical of FB, and may have responded simply to complete the questionnaire. On further probing of the FB group, the researcher discovered that the learner was more active than other group members; which seemed to contradict the responses made. A detailed count of responses per question is shown on Table 6.

4.10 ANALYSIS OF OPEN-ENDED QUESTIONS (QUESTIONS 12 - 16).

The researcher used the content analysis method in analysing the responses of the learners. The researcher asked the learners to express their opinions about adopting FB for learning purposes at the college. Three common words/phrases were identified in these responses as:

- internet access
- abuse by students
- not detailed enough

The researcher counted the number of respondents sharing the same sentiments, and discovered that 19 out of 21 had problems with internet access. Four learners identified FB abuse by students as one of the reasons for believing that the platform may not be successful in delivering learning content. One learner voiced the concern that some of the material provided on the platform was not detailed enough, and that it leaves the learner confused. This is reflected in Figure 6 as one of the inhibiting factors for improving pass rates resulting from FB use. Most of the responses from students centred on internet access and limited airtime, which precludes learners from constantly chatting on the FB created. Of 21 responses, 19 maintained that FB had helped to improve their quality of programming; three disagreed with this. One of the three learners said that it made her lazy. This learner is one who criticised the project throughout, but a close look at her usage on the platform showed a completely opposite result. The response helped the researcher understand that not all students will support the idea of FB, irrespective of its potential. Some of the learners will focus on the negative, turning a blind eye to the positive side.

Another observation made was that learners were giving one-word answers for open-ended questions which required supporting explanations. This could be owing to poor language skills; but it might be that learners did not have had enough time, as the researcher wished to collect the completed questionnaires at the end of the lesson, which took place over a weekend.

4.11 SUMMARY OF RESULTS

Overall, the findings showed that FB may be used for learning with a view to increasing/improving the passes in programming. The researcher was hoping that all registered students would complete the course, but in the end some learners did not write the September examination, which may have rendered the statistics incorrect. The

researcher had hoped that all students would complete the course; however, some, much to the disappointment of the lecturer, did not give feedback as to whether they were still interested in completing the course. Nevertheless, despite these dropouts, the test scores and attendances were far better compared with the previous years. Test scores clearly indicated that there was a great improvement in number of passes for the POE mark, which has the greatest impact on the final mark. The class average for the previous years of 2011 and 2010 was well below the average mark for the year 2012 in each of the two classes. The researcher also concluded that even the pass mark had improved. The results gleaned at this stage conclusively met the objectives of the research, giving the researcher the motivation to go ahead with the research, and providing a lead for future studies.

Of the various ways used to collect data test scores, calculation proved to be the most satisfactory method for checking whether the quality and pass rate of students had improved. The questionnaire proved to be effective for the short answers/closed questions in which responses were based on the Likert Scale. Microsoft Excel proved to be very effective in analysing the test scores and responses from the closed questions, using the COUNTIF, Average and SUM functions. However, in some cases the researcher had to truncate values after the decimal comma, to remain with integer numbers.

In the next chapter the researcher will present some of the findings revealed by the study.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter presents the conclusions and recommendations of the research in relation to the problem statement and the research question. The implications of the research to the institution—the College of Cape Town - are also highlighted. The researcher goes on to point out some limitations of the research which could be fruitful in future endeavours.

This research sought to obtain perspectives on SM usage (FB) to increase the number and quality of passes in programming. The study was motivated by a preliminary investigation (Dzvapatsva, *et al.*, 2011) conducted during the previous year (2011) as a result of the influx of SM usage by learners, as well as the researcher's interest in improving pass rates for the learners. In this respect, the researcher used College of Cape Town students who were studying programming at NCV level 3. With improvement in performance being the main notion, the researcher felt duty-bound to apply FB for lessons by involving learners in the study that sought to legitimize their involvement in issues that affected their progress at FET, and in the programming sector -- quality of passes. The research revolved around the major question: How can social media be used to help improve the quality and number of computer programming passes for FET students?

In breaking down the main question, a further four sub-questions were put forward, about the factors affecting quantity and quality of pass rate; how SM could be used by lecturers to increase contact time with learners in the subject; how SM could assist with learning in a FET college context; and what the specific learning needs were for programming students.

The researcher collected test scores from two classes of 56 students. These were split into four groups, namely, the LCT, TCT, PCT and PRCT, each group with fourteen learners. A total of 30 questionnaires were distributed; 21 responses were collected. In addition, four learners, one from each group, were picked at random, and asked to relate their views on the use of FB for learning programming: how useful it was to them, and what could be improved in future.

The literature review provided secondary data which were the foundation for the main research questions. The majority of the learners in the study were males, and this was owing to the population composition rather than to any bias. Many female prospective

learners are daunted by the idea of joining an IT field; a notion which may be reversed if more of the current learners in level 3 pass all their subjects. The researcher observed that many female learners are enrolled in the business studies department. In terms of age distribution, most of the learners fell in the age ranges of 17-19 and 20-22. This is mainly so because most of the learners enrol at FET's after grade 10 or a year or two afterwards.

5.2 ACHIEVEMENT OF RESEARCH OBJECTIVES

The research objectives were to:

- (i) investigate how SM can be used to help improve the quality and quantity of computer programming passes for FET students;
- (ii) identify how SM technologies can assist in increasing contact time for computer programming students outside normal college time;
- (iii) identify factors affecting quality and quantity of passes in programming and
- (iv) explain how SM can improve quality and quantity of passes in programming for FET students.

The research showed that social medium of FB can be used to increase contact time which is very important for improving quality and quantity of pass rates for FET learners studying computer programming. This was clearly evident in the findings when comparing the learners' pass rate in the previous years. FB was also used in this research to further explain the lessons done via face-to-face for those who might have been diffident or shy during the normal contact hours. Lecturers can post programme snippets on the FB groups created so that learners can try to code the same programme to check their understanding. The research further revealed how FB helps to improve lecturer-learner relationship which is also of great importance in building a platform necessary for learning purposes. If SM is used with lecturer invention it is more likely to motivate a positive effect towards improving passes for computer programming. This can be seen from the comparison of the results for the two groups (Lecturer contact time- LCT and Peer contact time PRCT). The average year mark for the LCT group was 72% with all learners from group passing while that of PRCT was only 46.3% with only six out of 14 learners passing in the group. Having met all the objectives of the research the researcher would like to stress that SM must not be used as a substitution for traditional teaching methods but to complement them. The findings of the research objectives of the study are discussed below:

i. Investigate how SM can be used to help improve the quality and quantity of computer programming passes for FET students.

From the primary data it transpired that an increase in contact time plays a pivotal role in quality and number of passes in programming. Learners need assistance to do their programming work at home. It is important to note that programming is conducted in a language other than home language; students learn it as a second language, unlike other subjects such as Life Orientation. It is also easier to find someone at home who can assist learners in homework for subjects such as IS, as long as that person has a sound IT background. The same cannot be said for programming, as languages used are changed in tandem with industry needs. The group that used FB with more lecturer contact time fared far better than did other groups.

ii. Identify how SM technologies can assist in increasing contact time for computer programming students outside normal college time.

Primary data (66.6%) showed that SM can help increase contact time. This is very important in improving quality and number of passes in programming. Only three learners (14.2%) felt that FB did not help to increase contact time. Although it was very difficult to have learners on the platform at the same time, at least those who logged in to the platform could follow the conversation. In FB, once information is posted, the group administrator can see who looked at the post and all those who posted comments. The researcher noted that, as with any other practical subject such as Office Data Processing, programming is allocated an equal number of hours in the laboratory due to the complexity of the subject. This should not be the case: more hours should be devoted to the subject.

iii. Identify factors affecting quality and quantity of passes in programming.

Observation has shown that FB helped to reduce absenteeism in the programming lessons. The lecturer did not have many disciplinary issues to deal with in class because a strong bond existed between the learners and lecturers and amongst learners themselves. Most of learners treated each other with respect and in a friendly manner; this was owing to the relationship created by working together on the FB platform and it increases peer interaction. Learners can undoubtedly gain more through collaboration with classmates out of class than they do when in class. All learners with learning difficulties can express themselves freely without feeling too much scrutiny being applied compared to being face-to-face with lecturers.

iv. Explain how SM can improve quality and quantity of passes in programming for FET students.

It emerged from the questionnaire that learners need the internet at the college to assist them in embracing new learning technologies. Learners expressed disappointment at the way in which the college blocks the use of the internet for them. The researcher had time to talk to learners; some requested that college organise work placements for them in programming companies during the holidays; allowing them some exposure to reality after studying for three years. This is a sound idea, although it may be a challenge for the college to find placements for all students. One of the learners suggested that opportunities should be given to outstanding students not only performance-wise but behaviour-wise.

It is the researcher's view that FB is a good learning platform; but it must not be treated as a substitute for face-to-face or traditional learning and teaching methods. Diverse teaching methods help to benefit all learners of differing abilities, from various social, economic, and behavioural backgrounds. The quality and number of passes may continue to improve if the use of FB is accepted; it should also not be limited to programming subjects. The strategy at the foundation of every FET College is to develop learners who can fill the skills shortage; being academically, socially, and technologically sound. Management must apply a strategy that embraces new learning and teaching styles to improve quality and number of passes. The researcher is also of the opinion that colleges should make deals with network providers for their learners to buy data bundles at cheaper rates. Although this may be a daunting task, an effort should be made to this effect. Taking up such initiatives could be another way in which passes in programming may grow and improve in quality.

Furthermore, for FB to work well, a working policy should be adopted by both learners and lecturers. The following may be considered important rules in implementing FB for learning purposes:

- (i) keep matters professional: use a separate account for classroom communications;
- (ii) make thorough use of privacy settings;

- (iii) be conscious of the unintended audience; iv. address students directly about any inappropriate language posted on one's FB page and
- (iv) avoid invitations to instal applications that would not reflect the educator-student relationship.

5.3 CONCLUSIONS

From the research it emerged that learners see lack of internet access as a factor greatly hindering their pass rate, although they have embraced their learning with new technology. Some students (n=2) highlighted their frustration that arose from scanty access to the internet at the college. This was an indication that students were not happy that the IT department, in most cases, block many sites, which is not expected at an institution of learning. These students are resident at the campus and would appreciate accessible internet (wireless connection) in order to use their laptops. The students who used their cell phones to access internet complained that at times they do not have sufficient data bundles to connect to the Internet, which could be eased by making wireless and wired internet connectivity readily available at the college, for use whenever learners are free. The emotional difficulties have been noted earlier from the secondary data; and primary data has supported that success of FB in learning outside campus or normal office hours may be hindered by learners' economic difficulties.

As the results show, there is a close relationship between using FB and increasing contact time outside normal learning time, to assist learners to study. The researcher observed that, unlike other subjects, programming is a complex subject; at times learners are given homework which they fail to do. At other times learners may not find people who are conversant with the language which they use in programming; or in the worst case scenario, some learners do not have a computer to use. The catchment area for College of Cape Town is the Cape Flats. Most residents of these communities are economically challenged - a computer is a luxury. As both literature and empirical information has shown, introducing new learning methods does not only assist in improving quality and number of passes; it increases learners' motivation to take charge of their learning. Learners are so immersed in SM that embracing this technology for learning is fully acceptable to them. The researcher also noted that FB works to the benefit of learners if the subject lecturer is always available to give feedback to probing learners, encouraging them to strive by giving learners tasks

and leads on where to find solutions. This was evidenced from the pass rate of the LCT group learners. Their performance was the best of the four groups. The TCT and PCT groups did well, but this outcome depended heavily on the administrator. The PRCT group did not perform as expected: an indication that learners need guidance when using FB to study, otherwise it becomes disruptive; a concern which some learners pointed out in responding to the open-ended questions. The researcher had expected the pass rate for the PCT group in practical assignments to be the best, owing to more practise time, but this did not prove to be the case. The researcher is of the opinion that if learners are unguided on FB, they tend to discuss matters that have nothing to do with the subject. Additionally, most of the learners live in the Cape Flats, which has a high crime and drug rate; the only way people can communicate with friends is through the SM; even visiting friends is not safe in most cases. Giving learners work on the platform unsupervised will not enhance their learning; social life being seen as much more important.

5.4 RECOMMENDATIONS

Findings were significant in improving quality and number of passes by learners who used the social medium of FB with lecturer facilitation. A detailed research could be recommended at a broader level to include a number of FET colleges from various geographic areas further to validate the reported findings. Action research could be conducted from the year when learners enrol at FET colleges for NCV level 2; tracking them until they complete level four. The researcher observed that most FET colleges have e-learning managers; these are the personnel who should be advocating such initiatives, to convince management to include in their budget a strategy embracing SM in learning.

It is in the researcher's interests to have this piece of work contribute to the body of knowledge for information management, through its findings on improving quality and number of passes in programming, using the social medium of FB. SM media remains a powerful, untapped support system with which to communicate with learners outside of the normal teaching time.

5.5 LIMITATIONS OF THE STUDY

This study reflects that a comprehensive investigation into the use of social media for learning purposes was carried out at College of Cape Town, one of the FET colleges in the

Western Cape Province. Furthermore, the study made some successful contributions to the manner in which lecturers can use social media to contact learners with a view to improve performance. However, there were some limitations to the study.

This research was limited to one FET college under the control of the Western Cape Province. This study did not include the lecturers for other subjects and their learners, whose participation is equally important especially for the core subjects like Systems Analysis where performance is low.

Another limitation of the study was that it was carried out in town and the student's catchment area being the Cape Flats where many students have a lot of SEBD's. Therefore, although the results of this study may be of value to all FET colleges in the province of country at large, the results may not be generalised over other provinces of South Africa or even to other FET Colleges in the province where students come from a different catchment areas, for example, the Boland community. It is essential that the findings of this study are tested in other areas of the province or country at large.

5.6 FUTURE STUDY

This research has revealed the important effect of FB on increasing student performance in programming. Although the present research has made significant contributions to the body of knowledge regarding lecturers' use of social media particularly FB in FET sector, certain areas still need to be explored. Therefore, further research needs to be conducted to check whether the social medium of FB will have the same impact on performance both quality and quantity of passes, in other core subjects like Systems Analysis, Computer Networking and Office Data Processing.

However, the data collected provided a good baseline to answer the research questions. This is a clear indication that there is, presumably, a high possibility of getting the same results even if the research is carried on a wider scale.

Future research could also focus on to what effect the lecturers' clarity, expectations, learners' attendance, attitudes and community support will increase quality and quantity of passes. The other problem is that although learners can access the SM of FB on their mobile phones, not all of them always have airtime for the data bundles needed for internet

connection. This in itself results in other learners having an advantage over others which will result in varying performances. FB usage and its impact on learning outcomes, especially performance on learners with unequal access to internet, remains an area that may require further examination.

Last but not least, this study mirrors only a 'snapshot' of a surfacing technology in the teaching and learning for FET students. Further in-depth studies will be vital to determine trends in the strategy of current and future information, learning/teaching strategies and hi-tech educational activities, which must include all concerned parties - from lecturers to representatives from industry and other institutions of higher learning such as universities.



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APPENDIX 1: CONSENT FORM
UNIVERSITY OF WESTERN CAPE
CONSENT TO PARTICIPATE IN RESEARCH

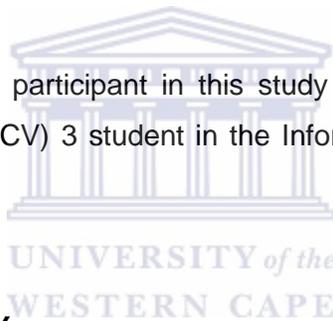
Title:

An investigation into the use of Social Media as a means of improving the quantity and quality of the pass rate in computer programming at FET colleges in the Western Cape

You are asked to participate in a research study conducted by Mr Godwin Pedzisai Dzvapatsva from the Department of Information Systems Science, Faculty of Economic and Management Sciences (EMS), UWC.

This research study is conducted towards the completion of the researcher's Masters' thesis at the University of Western Cape.

You were selected as a possible participant in this study because you are a registered National Curriculum Vocational (NCV) 3 student in the Information technology Department at College Of Cape Town.



1. PURPOSE OF THE STUDY

The aim of the study is to investigate the use of Social Media as a means of improving the quantity and quality of the pass rate in computer programming at FET colleges in the Western Cape

2. PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following - to:

1. Write a personal biographical and geographical history of yourself when you receive the questionnaires for the purposes of data collection to be used in the analysis.
2. Meet/interact with the researcher and peers on the Facebook groups that you will be pulled into during Terms 1 to 4 of this academic year (one-on-one consultation) in which your progress in the learning process will be discussed, and where you could identify challenges and difficulties that you encountered if you have failed some of

your modules in the throughout the learning; and/or if you have passed all your modules during the year, identify and write about what you have done that enabled you to pass all your modules.

3. Have regular chat sessions with fellow learners or subject experts depending with availability. Highlight (if any) the benefits, your challenges, and how you have overcome those, your successes and what you have done to achieve them in the learning of programming.

For any comments or further questions you can contact Mr Dzvapatsva in D18 (The computer lab for programming classes).

3. POTENTIAL RISKS AND DISCOMFORTS

No potential risks are envisaged at this stage. However, if something might come up, it will be dealt with in a sensible and sensitive manner.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

Potential benefits could be that the students would feel valued and safe (from the online meetings in which they could share their experiences in the learning process), and this could result in them acquiring a higher self-esteem and self-confidence in their own abilities, which could result in better performance in the courses that they are registered for.

Furthermore, the Department of Information Technology at College of Cape Town would benefit directly from the results and recommendations that will be made in that these recommendations will be implemented in the coming years and hopefully, would assist more students to successfully complete their three-year study. If this could happen, the department's failure and dropout rates would decrease, and a higher throughput rate would be achieved. Other departments at College of Cape Town could also benefit in this way, and possibly other FET colleges in the country.

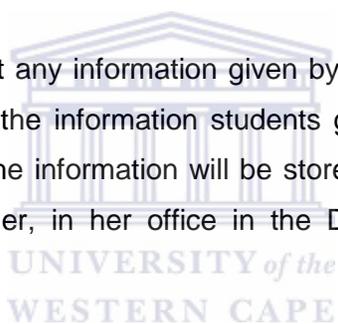
5. PAYMENT FOR PARTICIPATION;

No payments to the participants will be made.

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of referring to students as Student 1, 2, 3, etc, and by means of themes and categories that will be identified and used in the analysis and discussions of the findings and the outcomes, in the research report, the thesis, and in conference papers and articles that would be submitted for possible publication in academic journals.

The researcher further pledge that any information given by participants will be handled in the strictest confidence, and that the information students give will not be used to reflect negatively on them in any way. The information will be stored in files that will be locked in the filing cabinet of the researcher, in her office in the Department of information and Technology building.



7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so such as you not attending the monthly meetings over the course of the research period.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact me at (021) 696-5133 (o); 073-588-7757 (cell); and e-mail gpdzvapatsva@yahoo.com

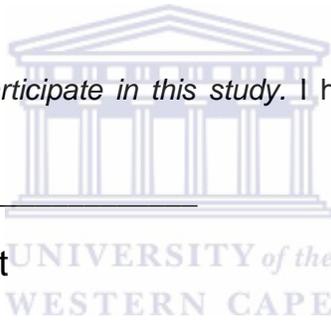
9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Mr Anthony Dietrich , Head of the IT Department or telephonically, (021) 696-5133; or via e-mail at adietrich@cct.edu.za

SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

The information above was described to *me, the participant* by Mr Godwin P Dzvapatsva (Programming lecturer) *English and I am the participant* in command of this language. I was given the opportunity to ask questions and these questions were answered to *my* satisfaction.

I hereby consent voluntarily to participate in this study. I have been given a copy of this form.



Name of Subject/Participant

Name of Legal Representative (if applicable)

Signature of Subject/Participant
or Legal Representative

Date

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____
[*name of the participant*]. He/she was encouraged and given ample time to ask me any
questions. This conversation was conducted in *English* and *no translator was used*.

SIGNATURE OF INVESTIGATOR

DATE



NB : (Names and Surnames have been removed for confidentiality in Appendix I – IV)

APPENDIX 2 : SUMMARY OF TEST SCORES FOR LCT GROUP

PRINCIPLES OF COMP.PROGRAMMING L3 - ICASS 2012- NCV3-1

LECTURER CONTACT TIME Group (LCT)

No	Surname	First name	PoE COMPONENTS (20% Th + 50% Pr + 30%Examination)										ICASS %
			Theory Tests (20%)		TOTAL	Practical Tasks (50%)		TOTAL	SEP.EXAMINATION (30%)				
			T1	T2		P1	P2		Pape r1	Pape r2	Final		
1	.	.	82	74	15.6	94	72	41.5	73.0	86.0	79.5	81	
2	.	.	72	96	16.8	88	68	39.0	71.0	91.0	81.0	80	
3	.	.	68	77	14.5	100	56	39.0	72.0	96.0	84.0	79	
4	.	.	88	69	15.7	100	66	41.5	57.0	79.0	68.0	78	
5	.	.	84	76	16.0	91	80	42.8	60.0	53.0	56.5	76	
6	.	.	66	67	13.3	100	60	40.0	57.0	85.0	71.0	75	
7	.	.	76	80	15.6	84	74	39.5	61.0	62.0	61.5	74	
8	.	.	66	76	14.2	94	60	38.5	59.0	76.0	67.5	73	
9	.	.	86	86	17.2	97	54	37.8	46.0	66.0	56.0	72	
10	.	.	82	50	13.2	97	70	41.8	42.0	50.0	46.0	69	
11	.	.	90	81	17.1	94	60	38.5	25.0	56.0	40.5	68	
12	.	.	84	69	15.3	94	72	41.5	40.0	29.0	34.5	67	
13	.	.	82	67	14.9	91	50	35.3	43.0	62.0	52.5	66	
14	.	.	60	66	12.6	94	50	36.0	42.0	62.0	52.0	64	
Average Percentages			78	74	15.1	94	64	39	53	68	61	72.8	
Total no. of learners who passed			14	14	14	14	14			13	11	14.0	
Percentage Passed			100	100	100	100	100			93	79	100.0	

APPENDIX III : SUMMARY OF TEST SCORES FOR PCT GROUP

PRINCIPLES OF COMP.PROGRAMMING L3 - ICASS 2012- NCV3-1

PRACTICE CONTACT TIME Group (PCT)

No	Surname	First name	PoE COMPONENTS (20% Th + 50% Pr + 30%Examination)										ICASS %
			Theory Tests (20%)		TOTAL	Practical Tasks (50%)		TOTAL	SEP.EXAMINATION 30%			PoE Mark	
			T1	T2		P1	P2		Pape r1	Pape r2	Final		
1			80	61	14.1	97	56	38.3	33.0	51.0	42.0		65
2			58	49	10.7	94	60	38.5	39.0	52.0	45.5	63	
3			50	59	10.9	81	72	38.3	44.0	47.0	45.5	63	
4			60	50	11.0	81	62	35.8	45.0	61.0	53.0	63	
5			62	69	13.1	81	68	37.3	43.0	40.0	41.5	63	
6			74	71	14.5	78	60	34.5	43.0	42.0	42.5	62	
7			66	56	12.2	91	50	35.3	50.0	29.0	39.5	59	
8			62	37	9.9	94	42	34.0	32.0	33.0	32.5	54	
9			64	46	11.0	88	56	36.0	11.0	30.0	20.5	53	
10			34	41	7.5	94	58	38.0	35.0	9.0	22.0	52	
11			50	79	12.9	69	26	23.8	29.0	45.0	37.0	48	
12			20	43	6.3	78	38	29.0	34.0	29.0	31.5	45	
13			12	15	2.7	29	42	17.8	0.0	0.0	0.0	20	
13			46	21	6.7	84	0	21.0	35.0	29.0	32.0	37	
Average Percentages			53	50	10.3	81	49	33	34	36	35	53.3	
Total no. of learners who passed			10	7	9	13	9		1	3	1	10.0	
Percentage Passed			71	50	64	93	64		32	21	7	71.4	

APPENDIX IV : SUMMARY OF TEST SCORES FOR TCT GROUP

PRINCIPLES OF COMP.PROGRAMMING L3 - ICASS 2012- NCV3-2

**MORE TECHNICAL CONTACT TIME Group
TCT**

No	Surname	First name	PoE COMPONENTS (20% Th + 50% Pr + 30%Examination)									ICASS %
			Theory Tests (12%)		TOTAL	Practical Tasks (21%)		TOTAL	SEP.EXAMINATION			
			T1	T2		P1	P2		Pape r1	Pape r2	Final	
1			90	60	15.0	88	60	37.0	28.0	89.0	58.5	70
2			64	66	13.0	81	58	34.8	58.0	58.0	58.0	65
3			82	60	14.2	94	56	37.5	50.0	64.0	57.0	69
4			62	64	12.6	91	66	39.3	50.0	56.0	53.0	68
5			68	80	14.8	69	60	32.3	64.0	75.0	69.5	68
6			70	71	14.1	84	68	38.0	57.0	52.0	54.5	68
7			82	50	13.2	78	54	33.0	51.0	53.0	52.0	62
8			84	69	15.3	59	52	27.8	55.0	78.0	66.5	63
9			50	62	11.2	72	64	34.0	50.0	20.0	35.0	56
10			60	60	12.0	72	64	34.0	50.0	20.0	35.0	57
11			66	59	12.5	66	50	29.0	32.0	69.0	50.5	57
12			40	47	8.7	94	42	34.0	25.0	61.0	43.0	56
13			90	71	16.1	66	54	30.0	34.0	23.0	28.5	55
14			80	50	13.0	75	58	33.3	22.0	34.0	28.0	55
Average Percentages			71	62	13.3	78	58	34	45	54	49	61.9
Total no. of learners who passed			11	11		14	13		9	10	9	14.0
Percentage Passed			92	92		100	93		64	71	64	100.0

APPENDIX V : SUMMARY OF TEST SCORES FOR PRCT GROUP

PRINCIPLES OF COMP.PROGRAMMING L3 - ICASS 2012- NCV3-2

PEER CONTACT TIME Group (PRCT)

No	Surname	First name	PoE COMPONENTS (20% Th + 50% Pr + 30%Examination)										ICASS %
			Theory Tests (20%)		TOTAL	Practical Tasks (50%)		TOTAL	SEP.EXAMINATION(30%)				
			T1	T2		P1	P2		Pape r1	Pape r2	Final		
1			80	84	16.4	97	72	42.3	65.0	97.0	81.0	83	
2			86	81	16.7	97	60	39.3	67.0	78.0	72.5	78	
3			38	53	9.1	90	62	38.0	46.0	72.0	59.0	65	
4			78	50	12.8	56	70	31.5	40.0	23.0	31.5	54	
5			62	56	11.8	75	30	26.3	50.0	28.0	39.0	50	
6			64	53	11.7	57	50	26.8	37.0	43.0	40.0	50	
7			76	50	12.6	63	38	25.3	30.0	24.0	27.0	46	
8			84	63	14.7	22	60	20.5	43.0	17.0	30.0	44	
9			66	34	10.0	75	16	22.8	20.0	50.0	35.0	43	
10			78	56	13.4	63	10	18.3	38.0	27.0	32.5	41	
11			34	40	7.4	84	0	21.0	35.0	34.0	34.5	39	
12			20	31	5.1	44	24	17.0	0.0	0.0	0.0	22	
13			0	57	5.7	0	24	6.0	31.0	12.0	21.5	18	
			24	0	2.4	52	0	13.0	0.0	0.0	0.0	15	
Average Percentages			56	51	10.7	63	37	25	36	36	36	46.3	
Total no. of learners who passed			9	10		11	2		3	4	3	5.0	
Percentage Passed			64	71		79	14		21	29	21	35.7	

APPENDIX VI FACEBOOK GROUP: SAMPLE COMMENTS

The screenshot shows a Facebook interface. At the top, the Facebook logo is on the left, and a search bar with the text "Search for people, places and things" is in the center. On the right, the user's name "Godwin Dzvapatsva" and navigation links "Find Friends" and "Home" are visible. Below the navigation bar is a comment input field with a placeholder "Write a comment...". The main content is a post by "Godwin Dzvapatsva" with the text "List any five data types". The post has a "Like" button, a "Comment" button, and an "Unfollow Post" button. The post was made on "April 23 at 2:45pm" and has been "Seen by 25" people. There are eight comments listed below the post, each with a profile picture, name, text, and timestamp. The comments are: 1. Jordan Groenewald: "String, Integer, Boolean, Double and Single ;) saaaaaafe" (April 23 at 2:46pm, 1 like). 2. Phumelela Hoho 1: "Boolean" (April 23 at 2:47pm, 1 like). 3. Tamryn Leigh: "boolean, string, integer, single, decimal" (April 23 at 2:47pm, 1 like). 4. Phumelela Hoho 2: "String" (April 23 at 2:47pm, 1 like). 5. Ayanda Sivaya Siaya Busakwe: "Boolean, Double, String, Decimal, Integer" (April 23 at 2:47pm, 1 like). 6. Phumelela Hoho 3: "Single, Double and Integer" (April 23 at 2:48pm, 1 like). 7. Ahmadi Kidimbe: "Integer, Boolean, Double, Decimal, Single.....this is me" (April 23 at 2:49pm, 1 like). 8. Godwin Dzvapatsva: "Dont forget about the char data type" (April 23 at 2:50pm, 1 like). A watermark for "UNIVERSITY of the WESTERN CAPE" is visible in the background of the comments section.

facebook Search for people, places and things Godwin Dzvapatsva Find Friends Home

Write a comment...

Godwin Dzvapatsva
List any five data types
Like · Comment · Unfollow Post · April 23 at 2:45pm

Seen by 25

Jordan Groenewald String, Integer, Boolean, Double and Single ;) saaaaaafe
April 23 at 2:46pm · Like · 1

Phumelela Hoho 1. Boolean
April 23 at 2:47pm · Like

Tamryn Leigh boolean, string, integer, single, decimal
April 23 at 2:47pm · Like

Phumelela Hoho 2. String
April 23 at 2:47pm · Like

Ayanda Sivaya Siaya Busakwe Boolean, Double, String, Decimal, Integer
April 23 at 2:47pm · Like

Phumelela Hoho 3. Single, Double and Integer
April 23 at 2:48pm · Like

Ahmadi Kidimbe Integer, Boolean, Double, Decimal, Single.....this is me
April 23 at 2:49pm · Like

Godwin Dzvapatsva Dont forget about the char data type
April 23 at 2:50pm · Like

APPENDIX VII :STUDENT QUESTIONNAIRE

Purpose of Questionnaire: You are kindly requested to complete the survey in our search for more information into the use of (Facebook) to improve quality and quantity of passes in programming at FET College with particular focus to College of Cape Town. This can take you up to 30 minutes.

Rationale: Information will be used as baseline in our quest to improve programming pass rate at College of Cape Town and may be countrywide

Please take note that information provided by you will not be used for any other purposes other than intended and will be kept confidential. The information is going to be used for my Masters studies at University of Western Cape.

Full Name(s) : _____(optional)

Class : _____

College : _____

Mobile : _____(optional)

Email Address : _____(optional)

Group : _____

Years enrolled : _____ optional

1. Gender Male Female

2. Age
 14-16 17-19 20-22 23 and above

3. Where do you live whilst you are attending (e.g. with relatives, hostel, on my own)
_____ optional

4. What type of mobile device are you using?

5. Do you have a computer with Internet connection at home?

Yes No

6. If answer is no how do you access Internet apart from mobile .

Please tick whether you want summary of findings in the boxes below

Yes No



Contact Person: Godwin Dzvapatsva

gpdzvapatsva@gmail.com

Lecturer: Computer Programming

College of Cape Town

Crawford campus

1. Which of the following have you used before. Select all applicable

Facebook Mixit Edmodo YouTube None of the above

2. Do you have Internet access outside the normal learning time/out of the campus

No Yes

3. I think Facebook is a good idea for learning programming..

Strongly Disagree Disagree Neutral Agree Strongly Agree

4. I feel that using Facebook improved my attitude towards learning programming.

Strongly Disagree Disagree Neutral Agree Strongly Agree

5. I feel that I have more personal involvement with my class work using Facebook than through traditional media.

Strongly Disagree Disagree Neutral Agree Strongly Agree

6. Because Facebook allows me to interact with colleagues or lecturer, I feel more confident in my approach to the subject.

Strongly Disagree Disagree Neutral Agree Strongly Agree

7. Working with Facebook did not engage me fully or stimulate me in learning programming..

Strongly Disagree Disagree Neutral Agree Strongly Agree

8. Facebook helps to increase contact time with other students or subject lecturers.

Strongly Disagree Disagree Neutral Agree Strongly Agree

9. I was able to get satisfactory feedback for the subject from my fellow students or lecturer using Facebook.

Strongly Disagree Disagree Neutral Agree Strongly Agree

10. I managed to build up a good relationship with my friends and lecturer.

Strongly Disagree Disagree Neutral Agree Strongly Agree

11. Success was easier to achieve in a class situation using Facebook than chalk and board method

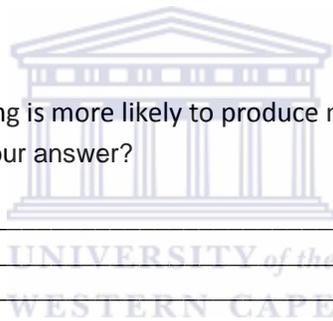
Strongly Disagree Disagree Neutral Agree Strongly Agree

12. What in your opinion could be the major problem in adopting Facebook for learning purposes at college?

13. Do you think you are better off than other students doing the same course who are not exposed to learning using (Facebook). Explain your answer?.

14. I enjoyed learning through Facebook than face to face lectures (Yes/No). Explain your answer?

15. Facebook in learning programming is more likely to produce more valuable learning experiences. (Yes/No). Explain your answer?



16. I feel that the enhanced quality in programming to the current level three students who used the group created. (Agree/Disagree). Explain your answer?
