IJEIR
International Journal of Educational Innovation and Research
Volume 4, Number 1, 2025, pp. 86-99
DOI: https://doi.org/10.31949/ijeir.v4i1.11626
ISSN: 2810-0808

How can the connection model for integrating Information and Communication Technology solve four major grade 12 accounting problems?

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ABSTRACT
There are several problems that affects the quality of teaching and learning in accounting in secondary schools. In grade 12 particularly, English language misunderstanding, limited advance teaching skills and abilities, restricted teaching times and lack of parental support have been observed as major problems that hinders quality teaching and causes poor academic performance. Therefore, this study aimed to demonstrate how the connection model for integration of Information and Communication Technology can solve these four major grade 12 accounting problems. Actor Network Theory (ANT) informed this empirical inquiry. In addition, critical paradigm and Participatory Action Research were used to understand the research phenomenon. Six teachers were purposively sampled to participate in the discussion and the data collected was analysed using a content analysis. Results showed that connection model can solve the four major problem in grade 12 by offering opportunities of communicating in one language and using auto-correct to improve vocabulary. Through reinforcing technological knowledge and skills for new pedagogical ideas. Furthermore, by providing an alternative convenient learning method and connecting teachers with parents via WhatsApp. Considering the above results, the study suggested that connection model must be more embraced in accounting. The model must be documented and made available to accounting teachers to also use it for ICT integration in accounting. It is recommended that the connection model should be developed into an app for accounting.

ARTICLE HISTORY
Received 2024-10-27
Accepted 2025-01-21

KEYWORDS
Connection model
Accounting
Grade 12 problems
Actor Network Theory
Teaching and learning

INTRODUCTION

In South Africa, accounting is a subject that equips learners with knowledge and skills that relate to finance, businesses and economy. Further the subject provides learners with financial understanding and preparations for different accounting professions. Accounting subject is impactful in the sense that when learners complete their basic education, they have obtained knowledge and skills to start and manage their businesses. Nevertheless, the subject is confronted by numerous problems including language barrier, limited teaching times, lack of commitment in learners, one size fit all teaching strategies, using traditional teaching strategies, broad content and limited innovative assessment strategies. These problems are observed and reported by teachers in schools. Mkhize, Mtshali and Sithebe (2022) indicated that problems such as not receiving textbooks on time, lower period allocation, lack of parental involvement, placing more emphasis on

science subjects, and lack of learners' motivation are challenges that results in high failure rate in accounting in schools. Although literature demonstrate the above challenges this study dwells on four major problems that are highly reported in grade 12 accounting namely English language misunderstanding, limited advance teaching skills and abilities, restricted teaching times and lack of parental support. These problems are regarded as causes for a high drop out in accounting subject, the subject being phased out in some schools and poor academic performance. Literature (Du Plessis & Mbunyuza, 2014) shows that measures to address these four major problems have been proposed before however they are still increasingly so. Consequentially, the problem at hand in this study are the four major persisting problems in grade 12 accounting. This then resulted in one main objective of this study which is to outline how the connection model can assist in mitigating the four major problems in grade 12 accounting. The rationale for utilising a connection model is that none of the measures that have been proposed before are technologically grounded.

Using connection model to solve the above-mentioned problems was a way of introducing a new angle of tackling accounting problems. The connection model would demonstrate a reform compared to the other strategies that have been proposed previously. This led to a gap the study is attempting to fill of adopting technology in solving the ongoing problems in grade 12 accounting. Another gap the study is trying to fill is the limited literature that addresses major problems in accounting and the utilisation of connection model. Therefore, the study is unique in the sense that it uses a technology idea to solve grade 12 major problems. Furthermore, the study's uniqueness is that it concentrates mainly on grade 12 and uses a science and technology theory. This social science study employed Actor Network Theory (ANT) which is a science and technology theory hence the study is unique. The connection model resonates from the findings of the study that was conducted for Doctor of Philosophy by Sithole 2024. The findings displayed that teachers mostly utilise smartphones, internet and WhatsApp to connect to learners for teaching and learning. From these findings Sithole formulated model called connection model that demonstrate how teachers are integration ICT in teaching accounting to connect instruction. It was discovered that the connection model makes effective teaching and learning in accounting when teachers are integrating Information and Communication Technology (ICT) in the classroom. Hence now the attempt is to use it in solving problems that relates to teaching and learning. The connection model needs human and objects which are a smartphone and the internet to be effective. Further the problems are experienced by humans (accounting teachers) therefore to address the problem of this study rigorously Actor Network Theory (ANT) was employed as it advocates that there is a relation between human and technology objects to produce knowledge and innovation. Further ANT shows that non-human objects play a significant role in networks systems, solve technology problems and knowledge production thus it was appropriate to link the major problems with ANT. The relationship between the four problems and connection model is that it connects humans and non-human objects to propose solutions. ANT and connection model advocate for connection of human and objects to create relationships and networks thus problems could be approached differently using the two. Padayachee (2017) point out that Information Communication Technology (ICT) integration in the classroom is often viewed as a panacea towards resolving South Africa's education challenges.

This paper begins with a deeper discusses the four major challenges faced by teachers in grade 12 accounting, the overview of the connection model and then the theory used to frame the study is explained. Thereafter comprehensive research methodology, presentation, and discussions of results are outlined, and the paper ends with recommendations and concluding thoughts.

Research Question

How can the connection model for integrating Information and Communication Technology solve four major accounting problems in grade 12?

Four major problems in grade 12 accounting

Below are the four major accounting problems that have been reported in accounting grade 12.

English language misunderstanding

In South Africa English is regarded as the medium of instruction in schools while learners have different home languages. The home languages are the ones that are mostly used within the family and amongst society for communication and knowledge construction. Even within the school premises learners mostly use their comfortable home language. This therefore becomes a problem when learners are in the classroom and must conceptualise curriculum content. As the language they use outside the classroom is not used in teaching and assessment consequentially understanding English becomes in vain. Further subject such as accounting have unique concepts that learners need to conceptualise for adequate content knowledge. This is a massive problem since it affects the quality of accounting learning and knowledge acquisition. An array of studies has observed language challenges in accounting (Letshwene & du Plessis, 2021; Mkhize et al., 2022).

Limited advance teaching skills, knowledge and abilities

Subjects such as accounting require teachers who are knowledgeable about teaching skills and abilities. Moreover, accounting teachers are anticipated to possess excellent subject knowledge and appropriate teaching strategies. These skills include content interpretation, delivery, critical thinking and problem-solving, and innovative and transformative skills. What is observed in accounting particularly in grade 12 teachers are still relying more on the traditional method of teaching which is a chalkboard and the talk and high reliance on textbooks. Buckhaults and Fisher (2011) maintain that accounting teachers need to understand the curriculum content, teaching materials, theories, approaches, philosophies, and new methods of introducing and presenting lessons.

Limited teaching times

Teaching times in accounting grade 12 are considered a problem as the content is lengthy and the academic year is short when compared to other grades. Grade 12 learners learn for eight months, and the time allocated for teaching and learning is four hours a week (DBE, 2011c). This allocated time is not adequate for undertaking all accounting teaching and learning activities which includes constant practices and assessment. Letshwene and du Plessis (2021) postulate that teaching times for accounting content are insufficient. Due to the limited teaching times in accounting teachers cannot spend enough time with all learners, particularly those who need extra attention. Dlamini (2000) concurred that accounting principles are allocated fewer periods per week which is among the factors negatively affecting performance in the subject.

Lack of parental support

Parental support in grade 12 is the most significant factor in achieving good academic performance. Learners in grade 12 face challenges such as being overwhelmed with overloaded work, demanding learning times, anxiety, and lack of motivation. While teachers experience challenges such as learners' misbehaviour, lack of commitment, absenteeism, and poor performance, parents can only be the relevant people to control and assist in solving such issues. Mkhize et al. (2022) noted that some grade 12 parents are not fully supportive of their child's learning which negatively affects the quality of learning. The authors further mains that parental involvement in subjects such accounting is crucial since it demands learners to endless.

Overview of a Connection Model

This connection model was design from findings of a doctoral study that was conducted by Sithole in 2024 at the University of KwaZulu-Natal. The model has not been tested however, it was presented in the dissertation where three examiners (internal, external and international) examined it. Examiners approved it and found it to be relevant for ICT integration in accounting. Thus, the author now presents it in various angles as means of testing it. The intention is to also encourage other scholars to test it through further studies. Since

examiners evaluated the model in the dissertation, the author felt that it could be used in schools, particularly in accounting. The author feels that the good instrument to test this model will be the public (scholars). Further, there is limited literature on connection model therefore presenting it to the scholarly world will attract other authors to write about it and add to literature. The connection model consists of five major components namely teachers, smartphones, the internet, WhatsApp, and learners. To deeply understand the model, the description is provided below followed by a diagram.

Teachers

One of the important roles of a teacher is to impart knowledge to learners and teachers are regarded as agents of change. Further, teachers could be regarded as the engine of teaching and learning as they drive the process. In this connection model teachers are playing a significant role in facilitating teaching and learning through smartphones and WhatsApp. Teachers are using smartphones and WhatsApp to connect teaching and learning.

Smartphones

Smartphones are the engine of the connection model since accounting teachers implement the model by adopting smartphones. Teachers' connection to smartphones created exposure and motivation to use them in the classroom. Further, teachers use smartphones to communicate curriculum knowledge to learners in the physical setting or remote areas. Although smartphones have been used before, the digital era and lockdown period have increased the degree of infusing of smartphones in teaching and learning. Kanu et al. (2021) assert that as much as the COVID-19 pandemic created negative outcomes in education, it created important opportunities for teachers' exposure to the utilisation of ICT in teaching, for instance, using WhatsApp, Facebook, and the internet to communicate with learners. Buabeng-Andoh (2019) outlines that mobile phones work at a great advantage for teachers as they allow teaching and learning to take place anyhow and anywhere.

Internet

The key success factor of the connection model is the internet. Teachers connect smartphones to the internet for successful teaching. Smartphones and the internet are interrelated since they are interdependent to perform tasks. Smartphones and the internet are accessible anywhere and everywhere, therefore connections for teaching and learning are carried out in any location. In connection model, accounting teachers used the internet widely by sending learners website links for teaching resources, downloading educational resources and videos for clarity on uncertainties and complex topics, and using WhatsApp. Giraldo and Báquiro (2020) point out that the Internet assists in enhancing ICT integration in education, promoting virtual spaces for collaboration, and promoting the design of digital content to support the curriculum.

WhatsApp

In Accounting, the connection model was also demonstrated using a social media platform namely WhatsApp. Teachers connected smartphones and the internet which created an opportunity to use the WhatsApp application to connect teaching and learning, manage content, and network. In the WhatsApp group teachers would share information, engage learners through voice note discussion, videos, and images, announce homework and tasks, send feedback, and receive responses and queries. Skhephe and Matashu (2021) alluded to teaching via WhatsApp as a new creative learning platform that encouraged learners to learn accounting. Similarly, Siyaya (2023) asserts that accounting teachers in most rural areas incorporate WhatsApp in teaching as it is a valuable mode of communication.

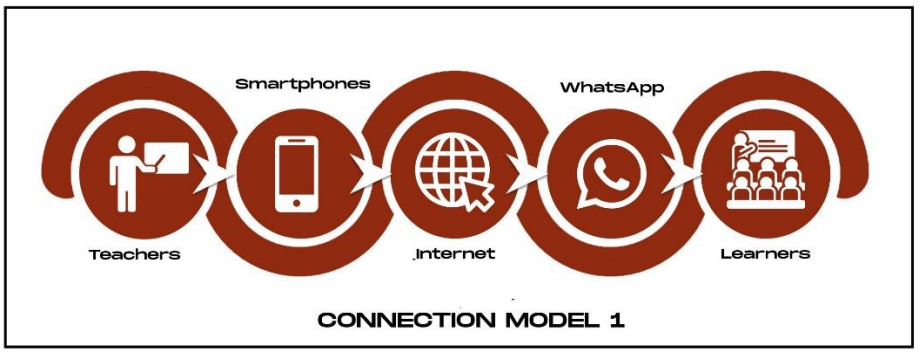
Learners

In the connection model accounting learners are given opportunities to actively interact with teachers which is different from just passive recipients of information. Learners engage with teachers via WhatsApp by

asking questions, completing tasks, and discussing feedback. The good thing about the connection model learners engages with teachers remotely and at any time.

The rationale for the model

The reason for coming up with this model was the fact that teachers reported that using WhatsApp has been beneficial in accounting teaching. For instance, advances teaching, create innovative learning and improve level of ICT integration in accounting. Furthermore, a huge drawback for ICT integration in accounting is caused by inadequate technological resources, therefore, using a smartphone for connection ensures that ICT integration progress is not stagnant. The idea behind this model is to demonstrate how teachers integrating ICT in teaching accounting using the most convenient and available modern technology devices and resources. The interlink between the elements on this model is that they rely on each other for perfect operation. The connection model is depicted below.



Theory

This study was guided by Actor Network Theory (ANT) which was developed by Latour, Callon, and Law between 1978 and 1990 (Law 2007). Initially, Law and Latour developed Actor Network Theory as a means of understanding how innovation and knowledge-creation take place in science and technology (Cresswell, Worth, & Sheik, 2010). In the field of Information Systems, Actor Network Theory advocates that there is no difference between human and non-human objects since Information Systems are concerned with the interaction between humans, technologies, and information systems (Doolin & Lowe 2002). According to Mitev (2009), ANT argues that non-human objects play significant roles in networks, and they are controlled by humans. This theory was appropriate to guide this study in the sense that solutions to solve grade 12 accounting problems were proposing the use of a connection model which requires an interaction between the human and the object. According to the connection model interaction is going to be between teachers, learners, and parents with smartphones and WhatsApp.

This theory ensured that to solve grade 12 accounting major problems, solutions are technological and feasible. For instance, using Smartphones and WhatsApp to connect teachers with learners effectively, enhancing content knowledge and pedagogical abilities, and connecting with parents. The theory allowed a clear advocacy of connection model in accounting and solving the subject problems. Mitev (2009) postulates that there is a close connection between social constructions, technology, organisation, individuals, groups, and culture. Thus, in this study, Actor Network Theory was chosen, the intention was to emphasise the connection between technology, teachers, learners, and parents in knowledge construction and solving grade 12 problems. Latour (1987) argues that in ANT all technological activities that involve computers and phones are important to the network since they support people and communication. Hence this theory was employed in this study.

METHODS

Research Paradigm

This paper is located within a critical paradigm since it attempts to emancipate people by changing their social, political, and cultural settings (Shah & Al-Bargi, 2013). This paradigm advocates changes in societal and educational structures and aims at practicality (Alwan, 2007). This paradigm assisted to proposing solution to the four major accounting problems in grade 12 that would emancipate teachers from the problems they are facing. Employing this paradigm ensured that connection model reveals ideas that will create transformation socially and in the classroom setting. Transformative paradigm was good for this study since using connection model changes how teachers in accounting normally deal with the major problems in grade 12. Through this paradigm it was possible to compose practical and feasible solutions that will bring change even in the minds of teachers when addressing teaching and learning issues. Through this paradigm proposed solutions using connection model benefited teachers with even better understanding of ICT integration in teaching and learning. The paradigm and connection model created a reformation in the accounting subject.

Research Design

Participatory Action Research (PAR) was employed as the research design of this research since it prioritises the value of experiential knowledge for tackling problems caused by unequal and social systems, and for envisioning and implementing alternatives (Cornish et al., 2023). This study aimed at tackling grade 12 major accounting problems by using an alternative which is a connection model. Further, PAR was relevant in this study in the sense that it involves the participation of those people experiencing issues (accounting teachers), who take action to produce emancipatory social change. Through PAR, participants deliberated on the model, accounting major problems, the research question and devised strategies. PAR was appropriate in the study as participants were first informed about the connection model and problems came from them. In that sense they were the ones to brainstorm and deliberate on solutions that could work or not. PAR was relevant in the sense that suggestions to the problems came from participants who encounter the problems in grade 12.

Research Approach

A qualitative research approach was used to explore how the connection model can solve four major grade 12 problems. Qualitative methods allow the researcher to collect in-depth knowledge on the research phenomenon and give voice to participants to share their experiences (Patten & Newhart, 2018). This approach was relevant in the sense that the researcher had the ability to obtain deeper information how teachers believe connection model can solve the four major problems in grade 12. In addition, data was collected from accounting teachers in schools who are experiences these problems in grade 12 instruction. More voices of participants on the research phenomenon were shared as this approach was allowing them to be open in their discussion.

Population and Sample

To select participants for this study, purposive sampling method was adopted. Under purposive sampling I used a homogeneous strategy to select six accounting teachers. The criteria used to select participants specified that teaching experience in grade 12 must be above 5 years, the teacher must be an accounting specialist, currently teaching accounting in grade 12, from quintile 3 and 4, and who were between the ages of 28 and 45 years. Six schools from Umlazi district were presented in this study.

Data Collection Instrument

The data collection instrument used in this study was a focus group schedule (FGS). This instrument contained a list of open-ended questions to guide me during the engagement with participants. Furthermore, collecting data using this instrument granted an opportunity of effective discussion which made participants

to feel that they are also in power of composing strategies and advocating change in accounting. Focus group discussion ensured that transformation and emancipation are presented by teachers who are the ones who encounter the problems in their instruction. Participants felt the freedom during the discussion as they were encouraged to be open in their discussion.

Data Collection Method

A group discussion was conducted with these six accounting teachers and to align research question with data collected four sub research questions were developed and used during the discussion. During the discussion the researcher kept on referring to the research question to ensure relevant data is capture. The researcher started explaining the model before the discussion and detailed description was included in the informed consent letters to ensure teachers get a gist of the model. Using focus group discussion on an untested model was a good idea since participants were free to reveal their feeling about the model and its possibility of solving the grade 12 major problems. The discussion was held online via Zoom. Creswell and Creswell (2017) opine that collecting qualitative data online through chat room interactions, e-mail, instant messaging, and videoconferencing benefits both the researcher and the participants. The discussion lasted 1 hour and 15 minutes, notes were also taken, and it was audio-taped for accurate records and safekeeping for analysis. Participants were very active in responding and provided detailed responses hence only this method was employed data collection.

Data Analysis

Thematic content analysis was used to analyse data. Thematic content analysis has been discussed in the literature as one of the methods that can be used in qualitative research to analyse data and measure trustworthiness in research (Creswell & Creswell, 2017). In this research, the researcher commenced by listening to the audiotaped recording several times to capture correctly what was shared by participants. Then transcribe audio into text by typing on the Word document. Thereafter, the transcripts were categorised according to their similarities to develop a preliminary list of themes arising from the data. Final themes were then linked to various scholarly views. The researcher perused at the categories of themes to interpret them and during the interpretation the researcher remained cognisant of the research question. Member check was used to ensure validity, meaning after data was analysed it was sent back to three participants including to validate if the data they provided was accurately reported. Triangulation was ensured through repeating the questions and the focus group discussion was held twice to verify responses. In order to report on the data analysed, a written presentation including the voices of participants, my reflection, descriptions and literature was provided.

Ethical Consideration

Ethical issues were considered in this study, and permission to conduct research was requested and granted by the University of KwaZulu-Natal Research Office with ethics number HSSREC/00004068/2022. Department of Education also granted permission to use the Umlazi schools. Other ethical procedures, which include informed consent, confidentiality and anonymity, and voluntary participation were explained to the participants and adhered to throughout the study. Informed consent letters explicitly described the nature of the study and its objective, participants were then invited to be part of this study. It was explained that they would not receive any financial benefit from participation, and they were free to withdraw at any time without penalty. Participants were given time to read and sign the consent forms should they agree to take part in this research study. The data generated including the digital recordings, and transcripts was kept safe on technology devices with secure passwords. All participants were kept anonymous by giving them pseudonyms. Below were the findings of this study and the voices of participants were included.

RESULTS

Four major themes emerged in an attempt to address the study's research question, and each theme is deeply elaborated below. Since the model was clearly explained to participants several times verbally and none verbally, their responses indicated the trust and positivity towards the model.

Through offering opportunities of communicating in one language, pronounce concepts, and use auto-correct to improve vocabulary

From the discussion with participants, it was apparent that the connection model can solve the problem of language misunderstanding in grade 12 since teachers and learners communicate with smartphones and WhatsApp using one language. Teachers disclosed that connection through smartphones and WhatsApp allows learners to use the limited English they have when posing questions, responding and communities with their fellow learners. All participants agreed that when they chat or teach using smartphones none of their learners use home language which is not what is happening in the classroom. The model also promotes the use of voice notes when learners are describing something, teachers observed this as a solution to the language issue since learners use a medium of instruction, so they learn the language, and accounting vocabulary and pronounce accounting concepts confidently. Teachers acknowledged that when learners send something electronically, they read more than they normally do with textbooks. Therefore, the more they read the more they can improve on understanding language. When one is typing on WhatsApp auto corrects normally corrects the grammar errors and clarifies the sentences. Participants were quoted saying:

"Normally language barrier is improved by constant practices of reading and pronouncing words. In my WhatsApp group with learners, we use English, it is a rare case when they ask, and I respond in IsiZulu and this made me realise that they are improving in their confidence in talking and writing in a medium of instruction language." Teacher C

Teacher E added to the comment of Teacher C by saying:

"From the description of the model, language problems could be improved as these learners like to type in English but do not want to use it in the classroom for learning. I believe in class they do not trust themselves, so WhatsApp connection model allows them to write, learn language, and be corrected."

The above findings showed that the language problem in grade 12 could be mitigated by the connection model since it relies on the use of a digital device and social media where the only language used is English and code-switching is not possible.

Through reinforcing technological knowledge and skills that would make teachers explore new pedagogical information

Findings showed that all participants felt that the connection model is advancing skills, knowledge, and abilities of teaching, especially technologically. Teachers regarded this connection model as one of the solutions to the challenge of limited teaching methods they have and can use to teach accounting. Through the model, teachers gain knowledge that smartphones and WhatsApp can facilitate accounting teaching and learning. For instance, using pictures, voice notes and typed words to teach accounting. Accounting teachers disclosed that the model has the potential to solve teaching skills they are knowledgeable in shifting from a traditional way of teaching to a more digital way. The model advances knowledge such as downloading connection applications, downloading words and PDF applications, sharing screenshots, and sharing links of information. Some of the skills the model improves in teaching include searching on the internet, selecting and analysing relevant data, sharing data electronically, reading, being innovative, and communicating skills. It was

evident that teachers network with each other through the model to share content information, and teaching strategies, tackle challenging transactions, and develop abilities of content enhancement and understanding. These are some of the highlights of what participants said:

"For me, the connection model is a great to advance our knowledge and skills. Personally, my knowledge of using the internet to search for accounting information, connect with learners after hours as I teach only grade 12s, and my skills of navigating apps." Teacher A

Teacher F elaborated:

"It eradicates the problem of routine teaching to innovative teaching and learning through involving various avenues of teaching including videos, visualising educational materials, downloading and editing educational learning materials such as question papers, formats and answer books."

The connection model addresses the problem of knowledge, skills, and abilities of teaching in accounting by providing certain ideas.

By providing an alternative convenient learning method that provides additional teaching times

The findings showed that accounting teachers felt that to teach accounting content effectively they always need extra time for all FET grades. Therefore, the connection model that promotes utilisation of smartphones and WhatsApp makes things easier as teachers can connect with learners anytime anywhere. Some teachers revealed that they set times with learners to engage on WhatsApp when they are at home. Teachers acknowledged that WhatsApp is helping to extend the time of teaching as they can send homework, class activities, and projects using WhatsApp. Teachers mentioned that this connection model is convenient for all accounting FET grades since the connection model makes it easy for both the teachers and learners to connect anytime anywhere. Teachers explained that they normally send work to be done by learners over smartphones, especially on weekends and holidays. It was apparent that it is also convenient for networking from teachers' and learners' side. This connection model has also made easy access to educational materials. Both teachers are downloading textbooks, teacher guides, question papers, memorandums, answer books, and study guides on their phones. Learners download textbooks, Learners sometimes create their study groups and connect to the teacher via WhatsApp. Teachers remarked:

"Teachers I'm a WhatsApp user, I thought it was my way of infusing technology into accounting. From my experience, it makes learning convenient. My learners know when we work on certain topics there are some weekends where I will be at home and just give them work mark it and send feedback there on WhatsApp." Teacher B

"Well, I also agree that this connection model will add some time to our teaching times as we can meet or continue with teaching even after hours. We did it during COVID where matric extra classes were online for me, we were using WhatsApp." Teacher A

According to the above findings, connection model is perceived as a mechanism to reduce the problem of limited teaching times in grade 12 as teachers and learners can connect anytime and everywhere.

Through allowing efficient connect between teachers and parents

The findings of this study showed that connection model is bringing a solution to the problem of lack of parental support in grade 12 teaching and learning. Accounting teachers acknowledge that the connection model components (smartphones and WhatsApp) make it easy to communicate and connect with parents

regarding learners learning progress, academic performance, and other problems that they are experiencing in teaching grade 12 learners. It was evident that accounting teachers are going to share teaching activities with parents, grade 12 programmes, and support that is expected and every activity that is going to be issued to learners is also going to be sent to parents. Accounting teachers disclose that they're going to create one class group with parents so that they can stay connected and support their children's education. Parents who do not have WhatsApp are going to add one family member who will represent the learner in the WhatsApp group. Teachers felt that this is a convenient and effective solution to enforce parental support in teaching, to connect, collaborate, and communicate with parents. This is what Teacher F announced:

"The massive challenge in accounting grade 12 of lack of support is going to be eradicated by this connection model because if I remember well, it needs a smartphone and WhatsApp which is something that parents have." Teacher F

Teacher E had this to say:

"I agree, connection model is going to assist us with the challenge of limited parental support since WhatsApp is more convenient, it going to force parents to be connected in their learners' learning."

The above findings reported that the connection model is a solution to the problem of lack of parental support in grade 12.

Discussion of Findings

The findings of this study illustrated that the connection model can solve the four major accounting problems outlined in the literature section. To begin with, the connection model could mitigate the language misunderstanding problem since teachers and learners use one language which is English. This way forces learners to use the medium of instruction and by sharing audio and videos of the accounting content they are enhancing their understanding of the language, pronunciations, and explanations. Godwin-Jones (2018) supported the above findings by pointing out that mobile phones enhance the opportunities for language practice beyond the classroom and they supply greater access to second language input than normal language use for communication. Godwin-Jones further argued that there is improvement in language when mobile phones are used for teaching and learning as they come with Word processor that replaces writing by hand, provides substitute word options, proofreading tools, and modifications that allow reconstruction of sentences. According to Hunsu et al. (2016), smartphones offer learners an efficient way to work with language and communication through written or spoken texts. Actor Network Theory was beneficial in selecting ideas from participants that will show a practical way of solving English language misunderstanding. ANT and connection model both embrace connection of networking systems which is appropriate in improving language misunderstanding.

Additionally, the connection model enhances accounting teachers' pedagogical knowledge, skills, and abilities. Puentedura (2014) confirmed the above findings by postulating that once technology is involved in teaching new educational approaches are developed and traditional ways of undertaking tasks are redesigned. Additionally, Godwin-Jones (2018) asserts that having students and teachers using digital devices in teaching and learning potentially redefines teaching practice, develops teaching knowledge, and new and more transformative ways emerge. When digital devices are used in learning teachers restructure learning, select effective strategies, and employ practical tasks more. In accounting, teachers' knowledge, skills, and abilities play a significant role in pedagogy thus they need to be constantly evaluated and developed. Through ANT notions selected from the participants' responses were offering teachers an opportunity of seeing and adopting innovative, transformative, technologically oriented, and feasible teaching strategies.

Furthermore, the connection model is regarded as a mechanism to increase teaching times. Anshari et al. (2017) support these findings by claiming that smartphones are used as an additional learning aid due to various reasons including the provision of convenient learning, extra communication times, multi-sources and multitasks, and environmentally friendly. This interaction outside the classroom is the one that makes grade 12 teachers regard the connection model as a mechanism of extra teaching time. According to Anshari et al. (2017), technology provides additional approaches and class times in schools for teachers since they can continue communicating with learners even outside the classroom. Actor Network Theory highlights the importance of using objects to create more space and time for interaction. Therefore, the solution regarding teaching times included ideas that will make accounting teaching and learning use smartphones for interactions in any space and time.

It was also apparent that the connection model can mitigate the lack of parental support in grade 12. Can (2016) supported this finding by outlining that utilisation of mobile technology such as cell phones is an excellent strategy for building a relationship between parents and schools more meaningful. Can further alludes that smartphone makes a much more immediate and instant connection which the learning objectives achievable. Teachers download applications including WhatsApp to communicate and connect with parents. Gauvreau and Sandall (2019) asserted that mobile technologies such as smartphones and tablets have been used mostly to promote parental support between a school and parents. Kemp (2015) also concurred with the findings by admitting that technology makes parental involvement easier and is very crucial to improving students' educational achievement. One method to improve parental involvement is to develop strong communication between home and school. According to ANT, there is a close connection between social constructions, technology, organisation, individuals, groups, and culture. This helped to ensure that the parental support solution reflects the development of interactions between teachers and parents using the object (smartphones). Overall employing ANT ensured that the research objective of the study is achieved. ANT and connection model highlighted solutions that will embrace connection in human and non-human objects.

CONCLUSION

This study aimed at evaluating how the connection model for ICT integration can solve grade 12 accounting problems. The major problems in grade 12 accounting the literature outlined included English language misunderstanding, insufficient teaching times, inadequate teachers' teaching skills, knowledge, and abilities, and limited parental support. The overall findings showed that the connection model can solve the most popular accounting problems in grade 12. By offering opportunities to communicate one language, pronounce concepts, do extensive reading, and use auto-correct to improve vocabulary. Further, advancing teachers' knowledge, skills and pedagogical abilities. It is a convenient way of learning method that provides additional teaching times. Teachers can efficiently connect and communicate with parents. The study concludes by emphasising the importance of the connection model to solve grade 12 accounting problems, develop accounting curriculum teaching and learning, and enhance the ICT integration within the subject area. Teachers have access to smartphones, and they are knowledgeable about WhatsApp thus connection model is significant. The overall findings of this study also show that the challenge of ICT integration on education can be mitigated through utilising the limited available resources to initiate ICT integration in the instructional practice. The limitation of this study is that it focused on one grade, one subject which may impact on generalising the findings. Another limitation of this study is that it employed one method of data collection. Moreover, the fact that there are no studies that have conducted on the connection model become a limitation in this study. These limitations could be addressed through the conduct of different studies in different subjects.

RECOMMENDATIONS

From the above findings connection model has the potential to successfully address some grade 12 accounting problems. Further, this model provides transformation and enhancement of ICT integration in accounting which is a debate at stake. The Actor Network Theory used to guide this study provided insightful insight into the significance of the interaction between humans and technology objects to produce innovative knowledge and the connection between technology, people, and culture. Having stated the above, this study suggests that the connection model be documented and made available for accounting teachers. Further, proper training to use this connection model is recommended in accounting so that teachers can all adopt it. The connection model should be developed into an app for accounting and to improve ICT integration. Teachers and learners must be allowed to utilise smartphones in the classroom when the need arises and there must be policies guiding the usage of smartphones in schools. Moreover, other scholars are encouraged to test this model through various studies. The usage of connection model and ANT to guide the study in outlining measures to mitigate major problems in grade 12 encourages employing network systems in accounting teaching and learning and further research on the challenges these two can bring in the subject. Further studies are encouraged on the effectives of connection model in teaching and learning as means of ICT integration. Future studies are also encouraged to test again the connection model on different subject and broader audience.

Author Contributions: This entire manuscript was written by the author (N.V Sithole) from conceptualisation of the study, gathering of literature, data collection, presenting, and analysing data synthesising the study. The connection model illustrated in this study emanated from my PhD study.

Funding: This study was not funded.

Acknowledgments : Thank you so much to the participants of this study

Conflicts of Interest: In this study, there is no conflict of interest.

REFERENCES

Alwan, F. (2007). Research paradigms in education: Research perspectives that underpin approaches to educational research. *Research in ELT Contexts, Dubai: TESOL Arabia Publications,* 3-20. https://doi.org/10.eric.ed.gov/?id=ED503767

Anshari, M., Almunawar, M. N., Shahrill, M., Wicaksono, D. K., & Huda, M. (2017). Smartphones usage in the classrooms: Learning aid or interference?. *Education and Information technologies*, *22*, 3063-3079. https://doi.org/10.1007/s10639-017-9572-7

Buabeng-Andoh, C. (2019). Factors that influence teachers ′pedagogical use of ICT in secondary schools: A case of Ghana. *Contemporary educational technology*, *10*(3), 272-288. https://doi.org/10.30935/cet.590099

Buckhaults, J., & Fisher, D. (2011). Trends in accounting education: Decreasing accounting anxiety and promoting new methods. *Journal of Education for Business*, *86*(1), 31-35. https://doi.org/10.1080/08832321003720692

Can, M. H. (2016). Use of mobile application: Means of communication between parents and class teacher. *World Journal on Educational Technology: Current Issues*, *8*(3), 252-257. https://doi.org/10.files.eric.ed.gov/fulltext/EJ1142251.pdf

Cornish, F., Breton, N., Moreno-Tabarez, U., Delgado, J., Rua, M., de-Graft Aikins, A., & Hodgetts, D. (2023). Participatory action research. *Nature Reviews Methods Primers*, *3*(1), 34. https://doi.org/10.1038/s43586-023-00214-1

Cowan, H., Kühlbrandt, C., & Riazuddin, H. (2022). Reordering the machinery of participation with young people. *Sociology of Health & Illness*, *44*, 90-105. https://doi.org/10.1111/1467-9566.13426

Cresswell, K. M., Worth, A., & Sheik, A. (2010). Actor-Network Theory and its role in understanding the implementation of information technology developments in healthcare. BMC medical informatics and decision making, 10(1), 1-11. https://doi.org/10.1186/1472-6947-10-67

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks: Sage publications. https://doi.org/10.www.ucg.ac.me/skladiste/blog_609332/objava_105202/fajlovi/Creswell.pdf

Dlamini, T. (2000). *A survey of factors influencing the performance of students in principle of accounts at O Level in the Hhohho region* (Doctoral dissertation, University of Swaziland). https://doi.org./10.core.ac.uk/download/pdf/39666622.pdf

Du Plessis, E.C & Mbunyuza, M.M. (2014). Does the Department of Basic Education take the international call to provide quality education for all seriously? *Journal of Social Sciences, 41(*2):209–220. https://doi.org/10.1080/09718923.2014.11893357.

Doolin, B., & Lowe, A. (2002). To reveal is to critique: Actor-Network Theory and critical information systems research. Journal of Information Technology, 17(2), 69- 78. https://doi.org/10.narrativestudies.lib.unb.ca/bibcite/reference/22625

Gauvreau, A. N., & Sandall, S. R. (2019). Using mobile technologies to communicate with parents and caregivers. *Young Exceptional Children*, *22*(3), 115-126. https://doi.org/10.eric.ed.gov/?id=EJ1224891

Giraldo, D. F. B., & Báquiro, J. C. A. (2020). Appropriation of ICT in the educational field: approach to public policy in Colombia years 2000-2019. *Digital Education Review*(37), 109-129. https://doi.org/10.1344/der.2020.37.109-129

Godwin-Jones, R. (2018). Using mobile devices in the language classroom: Part of the Cambridge Papers in ELT series. https://doi.org/10.www.cambridge.org/gb/files/6915/7488/7114/CambridgePapersInELT_MobilesInTheClassroom_2018_ONLINE.pdf

Hunsu, N. J., Adesope, O., & Bayly, D. J. (2016). A meta-analysis of the effects of audience response systems (clicker-based technologies) on cognition and affect. Computers and Education, 94, 102–119. https://doi.org/10.1016/j.compedu.2015.11.013

Kanu, I. A., Kanu, C. C., & Ndubisi, E. J. (2021). *COVID-19 Pandemic, ICT and Education System in Africa: Challenges and Opportunities, Proceedings of the International Conference of the Association for the Promotion of African Studies on the Impact of Covid-19 on Africa andthe Quest for Afrocentric Perspectives 17th September, 2020*. The Association for the Promotion of African Studies (APAS). https://doi.org/10.acjol.org/index.php/jassd/issue/view/72

Kemp, J. (2015). Increasing parent involvement by using a variety of communication tools. https://dspace.library.uvic.ca/items/6c8cb131-368e-4c36-9b16-233af0a76f82

Latour, B. (1987). Science in action: How to follow scientists and engineers through society. Harvard University Press. http://doi.org/10.www.bruno-latour.fr/node/130.html

Law, J. (2007). Actor Network Theory and Material Semiotics. Network, 1-21. http://doi.org/10.www.heterogeneities.net/publications/Law2007ANTandMaterialSemiotics.pdf

Letshwene, M. J. (2014). *Improving Grade 10 accounting teachers' competencies in the Ekurhuleni District of the Gauteng province.* Masters thesis, University of South Africa. http://doi.org/10.hdl.handle.net/10500/19029

Letshwene, M. J., & du Plessis, E. C. (2021). The challenges of implementing the Curriculum and Assessment Policy Statement in accounting. *South African Journal of Education*, *41*(2), S1-S10. https://doi.org/10.15700/saje.v41ns2a1978

Mitev, N. (2009). In and out of Actor-Network Theory: A necessary but insufficient journey. Information Technology & People, 22(1), 9 - 25. http://doi.org/10.1108/09593840910937463

Mkhize, M. V., Mtshali, M. A., & Sithebe, K. (2022). School-based factors affecting Grade 12 accounting learners' performance in the General Certificate Secondary Examination (GCSE) in Eswatini. *South African Journal of Education*, *42*(1), 1-12. https://doi.org/10.15700/saje.v42n1a2066

Padayachee, K. (2017). A snapshot survey of ICT integration in South African schools. *South African Computer Journal*, *29*(2), 36-65. https://doi.org/10.www.scielo.org.za/pdf/sacj/v29n2/04.pdf

Patten, M., & Newhart, M. (2018). Descriptive and inferential statistics. *Understanding Research Methods: An Overview of the Essentials*. 10th ed. Eds. publishers. https://doi.org/10.www.sultanchandandsons.com/images/BookImages/Chapters/673_TC%201307%20BookLet.pdf

Puentedura, R. R. (2014). SAMR and TPCK: A hands-on approach to classroom practice. *Hipassus. Enligne.15*(2), 1-20. *https:/doi.org/10./hippasus.com/rrpweblog/archives/2014/01/15/SAMRABriefContextualizedIntroduction.pdf*

Shah, S. R., & Al-Bargi, A. (2013). Research Paradigms: Researchers' Worldviews, Theoretical Frameworks and Study Designs. *Arab World English Journal*, *4*(4). https://doi.org/10.awej.org/images/AllIssues/Volume4/Volume4Number4Dec2013/15.pdf

Siyaya, M. C. (2023). *The impact of information and communication technology (ICT) in teaching accounting in secondary schools: a case of iLembe district*. Doctoral dissertation, University of Zululand. https://doi.org/10.uzspace.unizulu.ac.za/handle/10530/2351

Skhephe, M., & Matashu, M. (2021). The Use of Technology in Accounting Classrooms During COVID-19: What Do Accounting Teachers in the Eastern Cape, South Africa, Have to Say? *Research in Social Sciences and Technology*, *6*(2), 267-278. https://doi.org/10.46303/ressat.2021.30