An investigation of the Information and Communication Technology (ICT) integration strategies used by Junior Primary teachers in teaching phonemes in the Oshana region

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Abstract
This study investigated ICT integrating strategies used by Junior Primary School Teachers in teaching phonemes in English in the Oshana Region. The study adopted a qualitative research approach using a phenomenological research design to collect data from the junior primary teachers. The population of this study comprised 134 Junior Primary school English teachers in the Oshana education Region. The sample consisted of 15 teachers selected through purposive sampling from the four schools in Oshana region. The qualitative data was collected by means of in-depth face-to-face unstructured interviews. Data collected from the interviews were then transcribed, presented and then analysed using thematic analysis. The findings of the study indicated that the English teachers in the Oshana region acknowledged the role played by ICT in the teaching of phonemes. The findings of the study further indicated diverse varieties of ICT gadgets such as were YouTube videos, PCs and mobile phones, the jolly phonic programs, projector, and whiteboard, which they made use of in their teaching of English phonemes in schools. It can be concluded from the findings of this study that the most common ICT tools used in the teaching of English phonemes by Junior Primary school teachers in the Oshana Region were YouTube videos, PCs and mobile phones, the jolly phonic programs, projector, and whiteboard in teaching phonemes. The study recommended better ways to improve the ICT integration strategies for teaching English phonemes such as conducting teachers' training or workshops on the use of digital tools in the education sector for the benefit of all teachers.

Keywords: *ICT, strategies, integration, phonemes, teaching and learning, English, teachers*

Introduction

Information Communication and Technology (ICT) covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form (Warschauer, Zheng, Niiya, Cotton, & Farkas, 2014). According to Kent and Facer (2014), a phoneme is defined as the smallest unit of speech distinguishing one word (or word element) from one another, such as the elements p in tap or any of the perception distinct unit of sound in a specified language that distinguished one word from another, for example p, b, d and t in the English words pad, bad, and bat. English – consisted of approximately 41 phonemes. Kent and Facer (2014) further indicated that the theoretical teaching of phonemes without computer aided simulations and modelling makes the understanding of phonemes difficult at the junior primary school level. ICT devices such as computers and software can help make the teaching of phonemes effective and done efficiently. ICT comprises computers, digital television, email, modems and internet and it mostly deals with how these different resources can combine and work with each other in order to make teaching effective and fun for learners.

ICT resources can be divided into three categories namely information technology, telecommunication technologies and networking technologies. In this study, ICT in education was taken to mean the use of digital ICT resources to certain aspects of teaching and learning of English specifically phonemes. The place of English in the Namibian education system is crucial since it is a medium of instruction to students in the primary schools. Apart from Oshiwambo, Afrikaans and Otjiherero, all other subjects are taught in English. This therefore means that for students to do well in school they should have a good grasp of the language of instruction, which is English. Knowledge in ICT is a prerequisite within this modern society where every sphere of our lives is controlled by technology (Jackson, Von, Witt, Zhao, & Fitzgerald, 2011).

ICT should be integrated in the English curriculum and in the methods used to teach. In order to produce students who are ICT literate and who can function and fit well in this twenty first century where technology dominated every

sphere of life. Afreen (2014) is of the opinion that using ICT resources, especially computers, the internet and other related technologies in the classroom better prepares the learners for the work place in advance where this equipment is to be used. Students who are able to use ICT effectively have a better chance of being absorbed in the current globalizing environment. It is because of this need to have an ICT literate population that the Government of the Republic of Namibia (GRN) continues to invest in teaching and learning resources in these areas especially in primary schools (Ministry of Education, Sports & Culture, 2012).

Statement of the problem

The Namibia Ministry of Education, Culture, Sports, Science and Technology survey revealed that more than 33% of teachers were unable to use a computer and less than 25% were able to provide computer instructions (Ministry of Education, Sports & Culture, 2012). The Namibian government is pushing towards equipping the learners with the adequate required skills to fit in the technological era thereby promoting lifelong learning by success in ICT adoption in education. Nearly all the primary schools in Namibia have computers but very few have the required ICT connectivity. Well-wishers; private sectors and the government (Ministry of Education, Sports & Culture, 2012) aided those schools that have ICT connectivity. It has been difficult to develop ICT infrastructure in primary schools; the major obstacle being lack of internet connection. To improve on the sharing of learning materials, there is need to improve on the networks. Other alternative networks like the wireless systems cannot be used in schools because of the high cost of installation. Few learning institutions in Namibia can access high-speed data and communication systems; moreover, schools in the rural areas cannot access wireless technology such as Very Small Aperture Protocol (VSAT) to access internet. The national ICT strategy for education and training policy paper of 2014 recognizes that Namibia lags far behind in ICT integration in learning especially in primary schools (Kent & Facer, 2014).

As teachers of English, the researchers observed that teachers at junior primary school have various ICT equipment, learning tools and management systems but lack the relevant strategies and modern methodologies on how to use and integrate them into their lessons. This occurs especially when teaching the concept of phonemes in English which seems to confuse both teachers and learners at the junior primary school level. The Ministry of Education, Arts and Culture tried to equip the teachers with the necessary ICT skills that they can use in the integration of ICT in various lessons through the Tech/NA! ICT Implementation plan (Ministry of Education, 2012) and the ICT policy in Education (Ministry of Education, 2010). However, learners still struggle with phonemes and eventually perform poorly in English. The purpose of this study was to investigate the strategies used by primary school teachers in integrating ICT in the teaching of phonemes in English in the Oshana region. This study sought to answer the following research question:

1. What strategies are employed by junior primary school teachers in integrating ICT in the teaching and learning of phonemes in English at the junior primary school level in Oshana Region?

Theoretical framework and literature review

Technological Pedagogical and Content Knowledge (TPCK) model developed by Mishra and Koehler was used as the theoretical framework for this study (Mishra & Jaisankar, 2006). The reason for selecting this theoretical framework was that it focuses on technology, pedagogy and content on the integration of ICTs in teaching and learning in classroom settings (Archibald, 2012). Each element of TPCK represents foundational elements of a teacher's expertise. Working backwards, a teacher must first be an expert in a content area of the teaching experience. Next, they must possess knowledge concerning how students might best connect with curriculum content, or pedagogy. Finally, a teacher must possess knowledge related to the use of the technological tools themselves, including basic operations and mechanical controls. Together, these overlapping spheres of knowledge represent broad zones of expertise for effective teaching and learning.

The Technological Pedagogical and Content Knowledge (TPCK) theory states that a school is an important environment in which students participate in a wide range of computer activities, while the home serves as a complementary site for regular engagement in a narrower set of computer activities.

Increasingly, ICT is considered a powerful tool for educational change and reform. ICT tends to expand access to education. Through ICT, learning can occur any time and anywhere. In terms of ICT, learning and teaching no longer depend exclusively on printed materials (Kent & Facer, 2014). Multiple resources are available on the Internet, and knowledge can be acquired through video clips, audio presentations, visual presentations and so on. The recent research has indicated that ICT assists in transforming a teaching environment into a learner-centred one (Dang, 2019). Voogt (2008) stated that the integration of technology in education practice is a complex innovation for teachers. Voogt further stated that teachers have difficulty in integrating technology in their instructional processes because they have poor background in the use of technology. Therefore, even when the ICT application had proven to be effective, this does not always imply that the same effects are realised in natural educational settings.

Literature review

Serhan (2009) stated that ICT fostered autonomy by allowing educators to create their materials, thus providing more control over course content than is possible in a traditional classroom setting. Therefore, the whole learning process enriches students learning skills and broadens their knowledge beyond what they already know. By using ICT, students' creativity can be optimized. According to Voogt (2008) to integrate technology in educational practice, empowering teachers to appropriately use technology is of paramount importance, because knowledge of specific hardware and software is needed to enable teachers to understand the options from which they may select, and operate them efficiently for specific domain in the curriculum.

As indicated by Voogt (2008), integrating ICT in Education empowers teachers. The researcher strongly agrees with Voogt due to the fact that ICT could transform teaching and learning processes from being highly teacher – dominated to student - centred, and that this transformation would result in increased learning gains for students, and allowing opportunities for learners to learn better. Seidenberg (2013) concluded that ICT should be infused into the entire curriculum so that pre-service teachers have the opportunity to understand the educational reasons for using ICT and experience how ICT can support teaching and learning across different subject domains.

The use of YouTube videos, PCs and cellphones has gained significant popularity in the teaching of English phonemes in schools (Bizzocchi, 2017). Videos, PCs and cell phones can be of great benefit in teaching phonemes to the learners in schools as these would allow the learners to undertake sound and picture matches, movement and sound play, hand on letters, sing songs that are aligned to a specific sound (Akram & Malik, 2010). This helps learners to develop their phonetic understanding and allow them to be able to develop their reading of English comprehension especially if these are applied at lower grades. With continued practice, learners would be able to decode skills and become automatics that they concentrate on and increase their understanding through concentration with what they are doing (Ministry of Education, Arts and Culture, 2015). Phonics raises learners' phonetic awareness, videos and cellphones, can be very effective learning tools in the teaching of English.

According to Arnell (2012) there is a powerful relationship between phonemic awareness and reading achievement. Many phonemes, however, are difficult to hear because they are pronounced or blended together in rapid, everyday speech. Thus, in order to help students, learn how to read, it is important to employ teaching technology that enables students to hear individual phonemes in order to develop phonemic awareness (Arnell, 2012). The Rhyme is the vowel and any subsequent consonants (Bizzocchi, 2017). Onset and rime was an important aspect of phonological awareness and teaching onset and rime was an important phonological strategy. The ability to recognize rhyme requires an underlying awareness that rhyming words end with the same sound.

The integration of ICT in teaching and learning has increasingly been used in various schools to improve the learners' understanding of phonemes globally. These strategies, which are being used in various countries, depending on what developmental stage level that particular country is on the international scale (Ahmad et al., 2012). Those countries, which are highly developed, are making use of advanced electronic media and gadgets, which are given to the learners, while those countries that are still developing especially in the African and the Latin American communities,

are utilizing those gadgets, which they can afford to purchase. These gadgets range from television, laptops, projectors, downloaded applications, YouTube videos among others and they depend on whether the particular teacher is able to make use of or operate such gadgets (Ariandika & Kartikawati, 2018).

Ahmad et al. (2012) argued that the use of ICT gadgets in the teaching of English phonemes makes the teaching of English not only interesting but also understandable. From the point of view of Ahmad et al. (2012), gadgets made the teaching not only interesting but also understandable, the reseachers however strongly agreed and supported this view, as the researchers also understood and acknowledged that ICT enhances communication, speeds up work and boosts collaborations in a school setting. The researchers however strongly recommended that ICT can enhance performances and speed up teaching and learning. On this note, Arindika and Kartikawati (2017) stated that the synthetic phonics approaches emphasise the need for the child to be able to read the specific sound of every letter in a word. The sounds of letters are combined and the learners will be able to read out a word. This proves that with synthetic phonics, the learners are taught to segment sounds represented by each letter of a word and then blend the sounds. That means that the use of ICT can be used to make learners understand English phonemes better at the junior primary school level.

Projectors, whiteboards and jolly phonics are effective tools for lower primary learners to learn English phonemes. Jolly Phonics is a fun and child centred teaching approach for teaching literacy through synthetic phonics for each of the 42 letter sounds, the multi-sensory method is very motivating for children and teachers who can see the learners achieve their best in learning (Aliaga & Gunderson, 2017). Software programs can be used as effective ICT tools in the teaching of English phonemes to lower primary school learners. These programs or software's are effective in making learners master and improve their phonetic understanding at lower grade levels (Walker, Betts, & Sainsbury, 2013). These software programs vary from place to place and from school to school. Some schools prefer using Saxon phonics home study kits; the sing spell, read and write software, K5 beginning home school kit, happy phonics, hooked on phonics and the phonics pathways 10th edition (Coppola, 2006).

Methodology

This study employed a case study research in a gualitative research paradigm, because the researchers wanted rich descriptions of complex phenomena. This means that the researchers were interested in individual views of the junior primary school English teachers on their experiences with strategies they used in the teaching rather than information from books. It also means that the researchers were also interested in subjective views of the teachers on their views on how ICT can be intergrated in the teaching of phonemes in English second language. The population of this study comprised all the 134 junior primary school English teachers in the Oshana education Region. The sample of this study consisted of only 15 teachers selected purposively from the four schools in Oshana region. This study used purposive sampling technique to select 15 teachers of English from the four junior primary schools in Oshana Region.

One research instrument was used to collect data from the 15 teachers in this study. This was an indepth face-to-face interview. The face-to-face unstructured indepth interviews with open – ended questions were conducted with the English teachers from four junior primary schools to allow them to express themselves freely. Permission to conduct this study was granted from the Oshana Directorate of Education. The teachers were interviewed individually face to face. The information gathered was recorded by using an audio-recorder. The audio-recorded data collected from the interviews were analysed by developing themes that were aligned to answer the research question. The researchers linked analyses of the data to specific research question.

Data collected from the interviews were then presented and analysed using thematic analysis. All the participants in the study completed informed consent forms prior to taking part in the study. The pilot study was conducted at Oshakati West Primary school; the sample population for the pilot study comprised 3 teachers including the HoD for Oshikwanyama/Oshindonga first language at junior primary phase. Based on the outcome of the pilot study double-barrelled questions were reworded. Some questions on the interview and questionnaire protocol that were ambiguous were also amended based on the pilot study results.

Results

The results of this study were divided into two main themes

Table 1: Main themes and sub-themes with reference to the participants

Main theme	Sub-theme
Demographic information of the teachers	
Strategies that can be used by junior primary school teachers to integrate ICT in the teaching of phonemes in English at the junior primary level.	The use of YouTube, PC, Cell phones as teaching strategy
	Software programs/ICT Tools teaching strategy as teaching resources
	The use of Projector, white board, jolly phonic in teaching phonemes
	Use of Television, radio teaching method
	Downloaded app video as a teaching method

Theme 1: Demographic information of the teachers

Table 2: Demographic details of teacher's gender, qualification, employment and status

Participant	Gender	Educational Level	Employment Status
1	Male	Master's Degree	English Teacher
2	Female	Honour's Degree	HoD
3	Male	Master's Degree	HoD
4	Female	Honour's Degree	English Teacher
5	Female	Honour's Degree	English Teacher
6	Male	Master's Degree	English Teacher
7	Male	Honour's Degree	English Teacher
8	Female	Honour's Degree	English Teacher
9	Female	Master's Degree	English Teacher
10	Male	Honour's Degree	English Teacher
11	Male	BETD	English Teacher
12	Female	BETD	HoD
13	Male	Master's Degree	English Teacher
14	Male	Honour's Degree	English Teacher
15	Female	BETD	HoD

Theme 2: Strategies to integrate ICT in the teaching of phonemes in English at the junior primary level.

Theme 1 shows the strategies that could be used by junior primary school teachers to integrate ICT in the teaching of phonemes in English at the junior primary school level in the Oshana Region. The participants in the study indicated diverse varieties of ICT gadgets, which they made use of in their teaching of English phonemes. For example, Participant 3 had this to say, "*I am making use of videos and television sets and video recorders to teach English phonemes at my school".* This was echoed by Participant 10 who also stated that "*I make use of radios and YouTube videos to teach phonemes since these are effective in allowing the learners to see and listen"*. Only 2 out of 15 participants who have indicated the use of Rhyme generation, multi-sensory mapping strategy, picture snaps, sound sorts, treasure chest, etc., but seemed to have little knowledge about it. This gives evidence that teachers aware of the integration of ICT in their teaching of phonemes but seems to have little knowledge about it.

The use of videos, television sets and video recorders enhances the teaching and learning process as learners learn better by seeing and imitating what they see on the videos and television (Nomura, Matsuno, Muranaka, &

Tomita, 2019). This finding shows that all the 15 teachers made use of videos, television sets and video recorders to teach English phonemes. All the 15 participants also supported the use of videos, television sets and video recorders in the teaching of English phonemes. The participants revealed that Television was more widely used at schools as they usually gathered the learners and learned the sounds together since they only had one television set for the entire school. This proved that the teachers could show their learners these videos in their classes during teaching and learning.

Sub-theme 1.1: The use of YouTube, PC, and Cell phones as teaching strategy

The participants in the study indicated that some of the most common ICT tools they used in the teaching of phonemes were YouTube videos, PCs and mobile phones. On this issue, Participant 5 had this to say, *"I make use of downloaded YouTube videos to teach my learners English phonemes and these have proved to be very effective ICT tools in the teaching of English"*. Participant 12 also said that *"I make use of my mobile phone in the classroom to teach phonemes and this has proved to be very helpful"*. Another participant, Participant 14 stated that, *"I make use of a personal computer to teach phonemes to lower grade"*.

The use of YouTube video, PC and cell phones as stated by Participant 5, 12 and 13, who revealed that they made use of cell phones in the class. This shows that teachers were making use of their PCs and cell phones for the teaching and learning process to be effective. This therefore, showed that the use of YouTube, PC, and cell phones could be one of the strategies that could be used by the teachers to integrate ICT in the teaching of phonemes. This finding was supported by Odera (2011) who claimed that the communication in ICT is often carried out using PCs, YouTube videos and mobile phones that offer voice, text, and other communications services that the internet may support. These findings revealed that YouTube videos, PC and cell phones can be used as a strategy to integrate ICT in the teaching and learning of phonemes in English. This finding has proved that phones and videos could be used during the lesson as a teaching tool to enhance teaching and learning.

Sub-theme 1.2: Software programs/ICT tools strategy as teaching resources

On the buying of software programs to teach English, this is what Participant 1 had to say, *"I make use of Aerobics various prices, which is a program, used to help learners to improve their auditory processing skills issues and videos letter sound coordination, and which letter makes what sound"*. On this issue, Participant 6 had this to say, *"I make use of happy phonics software to teach learners how to pronounce letters and this software can be downloaded on a mobile phone"*.

The participants had indicated that they made use of the fundraising money to purchase the jolly phonic programs they had been using in the school for the past few years and the school had seen great performance upon acquiring the program. All participants revealed that they had other programs in place that they also used to teach spellings and it worked hand in hand with teaching letter sounds. This showed that if teachers were provided with software programs they could use those programs in their class as teaching aids to integrate ICT in the teaching of phonemes. Without the necessary support, the teachers would not teach with pride and enthusiasm. Nyathi (2010) stresses that a supportive working environment makes the teacher to go an extra mile in their teaching. A supportive working environment in regard to ICT is the one that is interactive, flexible and convenient. ICT has become the order of the day and opens up opportunities for learning because it enables learners to access, extend, transform, and share ideas and information in multi-modal communication styles and format.

Sub-theme 1.3: The use of projector, whiteboard, and jolly phonic in teaching phonemes

Participant 5, 6, 11 and 15 revealed that there were many advantages in using projectors ranging from producing much larger images and customizing image size is quick and easy among others. Participant 7, 9, 13 and 14 then revealed that interactive whiteboard encourages learner's engagement, make the learning process more enjoyable, accommodates different learning styles and reduces classroom costs. On the use of jolly phonics, the study revealed that the program improved cognitive development, confidence and self – esteem, enhanced emotional and social skills and improved oral communication and motor skills. On this matter, this is what Participant 7 said: *"I make use of the projectors and whiteboards and jolly phonic to*

teach my learners the English phonemes". This was supported by participant 11 who said that *"the use of ICT gadget like jolly phonics makes learners understand phonemes better than when other methods are used, and this method allows learners to imitate letter sound, and learn the formation and letter segmentation"*.

Participant 7 and 11 also presented another way of teaching phoneme to their junior primary school learners. Participant 7 stated that *"the jolly phonic program could be taught to the learners through five skills and these were, learning the letter sounds, letter formation, and blending, identifying letters in words and learning tricky or difficult words"*. Whereas, Participant 11 supported the jolly phonic program, and stated that the program allowed learners to imitate the sounds. All these findings outlined strategies that could be used to teach phonemes. This showed that it was very vital for schools and all stakeholders to support teachers by purchasing the jolly phonic program. Without the program or the knowledge on how to operate this program, the integration of ICT will not be implemented effectively. The Jolly phonic program could be used in class to connect to the TV so that the learners could watch the letters and hear their sounds.

Sub-theme 1.4: The use of television, radios as teaching method

On this issue, Participant 14 had the following to say: *"I make use of radios and televisions which makes the teaching of English phonemes easier and more interesting for the learner"*. On the same note, Participant 2 said that *"I make use of radios and that makes the teaching of phonemes more meaningful to my learners and this enhances greater understanding of the phonemes*". In addition, Participant 13 mentioned that *"At our school, we make use of televisions in the teaching of phonemes, learners enjoy watching the development of phonetic language and using the television, learning is made more meaningful and exciting to the learners"*.

The above findings indicated that television and radios could be used to teach phonemes. Participant 2 stated that radios enhanced learning and greater understanding of phonemes. The above explanation clearly showed that radios and television had the advantage of delivering timely messages and stimulated learning as learners enjoyed watching television. This finding revealed that if teachers were provided with the necessary ICT tools, they could teach successfully.

Schools that are led by transformational leaders have the potential to grow as they attract the best teachers who will also give their input in the development of the school (Riesen, McDonnell, Johnson, Polychronics, & Jameson, 2012). Schools that avail televisions and radios to their teachers can therefore produce good results and ensure that ICT is integrated in the teaching of phonemes successfully.

Conclusion

The findings of this study indicated that the Junior Primary English school teachers in the Oshana region acknowledged the role played by ICT in the teaching of phonemes. The findings of the study showed diverse varieties of ICT gadgets, which Junior Primary school teachers made use of in their teaching of English phonemes in schools. It can be concluded from the findings of the study that the use of video recorders and television as well as radio sets enhanced the teaching and learning process. It can also be concluded that the most common ICT tools used in the teaching of English phonemes by junior primary school teachers in Oshana region were: YouTube videos, PCs and cell phones, the jolly phonic programs, projectors, whiteboards, and jolly phonic in teaching phonemes. The teachers also made use of television sets, jolly-phonic programs, smartphones, PCs and radios.

Recommendations

The researchers provided the following recommendations which were based on the research findings of the study:

1. Regional officers should be at the forefront of making sure that Oshana Regional schools are provided with basic requirements in terms of ICT logistics and equipment.
2. Schools should participate with each other in sharing the resources they have, especially at the school level and circuit level where they needed more clarity on training, ICT demonstrating program for teaching English phonemes.
3. This study was conducted in Oshana Region in the junior primary schools only. More studies need to be undertaken in other circuits or regions so that these findings can be compared.

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