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Integration of ICTs into the teaching and learning of Secondary School Geography: The Seychelles Experience

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Abstract

This study aimed to establish the extent to which Information and Communication Technologies (ICTs) have been integrated into the teaching and learning of Geography in Seychelles Secondary Schools. The focus was on key issues such as policy provisions for the integration of ICTs into the Seychelles curriculum; teachers' and students' perceptions about the use of ICTs in teaching and learning of Geography; the types of ICTs used; and challenges faced in the integration of ICTs. Possible solutions are also explored. The researchers opted for a qualitative methodological approach to generate rich and in-depth data. The aim was to learn and understand from the case rather than to prove and establish cause and effect. Thus, various methodologies such as document analysis, focus group discussions and interviews were employed. Geography teachers and students were the main participants in the study, although other participants such as Ministry of Education officials were also interviewed. It is anticipated that the research findings and recommendations will benefit policymakers and practitioners in the Seychelles education system.

Keywords Information and Communication Technologies; Geography Education; Seychelles; ICT in Education

Introduction

The potential of ICTs becoming part of, and a medium through which, teaching and learning can be realised in much of the developing world remains far from being realised. There appears to be little evidence that technology is being integrated into

classroom activities. These activities include the planning and implementation of lessons that promote critical thinking, collaboration, and use technology in support of learning (Ramorola 2013). In subjects such as Geography, the use of ICTs would have been a game-changer since it could have made it

possible for learners to learn at different times, in different places and without the direct supervision of the teacher (Westhuizen, Richter, & Nel 2010). This could mean easily extending learning beyond the school boundaries and formal school time, thereby probably improving academic performance. Wang (2008) summed it up perfectly by noting that effective integration of Information and Communication Technology (ICT) into teaching and learning is becoming an essential competency for teachers. The Seychelles, being a developing nation is no exception. The integration of ICTs into education has not been impressive, and thus this study was undertaken as a result of the realisation that some Seychelles teachers are reluctant to use ICTs as part of instructional media in teaching and learning. This is despite the fact that ICT equipment is available in the majority of secondary schools, and teachers do have functional skills to use the resources.

The study focused on the integration of ICTs into Geography teaching and learning, the type of ICTs being used, challenges teachers are facing in integrating ICTs and the opportunities or benefits of ICTs integration into Geography teaching and learning. Apart from personal initiatives, the Ministry of Education of Seychelles encourages teachers to be innovative in their teaching and learning. Through the Seychelles Institute for Teacher Education (SITE) (formerly National Institute of Education or NIE) teachers take core ICT units to gain skills in the use of ICTs in teaching and learning. Moreover, the National ICT Policy for Seychelles stipulates the need to promote the use of ICT in formal education. Apart from ensuring that teachers have the necessary ICT skills, the Ministry also ensures that all state schools are provided with the necessary ICT equipment that can be used in teaching and learning. It should be appreciated that the

Seychelles Government through the Ministry of Education is playing a key role in ensuring ICTs form part of the Seychelles educational system and bridge the digital gap.

The significance of the study it intends to give policymakers some insight into on how teachers are integrating ICTs in the teaching and learning of Geography. In this way, the study intends to provide them with knowledge on what type of skill development workshops teachers would need to improve their ICT competencies. This would allow them to tailor-make the curriculum to make it ICT friendly. The research was also significant at the subject level since most research has been in Science, Mathematics, English and ICT with few studies in humanities subjects such as Geography since observations made some time back by Webb and Cox (2004).

Additionally, this research is of benefit to Geography teachers as they it promotes an awareness of the resources available for their use. Teachers were able to share opinions or experiences on challenges they have faced when using ICTs in teaching Geography. Teachers could gain an understanding of how students feel about the use of ICT in their learning, and what type of ICTs they are more related with. This insight assists teachers in selecting the type of ICT and how to use ICTs during lesson delivery to arouse students' motivation and interest. Through this study school administrators may also gain an understanding of what factors are hindering teachers from using ICT as an instructional medium in Geography. It also informs which type of ICTs that needs to be made available to Geography teachers. Finally, this research can be used as a future reference for other researchers in regard to how small island states are bridging the gap between education and technologies. In other words, how small island state Geography teachers are using ICTs as instructional

media to arouse students' interest in the subject at the Secondary School level. This research may be used by the Ministry of Education to determine the extent to which ICTs are being used efficiently in schools and areas where they need to improve. Moreover, the research will provide the Ministry of Education with a view on the challenges that teachers' face in their use of ICTs in the teaching and learning of Geography.

Contextualising the use of ICTs in Education in Africa and beyond

According to Rouse (2015), Information and Communication Technology is an umbrella term that includes any communication devices or applications, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them such as videoconferencing, distance learning ICTs. It is a group of practices and components that are meant to enhance and promote learning both formally and informally. Livingstone (2012) suggests that ICTs bring together educational technologies that were traditionally separated such as books, written items, telephone, television, photography, databases, games and many more, into an easily accessible platform and thus bridging knowledge and practice. In this way they interconnect places of learning at home, school, workplace and in the community. Carnoy (2004) had observed that ICTs are being used in the management of the education sector, particularly in networking schools and universities, and among individuals in schools and universities. Mohammed and Yarinchi (2013) identify several roles of ICTs and particularly computers which include that they can be used as a teaching device by both teachers and students, as sources of information, as storage devices for researched data and as communication tools that facilitate the

transfer of information and knowledge amongst the various levels of stakeholders. This is particularly significant to a subject like Geography where ICTs provide access to large quantities of information on people, distant places and environments. ICTs are a dynamic medium that, if used appropriately, can result in the significant acquisition, reinforcement and transfer of geographical knowledge and hence help in moulding productive members of society.

On the international scene Ojala (2009) observes that in Finland, students use the Internet for communication and as a source of information. Teachers use ICTs mainly in projects and problem-based learning. However, the same author points out that the magnitude of inequalities in the use of ICTs correlates quite well with the size of a school or administrative district. Small schools lack hardware and teachers are mainly left alone to deal with technical problems while large schools have more structured support systems and better technical possibilities for the use of ICT in teaching. Mekota (2009) describes ICT equipment in German schools. She states that access to computers in schools exposes teachers and young people to information that they can use to expand their knowledge base. Computers also give young people the skills to face future challenges in the use of rapidly changing technologies in the workplace. Computers are used for various purposes and as part of teaching different subjects in schools. Most teachers use computers for presentation purposes but also let the pupils use them in class. Only small deviations occur concerning the subject of teaching. Furthermore, the computer is seen as a means for preparing lessons for 89% of the teachers. Most of the teachers using computers in class use them in less than 10% of all lessons.

Mekota (2009) notes that in Germany, 90% of all teachers using computers make use of

offline learning materials, such as CDROMs and various websites to gather information, structure and enhance their lesson delivery. Faggiano & Fasano (2008) reveal that in Italy, whilst less than 40% of teachers use ICTs for lesson preparation and classroom presentation, a larger percentage of more than 60% use the internet to research their subject matter. These two researchers believe that “if teachers become aware of the potential usefulness and effectiveness of ICT as a methodological resource (enable to foster the constructions of meaningful learning environment) they would recognise the need of an effective integration of technologies in the classroom activities and view new technologies as cultural tools that radically transform teaching and learning” (Faggiano & Fasano 2008, p1).

Farrell, (2007) points out that Kenya has made remarkable progress putting in place an ICT policy framework and implementation strategy, complete with measurable outcomes and time frames. Along the same line Isaacs (2007), states that Botswana, not only boasts a liberal telecoms policy but its education and national ICT policies are linked to a broader economic vision for the country. The same writer goes on to note that Botswana is arguably among the countries with the highest PC penetration in education institutions in Africa.

Unfortunately, various factors are hindering the full implementation of ICT strategies. In Kenya, Farrell (2007) states that universal ICT implementation is being hindered by a lack of resources, the slow growth of ICT infrastructure, and electricity supply problems, particularly in rural areas. In the case of Botswana, Isaacs (2007), finds that Botswana’s ICT infrastructure is very good, but is not fully utilized. In Botswana, the use of ICTs in education is well articulated through its e-learning programme ‘Thutonet’, which is a critical component of

the national IT policy ‘Maitlamo’. Maitlamo targets the following, among others:

- to provide all schools with modern PCs and Internet access, such that there is a workable PC to learner ratio of one to seven,
- design and implement an ICT content and curriculum development programme for the primary, secondary, vocational, and tertiary sectors,
- design and implement professional development for teachers,
- introduce a strong ICT proficiency measurement and skills monitoring programme, and secure funding to sustain ICT use in education.

In short, this is a well-planned roll-out programme which, can bear fruitful results if well implemented. Teachers need to plan thoughtfully before they start ICT.

Integrating ICTs into the Education sector in Seychelles

In the Seychelles, Geography is taught in both primary and secondary schools. At the primary school level, it is part of the Social Science component, which in turn is one of nine essential learning areas in the National Curriculum Framework. At the Secondary School level, Social Science is then divided into two separate subjects: History and Geography. Secondary education is a five-year course divided into two key stages; stage 4 and stage 5. Within the key stage 4, secondary education levels 1 to 3 are known as lower secondary. This level caters for learners between 12 and 14 years of age and is equivalent to Botswana’s junior secondary school (Forms 1 to 3). Key stage 5 is made up of levels 4 and 5 of the secondary level and is known as upper secondary (equivalent to Senior Secondary school in Botswana). This level caters for students between the ages of 15 to 17 years. It is important to note that at each secondary level there are 5

classes, which make up a 'set'. Students are grouped into 'sets' based on their performance in the Stage 3 National Examination (Primary School leaving Exam). In other words, academic streaming is employed to create three streams of students based on performance. At the beginning of key stage 4 (Secondary 1), students start learning Geography as a subject on its own. They begin with introductory topics. As students proceed through stage 4, the level of difficulty and complexity of the topics gradually increases. By the end of stage 4 or third year of Secondary Education (S3), they undertake a Coordinated Exam set by the Ministry of Education.

At stage 5 students are regrouped using results from the coordinated exam they attempted at the end of Stage 4. They are allowed to select the subject they would like to specialize in. History and Geography students have the option to take one or both. Thereon students follow the IGCSE Cambridge Syllabus program. At the end of Key Stage 5, students who meet the pass mark sit for the IGCSE examination; whereas those who do not meet the required pass mark, sit for a National Examination set by the Ministry of Education. Thus, one could argue that Geography is a major subject in the Seychelles curriculum. However, with the onset of the digital age, it is imperative that Geography as a discipline changes with time or else it will slowly move into extinction. Hence, the object of this research was to assess the extent to which ICTs are being integrated into the teaching and learning of Geography.

The Seychelles Education Act (2004) part II stipulates that "It is the policy of the Government of Seychelles to ensure that all Seychellois are offered equal educational opportunities in accordance with their abilities, aptitudes and needs". Thus, the policy strives to ensure the maintenance of

institutions of education at the highest standard. It is the role of the Ministry of Education to carry out the policy of the Government of Seychelles stated in the Education Act.

The Ministry of Education through the National Curriculum Framework (2013, p. 9) provides national direction for learning and provides guidance for schools in the review and design of their curricula. When developing teaching and learning programmes, schools refer specifically to all the components of the National Curriculum.

In short, the National Curriculum has nine principles that guide the implementation of the school curriculum. Amongst the nine principles are the entitlement to a high standard of education which focuses on all children receiving a sound education to enhance his or her personal development regardless of their background. Learning should be learner-centred, this principle emphasises the use of strategies that allow students to develop skills that will be useful to them in adulthood. Curriculum coherence stipulates that learning is an ongoing process that allows learners to link with all learning areas. Teacher and school support focuses on the need for a productive stable learning environment and promotes the availability and access to resources that will enhance learning. Additionally, this principle also stipulates the need for continuous professional development of teachers.

The Ministry of Education (Seychelles) (2014) states that before the formulation of the ICT policy in Education and Training, the Ministry signed different Memoranda of Understanding to encourage the integration of ICT in the Education system. A good example is the memorandum of understanding with Iceland Seychelles Group in 2006 which, covers cooperation in

several areas of ICT particularly with regards to primary education. Another memorandum of understanding with Microsoft Partners in Learning in 2007 focused on providing professional development and training for educators and educational administrators. On the resource provision level, Isaac (2007) points out that in 2007, a subsidized laptop scheme was put in place so that teachers could buy Dell laptops at an affordable price.

According to the Seychelles Ministry of Education (2014), the Information and Communications Technology (ICT) in Education and Training Policy (2014, p. 6) provides guidelines on how ICT is to be integrated into Education in Seychelles. The long-term vision for ICT in education is to:

Provide leadership in the institutionalization of ICT into all educational processes; Encourage through safe and affordable access to ICT learner-centered education in all learning areas and at all the stages of education and training; Promote lifelong learning and a digital educational and training culture amongst the education community and national and international partners; Utilize ICT to optimize human, physical and financial resources whilst still enhancing quality and improving efficiency of educational and training processes.

The ICT in Education Policy outlines four key benefits that the integration of ICT in education is expected to bring. These include: “*Social* – the potential of equal access by all, to new technologies regardless of socio-economic background to reduce the digital divide between community groups: *Vocational and Economic* – the potential that knowledge and [familiarity] with technologies are important dimensions of employability: *Pedagogical* – the potential of new technologies to improve the quality of

educational and training experiences, by providing rich, exciting and motivating environments for learning and administrating: *Catalytical* – the potential of the use of technological devices to accelerate positive trends such as handling of data and problem-solving, and the promotion of collaborative environments for learning both within and outside of the country” (p.4).

For the past 10 years, the Ministry of Education has been encouraging the use of ICTs in teaching and learning by:

- Equipping each state school in Seychelles with two fully equipped computer labs.
- Ensuring that each school has the requisite IT hardware and internet connectivity.

Teachers through the Seychelles Institute for Teacher Education (SITE) (formerly National Institute of Education NIE), follow a mandatory core course in ICT while studying at the institution. This is to ensure that teachers are provided with the necessary skills and know-how in the field of information technology.

Teachers are encouraged to take part in an annual Microsoft project, where they can demonstrate the use of ICTs in the teaching and learning of their subject area. The Ministry also ensures that all secondary school teachers have access to Cambridge International Examinations online resource materials for teachers.

Thus, an awareness of obstacles to the use of ICT in education may assist educators to overcome these barriers and become successful technology adopters in the long run (Bingimlas, 2009).

Research methodology

A case study design was regarded as the most appropriate research design. A case study is described by Castellan, (2010) as the “analysis of one to several cases that are

unique with respect to the research topic... analysis primarily focused on exploring the unique quality". Farooq (2013) explains that a "case study is a comprehensive study of a social unit of the society, which may be a person, family, institution, community or event. It is explicit to a single unit with the aim to find out the influencing factors of a social unit and the relationship between these factors and a social unit". Castellán (2010) and Farooq (2013) identify similar characteristics of a case study research. This includes the use of a small sample size, the corroboration of statistical and descriptive data and the continuity of the case study. What can be understood from the authors' statement is that a small sample size is important when it comes to data analysis, since analysing qualitative data is a lengthy process, hence the need for small manageable data. Statistical and descriptive data can be incorporated to better identify, express and understand the issues which can be raised during the research with regards to the topic. Finally, case studies are continuous. This means that through studying a particular issue, at a specific period, on a particular topic, other issues or a hypothesis may arise, which can lead to further studies on a larger scale. Thus, a single but familiar school was studied. Although the findings can be regarded as unique and peculiar to the school, they can provide an insight into what is happening in other schools.

The research aimed to answer the key research question; how are ICTs being integrated into the teaching and learning of Geography? This research question was then further broken down into six sub-questions that guided the research to be undertaken. These questions were:

- What policy provisions are in place for the integration of ICTs into the Seychelles curriculum?

- To what extent are Geography teachers integrating ICTs into the subject?
- What are teachers' and students' perceptions and feelings about the use of ICTs in the teaching and learning of Geography?
- How are ICTs being used in the teaching and learning of Geography?
- What type of ICTs are teachers using in the teaching and learning of Geography?

What challenges are being faced in the integration of ICTs and how can they be resolved?

A qualitative research methodology was used to conduct this research. As defined by Denzin & Lincoln, (2005, p. 3) qualitative research is

...an interpretive naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them" (p.3).

Similarly, Castellán (2010) quotes Bogdan and Biklen (1998, p. 38) who state that qualitative research aims to "better understand human behaviour and experience... grasp the processes by which people construct meaning and to describe what those meanings are". The qualitative research method was relevant to this study as it provided an opportunity for researchers to learn and understand the feelings, perceptions, opportunities and challenges associated with the integration of ICTs into the teaching of Geography in the Seychelles. This type of research allowed the researchers and participants to interact. Since the main purpose of this research was to identify and gain an understanding of how ICTs are being integrated into the teaching and learning of Geography, qualitative research was the most suitable approach to adopt. The research was carried out at a secondary school in the

Seychelles. Through qualitative research, different points of view were exposed which provided insight into the perspectives of both teachers and students on the use and integration of ICTs in the teaching and learning of Geography, as well as factors influencing the use of ICTs in Geography.

Purposive sampling was employed in the research. This sampling type was suitable because it targeted the most appropriate participants to answer the research questions. Geography students from levels S1 to S5 (ages 11 to 15 years) were selected to participate in the research. Due to the large population size of students, only two students per class were selected to participate in the Focus Group Discussions (FGDs), interviews and filling in questionnaires. Although there are over 21 classes to choose from, the research confined the study to two classes at each level. This meant two classes for each of the 5 levels giving a total of 10 classes hence 20 students participated in the study. The population size was manageable and facilitated the lengthy process of data analysis. The small sample size (4) of Geography teachers meant that it was unnecessary to sample since the existing size was seen as manageable. In other words, all Geography teachers at the research site participated in the research. Different data collection strategies were used to ensure the trustworthiness of the data. This was effective in comparing the various viewpoints that were raised during the study. These sources and data collection strategies were used to provide information to answer the different research questions as well as validate and support the findings.

Document analysis was also used to corroborate the responses raised during the FGDs interview and questionnaires on the use of ICTs in the teaching and learning of Geography. The documents that were analysed included the teacher's scheme of

work, Geography syllabuses, the school resource database log, the national ICT policy, the Education Act, and lesson plans. Specific data were collected from each of these documents.

Geography schemes of work and lesson plans provided data on the type and frequency of use of ICTs in the subject. Geography syllabuses provided the various ways the use of ICTs is being encouraged in the teaching and learning of various Geography topics. The school resource data log provided the type of resources available to teachers and the frequency at which they are used by Geography teachers. The National ICT policy provided the Government and Ministry of Education points of view with regards to the integration of ICTs in Education. The Education Act provided the legalities of the quality of education that is expected to be offered in Seychelles. An observation checklist was used to identify the type of ICTs available at schools, their status conditions, and the different uses of ICTs at school. The observation checklist was used while visiting the school resource room, Social Science department and the classroom. A summary of the methods and tools use is shown in Table 1.

Compliance with research regulations

As argued by Smythe and Murray (2000), ethical considerations in social science research are an important component in any type of research and certain basic principles and standards governing the ethical treatment of human participants should be adhered to. Thus, in this study, all necessary steps which include free and informed consent, privacy and confidentiality assurances, avoidance of deception and lastly, the provision of information and debriefing were adhered to in this study. The research complied with the demands of the Office of Research and Development (ORD) at the University of Botswana that ensured that it complied with

the University research framework and regulations of which ethical issues are key aspects. Since this research involved human subjects (that is teachers, members of staff

and Ministry of Education officials), informed consent, confidentiality and anonymity were assured.

Table 1: Tools and methods that will be used to answer the various research questions

Sub Research Questions	Data Collection Tools and strategies	Participants
Question 1 What policy provisions are in place for the integration of ICTs into the Seychelles curriculum?	Document analysis: of Syllabuses, ICT policies, Education law, Schemes of work, lesson plans interviews	Researcher School administrators
Question 2 To what extent are Geography teachers integrating ICTs into the subject?	Questionnaires: FGDs Interviews	Geography Teachers' Students
Question 3 What are teachers' and students' perceptions and feelings about the use of ICTs in the teaching and learning of Geography?	Focus group interview Questionnaire	Geography students' Geography teachers'
Question 4 What challenges are being faced in the integration of ICTs and how can they be resolved?	Observation checklist Face to face interviews FGD Questionnaires	Researcher Geography teachers' Students

Data analysis and findings

Interviews were first transcribed and then analysed. Recurrent and emerging themes were noted. Some unexpected findings cropped up and these were never ignored but used to understand the bigger picture of ICT integration. Analysis was done as per the research question. The findings reveal that Seychelles does have the necessary policies in place for the integration of ICTs in education and these include the Education Act and the National ICT policy. Data collected from questionnaires, focus group interviews, informal interviews and observation checklists were used to establish whether teachers understand, and have the necessary skills to be able to use these ICTs. The overall picture from teacher participants reflects that Geography teachers are aware and are familiar with what ICT is all about and have the basic

skills to use it. With regards to the teachers' level of proficiency in carrying out tasks using ICTs particularly with regards to computers and the Internet, responses show that Geography teachers do use ICTs as a tool, storage facility, for processing and communication purposes. The levels of proficiency in these applications vary. For instance, the majority stated that they are very proficient when using ICTs for basic word processing, editing of pictures and creating presentations. Sending and receiving emails as well as participating on social networks were other common and well-established skills. However, with regards to creating and maintaining online activities, such as blogs, websites, creating and using databases or spreadsheets, the level of proficiency for the majority of the Geography teachers' is less satisfactory. In short, Geography teachers

have limited skills to enable them to explore other uses of ICTs especially when it comes to online activities such as creating and maintaining websites or using software that relates to their subjects. This is despite evidence that schools are considerably well resourced to allow good use of ICT skills.

However, through the FGDs students painted a completely different picture. Teachers rarely use ICTs in the classroom. Secondary 3 to Secondary 5 students mentioned that Geography teachers use ICTs in the classroom only once a term. Students also mentioned that the sole use of these ICTs is for PowerPoint presentations to illustrate pictures or diagram, and in some cases, they watch video documentaries. Secondary 1 and secondary 2 students mentioned that their Geography teachers have never used any form of ICTs in the classroom. Thus, there is a contradiction in terms of the frequency of use of ICTs in the classroom.

Students pointed out that they usually use ICTs to complete homework especially research work or projects assigned to them by their Geography teachers. This corroborates what Geography teachers said in informal interviews that they do encourage students to use ICTs in doing research or to simply typing their projects.

The teachers' and students' perceptions and feelings about the use of ICTs in teaching were generally positive. *"Provided we had both quality and quantity resources it would be very good and effective. But I strongly feel that geography is one subject which can support the use of ICT"* (Teacher A). This shows that teachers are aware of the potential use and benefits that ICTs can bring to the subjects. Additionally, another teacher mentioned the interactive potential of the discipline of Geography which can enhance students' skills. *ICT is not a substitute for a quality teaching, but it can enhance quality teaching. Virtual field studies cannot replace genuine field experiences, but students can be introduced to*

tools that geographers use when engaged in fieldwork. So, it is good to have virtual before the actual fieldwork. The use of technology, particularly computers, can increase the range of techniques available for teachers to have quality teaching.

Students' responses show that the use of ICTs in learning help in building an understanding of Geographical concepts. Common responses students gave included the following:

It helps us with reading, and I can refer to the documentary or video several times so that we can understand things better.

[It] changes the class atmosphere and makes us become more interested to learn.

It is easier for us especially in understanding things/concept being taught. It changes the class atmosphere; students behave better since the teacher brings in the projector and laptop. They get excited and eager to learn or find out what the lesson will be about. It helps with retention of details, like instead of just notes to read, visual pictures or video of what the topic or theme, helps us to retain information and understand the lesson.

Both teachers and students share optimistic perceptions about the use of ICTs in the teaching and learning of Geography. Both Geography Teachers and students feel the use of ICTs facilitates and enhances the teaching and learning process of Geography.

Challenges hindering the integration of ICTs into Geography teaching and learning

The key challenges that are hindering the integration of ICTs in the teaching and learning of Geography were: the syllabus, the type of ICTs available for use, the procedures to access ICTs, students' behaviour, and the classroom setting. The first challenge as pointed out by the Geography teachers is that the Seychelles Geography syllabus provides very little guidance on how ICTs, especially the World Wide Web or software applications, can be used in the teaching and learning of Geography. They argue that the Seychelles

geography syllabus is old and outdated. Moreover, they strongly believe that the syllabus does not cater for 21st-century skills. An analysis of the Seychelles Geography syllabus indicated that the syllabus is a trial edition of 2007. The suggested strategies in the syllabus make little reference to the use of ICTs. The use of the World Wide Web for further research and documentary presentation are the two main ICTs suggested as resources to use in the teaching of some Geography topics. Students in the upper secondary level; that is Secondary 4 and Secondary 5, follow the Cambridge International Examinations IGCSE Geography syllabus. Unfortunately, the questionnaire did not provide Geography teachers' the opportunity to share their opinion with regards to the extent to which the Cambridge syllabus guides them in the use of ICTs in their teaching and learning. An analysis of the Cambridge Geography syllabus, however, showed that it does guide Geography teachers in the use of ICTs in teaching and learning. The Cambridge syllabus provides Geography teachers with online resources and materials. Moreover, Geography teachers can access the Cambridge E-learning websites, which allows access to a variety of teaching and learning materials. Unfortunately, the unreliable internet connectivity at the school deters Geography teachers from meaningfully accessing such resources.

The availability of ICT hardware and software is still a challenge with laptops and HDMI projectors being the most common. Subject-specific programmes or materials relating to the teaching and learning of Geography are not available. PowerPoint presentations and video documentaries are by far the most common programmes utilised in Geography lessons. However, through observation, it was established that some Geography teachers are in the habit of using PowerPoint slides prepared by other teachers, hence, this raises issues of quality and proficiency amongst teachers.

The use of GIS and Google Earth could have enhanced the teaching and learning of map work. The Geographical Association (2014) contends that the use of GIS during the lesson provides students with a more attractive and engaging perspective of map reading. This is achieved using real-time aerial photographs or 3D imagery of an area. Furthermore, "enabling pupils to experiment with cartography by choosing colours, graphical techniques and methods of selecting and presenting data on maps; allowing more time to achieve higher-level thinking by replacing tedious mapping operations with interactive manipulation of large sets of digital maps and data to select, display and interpret spatial patterns and relationships." Thus, Geography teachers recommended that the Ministry of Education should invest in the purchase and installation of educational software as well as setting up workshops to enlighten and guide teachers on how to use these software applications in teaching and learning. During the interview with a Ministry Official, it was pointed out that the Geography teachers can request the Ministry to purchase and install subject-specific software applications.

The third challenge relates to managing access to ICTs at schools. Procedures used to access hardware and computer labs are cumbersome and restrictive thus the whole security-related process becomes counter-productive. For example, one of the procedures requires teachers to request access through a logbook one day before the use of the ICTs. This calls for a lot of planning and consultation with other users so that teachers do not make requests at the same time. Providing departmental gadgets could be the only answer.

The last challenge relates to internet connectivity and bandwidth issues. Although the school does have internet connectivity, it is not reliable. Often enough it is too slow or frequently offline. This poor connectivity is a result of poor service provision by the Internet Service Provider and hence nothing much can

be done by the school. A Ministry Official said that they are aware of the connectivity problem in the majority of state schools and that the Ministry is currently working on a permanent solution to the problem. A Ministerial project is already underway to provide schools with reliable internet connectivity and bandwidth appropriate to the needs of the schools. Eventually, this technical effort will help deal with Alkhawaldeh and Manchaca's (2004) assertion that the barriers to using ICTs in education are a lack of knowledge, a confidence, and training.

Conclusion

The study shows that there are policy provisions made to cater for the integration of ICTs in teaching and learning. The National ICT Policy and the Ministry of ICT policy for Education and training are specific documents that make mention and give guidance on the purpose of ICTs in the Education system of Seychelles. Both documents advocate the importance of ICTs as a key factor to aid in empowering the youth of Seychelles with the necessary skills which the 21st-century workforce requires. However, there is a need to synchronise the Education Act (2004) with these new two ICT policies. This is to ensure that ICTs are given prominence and compel all parties to play their role to ensure the full integration of ICTs in the Seychelles educational system.

Geography teachers understand the purpose of ICTs and the benefits it brings to teaching and learning. It was also established that Geography teachers do have a good level of proficiency when it comes to carrying out basic tasks using ICTs, but the extent to which Geography teachers are integrating ICTs into the subject orient around the types of ICTs available for them to use. The study also reveals that Geography teachers and students share mutual and positive perceptions with regards to the use of ICTs in the teaching and learning of Geography. Geography teachers' perceptions orient around the Geographical

content which provides opportunities for the use of ICTs. Geography as a subject allows learners to better understand the physical and human world, they live in. Through ICTs learners can be exposed to different geographical environments which are not familiar to them. ICTs need a lot of capital and once an investment has been made, there should be meaningful use for the stakeholders to reap the benefits. In most cases, this also brings about the dilemma of balancing ensuring the security issues and access. Many a time security concerns override the need to use and thus school regulations meant to protect the equipment may end up impeding the use of the very same equipment. The Seychelles Geography syllabus also provides little guidance to teachers on which ICTs or how best to use them in teaching certain concepts. Therefore, there is a need to infuse ICTs into the Education Act and the Geography syllabus.

Thus, although the overall finding of the study shows that ICTs are being integrated to some extent in the teaching and learning of Geography in the Seychelles, the major barriers identified by Bingimlas (2009), lack of confidence, lack of competence and lack of access to resources, are still evident.

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