Ashley Corneil Reddy
520267

Masters Research Project

The Feasibility of Integrating Digital Mobile Devices into Secondary Education in South Africa; Particularly in the Area of Learner Social Support

Research report submitted to the School of Education,
Faculty of Humanities,
University of the Witwatersrand, Johannesburg,
in partial fulfillment of the requirements
for the degree of Masters in Education

Declaration

I declare that this research report is my own unaided work. It is submitted for the degree of Masters in Education at the University of the Witwatersrand, in Johannesburg, and has not been submitted before for any degree or examination at any other university or institution.

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Name of candidate Signature of candidate

_____ day of _____ , 2017

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Abbreviations

ICT	Information and Communication Technology
M Ed	Masters in Education
LMS	Learning Management System
LOLS	Life Orientation and Life Skills
SACAP	South African College of Applied Psychology
HIV	Human Immunodeficiency Virus
AIDS	Acquired Immune Deficiency Syndrome
SPSS	Statistical Product and Service Solutions
ICASA	Independent Communications Authority of South Africa
MIM	Mobile Instant Messaging

Glossary of terms

- **Mobile Devices:** The term 'mobile device' or 'digital mobile device' is generically used to refer to mobile electronic devices which includes (but not restricted to) 'personal digital assistants (PDAs), handheld computers and cellular telephones' (Galeas, Kraemer, Padilla, Reyes & Varela, 2005). For this study, its use will imply mobile/cellular phones. Mobile phones are voice and data receivers and transmitters (Marvin, 1988).
- **Mobile Phones:** Originally termed 'cellular phone', and widely referred to as 'cell phone'; these mobile telephony devices operate on wireless transmission to and from service providers' cellular towers (MacDonald, 1979).
- **Network Coverage:** This is the service providers' provision of cellular towers/transmitters, strategically placed to ensure access to a cellular service within a serviced locality (O'donnell, 2001).
- **Computer:** A computer is a device that manipulates entered/stored digital data based on 'instructions on how the data is to be processed' (Oxford Dictionary, 2003). They vary in size, capability and mobility. The desktop computer is a

'stationary device' that lacks the mobility of devices such as laptops, smart phones, and cell phones (Weiss, 2003).

- **Mobile Learning:** Mobile learning, also known as 'm-learning' is the use of mobile wireless devices to aid and support formal and informal learning or the learning process; and has 'enormous potential to transform the delivery of education and training' (UNESCO, 2013). The following handheld devices may be considered for use in m-learning: 'tablet computers, MP3 players, smartphones and mobile phones' (UNESCO, 2013).
- **Barrier:** A barrier may be taken to be any factor that can be cited as an impediment to the learners' ability to achieve a learning goal. During this study, any factor that impedes an individual from embracing and excelling in the use of digital technology (ICTs) will be regarded as a barrier (e-Divide Team, 2005 – 2006)
- **Digital Divide:** The digital divide refers to the gap that exists between those who are able to access and effectively use to their benefit information and computing technologies (ICTs), and those who cannot (Chikati, Mpofu, Muchuchuti & Sidume, 2013). Nielsen (2006) states that 'the "digital divide" refers to the fact that certain parts of the population have substantially better opportunities to benefit from the new economy than other parts of the population'. What Nielsen alludes to is the impact that the disparity of access to and education in digital technology (ICTs) between individuals and groups, has on their ability to benefit from the economic and societal privileges.
- **Technocentrism:** Papert (1990) coined the word, and explains that it refers to 'the fallacy of referring all questions to the technology'. This means that there is a danger of using technology for more than empowerment of the learner, but to rely on it to 'teach' the learner in the learning process; and therefore being erroneously hailed as the 'wonder pill', to the exclusion of the other factors, for academic success.
- **Social Support:** 'Social support for academic learning' highlights the relationship between people support provided to the learner, and their academic achievement (Lee, Smith, Perry & Smylie, 1999). Social support is the all-round scaffolding provided by 'social agents' such as educators, parents and peers, which influence

the learner's 'academic attitude and behavior' (Legault, Green-Demers & Pelletier, 2006). It is the physical and emotional support that is provided by associates, and this support determines how an individual reacts or recovers from stressful situations. During this study, the term 'Social Support' will refer to emotional support provided by educators and peers to learners who are experiencing personal and academic challenges that leave them debilitated, ultimately incapacitating them to achieve academically.

- **Academic support:** 'Any activity or social exchange that supports the students in their academic studies' (Peck, Chilvers & Lincoln, 2010). It is the provision of any form of assistance (guidance, support or advice) 'to a known learner or group of learners, before, during and after the learning process' (Thorpe, 2002), so that the learner is empowered to perform to the learner's academic best.
- **Suicide Risk:** 'Thoughts, thoughts due to drug involvement, direct and indirect threats, attempts, depression, and drug involvement' (Thompson, Eggert, Randell, & Pike, 2001). A constellation of self-destructive thoughts and behaviors, including suicidal ideation, verbal suicidal threats and suicidal attempts' (Eggert, Thompson, Randell & Pike, 2002). The risk of suicide does not necessarily lie in premeditation, but can be the result of being momentarily overwhelmed.
- **Stress:** Lazarus (1966) states that 'Stress occurs when an individual perceives that the demands of an external situation are beyond his or her perceived ability to cope with them.' (Lazarus & Folkman, 1984). Stress is the belief or perception that something or everything that we are experiencing or are faced with, is beyond our ability to handle or cope with. 'Anything that poses a challenge or a threat to our well-being undermining both our mental and physical health, are stresses that are bad and debilitating' (Nordqvist, 2013).
- **Rural and Urban:** The categorization of rural and urban locales vary, based on the following factors: 'a threshold population size, population density, economic function and/or the presence of urban characteristics' (UNICEF, 2012). UNSD (2012) states that 'the designation of areas as urban or rural is so closely bound to historical, political, cultural, and administrative considerations', and adds another differentiating characteristic of urban areas in South Africa: that of possessing some

'form of local authority'. For the purposes of this study, rural will refer to a locality that lacks significant serviced infrastructure, remains outside the precincts of a metropolitan and its suburbs, is wanting in adequate modernized service facilities, has economic functions that only cater for basic needs of the residents, and has a non-elaborate configuration of local authority. School 1 is located in such a rural setting. For the purposes of this study, it would follow that the classification of urban is classified by the converse characterization of rural. School 2 is located in such an urban setting.

Chapter One: Scope of the Research

Introduction

'South Africa does not yet provide universal access of ICT in education to its students with more than half (62%) of the schools not having access to (desktop) computers' (Howie & Blignaut, 2009).

Are desktop computers the sole digital device that make ICTs accessible to learners in South Africa, and are other digital devices used extensively elsewhere? Beaudufe (2011), states that Africa 'is the fastest growing mobile market in the world'. With such technological resources at one's disposal, there must certainly be alternate digital devices (other than desktop computers) that can be exploited to provide learners with ICT access and integration in education in South African secondary schools. This study investigates the feasibility of adopting digital mobile devices into secondary education in South Africa, with a primary focus on the use of mobile phones in the area of social support for learners who are experiencing personal and academic adversities that affect their ability to achieve academically. Should this study provide substantive proof for the feasibility of using mobile devices for the provision of social support, significant conclusions can be drawn with recommendations that mobile digital devices have the potential to supplement and support academic instruction within secondary education. This may result in their adoption and inclusion as a viable technological inclusion to scaffold instruction, ultimately improving learner academic participation and achievement.

Rationale

The purpose of this research is to investigate the feasibility of integrating digital mobile devices into secondary education in South Africa, with a primary focus on the use of digital mobile devices for the facilitation of social support to learners, by educators and peers. If feasible, it will translate to the advantage of reaching and helping learners even beyond the boundaries of the classroom. These opportunities remain currently untapped, yet learners who are in dire need of support, and who live within the digital world, are not benefactors of such ubiquitously used technology, within the learning environment. In South Africa, there are unexplored areas in formal educational research on how such devices can be

meaningfully adopted in and beyond the classroom environment for learning and development purposes. Due to the scarcity of studies on the use of digital devices in education in South Africa, educators are reluctant to adopt digital devices. According to Moffitt (2012), 'portable digital devices can overall positively contribute to a quality learning environment by supporting the requirements of a Quality Learning Environment (QLE) to a high standard'.

In spite of the economic challenges that render sparse access to desktop computers, the prevalence of portable digital devices in society offers a viable alternative to integrating ICTs in and beyond the classroom. Comparisons on the basis of access to, and integration of digital devices, and learner and educator perceptions of using digital mobile devices within education, will have to be drawn between current and envisaged implementation and integration of digital mobile devices into education. The validity of the various claims made by the contributors in the literature review will also be contrasted and confirmed with the findings from the analysis and interpretation of the research data.

According to Ng (2011), current portable digital device research focuses primarily on theories and frameworks for mobile learning and design. The aim of this research however is to focus more on the practical applications of digital mobile devices, and how they can be used within the educational environment. This will involve examining current uses of digital mobile devices by educators and learners, then evaluating how digital mobile devices can be used for learner social support. The final research report will hold invaluable information and recommendations that will challenge the need to critically direct skills and resources to develop an all-inclusive and conducive environment for the adoption and effective integration of digital mobile devices in secondary education in South Africa.

Background:

The discourse on the digital divide continues to be a subject for discussion in various communities of practice. In 2012, as educational technology students at the University of the Witwatersrand were engaged in an intellectual enquiry on the subjects of the digital divide and ICT policy, a disquieting discovery was made in terms of the understanding and

practice of ICT access, as outlined in the South African White Paper on e-Education (2004). The then minister of education, Ms Neledi Pandor, stated that there still existed a digital divide in education in terms of access to ICTs. The document further elaborated that the 'access to ICTs' was really the 'access to desktop computers', and how the South African government, who are the custodians of education, were being acutely challenged to provide access to ICTs (desktop computers) to schools.

What was concerning when engaging other readings on ICT access and integration in education in South Africa, was the fact that the current ICT equipment in the majority of government schools, were being underutilized. Interest in this state of affairs was increased after learning of the ICT interventions other countries have successfully made using digital mobile devices extensively to augment and support learning within the formal education cadre. An immediate response to this information was to discover what the digital mobile penetration was in South Africa, as this would provide substantive reasoning for following suit and adopting and integrating it into education in South Africa. It was found that South Africa has over a 100% digital mobile penetration. This was the catalyst to drive the research study, deliberating on the possible reasons why digital mobile devices were not already integrated into education in South Africa. It was decided to research the feasibility of adopting and integration this medium of ICT within secondary education.

Research problem

According to the South African White Paper on e-education (2004), government cites 'the lack of access to digital devices' as one of the barriers to bridging the digital divide in education. The initial implementation of the ICT policy saw the procurement and distribution of only desktop computers to schools. Visser and West (as cited in Motlik 2008), stated in 2005 that the South African population owns less than 11 per cent landlines, in comparison to their ownership of 90% cellular phones. Current statistics on digital mobile penetration in South Africa provides overwhelming evidence that the digital divide, in terms of access, does not exist, as Mobile penetration in South Africa is past the 100% penetration mark:

Total connection and subscriber penetration by country

Country	Connections 2012	Connections 2017	Subscribers 2012	Subscribers 2017
Japan	113%	132%	88%	92%
UK	123%	128%	87%	89%
Spain	119%	129%	81%	84%
Israel	135%	152%	76%	80%
Russia	164%	183%	73%	79%
South Africa	**138%**	**171%**	**66%**	**79%**
Brazil	140%	177%	58%	68%
China	82%	107%	43%	52%
India	76%	100%	26%	40%

SA's real mobile penetration revealed (BusinessTech, 2012)

It can therefore be deduced that the South African government, who are the custodians of education, consequently responsible for ICT access and integration in education, have neglected to investigate and consider alternative digital devices such as digital mobile phones for inclusion in ICT access and integration in education.

Research question

How does the adoption of digital mobile devices in secondary education positively contribute to ICT access and integration?

Some relevant secondary questions include:

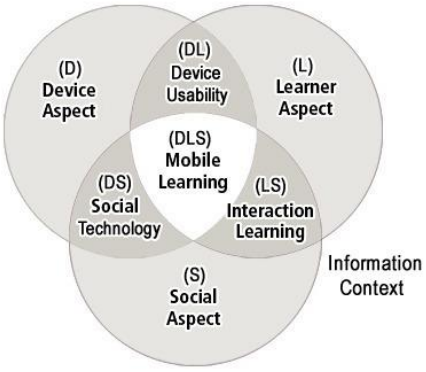
- What are the current uses of mobile phones amongst secondary school educators and learners?
- What are the challenges faced by secondary school educators in integrating mobile phones into the school environment?
- What is the perception of secondary school educators and learners on the integration of digital mobile devices for educational purposes?
- What are the current learner social support practices of both learners and educators?

- What is the perception of secondary school educators and learners on the integration of mobile phones for social support purposes for learners?

Conceptual Framework

The Rational Analysis of Mobile Education (FRAME)

The Rational Analysis of Mobile Education (FRAME) (Koole, 2009), is a model that describes the mobile learning process, and is therefore valuable to mobile learning designers and developers. This model is founded on the theory of constructivism, and provides equity of importance to the three fundamental components which are mobile devices, the learner and the social aspect.



The Rational Analysis of Mobile Education (FRAME) (Koole, 2009)

Vygotsky's constructivist concepts of 'mediation and zone of proximal development' (Koole, 2009) defines the interactions and mediations within the information 'caldron' which requires the three components to be embraced for successful learning to be realized. According to Koole (2006), the mobile learning process requires an equalized contribution and alignment to the three fundamental components: When the physical characteristics of the mobile device are investigated and exploited (D), the individuality of the learner is cogitated and accommodated (L), and the imperatives 'of social interaction and cooperation' are respected and observed (S); the resultant outcome is effective mobile learning (DLS). Whilst the intersection (LS) emphasizes the essential operation of the social constructivists' instruction and learning theory, Norman (as cited in Koole, 2009),

states that the intersections (DL) & (DS) accentuates 'the affordances of mobile technology'. Koole (2006) states that the adherence to the FRAME model when designing and developing mobile learning can assist both 'practitioners and researches to leverage the benefits' and 'better comprehend the complexity' of mobile learning. These benefits endeared by Koole (2006) are the very ones expounded by Taxler (2009).

Bringing the FRAME model home to the research specific application (mobile devices for learner social support) requires the unearthing of the learners' perceptions of and expectation for their personal wellbeing and academic achievement. The perspective of learners, on the role that social support (formal and informal) plays in their lives needs to be established, as this will provide impetus for the investigation of how such social support can be provided to learners (L). Societal impact on the learners, where such impact threatens the learners' wellbeing, demands critical interventions. Whist physical and mental distress and academic poor/non-achievement are results of society's effect on the learner; the provision of social support by that very society is obligatory (S). The degree to which mobile devices, particularly mobile phones, are currently being exploited, and their superior affordances for use within specific spheres; must be established for conclusions to be drawn on its appropriateness for use in the provision of learner social support (D). Determining the ubiquitous use of mobile phones within a community and unraveling the cultural and personal perceptions of its use, will determine its acceptance as a device that can be used to facilitate learner social support within secondary schools (DS). The learners' response and vocalization to stresses being experienced during their interaction within their societies (learning environments), and the reaction of society to the learners' anguish, will determine the effectiveness and efficiency of the much needed learner social support (LS). The degree of possession (number owning mobile phones) and use of mobile phones by learners, will denote the feasibility of its use as a ubiquitous device with potential for specific usage i.e. provision of learner social support (DL).

Once the data has been analyzed and their correlation with the components of the FRAME model established, conclusions can be drawn for or against the feasibility of successful mobile learning (DLS) within the context of this research. The FRAME model will be engaged during the 'Findings' of this research.

Chapter Two: Literature Review

Introduction

Castell and UNRISD (1999) states that the world is experiencing a multidimensional transformation, and lists amongst others the contribution that information technology is making as a vehicle for such transformation. Kozma (2008) concurs by stating that the twenty-first century has seen a dramatic awareness towards the role that ICTs play in various sectors of society. Its influence primarily in developed countries can be observed by the extent of accessibility and engagement with ICTs which have invariably radically transmuted all aspects of people's lives, whether directly or indirectly. The world's eight leading democracies have cited ICTs as the catalyst for sustained economic development, enhanced public welfare, strengthened democracies, increased transparency in governance, nourished cultural diversity, and advancement of international peace and stability.

Selwyn (2004) asserts that having realized the potential of ICTs, governments have feverishly directed efforts and resources to develop a human capital that will be sufficiently skilled to exploit the affordances of ICTs. Consensus was reached by the leading democracies and other multinational organizations to develop these essential ICT skills through education, training, and ongoing skill development. This translates to increased access to education, immeasurable knowledge network for learners and educators, scope and access to educator training, and a wide range of quality educational resources (Kozma, 2008). UNESCO (2013) brings it closer home in terms of ICTs relevance to education, by stating that ICTs significantly impacts and contributes to the 'universal access to education, equity in education, delivery of quality learning and teaching, educator's professional development and more efficient education management, governance and administration'. This approach towards ICTs reflects the holistic influence of ICTs on education, as it augments and supports access to information/knowledge, facilitation of teaching and learning and social support, as well as, assisting in establishing synergy within the multiple facets of education.

ICT Policies for Education

While global attention is focused on creating and sustaining 'knowledge economies' and 'network societies' (Lüthi, Thierstein & Bentlage, 2010) and (Castells, 2001), the initiative of individual nations to develop 'national policies and programs' remains the only 'important tool for the realization of ICT's promise in education' (Kozma, 2008), which impacts their participation in the knowledge economy. These sound and workable strategic policies are generated when a variety of people and organizations with varied perspectives are technically and politically involved in dynamic collaboration (Haddad, 1995). A strategic policy may however be the 'brain child' of an individual, who either has an uncontestable, workable proposition, or has the political clout to unilaterally have the policy accepted and implemented. Strategic policies lend themselves to the generating of multi-program, program and issue specific policies. Haddad (1995) further states that the nature of the national policy, due to its broad range, may not serve a single interest group only (neither will it satisfy every interest group completely), but has to have the 'broad base of political support' that will ensure its implementation.

Kozma (2008) is of the opinion that national strategic ICT policies function as a repository from which the following may be secured: rationale, goals, vision, and benefits (to name but a few), in order to justify the significant expenditures that are required for ICT procurement, deployment and employment. While individual and isolated programs and efforts to integrate ICTs into education are implemented and have their place, it is imperative that a national policy drives the process for coordination, continuity and sustainability. Essentially, the formulation and implementation of the policy is dependent on the intent and comprehensiveness of the rationale which will eliminate divergent or cross-purpose ineffectiveness, or abandonment of the implementation of the policy to a mere techno-centric exercise. Critical to the success of the policy is the operational components of the policy.

South Africa's ICT Policy for Education

The South African ICT policy for national education (Blignaut & Howie, 2009) and (Isaacs, 2007) when read in conjunction with the White Paper on e-Education (2004) has been touted to deliver on the expectation for ICT in education, and invariably bridge the digital divide through the following key pervasive initiatives:

- Ensure that all schools have access to diverse and quality equipment and services
- Support programs that provide opportunities for all, with the goal of initiating, sustaining and promoting lifelong learning
- Drive the delivery of quality learning and teaching
- Create partnerships between the state and the private sector to support the above listed initiatives

Howie and Blignaut (2009) comment on the three phases of the White Paper on e-Education that has been delineated for implementation during the period 2004 to 2007. The first phase is to ensure that technology has been provided, training of educators has been conducted, and ICT coordinators and leaders have been appointed. Just over 15% of educators were trained during this period, with 41% of schools having technology coordinators, leaving numerous other targets remaining unfulfilled. Phase two proposed for accomplishment during 2007 and 2010 focused on the integration of ICTs in curriculum and management. As will be expounded later, this has by far not been accomplished on the large scale that it was touted to do. Technical coordinators indicated that educators experienced extremely low ICT technical support, received minimal pedagogical training specific to 'ICT teaching and learning'; with the upside being a high level of general pedagogic support. The third phase to be rolled out during the period 2010 to 2013 was aimed at directing and empowering all provincial education departments to integrate ICTs in every facet of education and education management and administration. This delegation by the national government to the provincial departments of education, has subsequently led to varying degrees of ICT implementation from province to province (Isaacs, 2007).
Eight years down the line from the inception and implementation of the White Paper on e-Education, the South African Department of Communication has taken the initiative to

have all government ICT policies reviewed (Mdlongwa, 2012). What will be honed into, and which is of great importance, is the degree and success of the implementation of the White Paper on e-education in secondary schools during the past eight years. South Africa spends a large percentage of its budget on education (Howie & Blignaut, 2009). This however has still left 40% of schools classified as poor to very poor, 40% of schools without electricity, and 33% of schools without telephone lines. With schools suffering from the lack of basic amenities, it is not surprising that the prominence given to the enhancement of the use and integration of ICTs in education paints a dismal picture.

According to Howie (Blignaut & Howie, 2009), only 13% of schools had access to 'one or more computers' by 1999 and the wealthiest provinces (Gauteng and Western Cape) are the only ones that have made significant progress in implementing the ICT policy. Howie and Blignaut (Blignaut & Howie, 2009) identify financial constraints amongst the main limitations for ICT implementation in education. These financial constraints directly affect the government's delivery of access to hardware, the provision of which is hoped to eradicate the disparities and achieve 'digital equity'. Ms Neledi Pandor stated in the White Paper on e-Education (2004) that there still existed a digital divide in education in terms of access to ICTs. The document further elaborates that access to ICTs was in essence, the access to desktop computers; and that there was a challenge to finance the bridging of this divide. This would infer that Howie and Blignaut's (Blignaut & Howie, 2009) 'access to hardware' was synonymous with Ms Pandor's 'access to desktop computers'.

Technocentrism

This obsession by the South African government to acquire desktop computers as the sole digital device to bridge the perceived digital divide, has also filtered down to management and educators. Howie and Blignaut's (Blignaut & Howie, 2009) research brought to light that 62% of schools did not yet have desktop computers in 2006, with computer: student ratios higher than 1: 40. With this serious deficiency in provisioning of, desktop computers; principals were still bent on pursuing the same digital device by prioritizing the acquisition of desktop computers as a number one priority on their list of needs for ICT 'propulsion' within secondary education. It is evident that the South African technology coordinators

also ranked the provisioning of desktop computers as a critical component to the success of ICT implementation and integration in secondary schools.

While South Africa has a comprehensive and workable ICT policy, evidence of fragmented and incompetent implementation has been cited. The mentality of providing the technology without the necessary skills, material, curriculum and support, yet hoping to achieve the outcomes as clearly stated in the policy; infers that the South African government is confident that provision of technology alone will consequentially breed success in terms of ICT integration in education. Papert (1990) refers to this mythical approach as technocentrism; which is lauded as the 'silver bullet' for socio-economic development. What ICT implementers have failed to grasp is that technology only empowers individuals within education, and supports the teaching and learning process (Papert, 1990), only when it is utilized within a strategic and systematized process. This technocentric mindset coupled with restricted access to the technology further exacerbates the dilemma of ICT integration in education.

Due to the pursuance of this sole technology (desktop computers), location of the ICTs in schools are confined to computer laboratories. This means that more than 40% of schools do not have access to ICTs in the classroom, but are restricted to the use of ICTs based on the availability of the computer laboratories. While Howie and Blignaut's (Howie & Blignaut, 2009) have researched the readiness to integrate ICTs into mathematics and science pedagogy in secondary schools, their generic findings on provisioning of ICTs in secondary schools in South Africa has revealed that there is an acute deficiency in the supply and acquisition of desktop computers which renders South African secondary schools unready for ICT integration. There is little to no emphasis placed on provisioning of other fundamental elements such as skills, curriculum, etc. which are critical to successful ICT integration in schools, which will invariably lead to the realization of the higher goals (as expected by the South African government).

Integration of ICTs in Education

It is apt at this juncture to further elaborate on what is meant by integration of technology (mobile devices). Various individuals and organizations have disclosed their understanding of technology integration through numerous definitions and statements. The Forum (Unified Education Technology Suite, 2005) states that 'perfect technology integration is inherently unreachable', as technology is not static, and therefore poses a challenge to standardize its integration, regardless of the type of technology, its use, or its user population. As technology evolves, all related structures and entities are required to make the necessary changes and adjustments to accommodate the technology, for efficacy. It is these changes and adjustments made to accommodate technology that are at the heart of technology integration.

Technology integration is defined as 'the incorporation of technology and technology-based practices into the daily routines, work, and management of an organization' (Unified Education Technology Suite, 2005). Thus integration will include the important provision of social support via technology, as the effectiveness of this integration is only realized when technology serves its users in all realms, including the social and psychological (daily routines). This implies that technology integration not only affects every facet of the subject of its incorporation, but that it is also reliant on recognition, acceptance, cooperation and mutual subjection.

Within the teaching and learning environment, technology must first be recognized as an invaluable resource (Unified Education Technology Suite, 2005). It is however not recognized as the substitute for either the educator or the learner, but a critical element responsible for supporting both teaching and learning. Management, educators, learners and all relevant stakeholders are required to 'buy-in' to the effect, advantages and challenges associated with embracing a particular technology. This fundamentally involves knowledge and education to effect changes and alignment to attitudes and objectives. In order for technology to be successfully integrated and subsequently implemented for productive and profitable outcomes; standards and procedures need to be embraced and adhered to, by all within the sphere of integration. From 'hands-on use of the technology,

curriculum-specific applications, and support' (Unified Education Technology Suite, 2005) to implementation, evaluation and redress; all will be vital components of the integration process. While educators and learners are subject to the limitations of the technology (either the software application or the equipment itself), the use of technology must remain under greater subjection to the dictates of sound pedagogical application within the teaching and learning environment.

Digital Mobile Devices

While South Africa pursues the sole digital technology of desktop computers for ICT access and integration in education, numerous other countries have turned to the integration of digital mobile devices as a feasible alternative to support and facilitate learning (Ally, 2009). According to Terry (as cited in Ally, 2009), there is an apprehension to adopt mobile devices based on the premise that there are numerous challenges that still need to be overcome. She cites the following challenges: screen size is too small to effectively accommodate delivery from a LMS, cost of both purchase and operation of the mobile device, the consequential impediment of short battery life, and the lack of a reliable infrastructure in terms of network and support. While vocalizing her preconceived limitations to the use of mobile devices for education, her subsequent personal experience with mobile devices and her submission to being substantively informed of the affordances of mobile devices for educational purposes has given her a new perspective to which she concedes that mobile devices can be used effectively in the provision of formal and informal learning. She further states that mobile devices have the capacity 'to support quality learning, anywhere/anytime', allowing it to achieve what distance education has long attempted to achieve. Terry's comments find resonance in the provisioning of social support (anywhere/anytime).

Could South Africa be experiencing a similar uncertainty, in that the integration of mobile devices into education is not being pursued because there are misconceptions and traditional beliefs that contribute to ill informed decision making. This ultimately continues to impede the progress towards participation in the global information community? In light of this, it will be most apt to provide a fundamental understanding of mobile learning, and

unassailable evidence of the affordances of mobile devices for education. With the change in social structures and activities, economic demands, and general technological advancements; human beings have been for the most part involuntarily ceded to the 'haves' or the 'have-nots' of ICT access. This has created an environment which places acute exigencies on the need for ICT supported learning interventions that an individual can personalize for their specific access and context (Ally, 2009). Such access and context certainly includes the personalized access to and provision of social support. There is a no-brainer solution option to deliver on such a necessity with the identification of largely accessible and ubiquitously used mobile devices.

The current surge in global penetration of mobile devices, their constant evolution, and the extensive use of it for operations and activities beyond mundane use, promotes them as the sole feasible technological alternative to meet the current demand. Mobile devices necessitate the provision of access to 'information and learning material from anywhere and at any time' (Ally, 2009). What Ally (2009) proposes is that learner locality and time constraints are not confined to the access of prescribed material, but 'additional and personalized' information and learning material. Ally (2009) intimates that mobile learning should be pursued as it allows easily accessible and existing technology to be used, which for the South African context, provides an added spin-off: that of reaching people in remote/rural locations.

Mobile Learning

While Traxler (2007) emphasizes the enormous potential that mobile learning holds, for and within, education, he is not ignorant of its limitations and challenges of implementation. According to Traxler (2007), there is no holistic theoretical conceptualization of mobile learning, and therefore no hard definition for it. He states that mobile learning is 'noisy', in that it is 'essentially personal, contextual and situated'. This positions it more in the category of informal learning than formal learning, and therefore increases reservations as to its effectiveness and sustainability if deployed on a large scale. The dilemma of deciding what devices to include as 'mobile devices' for mobile learning, further exacerbates the conundrum of finalizing a theoretical conceptualization of mobile

learning. The effectiveness and considerations in favor of mobile learning 'as a sustainable and reliable form of educational provision' are highly contested due to the absence and deficiencies of appropriate evaluative approaches (Traxler, 2007).

Traxler (2007) states that the rapid, comprehensive evolution of mobile devices and related technologies, and their application within education; cannot be evaluated using archaic and nonspecific evaluation criteria and methods. In the absence of a definition of mobile learning, his argument on this issue of evaluation remains unchallenged. The conception and implementation of evaluation is only possible when conceptualization of mobile learning in terms of pedagogy, learners experience and technology is established. Koole (2009) parks the above stated inadequacies of mobile learning and springs into the visionary benefits of mobile learning which include greater access to information, reduction in cognitive load, 'increased access to people and systems', and the ability to surmount the various socio-economic challenges specific to learning. In spite of the reservations stated above, Koole (2006) is of the opinion that the mobile learning process has to be formalized, and to include 'knowledge navigation and collaboration in learning' simultaneously eliminating 'pedagogical issues of information overload'. This would infer that the process of mobile learning is not centered on elements of technology alone, but prioritizes the pedagogic and content components of the learning process.

Mobile learning promotes and supports personalized learning by accommodating 'diversity, differences and individuality' through the manner in which 'learning is developed, delivered and supported' (Traxler, 2007). Mobile learning considers the context in which the individual operates, and personalizes learning delivery for anywhere and anytime accessibility. This type of learning also supports situated learning as it makes learning meaningful through 'context-specific and immediate' learning (Traxler, 2007). Due to the portability of mobile devices, mobile learning is accessible to the individual in his/her real world of activity, and can therefore lend itself to on the job learning. Traxler (2007) states further that mobile learning sustains authentic learning as the learner can use the mobile device to access information, as well as, collaborate on real life issues and problems. Especially in situations where the learner and his work and learning peers are

physically distanced; mobile learning allows the learner to transcend the barrier of distance by providing a valuable collaborative, instructive and search 'classroom'. The advantages discussed above are not purists' vision of mobile learning, but practical applications of mobile learning to current learning challenges experienced by learners. Time, space, work and resources are but a few of the 'social and economic contexts' within which a learner is pressurized to operate/learn, and mobile learning affords the learner the opportunity to engage learning within the confines and context that they find themselves (Traxler, 2007).

Of the combination: 'mobile' and 'learning', Ford (as cited in Ford & Leinonen, 2009) emphasizes the importance of the learning aspect above the technology aspect (mobile devices), as the technology is only the instrument of communication that has the capability of being mobile, and being used as such. Clark (1985) also stresses the need to contextualize the use of technology, and adds that 'learning is influenced more by the instructional strategy than by the type of medium used'. This places in perspective the caution that needs to be exercised when attempting to leverage the potential of mobile devices for educational purposes in an answer to the scarcity and lack of contemporary ICT technologies. The other extreme to embracing mobile devices in teaching and learning, is the prohibition of it in schools as its current use is regarded as disruptive to the learning process (Ford as cited in Ford & Leinonen, 2009). According to Ford (as cited in Ford & Leinonen, 2009), this can be overcome through the buy-in of 'values-based principles' by all stakeholders, where 'individual responsibility and accountability' is initiated and nurtured.

Mobile Learning Initiatives

United Kingdom

How mobile phones help learning in secondary schools

Hartnell-Young and Heym (2008) investigated the use of mobile phones in three secondary schools in the UK. While The Mobile Life Youth Report (Smith, Mahdavi, Carvalho, Fisher, Russell & Tippett, 2008) found that 91% of 12 year olds owned mobile phones, the school policies for each school concerning mobile phones were aligned to England's Children's Minister and the General Secretary of a teaching union's stance, that mobile

phones were not to be brought to school, and if brought, should not be seen or used. The objective of the research was to determine the use of mobile phones, a ubiquitously used technology, 'as naturally as using any other technology in school' (Hartnell-Young & Heym, 2008). Results of the research showed overwhelming support for its permanent yet gradual adoption and integration, for the following reasons:

Students' communication and collaboration with educators and each other increased dramatically. The use of varied functions of the mobile phone for diverse learning applications increased participation and overall interest. Whilst educators, management and parents were pleasantly surprised by the effect and advantages of mobile phones for learning, learners' perception of the use of mobile phones for learning increased from 12% to well over 42%. Learners integrated their mobile phones with other technology as and when the need arose.

There were however observed minor glitches or areas for concern. These varied from stolen mobile phones, reduced battery life, poor quality pictures and the potential for hacking due to blue tooth being left 'on'. The overall findings revealed that mobile phones have tremendous benefits to supporting learning, although there were still challenges with the following: 'usability and software issues, costs, school policies and culture, and student behavior' (Hartnell-Young & Heym, 2008).

South Africa

MobilED – An Accessible Mobile Learning Platform for Africa?

The MobilED project, a South African initiative was developed on Open Source Software and has been piloted with findings that are encouraging, and in favor of adopting mobile devices for teaching and learning. Basic mobile phones were used, although some learners had access to more advanced mobile devices. The pilots were conducted on shared as well as individually accessed mobile phones, with learners preferring the option of having and using their individual phones. With mobile penetration in South Africa estimated at 138% (BusinessTech, 2012), including a relatively high penetration in rural areas where provision of infrastructure for and access to contemporary ICT technologies is a serious challenge;

the MobilED 'pro' findings should be further investigated and more enthusiastic measures towards strategic development and implementation of mobile devices into education should be undertaken. The MobilED project researched the attitude and reaction of learners aged around twelve years to sixteen years, and the following findings have been revealed: There was a greater degree of cooperation, collaboration and spontaneous sharing of information via the mobile device. Enthusiasm levels were extremely high, and learners who had no previous encounter with mobile phones, rapidly gained skills sufficient to participate. Their use of the mobile devices was not confined to the directives of the particular program, but ventured to other topics and information searches. What was also interesting was that learners preferred learning in an English medium instructed environment. There was easy instant real time polling. 'Teacher and learners felt empowered and confident in using the phones as learning tools' (Ford & Botha, 2009). This suggests that the initial fears, perceived challenges, negative stereotyping and traditional views on the choice of technology for teaching and learning can be quickly and effectively transformed once experience and consequential results are examined.

Mobile Phones and Educator Support

Dr LOLS is a project that was launched to assist both educator and learners on their selection of life skills topics (UNESCO, 2012). Life Orientation and Life Skills (LOLS) is a subject within the South African schools' curriculum. Via the Dr LOLS website, a team of tutors communicated with educators and learners via their mobile phones. Both educators and learners were also able to respond and provide feedback. Activity conducted on the MXit platform yielded the following feedback:

Educators were able to overcome their technophobia, learners were enabled to provide input without any fear of intimidation and victimization, and educators confessed that the interaction via the mobile phones within the program enhanced their knowledge of the formulation and delivery of the LOLS curriculum.

To prevent a cursory investigation into the feasibility of integration of mobile phones into South African secondary schools, it has been decided to limit the research to a particular area within the teaching and learning cadre. This will promote focused investigation with

detailed findings that can be used not only to determine feasibility of integration within the teaching and learning area being scrutinized, but may provide valuable insight for further broader generalizations for integration of mobile phones within teaching and learning in secondary schools in South Africa. The area chosen within which the study is to be conducted is *the provision of learner social support in secondary schools via mobile phones*.

Learner Social Support

Peltzer (as cited in Peltzer, Kleintjes, Van Wyk, Thompson & Mashego, 2008) states that adolescence is a crucial period in the life of an individual, as it presents many challenges and choices which elicit specific, and sometimes unique reactions from the individuals. These responses and reactions of adolescents are directly related to the shaping of their lifestyles for adulthood. Peltzer (as cited in Peltzer, Kleintjes, Van Wyk, Thompson & Mashego, 2008) further states that 'stress, social support and psychopathology' have a marked influence on such reactions/responses, invariably impacting their current and future lifestyles. Strydom, Pretorius and Joubert (2012) confirm that the adolescence years of an individual have a tremendous bearing on the individual's 'development of a socially integrated self-concept', which undoubtedly affects current and future decision making. The process of recognition and development of self-worth which promotes and sustains confidence to collaborate and contribute meaningfully within society, gains its greatest momentum with its most significant results, during the adolescent years. This would suggest that secondary school learners, the majority of who fall within the adolescence banding, are experiencing these challenges and committing to significant lifetime decisions.

Research reveals that 'anger control problems, low self-esteem, perceived stress and unmet school goals' amongst South African secondary school students were strong indicators of learners at risk to suicide (Peltzer, Kleintjies, Van Wyk, Thompson & Mashego, 2008). Mhlongo and Peltzer (Mhlongo, 1999) found that 'acute social problems and academic failure' were reasons provided by youth who were hospitalized for suicide related behavior. Studies amongst senior secondary school leaners revealed that the greatest stress levels

encountered by learners was due to schoolwork, followed by stress over the uncertainty of the 'future or future plans' (Strydom, Pretorius & Joubert, 2012).

While the South African Department of Education together with provinces such as the Eastern Cape, have recognized the overwhelming effects of stress suffered by Matric pupils and have initiated contingencies (example: secured the assistance of Lifeline – 24 hour toll free service) to support learners; the interventions for the most part are coordinated and operated outside of the learners' familiar school setting (Gauteng Health Department, 2010). These interventions have been born out of narrow considerations for matric learners alone, and have neglected to identify and provide for the general adolescent population in secondary schools.

As previously intimated in the motivation for choosing the secondary school learner range for this study, the following reasons for presumed high stress levels amongst learners must be considered with keen initiatives to provide effective and efficient social support: Grade eight learners have to make the transition from primary to secondary school, many of whom will be challenged to develop new social structures. Grade nine learners are focused on academic achievement to secure the selection of subjects that they wish to study during the senior secondary phase. They are also pressured to demonstrate to their juniors (grade eight learners) that they have made the necessary adjustments to the secondary phase. Grade ten learners on the other hand are pressured to cope with the intensity of study within their chosen subjects. Grade eleven learners are anxious about the final year of secondary study to come, and are also plagued by the pressure to maintain higher grades on which to eventually write their matric exams. Off course, the matric pupils (grade 12 learners) have higher workloads to deal with, greater societal pressures to address, and future plans to work towards. Isaacs (SACAP, 2011) explains that every individual responds and reacts uniquely to an event or situation, with further stresses such as competitiveness, disappointing family, personality stand/face-offs with peers and educators, etc. adding to the barrage of stress factors that secondary school learners have to face.

Results from Strydom, Pretorius and Joubert (2012) research delineated the following order of strategies for coping with stress amongst learners: socializing with friends, taking substances (alcohol or drugs), using prescription medication. Peltzer, Kleintjies, Van Wyk, Thompson and Mashego (2008) conclude that secondary school learners view suicide as a 'viable option for coping with a crisis' as they are either 'blinded' to alternative solutions, or without critical resources such as social support. Whilst learners have their own take and practice on coping with stress, the South African Government including numerous, significant and specialist sources are unanimous in providing ubiquitous counsel to stress ravaged individuals and groups: seek support, but more especially, 'speak to someone'. Isaacs (Bizcommunity, 2011) encourages the learners to speak to someone, but redirects learners to rather consult with qualified counselors who he says are able to 'make a valuable and positive contribution'. Katz (Bizcommunity, 2011) however interjects and confirms that 'there is a huge need for skilled counselors and practioners across the economic spectrum in our dislocated and traumatized society'. Be this as it may, findings by Strydom, Pretorius and Joubert (Strydom, Pretorius & Joubert, 2012) reveal that 'learners preferred discussing problems with peers, rather than parents, educators or school psychologists, due to concerns about confidentiality or possible stigmatization'.

While Traxler (as cited in Traxler & Wishart, 2011) states that mobile learning sustains authentic learning as the learner can use the mobile device (mobile phone) to access information, as well as, collaborate on real life issues and problems; research conducted by AlSugair, Hopkins, FitsGerald and Brailsford (2012) in the UK concur with Traxler, and revealed that 85.5% of school-aged children owned mobile phones, and used it extensively for socializing with peers. According to Vygotsky (Vygotsky as cited in AlSugair, Hopkins, FitzGerald & Brailsford, 2012) a child's development of 'superior understanding and creative thinking' is benefited and encouraged through peer interaction. Gall (1986) provides supporting evidence to the aforementioned, with an additional developmental consideration, stating that 'an important skill for a child to develop is the ability to seek and acquire help from peers and adults'. Gall and Gumerman (1984) further discovered that learners acquired social support from their peers, and derived academic support from their educators. It was found that children lean more on peer support than adult support as

they grow older. Ryan, Pintrich and Midgley (2001) found that the more competent a learner felt, he/she was more inclined to seek social and academic support.

Interviews conducted by AlSugair, Hopkins, FitsGerald and Brailsford (2012) brought the following to light: learners seek external support when faced with challenges, learners preferred one-on-one communication when receiving support, learners desired to choose their own potential support provider, learners' decision to seek support was largely influenced by the availability of the one providing the support, learners' choice of support was influence by the expertise of the one providing the support. Having obtained these findings, it was decided to establish a support system using the most ubiquitous technology available: that being mobile phones. While this study is currently underway, attention can be focused on an already tested and tried mobile phone support system initiative that has been most successful.

Reconstructed Living Lab (RLabs) (Parker, Wills & Wills, 2010) is a South African Social Enterprise initiative that collaborates with other international non-profit organizations to use mobile phones to successfully provide social support and advice services via mobile phones through MIM. MIM is used as it is very cheap, making the services rendered accessible to all. The support and advice service covers the area of substance abuse, and supports both the 'addict' and the families of 'addicts'. The main feature of this service is its ability to satisfy the need for instant, anytime, anonymous support and advice. The mobile phone as the adopted technology for this initiative provides the necessary affordances for the service criterion. 'RLabs offers one of the most successful ways of helping families with an immediate drug related problem' (Parker et al., 2010). Although this initiative is not specific to the school setup, it does however provide sufficient light on the affordance of providing social support via mobile phones, and intimates that if this technology can be used at a macro level, there is a strong probability of it being successfully utilized within the micro environment; that being the secondary school.

Life Orientation as a subject within the National curriculum has been touted to answer the call of 'learner social support'. The Western Cape Education Department (2003) provides the following definition and purpose of Life Orientation as a subject:

Definition

'Life Orientation is the study of self in relation to others and to society. It applies a holistic approach. It is concerned with the personal, social, intellectual, emotional, spiritual, motor and physical growth and development of the learners, and the way which these dimensions are interrelated and expressed in life. This subject addresses knowledge, values, attitudes and skills about the self, the environment, responsible citizenship, a healthy and productive life, social engagement, recreation and physical activity, and career choices.' (Department of Education, 2003).

Purpose

'Life Orientation equips learners to engage on personal, psychological, neuro-cognitive, motor, moral spiritual, cultural socio-economic and constitutional levels to respond to the demands of the world to assume responsibilities, and to make the most of life's opportunities. Life Orientation promotes knowledge, skills values and attitudes that prepare learners to respond to the challenges that confront them as well as the challenges they will have to deal with as adults, and to play a meaningful role in society and the economy.' (Department of Education, 2003).

The above background to the development and implementation of Life Orientation, reveals two significant flaws that hinder it from effectively answering the call for the provision of learner social support: firstly, all the literature reviewed during this study on the subject of learner social support unanimously agree that learners prefer one on one provision of social support, and that it must be provided by one who the learner himself/herself chooses. Secondly, life orientation as a subject has more of an academic agenda, than a pure learner social support affordance. This implies that the Life Orientation subject essentially does not answer the call for the provision of 'learner social support'.

If the needed service for support and advice is characterized by 'instant, anytime, anonymous' provision (Parker, Wills & Wills, 2010), digital mobile devices answers the service call. When learners experience bullying, harassment, exclusion or victimization by learners/peers or educators/staff, or when learners have pressing issues of a personal nature, that requires 'instant, anytime, anonymous' social support assistance, digital mobile

devices are most sufficient for facilitating such a service. The question many would ask is why do digital mobile devices have to be used during official school hours when learners have access to face-to-face consultation with peers, educators and staff? Cognizance must be taken of the implicit influences that impact the desire for or decision to reach out for social support. In the case of bullying, harassment, exclusion or victimization, the learner certainly does not want to be labelled a 'snitch or softy', and most certainly does not want to intensify the maltreatment if it is discovered that he/she has sort social support (or reported). In instances of a personal nature, just being observed consulting with a peer or educator/staff (particularly if the conversation is overheard), may create suspicion, and may further complicate the learners' circumstances. In all of this, it must be recognized that 'instant, anytime, anonymous' provision of social support within formal school hours (for the most part), most certainly cannot be achieved. It is for this reason that digital mobile devices are recommended to assist in facilitating 'instant, anytime, anonymous' provision of social support. Note is taken that various logistics need to be investigated, fine-tuned or circumvented (eg. managing anonymity considering that mobile numbers appear on the receivers' mobile handset; the prevention of abuse of use particularly when learners are under 'active' academic instruction (eg. in a classroom); interruptions that may be experienced by both educators and learners during the process of such social support solicitation).

In light of the current decrepit state of ICT integration in education in South Africa and the traditional stance on implementing a comprehensive and well-intended ICT policy; no immediate solution to the dilemma can be forecast, with the government's hankering after a widely inaccessible and costly ICT device. The answer may yet lie with a ubiquitous and contextual ICT device; that being the mobile phone. Whilst there have been fragmented and isolated attempts at using mobile phones as satisfactorily as other technology within the school, there is however still an insubstantial amount of information on which to unequivocally confirm that mobile phones can be adopted and effectively used in secondary schools, particularly in the area of social support. The results of research and studies discussed above provide generic yet cloistered findings, which most certainly cannot be used to conclusively answer the research question and provide a satisfactory response to the demands of this research topic. It is therefore imperative that the intended

research be undertaken and its findings presented to either support or negate the suggestions and findings detailed within the above review of relevant literature.

Chapter Three: Research Methodology

Research Method

While it has been established from the afore discussed literature that there exists an acute lack of government foresight to pursue alternative devices for ICT access and integration in education, it needs to be conclusively corroborated whether the access, advantages and effectiveness of digital mobile devices for integration in education, as accented in the literature, can be feasibly adopted in secondary education in South Africa. The following research methodology was embraced to support and authenticate the investigation:

A research problem was formulated, and it was decided that an empirical qualitative research study be undertaken to facilitate the findings for a normative knowledge claim (Chalmers, 1988). The qualitative research method was utilized as it is the intention to measure variables and quantify attitudes and behaviors, using data that is found outside of texts. Educators' and learners' perceptions and experiences were analyzed and interpreted. This data was used to provide statistical and descriptive insight to relationships that are pertinent to the decision making process of the study.

This inductive method allowed meaning to be constructed from 'specific observations' (data collected), and thus subsequently allowed the researcher to use this 'measurable data' to make 'generalizations' (judgment) on facts and patterns (Creswell, 2013). While only a few classes in the secondary phase, within a few schools were surveyed, it is hoped that the research findings will be substantively conclusive to warrant its generalization for secondary education nationally. A qualitative phenomenological approach was employed to expose the 'experiences and perceptions' of the research participants, simultaneously allowing 'it to inform, support or challenge policy and action' (Lester, 1999). According to Galt (2009), when the qualitative approach is used, 'interpretations of the data' leads the researcher to 'create(s) an agenda for change or reform'; meaning that the conclusion of the research should hold a proposition for or against ICT integration of digital mobile devices in secondary education. The nature of this research method leaves room for the narrative conclusion to be influenced by the element of 'researcher subjectivity' (MacKellar, 2012).

Data Collection

The choice of research question defines the objective to be achieved, and therefore ultimately determines the 'sampling method for informant selection' (Tongco, 2007). It was decided that purposive sampling, 'a type of non-probability sampling' be employed during the data collection process (Dissertation.laerd.com, 2013). Non-probability sampling encompasses various sampling techniques that do not subscribe to random selection of samples, but that enable the researcher to narrow the subject of study to a particular unit or population. Purposive sampling expresses the predisposition of the researcher to select a sample that answers the researcher's purpose and ultimately the research question (Palys, 2013). The type of purposive sampling used was homogenous sampling, as it directed the researcher to the choice of sample that has 'specific characteristics within the particular group of interest', and which lends itself to detailed examination of the sample (Dissertation.laerd.com, 2013). This being decided, the sample for this research was restricted to learners and educators within secondary schools for the following reasons (as previously stated in the literature review):

Grade eight learners have to make the transition from primary to secondary school, many of whom will be challenged to develop new social structures, while dealing with academic adjustments. Grade nine learners are focused on academic achievement to secure the selection of subjects that they wish to study during the senior secondary phase. They are also pressured to demonstrate to their juniors (grade eight learners) that they have made the necessary adjustments to the secondary phase. Grade ten learners on the other hand are pressured to cope with the intensity of study within their chosen subjects. Grade eleven learners are anxious about the final year of secondary study to come, and are also plagued by the pressure to maintain higher grades on which to eventually write their matric exams. Of course, the matric pupils (grade twelve learners)have higher workloads to deal with, greater societal pressures to address, and future plans to work towards. The above stated reasons for presumed high stress levels amongst learners, exacerbated by challenges bearing down on them from home, community, and personal physical and emotional maturation transformations, are adequate cause to warrant the provision of effective and efficient social support. Educators were surveyed as they currently provide learner social

support, or recognize the need for it. The educators' association with the learners allows the educator to be privy to learner personal and community challenges, which further informed the researcher of the feasibility of the use of mobile phones for learner social support.

While the research focused on a particular area of mobile phone integration, there was an expectation to conclude this study with a generalization on the feasibility of integration of mobile phones in secondary schools for other teaching and learning areas.

The research question was then formulated, followed by the development of the research survey instrument which was questionnaires. These were designed to solicit responses from the participants, and these responses were statistically arranged and interpreted to answer the research question. The questionnaire was chosen as a data collecting instrument as it was inexpensive for administration to a large number of participants where representation across a varied demographic group, was achieved within a relatively short period of time. The participants were able to complete the questionnaire comfortably within thirty minutes. While there were a total of ten classes per school that needed to be surveyed, including educators; many of the classes were surveyed simultaneously with the cooperation and assistance from educators (class/subject educators). Educators were requested to complete the questionnaire at their convenience during the stipulated data collection day.

Warwick and Linninger (1975) state that there are two important elements that need to be honed onto when designing a questionnaire: the questionnaire must yield information relevant and adequate to the survey for analysis and interpretation; and the design and content of the questions must not leave room for ambiguity. The aforesaid together with the manner in which the questionnaires were administered contributed to the validity and credibility of the information/data gathered. Open-ended questions were therefore customized to ensure that substantial research relevant data was gathered, thus bolstering the data analysis and interpretation process where patterns and trends were explored. One questionnaire for educators and one for learners was administered to each group, with no variation in each questionnaire for the entire research data collection period. Every effort

was made to ensure that the variance in the environment was kept to a minimal which further preserved and supported the credibility and validity of the data.

Participants

Two government schools were identified, both falling within the provincial boundaries of Gauteng. Government schools were selected as they represent the provision of education to the majority of learners in the country. They were also selected as there is a healthy mix of learners based on their economic standing, relating to their capacity to acquire digital mobile devices and its related resources. Including private schools will bias the findings as most private schools already use digital mobile devices extensively for the provision of a variety of 'services' to learners. Further, most private schools already mandate the acquisition of the latest digital mobile devices by leaners. The two schools within different localities (rural [School 1] and urban [School 2]) were selected, as the researcher presupposed that the circumstances of engagement with social support will be markedly different, due to the advantages and disadvantages disparately experienced by both groups of students within their environment. The rural students lacked significant basic resources (food, finances, transport, etc.), as evidenced by the significant rise in school attendance since the school's provision of meals to students each day. This infers that students may not have the luxury of owning/possessing a digital mobile devices and its related resources (airtime, data, etc.). This would also affect the type of digital mobile device that was procured (grade of cell phone or smart phone). Students from rural settings are more likely to enjoy the benefits of social support from extended family, which is characteristic of rural communities, which may affect students' pursuance of external social support (educators and peers face to face or via mobile devices). Due to the increased availability of employment in urban areas as compared with rural areas, urban families enjoy more dispensable income, which accounts for students being often in possession of more than one mobile phone of latest technology (cell phones or smart phones), and with all the related resources (airtime, data, etc.). Students in urban areas also endure the absence of extended family support due to the hectic urban life, and fractured family relationships (single parent homes, living away from home/family, capitalistic enforced self-prioritization). This would infer that students from urban areas would be more apt to reach out for social support (educators and peers face to face or via mobile devices).

The above stated differences experienced by students from two different locales will bear significantly upon the data, its interpretation, and the forthcoming resultant recommendations for the ubiquitous use of mobile devices for the provision of social support to students, as well as, the students' need to reach out to educators and peers for social support. The type of mobile device may also quash the desire for soliciting social support via mobile devices, as cell phones can be used for talk and text, whilst smart phones can be used for face timing which appears more personal and 'real' (equivalent to in-person face to face). The affordability of mobile devices and their payment for services (prepaid or contract) also lends itself to the certain benefits (free minutes talk and texts, free MB/GB of data). This will impact the use of mobile devices for the acquisition of social support.

The questionnaires (Annexure A & J) was administered to educators and learners respectively, of the two schools. Whilst it was envisaged that many (if not all) educators within the two schools will be surveyed, only two classes of learners per grade (grades 8 to 12) per school were surveyed. Every pupil within each class selected was invited to participate. The selection of classes per grade to be surveyed was done on a random basis so as to prevent any bias. This however excluded input from learners in un-surveyed classes who may have a greater need/desire for social support than their surveyed colleagues; and was therefore given due cognizance during the research 'analysis of research findings' and the 'conclusion' stages. The questionnaires required participants to provide demographic details such as socio-economic banding, age within a range, subjects and grades currently being taught (educators), current school grade and subjects (learner) and locality of residence. It also required users to provide general factual and subjective information related to their perceptions; and experience with and exposure to ICTs, particularly digital mobile devices and personal internet access. Learners were finally required to answer questions related to the area of social support for learners via the use of digital mobile devices, as this had a direct bearing on the resultant outcome of this research.

Anticipated limitations/constraints

Administrators of schools may not consent to educators and learners in their schools participating in the survey as they may fear that the data or findings may be directly

associated with their school and made public, thus prejudicing the school by bringing undue negative attention and enquiry. The administrators were briefed on the objective of the research and the strict confidentiality and discretion that would be exercised with both the raw data and the findings; and the voluntary nature of participation by the school, educators and learners was stated upfront.

Educators and learners may refrain from participating or may provide false information for fear of being prejudiced or victimized in their professional or scholastic performance or achievement. In order to ally these fears, they were advised that their contributions would receive complete confidentiality and anonymity, and that no one except the researcher would have access to the questionnaires and their responses.

Due to the nature of the research (soliciting personal responses from learners), parents may also refrain from providing consent for their child's/children's participation in the research, for fear of possible exposure of parental and family factors contributing to learner stress. Parents were briefed via the information sheet provided, that information provided by their children (learners) would not be divulged to any third party, nor be used to instigate any form of formal or informal investigation into any allegations.

Learners may be further apprehensive in expressing their desires if they do not have a personal mobile device, or if they are sharing one. This again refers to the issue of confidentiality for the learner. Learners' fears were assuaged by explaining to the learners that every identified breach in confidentiality would be circumvented, and workable strategies would be adopted.

Not all classes in each secondary school can be surveyed due to time constraints and prevention of disruption to the school program, therefore only two classes in each grade were surveyed.

The researcher's biasness, prejudices and stereotyping may also have a negative influence on the objectiveness of the interpretation of the data, and may therefore affect the findings and recommendations derived from the research. This was minimized by the researcher soliciting 'a variety of independent opinions on the interpretation of various pieces of textual data' (MacKellar, 2012).

Data Analysis

'Data Analysis is the process of systematically applying statistical and/or logical techniques to describe and evaluate data' (Northern Illinois University, 2012). This aspect of data management preceded the data interpretation phase in the research, and followed the data coding phase.

The users responses (answers to questions in the administered questionnaire) were data captured onto excel spreadsheets; the first two containing data from each school separately, so as to make a comparative study of the responses of participants from both schools. The data at this point was also captured per grade, as well as, having data of learners and educators distinctly separate. The third and fourth spreadsheets contained data from each school respectively with the data from each grade now combined and captured as a whole. The fifth excel spreadsheet had combined data from both schools captured as a whole. At each stage, the data was categorized and coded to ensure a successful data validation process, which significantly aided more comprehensive and forensic analysis of the data.

Subsequent to the analysis of the data, a descriptive analysis was provided where a description of the data, once thematically coded, was provided without venturing further to interpret the coded data. This description is a face-value summary of the data at hand. This descriptive analysis was followed by inferential statistics which analyzed the data to find conclusions which had a greater significance to the research study than the descriptive statics. The research question and sub-questions featured prominently in inferential statistics, as they addressed the research objective. Inferences, presuppositions and judgments were here conceived and crafted. (Trochim, 2003).

For all of the above to occur, data coding into themes needs to be designed and affected. Data preparation entails 'checking the data for accuracy' (Trochim, 2006), data capturing on computer and 'cleaning or editing data' which is the removal of or disregard for certain collected data. Exceptional care must be taken to edit the survey data so that the results are not altered to reflect one's bias. This suggests careful processing of the raw data, constantly referring to the research objectives.

Data coding is the systematized arrangement of 'extensive data sets into smaller analyzable units through the creation of categories (and themes) and concepts derived from the data' (True, Cendejas, Appiah, Guy & Pacas, 2012). Data coding ensures that the raw data

evolves progressively into an expressive structure that can be deliberately rearranged for the facilitation of analysis and interpretation. In this study, the data was coded along Hahn's (Hahn, 2008) recommended coding format:

Level 1 Coding – Open Coding: data is focused and labeled

Level 2 Coding – Category Development: further focusing of data

Level 3 Coding - Thematic development: previous coding is studied to develop highly refined themes

Data once coded was presented in graphs and tables for ease of reference, description, retrieval and interpretation. The codes for analyzing of data for this research and the instrument for validating the data was determined once the questionnaires had been completed and collected, as the number of completed questionnaires impacted the use/choice of particular data validating instruments.

Ethical Considerations

The following ethical considerations were determined and implemented:

The GDE form (Gauteng Department of Education research request - Annexure G) was completed by the researcher, to request permission from the Gauteng Department of Education, to conduct research in the identified schools and with the identified participants. The administrators of each of the two schools were briefed in-person on the details of the research project, and were provided with letters (Annexure E & F) and institution consent forms (Annexure C & H), requesting their participation in the research. All participants (schools, educators and learners) were forthrightly advised of the researcher and what was hoped to be achieved through the research through the dissemination of a participation information sheet (Annexure B). Learners were provided with a learner consent form (Annexure D), requesting permission from parents/wards for their child's/ward's participation in the research. They were informed that their participation would hold no direct benefit for them, and that participation in the research survey was voluntary. They were also informed that their desistance or withdrawal at any given point was acceptable, and would not bear any prejudicial consequences to either institute or individuals.

There were no foreseeable risks in participating in this study. The participants were not paid for this study. The names of the research participants and identity of the school will

be kept confidential at all times and in all academic writing about the study. Individual privacy will be maintained in all published and written data resulting from the study. All research data will be destroyed between three to five years after completion of the project.

Due to the sensitive nature of the information required from the learners, parental consent was vital, so as not to jeopardize the research, nor open the doors to legal repercussions. Parents were briefed via the consent form on the reason and nature of the research. The participants (educators and learners) were briefed on the research and the value of their participation to the success of the research. They were provided with an information sheet, and were informed that their participation was voluntary, and that their participation or non-participation would not prejudice them in any way. They were also advised that they may withdraw from participation at any point during the administration of the questionnaire. The guarantee of confidentiality and anonymity was discussed. Those that choose to be participants (educators) were provided with consent forms, which was further explained, before they signed. Both educators and learners were encouraged to answer all questions, yet informed that they did not need to answer questions that they were uncomfortable with providing an answer for.

Only the researcher and his supervisor were privy to the raw data. No names on questionnaires were required, but a number which corresponds to the educators and learners details on the consent forms was given to each participant. The participating schools were also reassured that confidentiality would be enhanced through the use of pseudonyms when referring to the data from participating schools (School 1 and School 2). During the data analysis process, no reference was made to the names of the participants. Neither the name nor number of the participants was reflected in the final report (the number was however used to reference the educators' and leaners' details). All questionnaires are being kept in safe storage, under lock and key, and will be destroyed after three to five years.

Validity and Credibility

'Validity is an integrated evaluative judgment' (Messick, 1990) which determines the extent to which a test measures what it claims to measure', as well as, the accuracy of how the data collected is applied and interpreted to demonstrate the relationship between the test and the behavioral reality being tested. This suggests that validity is a crucial standard by which compilation of the instrument needs to conform to, in order to produce research related and research relevant data; which must be analyzed and interpreted without a bias or insubstantial approach. Content validity refers to the measurement of the various facets of the subject being researched (Key, 1997) and is the approach employed in the formulation of the questionnaire, as it contains questions that elicit demographic and subjective responses which provide insight to the feasibility of integrating digital mobile devices in secondary education. External validity embraces the proposition to approximate truth thus crafting generalizations (Trochim, 2006). By choosing schools that were representative in terms of locality and socioeconomic standing, the research lent itself to external validity. Further to the aforementioned, validity of the research findings was also secured through the following ways: The researcher had no pre-existing bias with regards to the participants or about the topic being researched. The learners and educators were aware that they were being studied, and were briefed on the voluntary, confidentiality and anonymity of their survey participation and their responses in the questionnaire. All participants were encouraged to participate and answer the questionnaire truthfully, and were informed that the study and its results would have no direct benefit to them.

Having explored every provision to ensure the validity of the test instrument and the data thereby gathered, it was imperative to secure credibility, also known as internal validity (Navarro, 2007). Credibility often relates to the consistency of the test results when the test is applied to varying scenarios. It must however be noted that should such test results yield inconsistencies which are disclosed, credibility is not necessarily weakened. (Patton, 1999). The questionnaire was the independent variable, while the responses of participants were the dependent variable. The internal validity is said to be valid if the questionnaire (independent variable) elicits the identical response (dependent variable) when administered to the same participants repeatedly. The same questionnaire was administered to all 'like' participants under identical environmental conditions. Credibility may have

been negligibly compromised by the participant's attitude towards the school's policy in terms of possessing or using a mobile device on the school premises.

Chapter Four: Presentation and analysis of findings

Techniques used to analyse the data

Suitable data entry templates were created in SPSS Statistics Version 21, which is a predictive analytics software' (IBM, 2013). Once this was completed, all data was then entered into the templates as two separate data files. After entry of the data, intensive data cleaning was instituted to ensure that the quality of the data used for analysis was superior, as the quality of data directly influences the analysis and therefore the findings within the study. The various statistical tools used, and charts created, during data analysis included frequency distribution tables, cross-tabulation of categorical variables, and clustered bar charts. Where data analysis was performed separately for each school/grade/gender, the "*split*" function in SPSS was used.

Data analysis approach

At the outset, I the researcher am fully aware of the causal mechanisms that will have significant impact on the possibilities of this study. Mahoney (2003) defines causal mechanisms as the 'independent variable that exerts an effect on a dependent variable', which then generates an outcome (cause and effect). The independent variable itself does not however need to be explained, but to be identified as a hypothetical influence of the outcome. These causal mechanisms may take the form of 'unobserved entities, processes, or structures'. Mahoney states that there are three main causal mechanisms: 'the functional needs of social systems; the rationality of individuals; and the power of collective actors'. These causal mechanisms are responsible for the 'empirical regularities that are to be explained' (Mahoney, 2003). This said, I propose that the elements of this study, that will be analyzed to determine the feasibility of integrating digital mobile devices into secondary education in South Africa, particularly in the area of learner social support, are the outcomes of multiple causal mechanisms; and will therefore be treated circumspectly. Whilst it has been postulated in my argument that there has been neglect by the South African Government to seek alternate ICT devices to nurture and grow the field within education, it cannot be hypothesized that neglect alone on the part of the government has led to the current ICT in education 'hostage' debacle.

Having surveyed two schools, one rural and one urban; I as the researcher am alert to the possibility that uniquely varying causal mechanisms have modeled (directly or indirectly) the two sets of data. While this offers a further challenge when analyzing the data, it will lend itself to greater authenticity to the findings of this study.

The identification of barriers to ICT integration in South African schools by the South African Department of Education, their approach towards overcoming these barriers and remedying the current situation, coupled with the poor results reflected in ICT integration audits; awakens suspicions that the barriers identified may be overly blamed for ICT non-integration. Such suspicion is extended to the probability that current identified barriers are recognized as such due to the neglect in identifying and incorporating suitable and ubiquitous alternatives. The prospect of underlying attitudes impacting ICT integration may also exist.

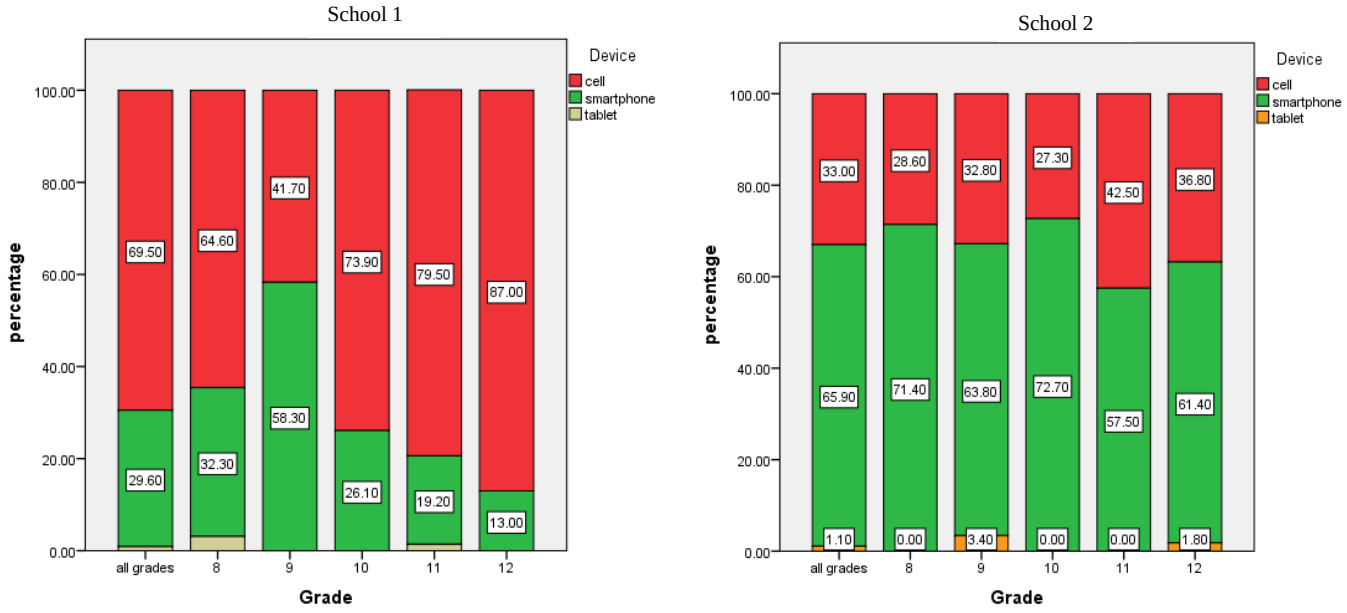
Referring to the quote in the introduction of this study: *'South Africa does not yet provide universal access of ICT in education to its students with more than half (62%) of the schools not having access to (desktop) computers'* (Howie & Blignaut, 2009); I decided to investigate the validity of this notion. What was discovered in both schools was that there was a computer lab in each school which housed an average of 25 desktop computers. Learners had access to these computers only when educators decided to integrate ICT into their subject area, or particular topic; and only during supervised sessions. Priority of use was afforded learners who had chosen ICT studies as part of their syllabus. Basic computer lessons were afforded to grades eight and nine, but these were structured to teach learners how to operate the computer, rather than how to integrate it in their studies. It must be added that the computers were also technologically outdated and did not possess the latest software. School 1 had a learner population of approximately 737 learners; and School 2 had a learner population of approximately 1035 learners. The ratio of computers to learners per school (School 1 – [737 Learners: 24 Desktop Computers] 31:1; School 2 – [1035 Learners : 27 Desktop Computers] 38:1) indicates that the notion purported by (Howie & Blignaut, 2009), is valid, in that *South Africa does not yet provide universal access of ICT*

in education to its students with more than half (62%) of the schools not having access to (desktop) computers'.

Having satisfactorily validated the above, it was necessary to explore the validity of the statement made by the then minister of education, Ms Neledi Pandor in the South African White Paper on e-Education (2004): *there still existed a digital divide in education in terms of access to ICTs. The document further elaborated that the 'access to ICTs' was really the 'access to desktop computers', and how the South African government, who are the custodians of education, were being acutely challenged to provide access to ICTs (desktop computers) to schools.*

Learners

Figure 1: The graphs below indicate the percentage of learners per grade in terms of the specific mobile devices in their possession

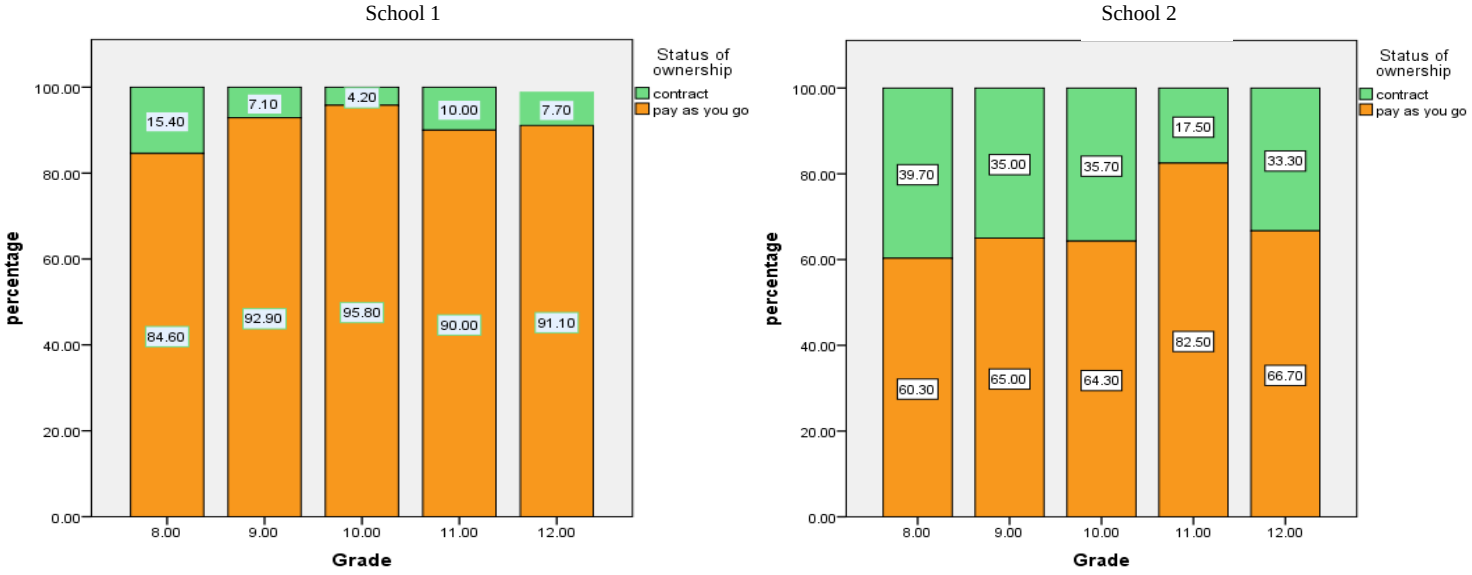


In both schools, an overwhelming majority of students were in possession of mobile digital devices. There was however a notable difference in the percentage of possession of particular devices between both the schools. While School 1 learners were in possession of a higher percentage of cellphones over smartphones and tablets, School 2 learners were in possession of a higher percentage of smartphones and tablets. A possible reason for this would be economics (affordability), as School 1 learners come from a low socio-economic

environment, whilst learners from School 2 are advantaged by their affluent environment. What must also be observed is the uniformity in ownership of digital mobile devices across the spectrum of learner grades, which implies that digital mobile devices are indeed ubiquitously subscribed to devices.

Due cognizance must be given to the possibility that not all learners are in possession of mobile phones, and that their neglect to indicate this is due to fear of peer ridicule (social acceptance is paramount for secondary school learners). Having said that; such high numbers of learners in possession of mobile phones confirms Kozma's (Kozma, 2008) findings that the extent of accessibility and engagement with ICTs is indicative of the significant role that ICTs play in the lives of people; in this case, South Africans.

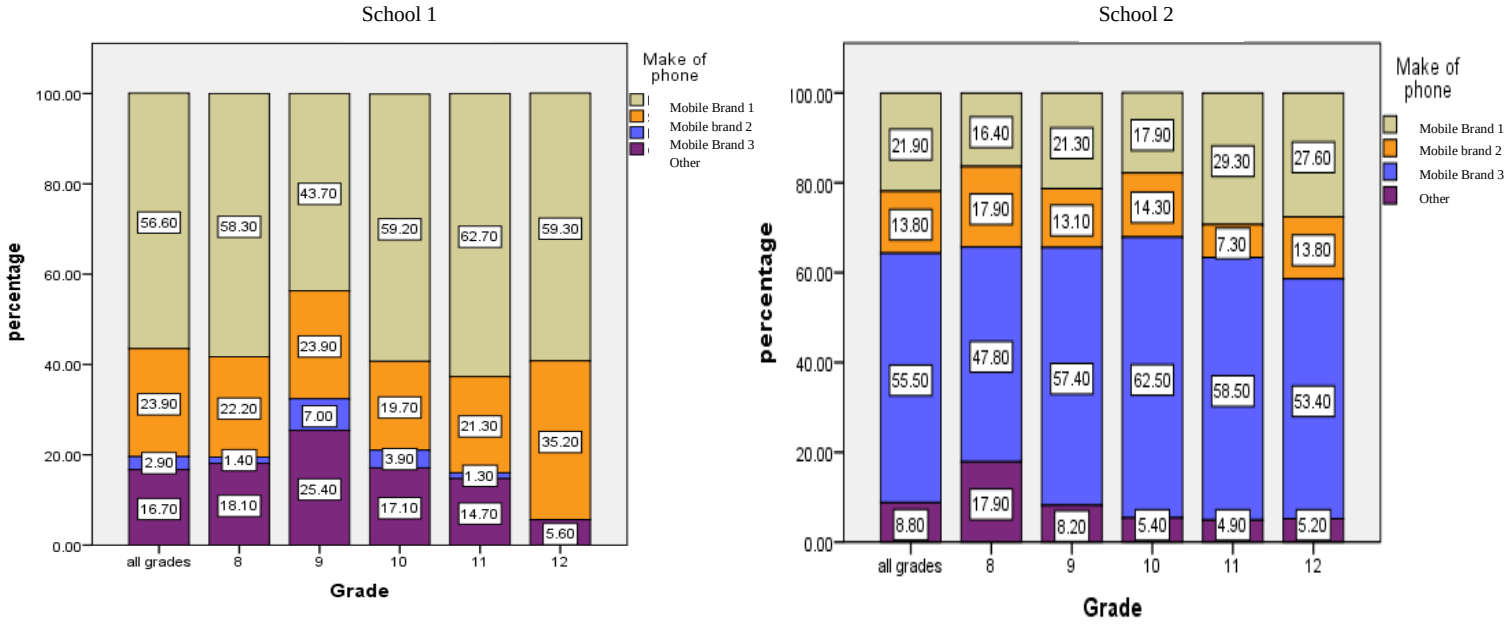
Figure 2: The graphs below indicate the percentage of learners per grade in terms of their specific status of ownership of their mobile device



Due to the lack of resources to guarantee contract payment on a mobile digital device, a large percentage of learners from School 1 have opted for once-off payment of the device and to subscribe to the 'pay as you go' option. It must also be borne in mind that many of these devices owned by the School 1 learners may have been acquired as 'used or second hand units' due to their affordability. It may be that most learners have opted for the cash option for cell phones, while a few (with affordability) have opted for the contract option to acquire smartphones and tablets. School 2 learners on the other hand appear to have the economic means to sustain the payment of contracts for mobile digital devices, but who

still have the affordability to purchase devices cash. Whilst Howie and Blignaut (Howie & Blignaut, 2009) state that the state is challenged by financial constraints that limits ICT implementation in education, learners have transcended the challenges of finance to ensure possession of a mobile phone. Many may have purchased these mobile devices brand new via various credit facilities. The availability of mobile devices amongst learners begs a reassessment of the state's reasoning for poor ICT in education roll out and integration.

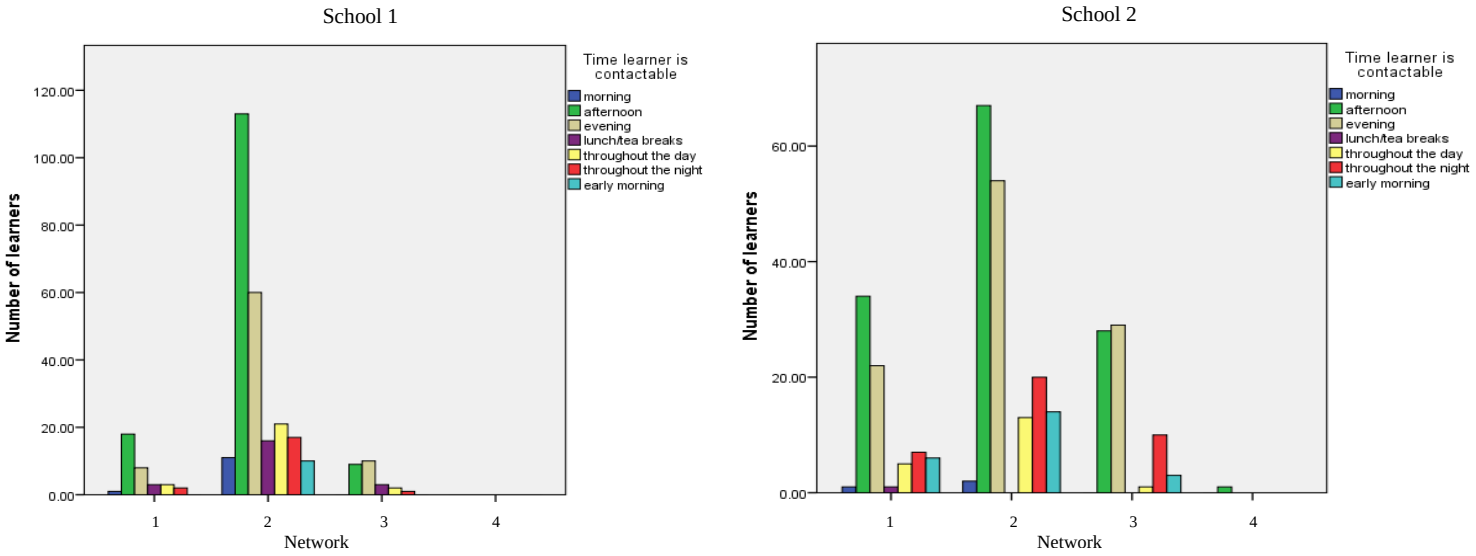
Figure 3: The graphs below indicate the percentage of learners per grade in terms of the make of mobile device they have in their possession



The data reveals that certain brands of mobile devices are more widely used or owned by students in each respective school (Mobile Brand 1 and Mobile Brand 2). Economics could very well be an influential factor for this phenomenon. Mobile Brand 1is generally priced lower than Mobile Brand 2, and therefore the higher percentage of Mobile Brand 1 ownership amongst School 1 learners, while School 2 learners enjoy a higher percentage of Mobile Brand 2 ownership. What can also be deduced by the respective preferences is that affordability of device outweighs advantages of the device. With Mobile Brand 2, text from Mobile Brand 2 to Mobile Brand 2 phones are free; not so with Mobile Brand 1, yet the School 1 learners opted for the cheaper phone which does not have the advantages of free SMSs (Although it must be added that it has been said that Mobile Brand 1 phones are

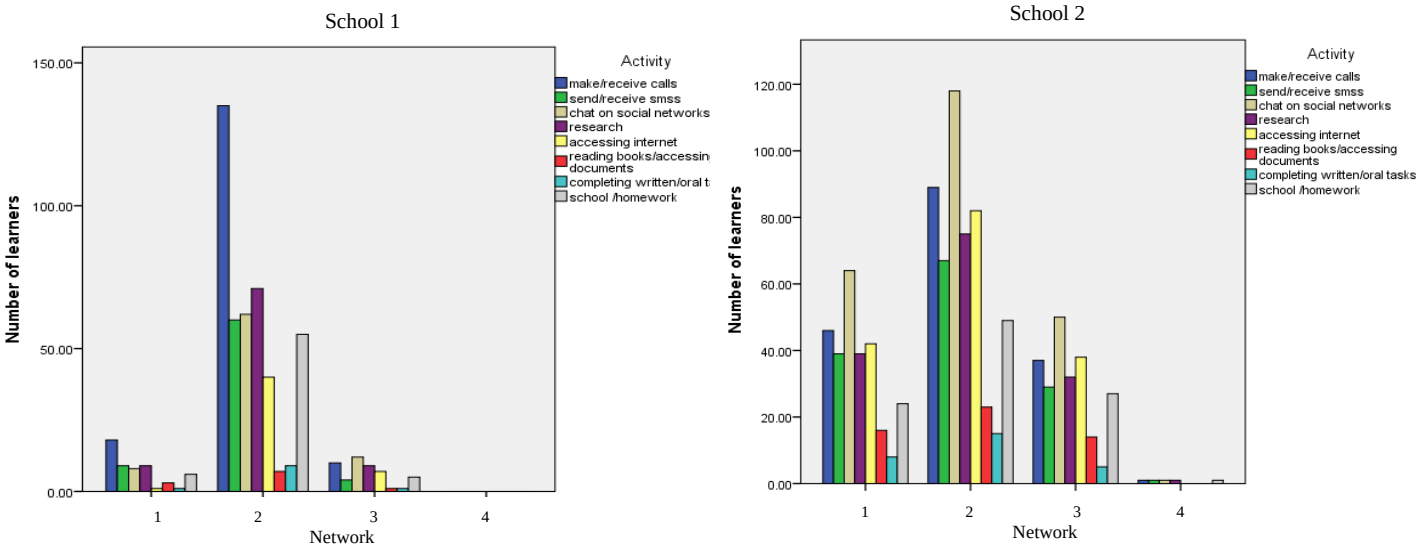
easier to navigate through than Mobile Brand 2 ones. Here again, this could be a matter of individual or group preference).

Figure 4: The graphs below indicate the number of learners per subscribed network in terms of the periods during the day when they are contactable via their mobile device



The period of use (or availability) of the device by the learner is critical when considering the argument of accessibility and use. At both schools, learners are prohibited from using their digital mobile devices. The trend of usage can therefore be explained by this prohibition, as learners in both schools indicated exponential use of devices in the afternoon and evening, outside of school hours. Their choice of service provider (network) indicates that quality and reliability of connectivity is important to learners, particularly if they are communicating on critical academic and/or social support issues. Since Mobile Network 2 was pronounced by ICASA (Independent Communications Authority of South Africa, 2013/2014) to be a leader in the following areas: Average Call Setup Success Rate (highest) and Average Drop-Call Rate (lowest) for the vicinity within which both High Schools lie; it becomes obvious why Mobile Network 2 is the most used/chosen network. From this it becomes evident the learners' need to have uninterrupted network access so that their 'limited' cell usage period is not further reduced. Poor network access may impact their ability to engage in academic activities, and receive or provide learner social support.

Figure 5: The graphs below indicate the number of learners per subscribed network in terms of the activities they are engaged in on their mobile devices



Learner activities conducted on digital mobile devices would certainly have a direct bearing on the ability to achieve learner buy-in on the use of digital mobile devices for educational purposes. Making and receiving calls dominates the School 1 learners' activities with digital mobile devices. Due to the insufficiency of resources (libraries, etc.) in rural locales, learners at School 1 would be forced to use their devices extensively for research and completion of schoolwork/homework. What is noticeable is a similar trend with School 2 learners who use their digital mobile devices for research and schoolwork/homework. This trend would suggest that learners circumvent the tedious and time-consuming attempt to visit libraries, by accessing information via their digital mobile devices.

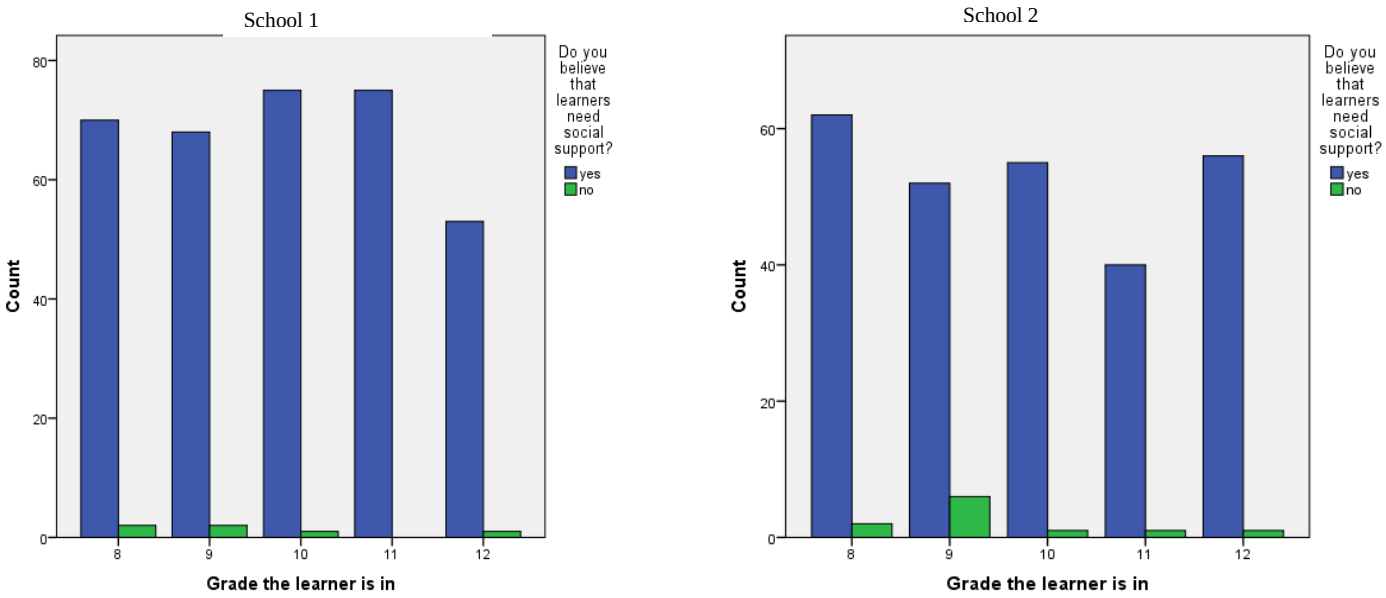
Once again, it can be established that Network 2 is preferred by most learners in both schools (previously observed in Figure 4), and in this instance, for their engagement of activities via mobile devices. This reiterates the priority learners place on the quality of connectivity, and not necessarily cost.

The learners' use of digital mobile devices for SMSs and chat on social networks are distinctively lower at School 1 than School 2. There can be three possible reasons for this trend of use for School 1 learners. One is that rural locations are generally challenged by

the lack/absence of electricity which in turns demands the conservation of digital mobile device battery life. Since chats on social networks are relatively lengthy, the probability of expending battery life on the device is high. Learners are therefore obliged to use the device 'responsibly' to conserve battery life/charge. Learners at School 2 have no such electricity constraints, and can therefore chat for lengthier periods. The second reason for the School 1 learners' trend of use of digital mobile devices as far as chat on social networks is concerned, is the chary attitude that generally prevails in rural locations due to 'ignorance' or cultural restraints, e.g. it would be most inappropriate for a female to be conversing during the late hours of the night. Thirdly, rural inhabitants have numerous tasks that have to be accomplished due to the non-availability of urban conveniences. This would account for the high call rate where the conversations are short yet concise. It is unfortunate that 'duration of calls and chats' was not surveyed, as this would confirm the three suppositions. While much 'mobile learning' is ventured upon in an informal manner, Koole (Koole, 2006) is of the opinion that it must be formalised. This can only be accomplished through integration of the mobile device into secondary school education.

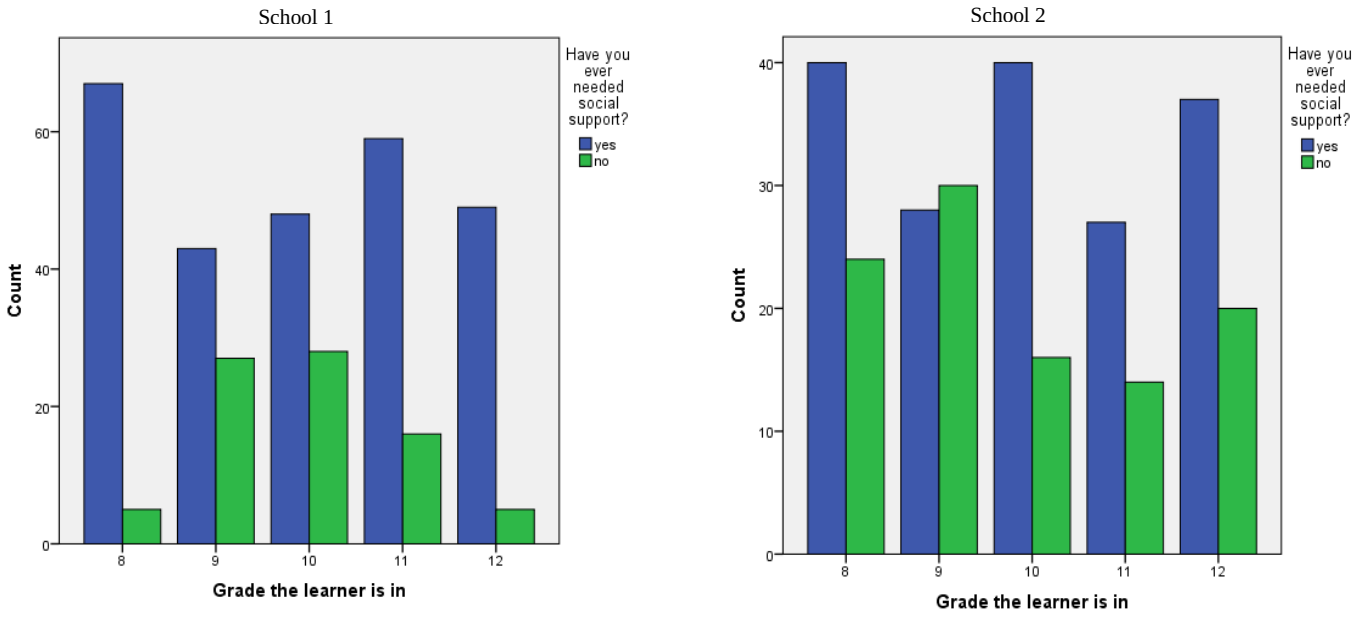
Having provided a descriptive analysis of the responses of the learners on the access to and usage of digital mobile devices, it is imperative to analyse the data to determine the possibility of integration of digital mobile devices into education particularly in the area of learner social support. It is hoped that the findings from such data analysis would generate adequate evidence to propose a generalization for the affordances digital mobile devices offer for their integration into education in the support and facilitation of academic instruction to learners. While there have been isolated attempts to integrate digital mobile devices into education, no unreserved effort has been afforded the investigation of the integration of digital mobile devices into education on a national level.

Figure 6: The graphs below indicate the number of learners per grade in terms of their response to the need for learner social support



There appears to be overwhelming consensus from both school's learners that social support is needed. Such a response would signal that learners view learner social support as a crucial ingredient in their development within the educational environment. In addition to this, 90% of learners at both schools indicated that the provision of learner social support would most certainly improve behaviour and study performance/achievement. This further substantiates the claims by academics who have constantly voiced their view of the importance of learner social support within the learning environment. Peltzer, Kleintjies, Van Wyk, Thompson and Mashego (Peltzer et al., 2008) together with Strydom, Pretorius and Joubert (Strydom, Pretorius & Joubert, 2012) provide an explanation for the learners' loud cry for social support. They accentuate tumultuous challenges and stresses that adolescents experience or are faced with, which more often than not incapacitates the individual. Social support remains the most viable therapy to help an individual refocus and regain holistic composure.

Figure 7: The graphs below indicate the number of learners per grade in terms of their personal need of social support in the past



While there seems to be a significantly large number across the grade range that have revealed their need for social support, it is noteworthy to mention the consistency within both schools of the grade eight learners need for learner social support. This would corroborate what was previously stated, that grade eight learners are severely challenged in making the transition from primary school to secondary school. Grade ten learners are also significantly challenged, attempting to cope with their newly chosen subjects. The response of the grade eleven and grade twelve learners from School 1, may also be the result of economics.

Table 1: The table below indicates the percentage of learners per grade in terms of their personal receipt of social support in the past

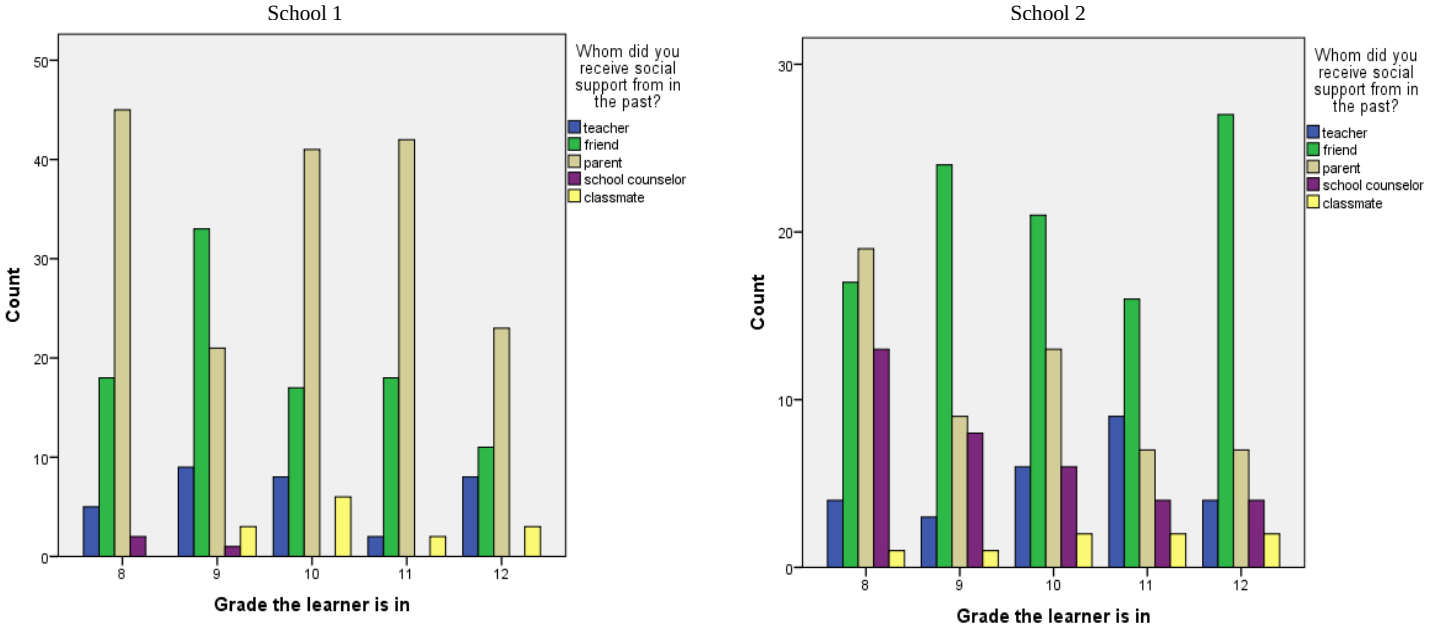
Have you ever received social support?				Yes	No	Total
School 1	Grade	Eight	Number of students	59	11	70
			%	84.3	15.7	100
		Nine	Number of students	48	21	69
			%	69.6	30.4	100
		Ten	Number of students	55	21	76
			%	72.4	27.6	100
		Eleven	Number of students	53	22	75
			%	70.7	29.3	100
		Twelve	Number of students	26	27	53
			%	49.1	50.9	100
Total			Number of students	241	102	343
			%	70.3	29.7	100

Have you ever received social support?				Yes	No	Total
School 2	Grade	Eight	Number of students	43	20	63
			%	68.3	31.7	100
		Nine	Number of students	35	23	58
			%	60.3	39.7	100
		Ten	Number of students	39	17	56
			%	69.6	30.4	100
		Eleven	Number of students	31	10	41
			%	75.6	24.4	100
		Twelve	Number of students	30	27	57
			%	52.6	47.4	100
Total			Number of students	178	97	275
			%	64.7	35.3	100

Have you ever received social support?				Yes	No	Total
School 1 & 2 (Composite)	Grade	Eight	Number of students	102	31	133
			%	76.7	23.3	100
		Nine	Number of students	83	44	127
			%	65.4	34.6	100
		Ten	Number of students	94	38	132
			%	71.2	28.8	100
		Eleven	Number of students	84	32	116
			%	72.4	27.6	100
		Twelve	Number of students	56	54	110
			%	50.9	49.1	100
Total			Number of students	419	199	618
			%	67.8	32.2	100

On average, 78% of learners received learner social support. This is an alarmingly high yet understandable considering the socio-economic climate within which learners exists. This being the exposed reality, it begs an answer as to why 'guidance and counselling' was removed from the curriculum, and replaced with 'life orientation'…they are certainly not synonymic and can therefore not be interchangeably substituted. The spatial provision of social support through government initiatives is most inadequate (Gauteng Health Department, 2010). Learners who are in need of social support are often too debilitated to ardently pursue contacting formal social support services. For the majority of learners, contacting Lifeline or a qualified counsellor will require too much effort on their part, resulting in them inadvertently remaining at 'risk'. Alsugair, Hopkins, FitzGerald and Brailsford (2010) state that a learner's decision to seek social support is 'largely influenced by the availability of the support'. This would infer that the percentage of learners that indicated their reception of social support would most definitely be higher where the availability of the social support copiously present and accessible.

Figure 8: The graphs below indicate the percentage of learners per grade in terms of the source/provider of their past receipt of social support



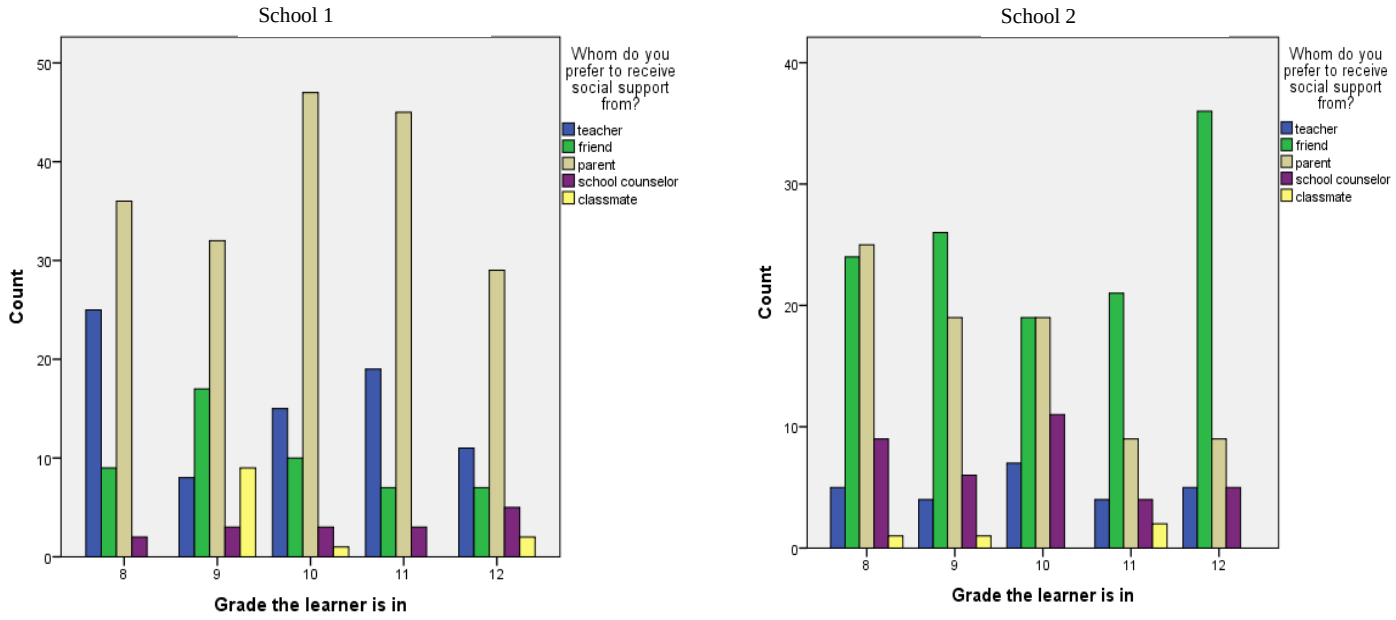
An interesting observation was made between responses from both schools, when asked who learners received learner social support from in the past. It is evident that the statistics appear to be guided by the socio-economic influence on families and how this plays out in the lives of the learners. At School 1, learners indicated that they received learner social support predominantly from parents, closely followed by friends, and then educators. At School 2, learners indicated that they received learner social support predominantly from friends, followed not so closely by parents and then by school counsellors. There is quite a marked difference in the provider of learner social support at both schools. The statistics of both schools can be explained relative to the socio-economic influences.

Family units are and family values are more guarded in the rural environment. There is a greater likelihood of finding dual parent homes even if one or both parents are migrant labourers. Due to the absence of many of the urban lifestyle diversions, family life is of a richer quality. This would be reason for learners to receive learner social support from parents, based not only on community imperatives, but as shown; by learner personal choice (which may still be influenced by community imperatives). School 1 learners received learner social support from friends, which may speak of the fact that most educators in rural schools live outside of the community within which they teach. This would mean that educators leave school immediately at the end of the day, and arrive at school on-time or late. This would mean that learners cannot receive the much needed learner social support from educators, and friends become the next logical option after parents. It is worthy of note that the learners indicated that they prefer to receive learner social support from educators, second to parents. The stats however indicate that learners choose educators as their third preference from whom to receive learner social support.

Strydom, Pretorius and Joubert (2012) state that learners prefer to receive social support from peers, and Hartnell-Young and Heyn (2008) state that the access and integration of mobile phones in schools drastically increased learner to learner and learner to educator communication and collaboration. Herein lies an alternate reason for the trend of learners from School 1 opting to receive social support from parents rather than friends, because they do not have the financial means (airtime) to turn to their first option for social support (peers).

Isaacs (2001) encourages learners to consult with qualified counsellors should they require social support. Katz (2011) however states that there is a dire lack of skilled and qualified counsellors. This would mean that Isaacs (2011) option for learners is a most nonviable one. It would also account for the higher numbers of learners at School 2 who sort school counsellors for social support as the availability of such counsellors will be higher in urban areas than rural areas (counsellors practice where there is business and affordability for their services). The School 1 learners are not so privileged and generally will not have both; affordance for and presence of counsellor services.

Figure 9: The graphs below indicate the number of learners per grade in terms of their preference of source/provider for their social support

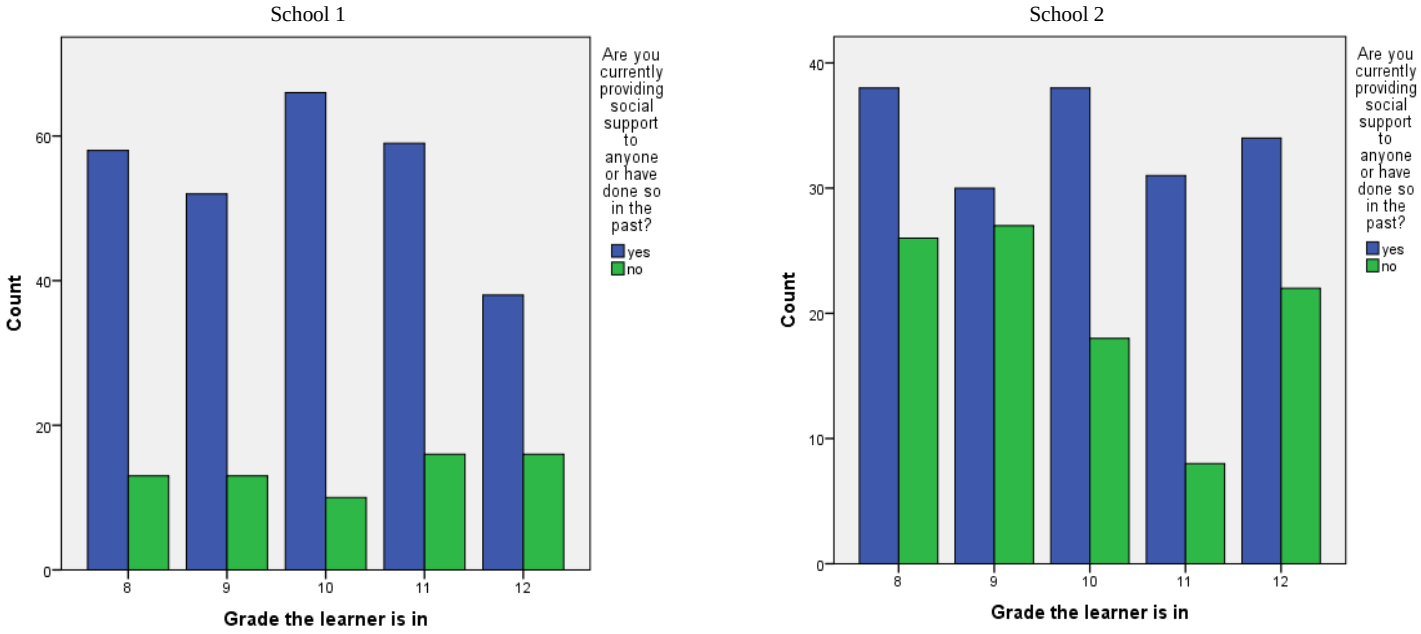


School 2 learners on the other hand were consistent in their responses for both current and preferred provider of learner social support. This would be consistent with the family values and family structure of a high percentage of urban family units. A large percentage of urban families are single parent units and often dysfunctional. This would account for the consistent first preference and current practice of friends being the notable providers of learner social support, with parents taking second spot in both preference and current

practice in the provision of learner social support. Chosen above educators as providers for learner social support are school counsellors. This may be a consequence of the learners' desire for confidentiality, and also an attempt to prevent any possible prejudice towards them from educators, if the educators were the providers of learner social support.

The consistency of response in terms of the low acquisition of social support from classmates, may be due to learners regarding their classmates as acquaintances or that learners realise the possibility and impact of confidentiality being breached and 'items' going viral within the school environment. Here again, learners at School 2 provide responses that support the findings of Strydom, Pretorius and Joubert (2012), that learners prefer to receive social support from peers. The learners from School 1 probably submit to their choice of social support provider due to affordability, access and opportunity.

Figure 10: The graphs below indicate the number of learners per grade in terms of their current and/or past provision of social support



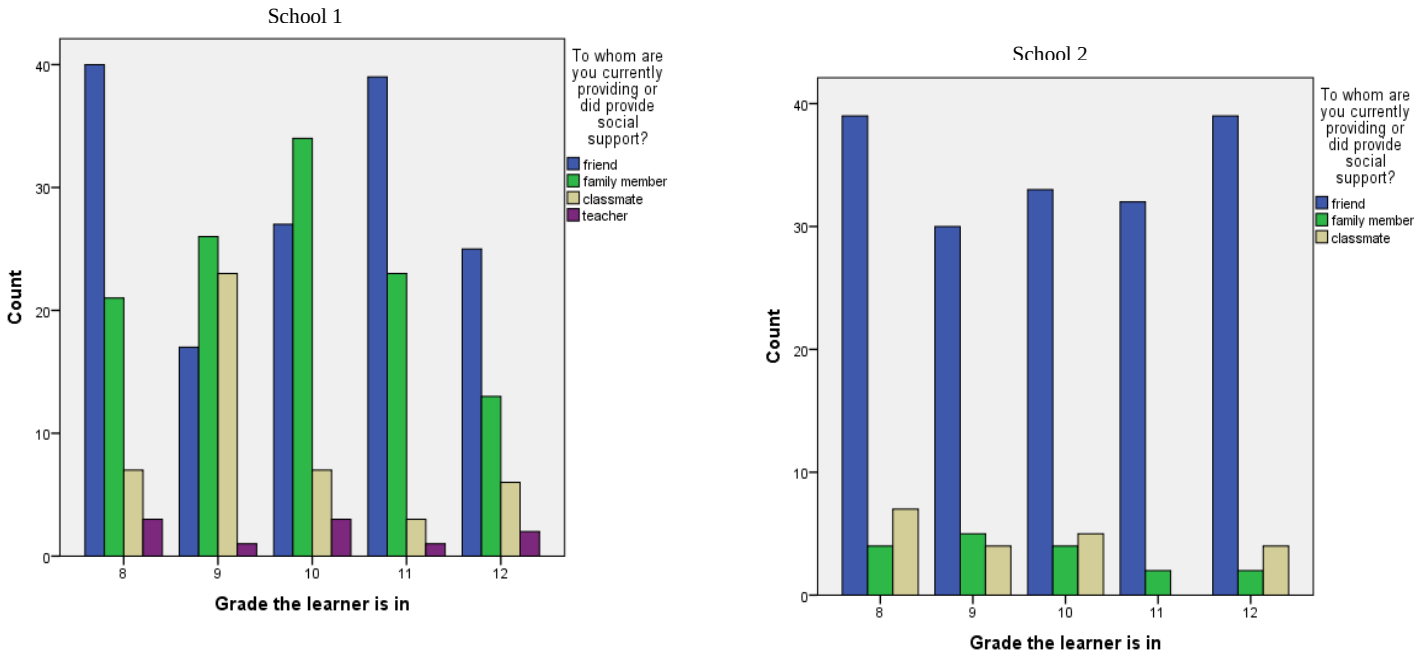
The learners at School 1 are highly engaged in the provision of social support, while those at School 2 remain far less engaged in the same. Various factors may be responsible for the marked difference in the learners' provision of social support at both schools. The absence of ready access to educators and counsellors outside of school hours may be

responsible for the School 1 learners stepping in to provide the necessary social support. The socio-economic factor may have a direct bearing on this practice, as families do not have the financial resources to engage professional counsellors. Rural communities often cultivate the culture of 'family', which makes every individual a 'brothers' keeper'. The principal of School 1 advised that the school provided learners with a lunch meal every day. He further elaborated that for the majority of learners, the single meal provided during lunch time at school was their only meal for the day. This would account for the high engagement of learners providing social support as this would be the natural effect of empathy.

Learners from School 2 have a lower engagement in the provision of social support due to the availability of and access to educators and school counsellors outside of school hours. Families in the urban areas generally have the financial resources to engage the services of professional counsellors. What must also be factored in is the abundant availability of private and state counsellors within the community.

The significant figures provided for the provision of social support invariably indicates the exponential need by learners for social support.

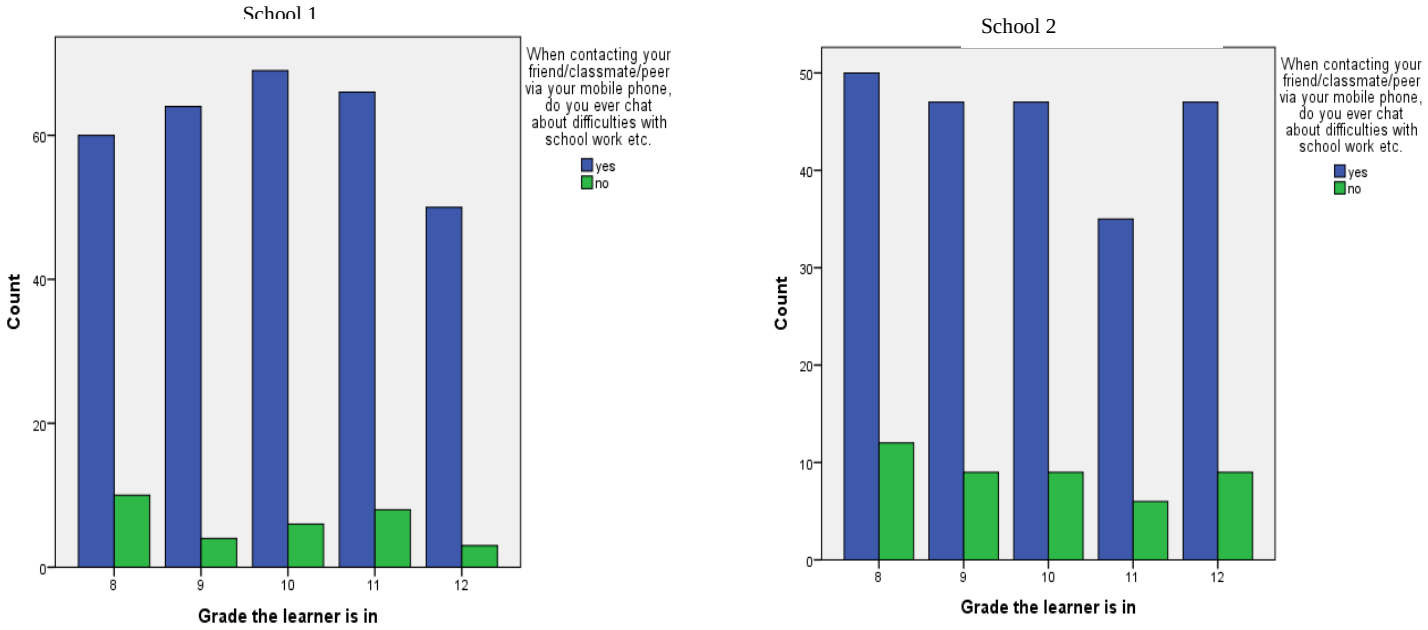
Figure 11: The graphs below indicate the number of learners per grade in terms of whom the learners currently and/or in the past provided social support to



Learners at both schools indicate that they are currently providing social support, and that such support is largely provided to friends. Strydom, Pretorius and Joubert (2012) state that learners prefer to receive social support from peers. This is supported by the data, provided that 'friends' implies (or is used interchangeably with) 'peers'. It is however apparent that the School 1 learners provide significant social support to family members, more than they do to classmates. This may be attributed to the ethos of the rural community which fosters the following:

a) The provision of assistance and support is to be provided to those within the community, whilst simultaneously ensuring high levels of secrecy and silence.
b) The implicit protocol would consider divulgence of social ills to non-community members as taboo. The provision of social support would then rest heavily upon family and friends if and when there is sufficient courage or distress for social support to be sought.

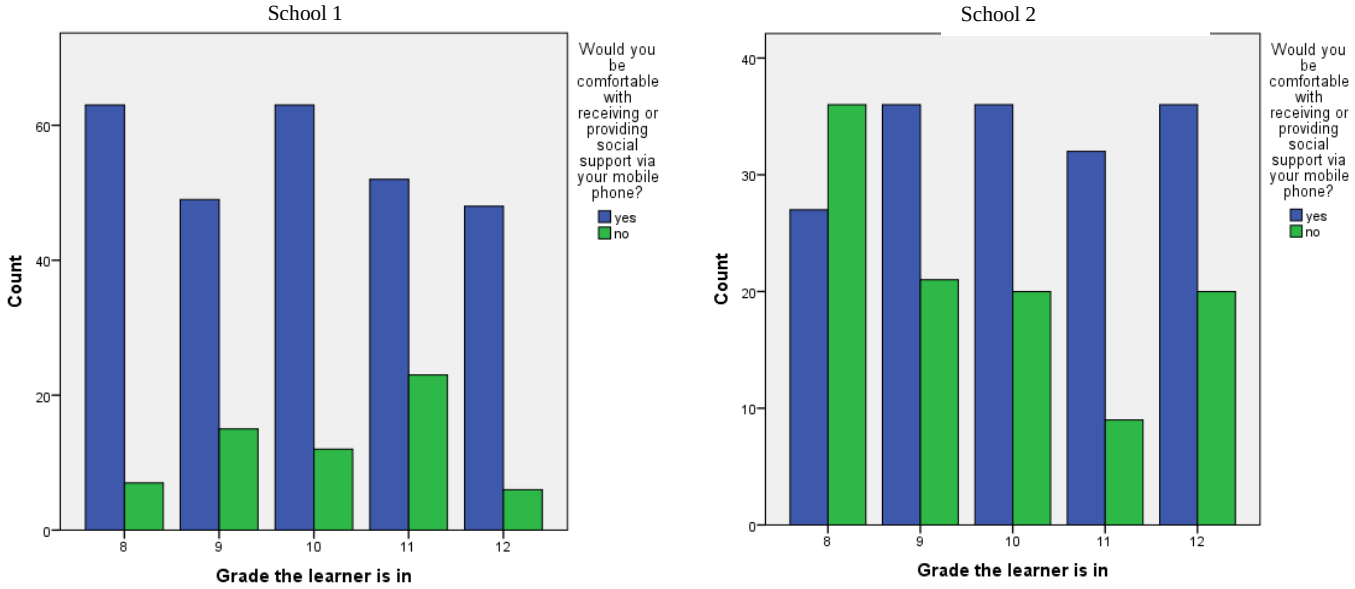
Figure 12: The graphs below indicate the number of learners per grade in terms of the specific conversations they conduct with their friend/classmate/peer via mobile devices



Learners at both schools indicate that they currently discuss with their friends/peers/classmates, issues that often lend themselves to the need for the provision of

social support. This current practice denotes that learners' conversations when using mobile devices is not confined to superficial and frivolous chat, but on issues of a personal nature that may often from time to time warrant the provision of social support (intentional or not). This is in accordance with Traxler's (2007) statement that mobile learning sustains authentic learning as the learners can collaborate on real life issues and problems.

Figure 13: The graphs below indicate the number of learners per grade in terms of their preference to receive or provide social support via mobile devices



The responses of the learners to the question of whether they are comfortable with the reception or provision of social support via their mobile devices has been diverse. The majority of the learners surveyed at School 1 indicated that they are. While there were a few 'NOs', which may be due to the understanding that the cost of such an endeavour may have to be borne by the initiator or provider of the social support. The issue of confidentiality may also be a contributing factor for these learners who have indicated that they are not comfortable using their mobile devices for the reception and provision of social support. What must also be noted is that the learners did not emphatically state that they are not willing to use mobile devices for the purpose at hand.

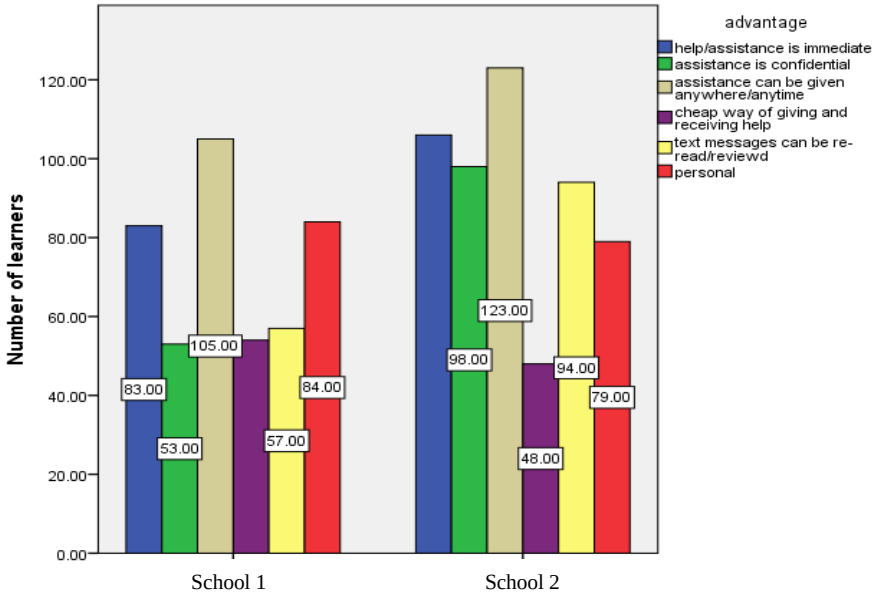
School 2 learners on the other hand provided a larger percentage of 'NO' responses to the question. It is also interesting to note that the learners in Grade eight had a greater

percentage of 'NO' responses than 'YES' responses. If the Grade eight learners of School 1 had a similar response type count, it could be deduced that the Grade eight learners have responded so due to insecurity and fear because they have recently entered a new environment. It could be they have just been afforded the privilege of owning the mobile device, and are weary of doing anything that will jeopardise their currently enjoyed privilege.

In response to the large number of learner responses at School 2, where learners were not comfortable with the reception and provision of social support via their mobile devices; the only plausible explanation would be that the learners fear for breach of confidentiality. This may be due to the fact that urban living offers greater knowledge, means and opportunity for intercepting or hacking which may ultimately lead to confidential information going viral.

Harnell-Young and Heym (2008) state that 'usability and software issues, costs, school policies and culture, and school behaviour' were real challenges that affected the exploitation of the affordances of mobile devices. When both schools' learner responses to the issue of providing learner social support via their mobile phones are viewed in light of the elements listed by Harnell-Young and Heym (2008), the variances in responses are adequately validated.

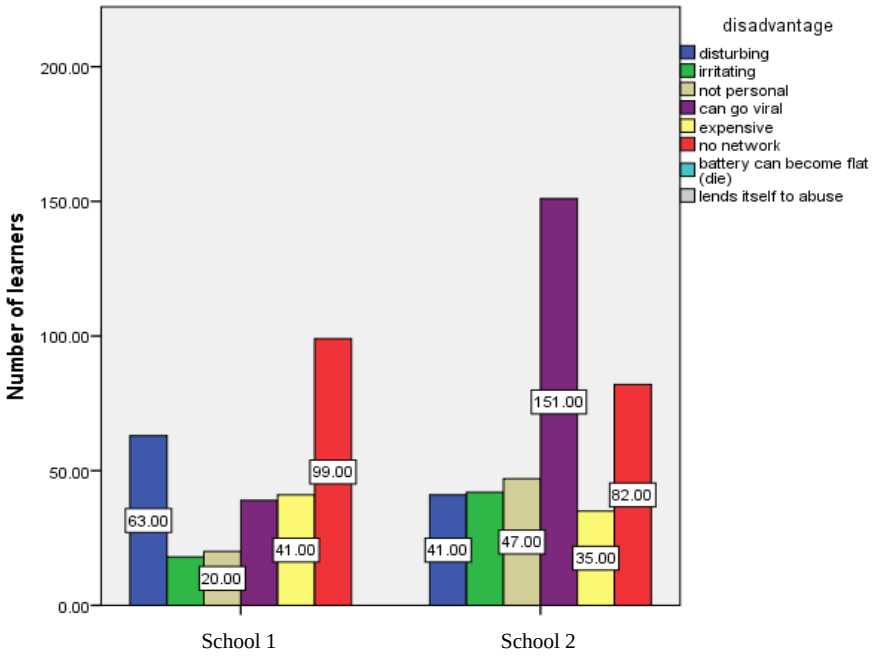
Figure 14: The graph below indicates the number of learners per school in terms of their perception of the advantages afforded by the use of mobile devices to provide and receive social support



Whilst learners in both schools varied in their prioritization of advantages for the reception and provision of social support via their mobile device, an overwhelming choice was the advantage of providing or receiving social support anywhere and anytime. This choice of advantage characterises the critical need for social support, and for its provision via ubiquitous available means.

Ally's (2009) contribution to the advantages of the use of mobile phones in education (learner locality and time constraints do not impeded the use of mobile phones), is reiterated in the learners' responses to the advantages of the use of mobile phones for the provision of social support. Koole (2009) concurs with the stated advantages for the use of mobile phones by stating that mobile phones 'increase access to people and learning', whilst Traxler (2007) adds that mobile phones contribute to 'context-specific and immediate' learning.

Figure 15: The graph below indicates the number of learners per school in terms of their perception of the disadvantages presented when mobile devices are used to provide social support



Amongst the responses of learners towards the disadvantages of using mobile devices for the reception or provision of social support, the absence or quality of the network significantly influenced their decision to use mobile devices for the purpose at hand. The learners from School 1 also indicated that a significant disadvantage was that the use of the mobile device for social support would cause a disturbance. This can be attributed to early sleeping, or lack of privacy to provide or receive social support. The learners from School 2 indicated that the probability of a breach of confidentiality was a significant disadvantage; which therefore confirms the reason for their response to the previous question why a large percentage of learners are reluctant to use their mobile devices to receive or provide social support.

Terry (as cited in Ally, 2009) states that costs and network (amongst others) are challenges that impede the adoption and integration of mobile phones into education. Both of these have been cited by the learners at both schools as disadvantages for the use of mobile phones for the provision of social support.

The overall statistics indicate that learners at both schools recognise far greater value (advantages) than deleterious impact (disadvantages) on learners if mobile devices are used for reception and provision of social support.

Table 2: The table below indicates the number of learners per grade in terms of their perception of their submission and receipt of school work, and academic support via mobile devices

Would you be comfortable submitting and receiving school work and academic support via your mobile phone?				Yes	No	Total
School 1	Grade	Eight	Number of students	61	6	67
			%	91.0	9.0	100
		Nine	Number of students	64	4	68
			%	94.1	5.9	100
		Ten	Number of students	52	23	75
			%	69.3	30.7	100
		Eleven	Number of students	56	18	74
			%	75.7	24.3	100
		Twelve	Number of students	50	4	54
			%	92.6	7.4	100
Total			Number of students	283	55	338
			%	83.7	16.3	100

Would you be comfortable submitting and receiving school work and academic support via your mobile phone?				Yes	No	Total
School 2	Grade	Eight	Number of students	40	23	63
			%	63.5	36.5	100
		Nine	Number of students	40	16	56
			%	71.4	28.6	100
		Ten	Number of students	44	11	55
			%	80.0	20.0	100
		Eleven	Number of students	30	11	41
			%	73.2	26.8	100
		Twelve	Number of students	41	16	57
			%	71.9	28.1	100
Total			Number of students	195	77	272
			%	71.7	28.3	100

Would you be comfortable submitting and receiving school work and academic support via your mobile phone?				Yes	No	Total
School 1 & 2 (Composite)	Grade	Eight	Number of students	101	29	130
			%	77.7	22.3	100
		Nine	Number of students	104	20	124
			%	83.9	16.1	100
		Ten	Number of students	96	34	130
			%	73.8	26.2	100
		Eleven	Number of students	86	29	115
			%	74.8	25.2	100
		Twelve	Number of students	91	20	111
			%	82.0	18.0	100
Total			Number of students	478	132	610
			%	78.4	21.6	100

The overall response of learners to this question in the survey indicates that the majority of the learners are comfortable with receiving and submitting school work; and receiving academic support via their mobile device. Learners would have chosen this option as the current lifestyle which includes much travel, makes it possible for them to attend to school work 'on the move'. Educators are also very often not available for academic support to be

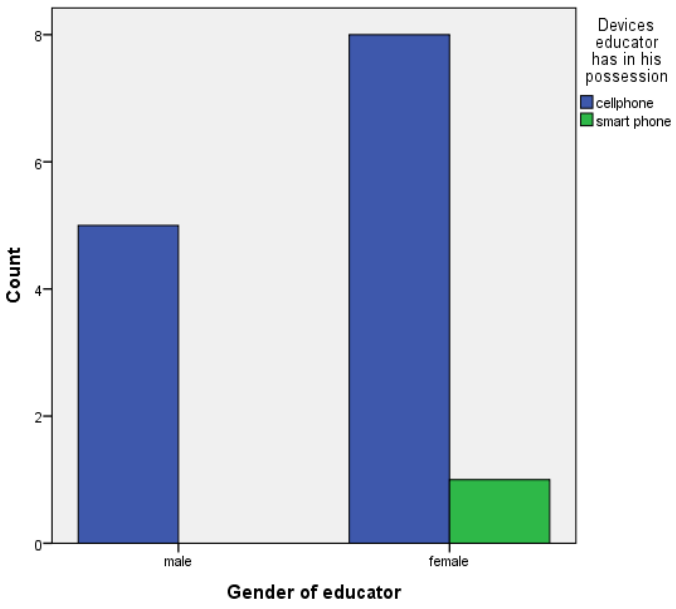
provided, and this allows both educators and learners to sync their availability for such academic support sessions. There is however a substantial difference in the percentage of learners at both schools who responded in the affirmative. A possible reason for School 1 learners indicating a higher percentage than School 2, is the availability and suitability of facilities or venues at which these learners can complete academic work (particularly homework). The lack or absence of space, electricity, a conducive study environment and resources (stationery), would result in the learners opting for a viable alternative for the reception and submission of academic work and support. Another possible explanation for such a response, is the learners' opting for an option where they can receive and submit school work and receive academic support without travelling (often by foot) long distances to the school and then back home. With the many chores and responsibilities rural learners are saddled with, they would prefer this option as it allows them the freedom of attending to school work as and when they are able to.

All proponents of the adoption and integration of mobile devices into education share the unanimous view of the affordances of mobile devices particularly its ability to transcend the learning challenges of distance, culture, costs, premium of learning time and opportunity, as well as, individual preferences and limitations.

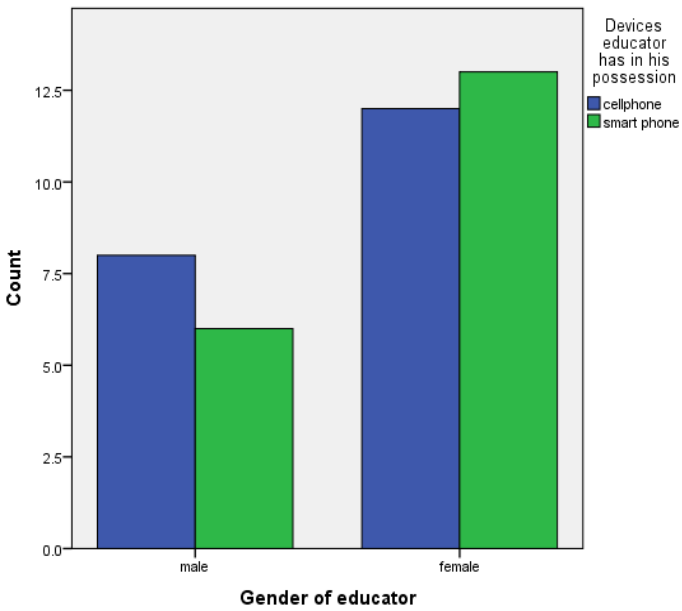
Educators

Figure 16: The graphs below indicate the number of educators per school in terms of the specific mobile devices that they have in their possession

School 1

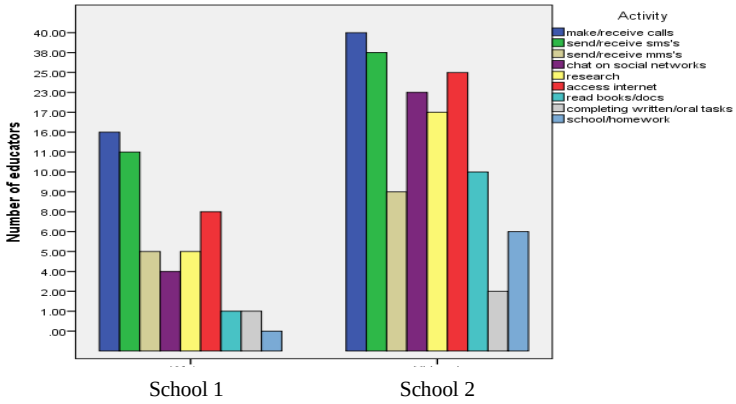


School 2



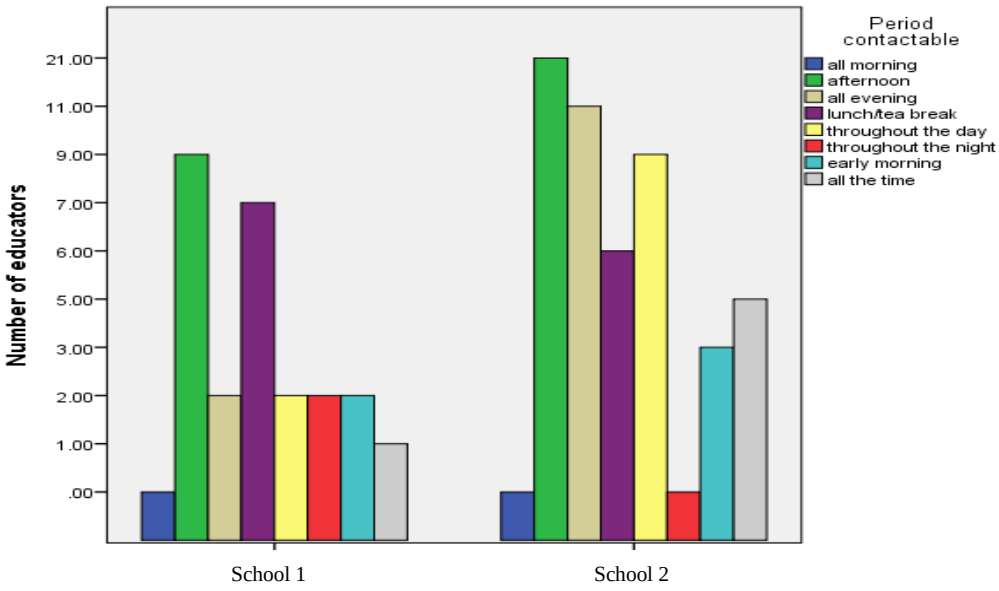
All educators indicated that they possess at least one mobile device. It would appear that affordability sees the difference in the number of educators owning smartphones, when comparing both schools. Another notable difference is that female educators indicated higher possession of smartphones compared to their male counterparts. This could possibly be a result of women desiring to have more efficient and effective access to social media sites, as they do outnumber men in the use of social media sites (Klos, 2013); or used just as a status symbol.

Figure 17: The graph below indicates the number of educators per school in terms of the activities they are engaged in on their mobile devices



There appears to be a certain degree of consistency in use, in that educators from both schools use their mobile devices extensively for the making of calls and SMSing. A significant observation is that a large number of educators from both schools use their mobile devices for research and internet access. This would imply that these educators recognize the importance and affordances of digital mobile devices for learning, as they are personally engaged in the same. This should auger well for gaining educators' support for the integration of digital mobile devices into education, where students can also take advantage of such affordances to augment their learning experience.

Figure 18: The graph below indicates the number of educators per school in terms of the periods during the day when they are contactable via their mobile device



A large number of School 1 educators indicated that they are contactable more during the afternoon and lunch/tea breaks. This could be the result of them travelling distances to school (going to bed early to wake up early the next morning, then to leave early in the morning to be on time for school). While a large number of School 2 educators indicated that they are contactable during the afternoon and all evening, there was still a fair distribution of numbers who were contactable throughout the entire 'contactable period range'.

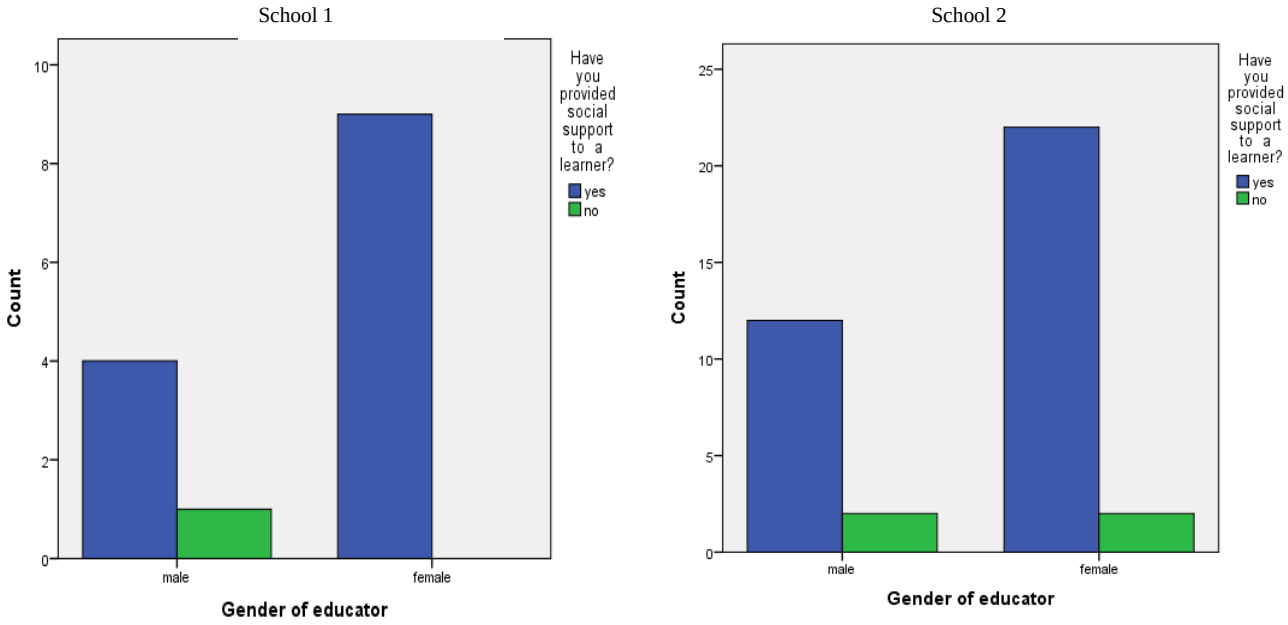
Table 3: The table below indicates the number of educators per school in terms of their perception of the need for the provision of learner social support

Do you believe that learners need social support?				Yes	Total
School 1	Gender	Male	Number of educators	5	5
			%	100	100
		Female	Number of educators	9	9
			%	100	100
Total			Number of educators	14	14
			%	100	100

Do you believe that learners need social support?				Yes	Total
School 2	Gender	Male	Number of educators	14	14
			%	100	100
		Female	Number of educators	25	25
			%	100	100
Total			Number of educators	39	39
			%	100	100

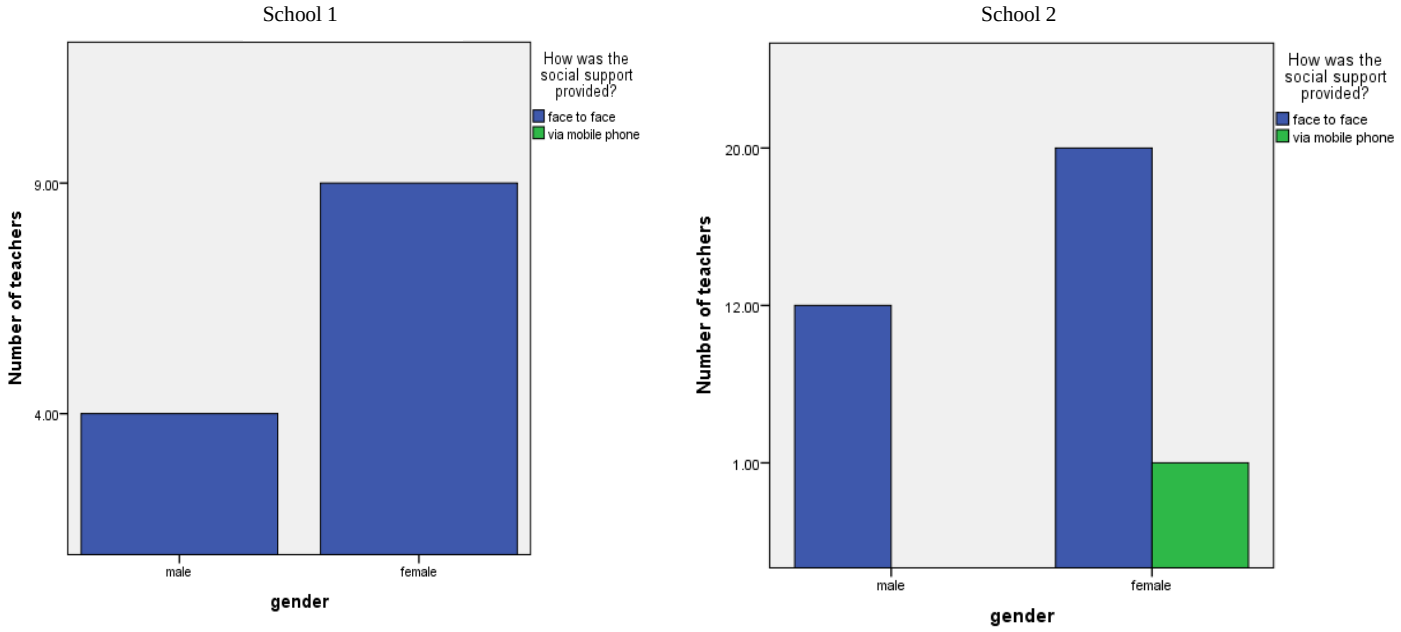
There was a unanimous affirmative response to the question on whether learners need social support. This affirms the findings and recommendations within the literature on the critical need for learner social support.

Figure 19: The graphs below indicate the number of educators per gender in terms of their provision of social support to learners



The figures indicate that educators in both schools have provided social support to learners. What is notable is that female educators are engaged in the provision of social support to leaners, more than their male counterparts. This can be reasonable explained by the following: the nature of the required social support intervention may be too sensitive or embarrassing for males to attend to, so their female counterparts are roped in to deliver the necessary. Another plausible explanation will be that the social support rendered may require greater maternal input. It must also be stated that male learners are less likely to request social support, while female learners just by their external emotional state may invite the provision of social support from female educators. The proportion in gender of the learners and educators within the surveyed group may also influence the statistics.

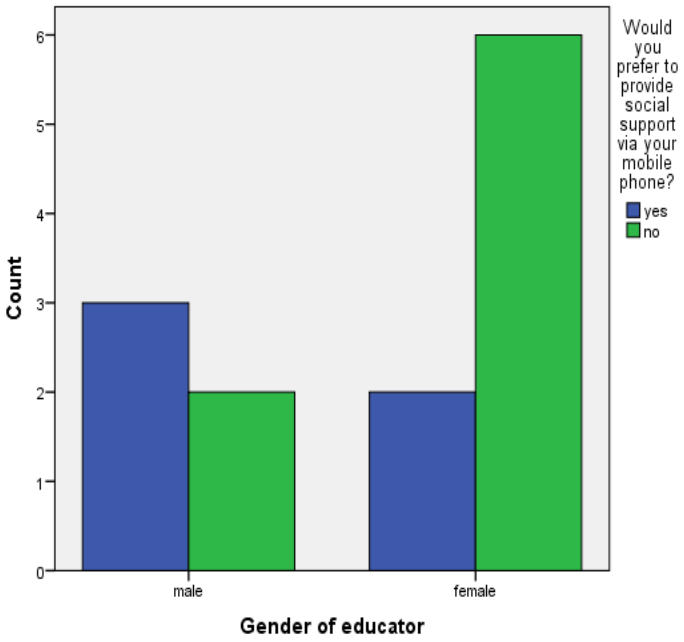
Figure 20: The graphs below indicate the number of educators per gender in terms of the method (face to face or via mobile device) of provision of social support to learners



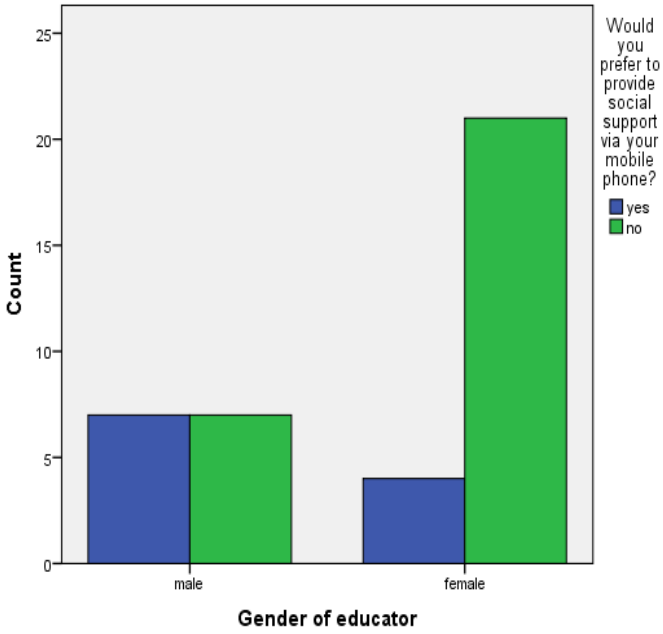
The responses indicate that the majority of the social support initiatives were provided in face to face sessions. Since both schools do not allow their learners to use mobile devices during school hours, the educators have no other option but to provide social support through face to face sessions with learners. What has not been established during the data collection exercise is whether the social support initiatives/sessions have been conducted during or outside of formal school time. Given the non-tolerance of learner use of mobile devices during school hours, it can be inferred that the rather small provision of social support via mobile devices occurred outside of school hours.

Figure 21: The graphs below indicate the number of educators per gender in terms of their preference to provide social support via mobile devices

School 1

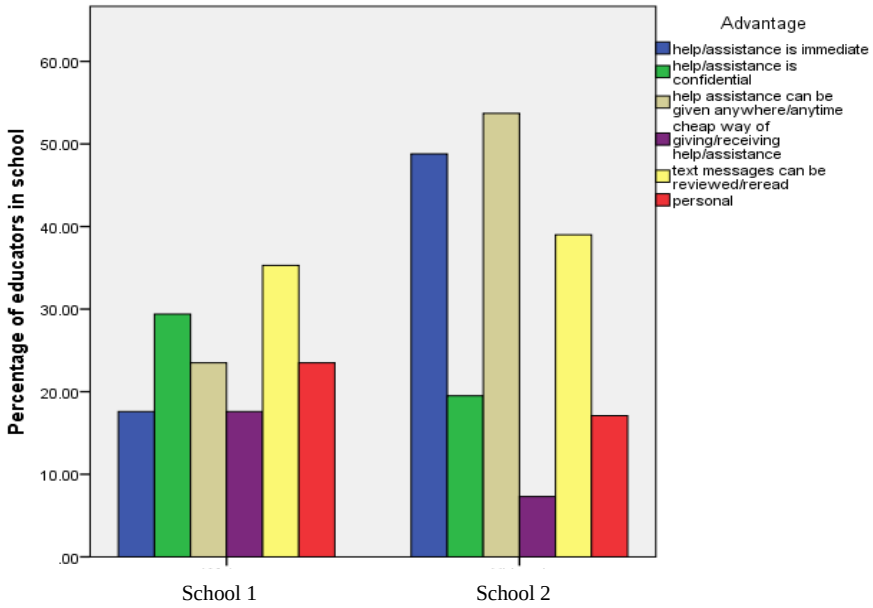


School 2



There appears to be consistency in the response towards the question of providing social support via a mobile device. On average, 55% of the male educators at both schools are comfortable with the provision of social support to learners via their mobile devices. On the other hand, 80% of the female educators are not comfortable with the provision of social support to learners via their mobile devices. Societal perceptions are likely to have had a significant impact on the responses for both male and female educators. Particularly where educators are married, spouses' perception and reaction will bear heavily on the decision by educators on the provision of social support to learners. Secondly, educators may still be keen on providing social support via a medium that offers greater confidentiality and one that is considered more personal. Female educators may also be weary that a learners' association with an educator via a medium that is generally regarded as 'personal' (item and space), may lend itself to various forms of abuse. This reasoning is aligned to the educators' response to the disadvantages for the use of mobile devices for the provision of learner social support. The consideration of costs and possible infringement on personal time, may have also played a role in influencing the educators' responses.

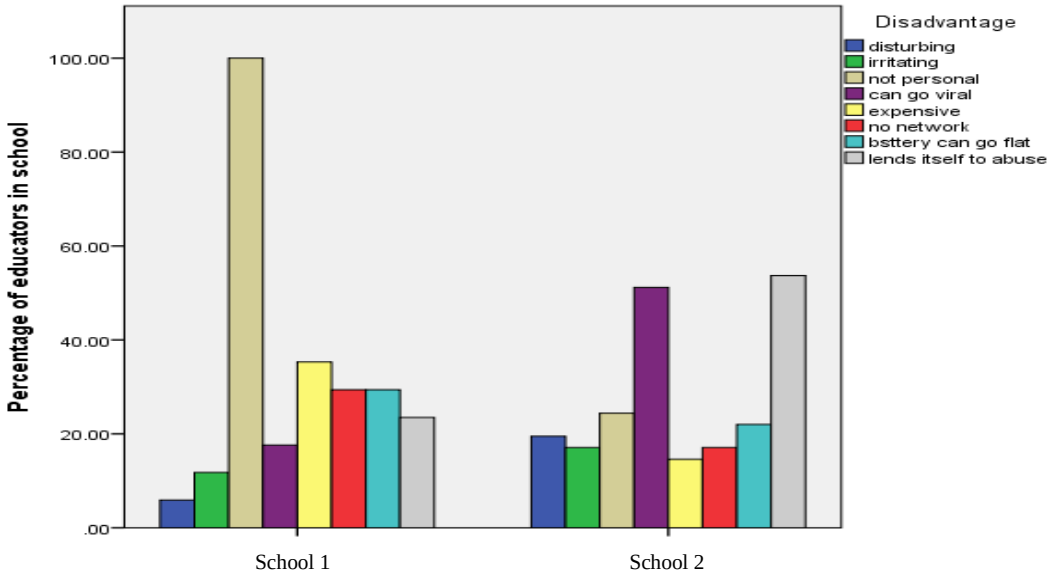
Figure 22: The graph below indicates the percentage of educators per school in terms of their perception of the advantages afforded by the use of mobile devices to provide social support



The response of School 1 educators confirms what has been purported earlier. The reason for a large percentage of educators siting the advantage of 'text messages can be reviewed/reread', is due to both learners and educators traveling distances to and from school. Messages cannot be responded to immediately, and can be revisited later (after they have arrived home) to receive or provide the appropriate and necessary social support.

The response of the School 2 educators to the same question, appears to correspond with the responses of learners from both schools; where the advantage of 'help assistance can be given anywhere/anytime', as well as, 'help/assistance is immediate' are ranked most significant advantages.

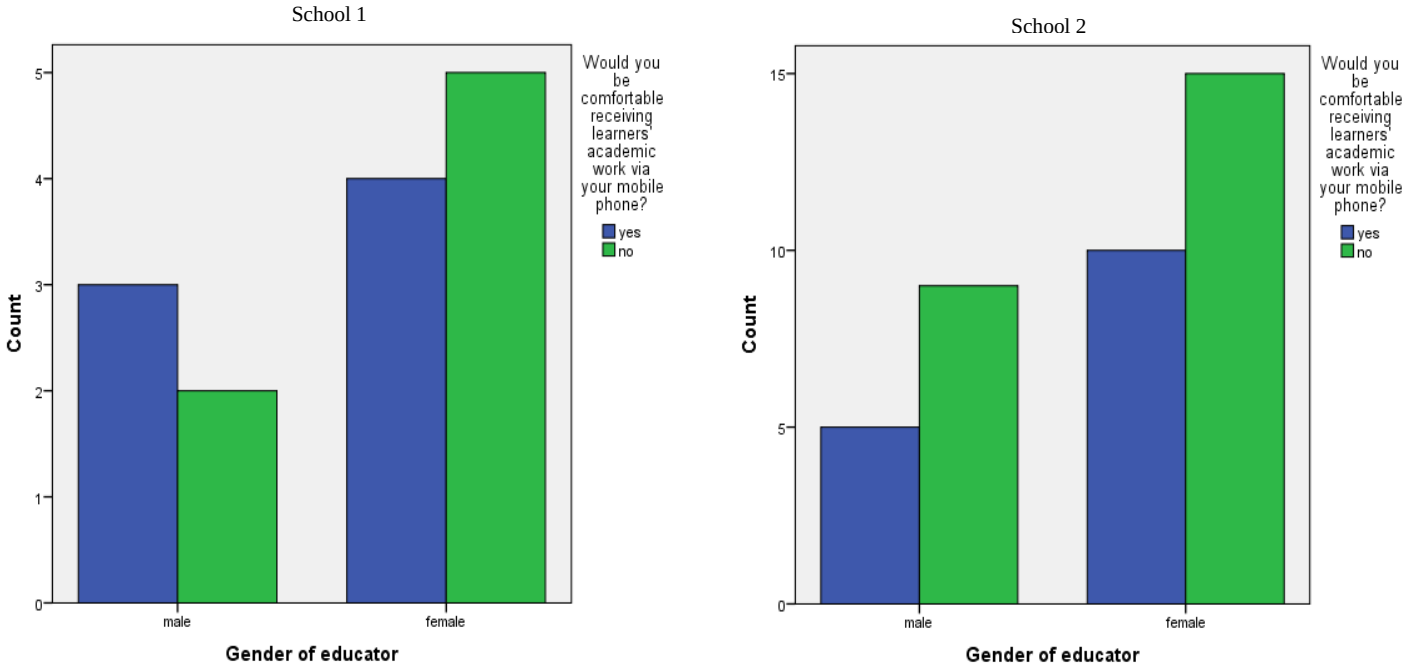
Figure 23: The graph below indicates the percentage of educators per school in terms of their perception of the disadvantages presented when mobile devices are used to provide social support



It seems that learners and educators at School 1 do not regard the same aspects as disadvantages, for the use of mobile devices for the provision of social support. Here, the educators of School 1 consider the use of mobile devices for the provision of social support as disadvantageous in that it is not personal (i.e. impersonal).

There however appears to be a degree of consistency between the responses provided by the learners and educators of School 2. Their concern for information going viral has caused them to prioritise this concern as a disadvantage for the use of mobile devices for the provision of social support. This may impact the decision to adopt mobile devices in secondary schools for the provision of social support. The educators' concerns are legitimate posing a challenge to the integration of mobile devices in education in secondary schools (such challenges can be circumvented).

Figure 24: The graphs below indicate the number of educators per gender in terms of their perception of their receipt and submission of learners' academic work via mobile devices

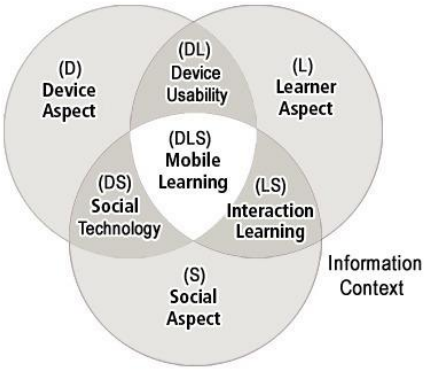


There is a significant increase in the number of female educators who responded that they are comfortable submitting and receiving learners' academic work via their mobile devices, when compared to their responses to the question of providing social support to learners via their mobile devices. It is immediately apparent that the personal nature of the provision of social support poses a challenge to the educators 'wellbeing'. The 'NO' response of the male educators at School 2 increased and may be due to the possible infringement on personal time, with no financial benefit; or the implication of costs.

Chapter Five: Findings

It is evident through the analysis of the data that ICTs in the form of mobile devices are available and accessible by both learners and educators at both School 1 and School 2 schools. These devices are currently being used outside of formal school hours by both users in their private and personal capacity for educational and non-educational purposes. This would at the outset repudiate Pandor's statement (2004) that there still existed a digital divide in education due to the critical lack of access to ICTs. Statistics provided in the literature on digital mobile penetration in South Africa provides overwhelming evidence that the digital divide, in terms of access to ICTs, does not exist, as Mobile penetration in South Africa is cited to be 138% (BusinessTech, 2012), with some sources citing 138% mobile penetration. The data analysis results corroborate that which has been presented in the literature review. Due cognizance must however be given to the understanding of ICT 'access' within the context of this research; where 'access' implies availability and use of ICTs within formal school hours for educational purposes. The realities of 'access' to ICTs within secondary schools when measured against 'access' within the context of this study confirm the existence of a digital divide; a product of oversight by the powers that be.

What now needs to be addressed is the validity of the statement made by Howie and Blignaut (2009): 'South Africa does not yet provide universal access of ICT in education to its students with more than half (62%) of the schools not having access to computers'. Whilst the second half of this statement claim has been dealt with (the issue of ICT access), the first part (ICT [integration] in education) remains unchallenged. It is believed that a legitimate attempt to answer the research question: 'How does the adoption of digital mobile devices in secondary education positively contribute to ICT access and integration?' will provide evidence that will give credence to the repudiation or support of their claim. To answer the research question, and thus bring this research to a close, the analyzed data will have to be evaluated within Koole's FRAME model.



The Rational Analysis of Mobile Education (Koole, 2009)

In order for the 'adoption of digital mobile devices in secondary education *to* positively contribute to ICT access and integration' for successful learning; all requirements of the FRAME model need to be met:

Device (D)

The analysis of the data has irrefutably proven that there is availability and accessibility to legitimate and adequate ICT devices in the form of digital mobile devices, which are capable and able to sustain ICT needs in secondary education (fig 1 & Fig 2). The current ubiquitous use of mobile devices by both secondary school educators (fig 17) and learners (fig 5) calls for a rethink of plan and practice to pursue the provision and integration of desktop computers. The challenge facing the use of digital mobile devices for the provision of both social support and academic engagement lies in the responses of the learners and educators, with learners being in favor its use for social support and academic engagement (fig 13 & table 2), while educators and academic engagement (fig 23 & fig 24). Whilst this research was in progress, the Gauteng Department of Education announced the distribution of 80 000 tablet computers to schools within the Gauteng province (Wilson, 2013). In the same article, Steven Gounden stated that training of educators would be completed by mid-January 2014, and was emphatic that tablets would be distributed within the Month of January 2014 for learners to immediately begin using. One of the schools being surveyed in this research indicated (February 2014) that educators have received training, but tablets

have not as yet been distributed. While Gounden (Gouden as cited in Wilson, 2013), states that curriculum material will be supplied to schools, none has been received thus far. Access to learners will be open to an online portal with restricted access to the internet. With the roll-out of the device scheduled before the reception of the curriculum by schools, as well as, the use of the same service provider that provided both device and connectivity for the Gauteng Online Project (service provider failed to provide satisfactory service delivery on both items, significantly contributing to the dismal failure of the program); one can only categorize this initiative as technocentric. The title of a similar article found in Business Day Live: 'Distribution of tablets to bridge digital divide in Gauteng schools' (Maqutu, 2013), alone speaks of a misnomer, as there is no digital divide, just a neglect to recognize already available technology (mobile phones).

Learner (L)

Learners in secondary schools would benefit substantially from the use of ICTs in education, particularly digital mobile devices. Their current dilemma of being restricted to the use and access of limited and archaic desktop computers renders them digitally deprived, technologically marginalized, and therefore socially disconnected. The learner however is obliged to forge ahead using every available and accessible means to learn, minus the use of accessible and convenient technology (digital mobile devices). The analysis of data reveals that learners are currently actively engaged in receiving and providing social support, and the majority believe that social support is necessary (fig 6). A significant number of learners view digital mobile devices as an acceptable medium for the facilitation of social support (fig 13), with many advantages (fig 14). Their decision to use digital mobile devices for social support is however accompanied by concerns (fig 15). Just as refreshing is the response of learners to embrace the use of digital mobile devices for academic purposes (table 1).

Social (S)

The learner is schooled through social interaction in society at large, and principally within the confines of the school environment. There are socially accepted and offensive practices that are communicated to, and learnt by the learner in his/her association with things,

circumstances and people within his/her social environment. With and through these interactions, certain stresses are exerted and experienced, which impact the emotional wellbeing of the learner. It is within this environment that learner social support is critical. The secondary school is a microcosm of society at large, and the secondary school learner is therefore compelled to learn through interaction within this social environment. It is therefore necessary for social support to be provided to the learner so that he remains active, accepted, contributive and successful (in terms of his learning) within this learning environment.

Whilst Terry (as cited in Ally, 2009) states that mobile devices have the capacity 'to support quality learning, anywhere/anytime', Traxler (2007) states that mobile learning sustains authentic learning as the learner can use the mobile device to access information, as well as, collaborate on real life issues and problems. Especially in situations where the learner and his work and learning peers are physically distanced; mobile learning allows the learner to transcend the barrier of distance by providing a valuable collaborative, instructive and search 'classroom'. The analysis of data reveal that learners do use the digital mobile devices for learning and social interaction anywhere/anytime (fig 5 & fig 17), with evidence to support Traxler's statement that learners use digital mobile devices to collaborate on real life issues and problems, which most certainly includes the provision of social support (fig 12 & fig 13).

Interaction Learning (LS)

While the learner interacts within his/social environment for the 'product' of learning, the learners' personal needs, background, practices and circumstances are brought into direct contact with societal expectations and norms. During this Interaction Learning, severe pressure (almost cohesive force) is exerted on the learner to conform. Depending on the learner's holistic constitution, learning within such a 'socially interactive environment' will more often than not leave him/her overwhelmed, and in desperate need of learner social support. It is within this area of Interaction Learning that various social support provisioning elements are located, eg. educator, friend, family, etc. Educators are currently providing social support to learners, but in face to face sessions (fig 19 & fig 20). Both learners and educators are in agreement that the provision of learner social support is

essential for learning to be efficacious; but while learners have no qualms with mobile devices being used to aid the facilitation of social support, educators are largely against the provision of social support via mobile devices (fig 23). Educators are generally expected to use every 'legal' means to profit the learners' learning experience. What is most interesting, is that learners are most enthusiastic about using digital mobile devices for academic purposes, but the majority of educators have spurned such a thought (fig 23).

Social Technology (DS)

In order for learning to be viable, the technology that is being used to aid the facilitation of learning, must be ubiquitous, as well as, be used in adherence to the imperatives that govern or protect that particular society. Because learning occurs within a social context, which is most certainly not confined to the contemporary classroom; technology that is embraced must afford individual and personalized usability to the learners' learning, whilst still allowing for 'community' learning (collaboration and contribution). The only current 'piece' of technology that answers to such rigorous requirements and performance, is the digital mobile device. An important aspect to consider is the perception with which society perceives the technology. Mobile devices within the secondary school environment are currently perceived as irritating and disruptive items that must be restricted in use and access. Both schools that have been surveyed have prohibited learners from using mobile devices during the formal school hours, regardless of its intended use. This perception is most definitely a barrier that has been 'erected' (often unintentionally) to deprive the learners from the use of technology that has tremendous potential to increase and enhance their learning locale and experience respectively. No prior research has been done to address the perceptions and legitimacies of staff and administration at secondary schools on the current non-negotiable stance to ban the use of mobile phones at secondary schools. This sustains the earlier categorization of the GDE's latest decision to distribute 80 000 tablet computers as technocentric, as no consultation and significant research has preceded this decision. If it had been performed, the current perception and attitude towards mobile phones may well have been attended to or remedied.

Device Usability (DL)

The analyzed data has confirmed that secondary school learners are well equipped with ICTs (digital mobile devices), proficient in its operation, and have abundant experience over a wide range of its uses (fig 5). Currently, the issue is not about learner access and usability of digital mobile devices, but the limitations and restrictions placed by the administrators of secondary schools. Both schools surveyed have policies in place that prevented mobile devices from being used during formal school hours, yet Traxler (as cited in Traxler & Leach, 2006) states that mobile learning sustains authentic learning as the learner can use the mobile device (mobile phone) to access information, as well as, collaborate on real life issues and problems. The learners' responses are in agreement with Traxler's statement, in that learners are keen to use their mobile devices to receive and provide social support (fig 13), and have indicated their enthusiasm for their mobile devices to be used for academic purposes (table 2). Access to ICTs does not translate to adoption and integration of ICTs.

Mobile Learning (DLS)

As far as Device Usability is concerned, the digital mobile device can be accessed and used for learning. Learners and educators have access (fig 1, fig 2 &fig 16)), and are competent uses of the mobile device (fig 5 & fig 17). The two areas that most certainly pose a challenge to the adoption and integration of mobile devices in learning are Social Technology (DS) and Interaction Learning (LS). Schools prohibition of the use of mobile devices by learners during formal school hours, coupled by the educators' reluctance and refusal to use mobile devices for social support or academic purposes, makes Koole's model unworkable, and therefore pronounces unfeasibility of the use of mobile devices for the provision of learner social and academic support.

Chapter Six: Conclusion

Whilst learners provided an array of concerns (disadvantages) for the adoption of digital mobile devices for the provision of learner social support, the research provides empirical evidence to substantiate the claim that learners at both secondary schools are in favor of the adoption of digital mobile devices for the provision of learner social support. In spite of the disqualification and neglect to formally adopt digital mobile devices at both secondary schools, for the provision of learner social support, learners are engaging each other informally via digital mobile devices for that very purpose (learner social support).

The cageyness with which educators at both schools have responded to the adoption of digital mobile devices for the provision of learner social support, can be attributed to their perceived disadvantages of adopting digital mobile devices for the provision of learner social support. Whilst there remains significant educator numbers against the adoption of digital mobile devices for the provision of learner social support, it is encouraging to observe that there are some educators who support the concept. It is critical that an investigation be made into educator cageyness in respect of the decision to adopt digital mobile devices for the provision of learner social support, as the decision of the educators is pivotal to the adoption of digital mobile devices in secondary education for its positive contribution to ICT access and integration.

No previous investigation was conducted into both the secondary schools' administrations, in order to ascertain their posture on the adoption of digital mobile devices for the provision of learner social support. Both schools' prohibition of the use of digital mobile devices during formal school hours infers that, regardless if learners' and educators' aspiration for the adoption of digital mobile devices is unanimous, the very posture of the schools would make it untenable. The research question (How does the adoption of digital mobile devices in secondary education positively contribute to ICT access and integration?) must be answered thus: the non-adoption of digital mobile devices in secondary education impedes ICT access and integration. Both schools, by their very posture on the use of digital mobile devices during formal school hours, are precluding any possible prospect of the use of

digital mobile devices for the provision of learner social support; and thereby staunching ICT access and integration. It must however be remembered that the ethos of a school is largely shaped by the directives communicated by the national and provincial education departments. This infers that the adoption of digital mobile devices into secondary education for the provision of learner social support, is impeded by the posture that the national and provincial education authorities have assumed.

This refusal to adopt digital mobile devices into secondary education by the secondary schools themselves, causes the ICT access and integration status quo, as delineated by both Pando (2004) and Howie & Blignaut (2009) to remain. Koole's FRAME model (2009) is not workable, as facets of the model remain 'absent' (Device Aspect [D] & Device Usability [DL]), and certainly not by virtue of their nonexistence. Both secondary schools refuse to adopt digital mobile devices, and educators remain reticent to their adoption for the provision of learner social support. It is certainly attainable that educators can be significantly influenced by their exposure to supporting evidences from ICT projects/programs nationally and internationally, where digital mobile devices are being used/integrated into secondary education with success. Formal skilling of educators and the establishment of an appropriate curriculum, can assist in accomplishing educator buy-in for adoption of digital mobile devices in secondary education. Learners from both schools, on the other hand, are informally engaged via their digital mobile devices in all facets of the FRAME model, and are most zealous in embracing the integration of digital mobile devices into their education, both for learner social support, as well as, for facilitation of academic instruction.

It is therefore recommended that further investigation be made into the current impediments (rationale of national and provincial education departments, school administrators, and educators) for digital mobile device non-adoption. The findings of such investigation will allow for the confutation of current reasoning, and the presentation of comprehensive apologetics for the adoption of digital mobile devices into secondary education. The evidence, as presented in the literature review, reassures us of the affordances of digital mobile devices for education, but until the adoption of digital mobile

devices into secondary education materializes, the positive contribution of ICT access and integration into secondary education cannot be realized.

It is therefore currently infeasible to integrate digital mobile devices into secondary education in South Africa; particularly in the area of learner social support.

Appendices

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