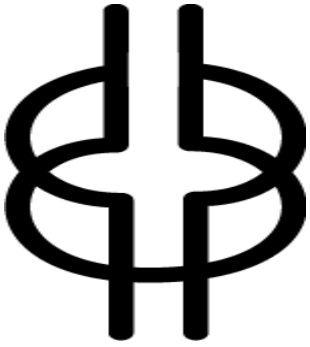
Ghana Journal of Education: Issues and Practice (*GJE*)



NYANSAPO – "Wisdom Knot"

Symbol of wisdom, ingenuity, intelligence and patience

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Editorial Comment

The Ghana Journal of Education: Issues and Practice (*GJE*) is a peer-reviewed journal which focuses on classroom practice and policy issues that affect teaching and learning. In this volume, researchers and authors have contributed high-quality and informative material to the journal. This volume contains eight articles that have gone through the peer review process at three levels by independent reviewers.

Martha-Pearl Okai, Emmanuel Kofi Gyimah, Irene Vanderpuye and Mohammed Bello investigate the effect of repeated reading on the reading ability of children with reading difficulties. The study established that Repeated Reading (RR) is an effective and significant approach that can be used to improve children's reading abilities and recommended that the Ministry of Education (MOE), in collaboration with school heads should provide in-service training for teachers to enable them acquire the requisite skills and strategies to teach pupils who face reading challenges.

Samuel Olufemi Adeniyi, Olubukola A Olufemi-Adeniyi and Abiola Wasiu Raheem examine self-management therapy's effectiveness in managing psychological distress among adolescents with hearing impairment using a quasi-experimental pre-test-post- test design. The authors find, among other things, that there was a significant main effect of treatment (self-management therapy) on the management of psychological distress among adolescents. In addition, there was a significant effect of onset of hearing loss on participants' management of psychological distress, and there was a significant interaction effect of onset of hearing loss and self-esteem on participants' management of psychological distress. The authors recommend that stakeholders in the education and care of adolescents with hearing impairment should employ self-management therapy to reduce their psychological distresses.

Eric Ballang and Bethel T. Ababio use the descriptive survey design to examine the contributions of fieldwork towards the teaching and learning of Geography in selected senior high schools in the Upper West Region of Ghana. The findings showed that the extent to which Geography teachers used fieldwork is small, though it was affirmed that fieldwork is vital in the teaching and learning of geography. Further, it was recognized that challenges such as lack of financial resources, inadequate time, lack of support from school management and parents

and lack of logistics and material resources such as vehicles to convey students to the field in most instances, make it difficult for teachers to organise fieldwork for students. The study recommended that teachers explore more fieldwork opportunities within their immediate school and community environment and that all educational stakeholders should assist in organising fieldwork to enhance effective teaching and learning of Geography in senior high schools.

Moro Eliasu and Kordie Godslove Adjeiwaa examine the extent and adequacy of motivation within the Ghana Education Service (GES) and its effect on teaching. The study population was all East Gonja District's teaching staff. They identified promotion, salary increment, cash rewards, and study leave with pay as motivating factors for teacher performance. The authors recommend that management pays attention to the factors that motivate teachers to improve performance.

Festus Osadebamwen Idehen explores the mathematical and educational potential of the indigenous Ogiurrise game, a traditional indigenous game played by the Edos of the Mid-Western part of Nigeria. The author identified counting, addition, multiplication, subtraction, division, equality, probability, geometrical shapes and patterns as some of the mathematical concepts in the game. In addition, this study revealed that the Ogiurrise game could support the teaching and learning of the number at the Junior Secondary School level.

Maame Afua Nkrumah, John Frank Eshun and Eric Davidson Ahiable examine the experiences of the Deaf pursuing TVET programmes in a mainstream Technical University and how they can be supported using a concurrent mixed-methods approach. The study revealed that the Deaf had academic, financial and socio-cultural challenges.

Forster D. Ntow, Susana Danso Mensah and Martha-Pearl Okai explore the experiences of a group of professionally-trained mathematics teachers who teach in a school designated as an inclusive school located in the southern part of Ghana. The findings showed, among others, that teachers faced several challenges, including inadequate knowledge and skills in teaching students with SEN. In addition, assessing students who are blind was a challenge due to difficulties faced by some of the teachers and students in using Braille to facilitate teaching and learning.

Justice Ray Achoanya Ayam examines the relationship between the following management factors, financing scheme, governance framework, cost management, accounting information system, and pricing approach, on financial sustainability. The study revealed a statistically significant relationship between all five factors and financial sustainability. The study findings further showed that three of the five factors: governance framework, cost management and pricing approach, were significant in predicting a best-fit equation for financial sustainability. The authors recommend that policymakers and higher education managers should review policies and legislations on the cost and competitive fee structure of public higher education institutions in Ghana.

The editorial team is grateful to all reviewers for the useful feedback they offered on the papers they reviewed and the level of professionalism they exhibited through the review process. To the Provost of the College of Education Studies, University of Cape Coast, the team would like to say a big thank you for the continual financial and logistical support which has made the publication of *GJE* possible.

Ernest Kofi Davis, PhD
(Editor-in-Chief)

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Effect of Repeated Reading on the Reading Ability of Children with Reading Difficulties

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Abstract

Utilising the quasi-experimental research design, the study investigated the effect of repeated reading on the reading ability of children with reading difficulties. Simple random and purposive sampling techniques were used to select 22 Basic Three children for the study. The experimental group comprised 12 children while the control group had 10. Running record was used for the data collection. The study revealed that Repeated Reading (RR) is an effective and significant approach that can be used to improve children's reading abilities. There was a statistically significant difference in the scores of children in the experimental group and children in the control group. The study recommended that school heads, administrators and teachers should make a conscious effort to screen pupils in primary three to ascertain their reading abilities. Ministry of Education (MOE) in collaboration with school heads should provide in-service training for teachers to enable them acquire the requisite skills and strategies to teach pupils who face reading challenges.

Key words: repeated reading, reading ability, reading difficulties.

Introduction

Difficulty with reading is the most common characteristic of children with learning disabilities (Heward, 2009). It is estimated that 90% of all children identified as learning disabled are referred for special education services because of reading problems (Kavale & Forness, 2000). Even, some children with high cognitive abilities in

general education have reading difficulties; they comprise 10% of school children (Lyon, 1995; Shaywitz, 2003; Snow, Burns, & Grifftin, 1998). These children with reading difficulties with or without additional learning difficulties have problems with poor phonological processing (Snowling, 2000). Additionally, they have difficulty decoding alphabets and relating visual symbols to basic speech sounds (Snowling, 2000).

Children's academic achievement is dependent on their ability to read. Therefore, if they have problems in reading, they will face challenges in their academic achievement (Hitchock, Prater & Doworick, 2004; Osborn, et al., 2007). This presupposes that academic success is dependent on the individual's ability to read. Thus, if children do not learn to read and understand it will create serious conditions that may lead to academic challenges in life (Lyon, 2003).

Literature Review

Repeated Reading (RR) involves having children re-read a short passage until a suitable reading fluency level is met (Begeny, Krouse, Ross, & Mitchell, 2009). RR strategy can be traced to Samuels (1979). Samuels' research has greatly impacted the field of reading strategies that focus on guided practice and repetition. RR has been used with regular and children with special education needs (Morisoli, 2010). Ruskey (2011) reported that researchers have demonstrated the positive results of this method. Morisoli (2010) investigated the effects of RR on the fluency of diverse secondary English language learners (ELLs) with a specific learning disability (SLD) in reading. A multiple baseline reversal design across subjects was used to explore the effects of RR on two dependent variables: fluency (words read correctly per minute; wpm) and number of errors per minute (epm). Data were collected and analysed during baseline, intervention, and maintenance probes. In his intervention period, reading was followed by three oral RRs of a passage in duration of three weeks. Morisoli concluded that RR had a positive effect on the reading abilities of ELLs with a SLD in reading. Participants read more wpm and made fewer epm. Also, her study demonstrated that RR improved the reading abilities of ELLs with a SLD in reading.

Additionally, Bouguebs (2007) conducted an experimental research on the effects of RR on reading fluency. The purpose of the study was to ascertain the components of reading fluency (reading

speed and word accuracy) on learners' reading fluency using RR. The study was carried out at the Teacher Training School of Constantine with 16 second year students. Participants were selected from the English Department, and were randomly assigned to two groups (experimental group and control group). Her participants were, first, pre-tested through Curriculum Based Measurement Test to know their reading fluency scores prior to the beginning of the experiment.

At the end of the experiment, post-test was conducted via the same test used in the pre-test. Results from the pre-test and post-test were given in mean scores. The findings suggested that the results of students in the experimental group were significantly better than those in the control group. It was therefore concluded that the students who were taught with the RR method improved their reading fluency as indicated by the increase of the total number of words read correctly per minute.

Lastly, Ruskey (2011) conducted a study using a small group of students who met with the researcher for 30 minutes each day for four weeks receiving fluency instruction and reading poetry aloud. The findings of the study indicated that fluency instruction and practice using RR is a successful strategy and should be included in elementary school classrooms. The findings indicate the benefits of RR in various settings. This study was conducted to ascertain the effects of RR on the reading ability of children with reading difficulties.

Participants who were involved in RR in other geographical context showed significant improvement in their fluency (Linan-Thompson, Vaughn, Hickman-Davisand & Kouzekanani, 2003). In Ghana, it appears that there had not been any reported study to support the finding that RR has significant influence on reading fluency. Also, Ghana has unique cultural settings and English is the second medium of instruction from primary one to three. Could such gains be established among pupils in the Sekondi-Takoradi metropolis in the Western Region of Ghana? Would there be a difference in the reading ability between pupils with reading difficulties who are taught using the RR method and those who are not? Therefore, this study was conducted to ascertain the effects of RR on the reading ability of pupils with reading difficulties.

Hypothesis

There will be significant difference in the mean scores of reading ability between children with reading difficulties who are taught using the RR method (experimental group) and those who are not taught with the RR method (control group).

Methodology

Research Design

Quasi-experimental designs are similar to true experiments, but they lack random assignment to experimental and control groups. Quasi experiments give the experimental purists a queasy feeling as they require a pretest and posttest for a treated and comparison group that is similar to a control group except assignment to the comparison group is not determined by random assignment. The non-equivalent comparison group design was adopted for the study. The design looks a lot like the classic experimental design, except it does not use random assignment. In many cases, these groups may already exist (Trochim, 2020; Rubin & Babbie, 2017). In this study, the experimental and control groups comprised children with reading difficulty. One of the groups received the intervention and the other did not. No one was assigned to treatment or comparison groups. Those groupings existed prior to the study. While this method is more convenient for real-world research, it is less likely that the groups are comparable than if they had been determined by random assignment. Perhaps the treatment group has a characteristic that is unique–for example, higher income or different diagnoses–that make the treatment more effective.

Sample and Sampling Procedure

The population comprised 63 grade 3 pupils selected from two public schools in the Sekondi-Takoradi Metropolis in the Western Region of Ghana. Purposive sampling was used to select 22 participants for the study while simple random sampling was used to select the two schools. The purposive sampling technique was used as it enabled the researchers to select participants who read at the same reading level, were in the same class and were within the same age range and therefore had similar characteristics, as suggested by Bryman (2012). The participants from the two schools were randomly assigned to either the control or the experimental groups. The experimental group

had 12 pupils and the control group had 10 pupils with reading difficulties in primary three, hence the variation in the sample size as shown in Table 1.

Table 1: Group of Participants

Participants	Frequency	Percentages
Experimental Group	12	55.5
Control Group	10	45.5
Total	22	100.0

Research Instrument

Running Record was adapted as the sole instrument used to test the children's reading ability. Running Record is an informal reading assessment tool developed by Marie Clay in 2002. It is a tool for decoding, scoring and analysing children's precise reading behaviours (Fountas & Pinnell, 2005). According to Spinelli (2012), Running Record involves the teacher 'keeping a "running record" of students' oral reading by closely monitoring and recording their errors while they read (p. 212). Spinelli (2012) describes the procedures for constructing and administering the running record as follows:

Substitution (S): The teacher writes the error on top of the line while the correct word from the text is written below (each incorrect response is counted as one error)

Multiple attempts, or repetitions (R): When the child attempts to read a word several times, each attempt is recorded (errors are recorded as many times as the child makes the error, for instance, if the child attempts to mention the word and makes 10 errors in the attempts, all the errors will be counted).

Self-correction (SC): If a child reads a word wrongly and corrects the word himself/herself, the teacher marks it SC (not counted as an error).

No response or omission: If the child gives no response or omits a word, the teacher records with a dash (counted as one error).

Insertion: When child inserts a word on his or her own, the teacher records with a dash (counted as one error).

Word told (T): The child stops because he or she finds out that a word is being pronounced wrongly or does not know the word; the teacher provides the word and records it as T (counted as one error).

Appeal for help (A): When the child asks for help, the evaluator marks with an A and tells the student to try it (counted as one error). Only the second attempt is scored. If the student gets the word correct the second time, there is no error.

Repeated errors: The child makes an error and continues to substitute the word again and again (counts as one error each time). Exception: When a proper name is substituted, it is counted as an error only the first time it is substituted.

Words or phrases repeated: When the child accurately reads a word or phrase more than one time, no errors are counted.

Pilot testing of research instrument

The instrument was pilot-tested in one public school in the Cape Coast Metropolis and a reliability coefficient of .79 was obtained. To establish the content validity of the instrument, it was critically analysed by three subject matter experts in the field of special education, as suggested by Gay, Mills, and Airasian (2009) in order to meet the expert judgment requirement. The pilot test provided sufficient evidence that some pupils in the metropolis had reading difficulties. Based on the pilot testing, there was the need to refine the construction and administering of the Running Record to suit the study. Therefore, the following miscues and scoring procedures were used for the actual reading assessment:

Self-pronounced word – mark the top of the word pronounced correctly

Misread word – write the correct word with the error above it.

Omitted word – write the word and circle it.

Self-corrected word – write the word with SC above it.

Teacher tells the word – write the word with TT above it.

For the scoring, self-pronounced words attracted a mark (1 mark) each whereas all other miscues were scored zero (0 mark) with the exception of self-corrected words that also attracted a mark (1 mark). The children read individually and were scored based on the number of correct words.

Pre-Test Procedure

The pre-test was done in one day. The following procedures were used to administer the Running Records:

1. Selection of reading material: The researchers selected 110 words passage that the pupils had already read from the Government Basic Two reading book. This passage was used for all the pupils. The passage was selected because it encouraged and sustained readership, had moral lessons and it provided general information to facilitate daily living skills (Day & Bamford, 2004). The reason for choosing 110 words was that Fountas and Pinnell (2005) suggested that the passage to be used should be between 100 to 200 words. The researchers therefore decided to select words within that range. The rationale for selecting the government reading book was to ensure that the passage was standardised and appropriate for the pupils. Again, considering their reading abilities (reading difficulties), a passage below their level was appropriate in assessing their reading abilities.
2. Pre-reading stage (before assessing their reading ability): Before asking the pupils to Read Aloud individually, as the second step in administering the instrument, the researchers engaged each pupil in a brief conversation approximately one-minute chat to ensure they were relaxed and free from any fear or anxiety. The rationale for this activity was based on Krashen's (2007) language learning acquisition, thus the 'affective filter'. According to him, once the affective filter is low, language learning is high. He suggested that during language acquisition and learning, children should be in an "anxiety-free" environment to enhance learning.
3. Reading stage (assessment stage): the researchers gave the passages to the pupils to read aloud individually. Each child was given 9 minutes to read the passage.
4. Post reading stage (Scoring): This was based on the number of words that each pupil was able to pronounce correctly, using the following miscues;

    Self-pronounced word – mark the top of the word pronounced correctly

Misread word – write the correct word with the error above it.
Omitted word – write the word and circle it.
Self-corrected word – write the word with SC above it.
Teacher tells the word – write the word with TT above it.

In scoring each child's reading ability, self-pronounced word attracted a mark (1 mark) each while all other miscues were scored zero (0 mark) with the exception of self-corrected words that also attracted a mark (1 mark). As pupils read individually, the number of words they pronounced correctly was noted**.**

Data Collection Procedure

Permission to carry out the study was obtained from the Metropolitan Director of Education in the Sekondi-Takoradi Metropolis in the Western Region and the heads of the primary schools. The rationale and ethical issues involved in the study were explained to the head teachers, class teachers and parents of the selected pupils and their informed consent was elicited. Informed consent of the pupils was also elicited. They were made aware that they could withdraw from the study at any time.

Intervention phase

The intervention was provided to the whole group. This phase lasted six weeks. There was one session each day from Monday to Friday which lasted for 45-minutes. Monday to Thursday were used to teach the passages while Friday was used to teach decoding skills (word recognition) of difficult words in the passages (Table 2). Flash cards and word games were used to facilitate the intervention.

Table 2: Weekly intervention schedule

Days	Lines in the passage	Number of words
Monday	3 lines	29
Tuesday	3lines	23
Wednesday	3 lines	32
Thursday	3 lines	26
Friday	Review of difficult words	19

During the intervention phase, the procedures outlined by Mercer, Mercer and Pullen (2011), were followed. These included continuous

engagement with the pupils, selecting a reading material that was suitable for their maturational level, given constant feedback and modelling.

Monday

Step One: (Introduction Phase)

The researchers introduced themselves to the pupils and asked the pupils to do same. The researchers explained the reason for our meeting to the children and motivated them to participate fully and avoid missing the sessions.

Step Two: (Teaching Phase)

The teaching phase involved the actual intervention sessions. Pupils were given the first three lines of the passage to be read. This had four sentences consisting 29 words. The following activities were done:

Activity One (Pre-Reading Stage)

Difficult words in the first three lines were learnt.

Activity Two: During Reading Stage - Teaching and Learning Activity

The researchers read each sentence and asked the pupils to read as a group six times. This was done for all the four sentences in the three lines. The researchers called the pupils individually to read sentences in the lines six times. The researchers guided them and corrected the words they found difficult.

Activity Three: Conclusion- Post-Reading Stage

The researchers asked the pupils to mention some of the words they heard in the passage. Pupils were called randomly to decode the words they mentioned by pointing to the words in the passage six times. The purpose of the post-reading activity was to ensure that pupils decode the words they mention and were not rote learning. This increased their word identification skills.

Activity Four: Evaluation

The researchers pointed to the words randomly and asked pupils to decode them six times.

Remarks: All the pupils were present for the session.

Tuesday

Step One: (Introduction Phase)

The researchers revised the previous lines read with the pupils. Pupils were asked to identify some of the words in the previous readings. This was done 3 times.

Step Two: (Teaching Phase)

The researchers indicated the lines to be read to the pupils. The researchers then, proceeded to the activities.

Activity One: Introduction

Pre-Reading Stage

The researchers guided the pupils to read the difficult words in the passage (in specific lines) six times. These were made up of 3 lines, 3 sentences and 23 words.

Activity Two: Teaching and Learning Activity.

During –Reading Stage

The researchers read each sentence and asked pupils to read as a group six times. This process was done for all the sentences in the three lines. Pupils were called individually to read sentences in the lines six times. The researchers guided and corrected the words they had difficulties in pronouncing.

Activity Three: Conclusion

Post-Reading Stage

The researchers mentioned some of the words in the passage randomly and asked the pupils to identify those words by pointing to the words and decoding the words six times. Pupils were called individually to perform the task. This was done six times.

Remarks: All children were present for the session.

Wednesday

Step One: **(Introduction Phase)**

The researchers asked the pupils to read in groups repeatedly the previous lines read. The researchers called the pupils individually to read each sentence 3 times till all the lines were completed. This procedure was to revise the previous lines and ensure continuity.

Step Two: **(Teaching Phase)**

Pupils were told the specific lines to be read. In all, there were three lines, made up of two sentences and a word count of 32.

Activity One: Introduction

Pre-Reading Stage

The researchers guided the pupils to decode the difficult words in the lines repeatedly (six times).

Activity Two: Teaching and Learning Activity

During-Reading Stage

The researchers read each sentence and asked the children to model repeatedly (six times). The same was done for the other sentences. Pupils were asked to read the sentences individually six times. The researchers guided and corrected the pupils as they read.

Activity Three: Conclusion

Post-Reading Stage

Pupils were asked to decode the words randomly repeatedly (six times). This task was done in groups and also individually.

Activity Four: Evaluation

The researchers pointed to words randomly and asked the pupils to decode them repeatedly. They also read in groups repeatedly (six times).

Remarks: All pupils were present for the session.

Thursday

Step One: (Introduction Phase)

The researchers revised the previous lines read with the pupils. Pupils were asked to identify some of the words in the previous reading. Each word identified was mentioned 3 times.

Step Two: (Teaching phase)

The researchers indicated the lines to be read to the children. We then proceeded to the reading activities.

Activity One: Introduction

Pre-Reading Stage

Pupils were guided to read the difficult words in the passage repeatedly (six times). The passage had 3 lines, 3 sentences and 26words.

Activity Two: Teaching and learning activity.

During-Reading Stage

The researchers read each sentence and asked the pupils to read as a group repeatedly six times. Each pupil was called to read sentences in the lines repeatedly 6 times. The researchers guided and corrected the words they had difficulty.

Activity Three: Conclusion

Post-Reading Stage

The researchers asked the pupils to decode the words randomly. This was done repeatedly six times. Pupils read in groups and individually.

Activity Four: Evaluation

Pupils were asked to point to words randomly and decode them repeatedly.

Remarks: One of the pupils was absent.

Friday

Through word drills, flash cards and word games, the researchers guided the pupils to decode all the difficult words in the passage repeatedly.

Step One: (**Introduction Phase)**

The researchers guided them to decode the difficult words repeatedly (six times).

Step Two: (Teaching Phase)

The researchers asked pupils to pick flash cards and decode the words on them. Each child identified the words and repeated them six times.

Step Three:

Pupils were paired to identify the words and pronounce them six times. Thereafter, each partner also pronounced the word three times. This exercise was done till all partners decoded the words repeatedly with our assistance.

Remarks: All pupils were present for the session.

Other weeks

The other weeks proceedings followed the exact procedures described in week one.

Post-Test Procedure

The post-test was done within a day for both experimental and control group. The post-test took the same procedure as the pre-test. However, they were timed 7 minutes for the post-test.

Data Analysis Procedure

The independent samples t-test was used to analyse the data. Independent samples t-test is used on two different groups of participants to determine the differences in mean values or scores (Pallant, 2010) in order to determine if there were any significant difference between the experimental and control groups.

Discussion of Findings

Hypothesis: *There is no significant difference in the reading ability between pupils with reading difficulties who are taught using the RR approach (experimental group) and those who are not taught with the RR approach (control group).*

The main purpose of this hypothesis was to determine whether RR approach would be an effective intervention for helping pupils with reading difficulties. The hypothesis was tested at the .05 level of significance. The results of the pre-test comparison of the experimental and control groups are shown in Table 3.

Table 3: Independent Samples t-test on Control and Experimental Groups (Pre-test)

Approach	Group	N	Mean	SD	df	t	p
Repeated Reading	Experimental	12	7.00	5.26			
	Control	10	6.40	6.59	20	0.238	0.814

Significant at p=0.05 (2-tailed)

The independent samples t-test result revealed that there was no significant difference in scores for pupils in the experimental group (*M* = 7.00*; SD* = 5.26) and pupils in control group [*M* = 6.40*; SD = 6.5; t(*20) = 0.238, *p* = .814].

Table 4: Independent Samples t-test on Control and Experimental Groups (Post-test)

Approach	Group	N	Mean	SD.	df	t	p
Repeated Reading	Experimental	12	13.17	6.67	20	2.410	.026
	Control	10	6.40	6.42			

*Significant *p* = .05 (2-tailed)

Table 4 reveals the result of the post-test after the Repeated Reading approach was adopted as an intervention to help pupils with reading difficulties. It was observed that there was large improvement in the reading abilities of the pupils in the experimental group who had a mean score of (*M* =13.17*; SD*=6.67) while the pupils in the control group had a mean score of (*M* = 6.40*; SD* = 6.42). This clearly indicated that the RR Approach significantly helped to improve the reading

abilities of pupils. When the mean scores of the two groups were tested using the independent samples t-test at 5% significant level, two-tailed, the results revealed that there was significant difference between control and experimental groups t*(20df)* =- 2.410, $p<.026$.

Table 5: Result of the Difference between Pre-test and Post-test

Approach	Group	N	Mean	SD	df	t	p
Repeated	Experimental	12	6.17	3.88	12.158	5.364*	0.000
Reading	Control	10	0.00	0.82			

*Significant at $p = .05$ (2-tailed)

Table 5 shows the performance of the pupils after comparing the result of the pre-test and post-test. The result in the table shows that there is a significant improvement in the performance of the pupils after using RR Approach. The pupils in the experimental group had a mean score difference of ($M = 6.17$*; SD* = 3.88) while the pupils in the control group rather showed no significant difference in their mean scores (M =0.00*; SD*=0.82) in their reading abilities. Again, after comparing the mean scores of the two groups, the independent-sample t-test reported that there was significant difference in the scores or performance of pupils in the experimental group and pupils in the control group, $t(12.158) = 5.364$, $p = .001$. The result implies that RR approach is an effective approach and strategy to be adopted to help children with reading difficulties in order to improve upon their reading abilities.

The result is in congruence with the findings of Morisoli (2010) that RR had a positive effect on the reading abilities of English language learners with Specific learning disability in reading. Rasinski and Padak (2005) found that practice with RR leads to improvement in oral reading fluency on the practice passage, but also on passages that have never before been encountered. RR has been shown to be effective in increasing reading fluency and, to a lesser extent, reading comprehension for pupils with learning disabilities (Therrien, 2004). Therefore, pupils experience success through RR use and it builds their confidence and encourages them to invest more time and effort in achieving the skill of reading fluently (Nuttall, 1996). Ruskey's (2011) findings indicated that fluency instruction and practice using RR was a successful strategy and should be included in elementary classroom. RR is therefore beneficial in various settings.

Furthermore, the results of the current study is in congruence with the finding of Roundy and Roundy (2009) that on the average, the use of RR strategies increased students' fluency, words per minute (wpm) reading score, reading-oriented self-esteem, and confidence. Neumann, Ross and Slaboch (2008) concluded that as pupils reread text, new sight words were learned and pupils were able to apply these sight words to new text. There is an ample evidence to conclude that when used consistently, RR intervention could improve pupils' reading ability rates (Kuhn & Stahl, 2003; Therrien, 2004). Linan-Thompson, Vaughn, Hickman-Davisand and Kouzekanani (2003) found that the gains in fluency when Repeated Readings was implemented was valuable to the participants, however, researchers had difficulty determining whether the RR alone accounted for the gains because of the multi-componential nature of the intervention.

Conclusions

Repeated Reading improves pupils' performance in reading fluency and word identification skills. Pupils have shown a gradual progress in fluency rate by increasing reading rate and decreasing word reading errors. This study demonstrates that this strategy can help create a positive reading experience for pupils. This experience may translate to the development of self-confidence in one's ability to read.

Recommendations

A conscious effort should be made by school heads, administrators and teachers to screen pupils in primary three to ascertain their reading abilities. If some of the pupils are identified as having reading difficulties, they can further be assessed by professionals to find out if they have dyslexia (serious reading difficulties). Pupils who are identified as having reading difficulties should be managed with effective reading strategies like RR in the regular education class to enhance their reading ability. However, pupils who are found to be dyslexic can be assisted with effective strategies in a resource centre.

In order for remediation to succeed, it is suggested that the Ministry of Education in collaboration with school heads should train teachers to acquire the requisite skills and strategies that will help pupils who face challenges in reading to do remedial teaching. To this end, it

is necessary for educational administrators and curriculum designers to strengthen courses in Special Education to aid in effective teacher training. Regular teachers may then be able to teach effectively to help the pupils with reading difficulties.

Lastly, it is suggested that teachers should encourage their pupils to practise RR in the classroom under their guidance and independently when they are alone. RR should be propagated to improve the reading ability of children with reading difficulties.

Limitations

Only pupils in class three of two selected basic schools in the Western Region of Ghana were used for the study. Hence, not all the pupils in the basic schools were covered. This undoubtedly affected the sample size making it impossible to generalise the findings.

Also, certain basic essentials were taken for granted. These include the economic background of the pupils, the presence or absence of quality teachers (that is well trained teachers) and availability or lack of teaching and learning materials in terms of reading materials or libraries.

References

Begeny, J., Krouse, H., Ross, S., & Mitchell, C. (2009). Increasing elementary-aged students' reading fluency with small-group interventions: A comparison of repeated reading, listening passage preview, and listening only strategies. *Journal of Behavioural Education, 18(1),* 211-227.

Bouguebs, R. (2007). *The effect of repeated reading on reading fluency: The case of second year university EFL students at the English Department*. [Unpublished masters' dissertation, Mentouri University, Constantine].

Bryman, A. (2012). *Social research methods* (4th ed.). Oxford University Press.

Day, R. R., & Bamford, J. (2004). *Extensive reading activities for language teaching.* Cambridge University Press.

Fountas, I. C., & Pinnell, G. S. (2005). *Benchmark assessment system* (2nd ed.). Portsmouth: Heinemann.

Gay, L. R., Mills, G. E., & Airasian, P. W. (2009). *Educational research: Competencies for analysis and applications.* Prentice Hall.

Heward, W. L. (2009). *Exceptional children: An introduction to special education* (9th ed.). Upper Person-Merrill.

Hitchcock, C. H., Prater, M. A., & Dowrick, P. W. (2004). Reading comprehension and fluency: Examining the effects of tutoring and video self-modelling on first-grade students with reading difficulties. *Learning Disability Quarterly, 27*(4), 89-103.

Kavale, K. A., & Forness, S. R. (2000). What definitions of learning disability say and don't say: A critical analysis. *Journal of Learning Disabilities, 33*(2), 239–256.

Krashen, S. (2007). Extensive reading in English as a foreign language by adolescents and young adults: A meta-analysis. *International Journal of Foreign Language Teaching*, *3*(2), 23-29.

Kuhn, M. R., & Stahl, S. (2003). Fluency: A review of developmental and remedial strategies. *The Journal of Educational Psychology. 95*(3), 1-19.

Linan-Thompson, S., Vaughn, S., Hickman-Davis, P., & Kouzekanani, K. (2003). Effectiveness of supplemental

reading instruction for second-grade English language learners with reading difficulties. *Elementary School Journal, 103*(1), 221-238.

Lyon, G. R. (1995). Toward a definition of dyslexia. *Annals of Dyslexia, 45*(2), *3-27.*

Lyon, G. R. (2003). Reading disability: Why do some children have difficulty learning to read? What can be done about it*? The International Dyslexia Association's Quarterly Periodical Perspective, 29*(2), 34-45.

Mercer, C. D., Mercer, A., & Pullen, P. C. (2011). *Teaching students with learning problems* (8th ed.). Upper Saddle River: Pearson.

Morisoli, K. L. (2010). *Effects of Repeated Reading on reading fluency of diverse secondary-level learners.* [Unpublished doctoral dissertation, University of Arizona, Tucson].

Neumann, V. S., Ross, D. K., & Slaboch, A. F. (2008). *Increasing reading comprehension of elementary students through fluency-based interventions*. [Unpublished master's thesis, Saint Xavier University].

Nuttall, C. (1996). *Teaching reading Skills in a foreign language*. (2nd ed.). 361 Hanover Street, Portsmouth: Heinemann.

Osborn, J., Freeman, A., Burley, M., Wilson, R., Jones, E., & Rychener, S. (2007). Effect of tutoring on reading achievement for students with cognitive disabilities, specific learning disabilities, and students receiving Title I services. *Education & Training in Developmental Disabilities, 42*(2), 467-474.

Pallant, J. (2010). *SPSS survival manual: A step by step guide to data analysis using SPSS (Version 15)* (4thed.). Open University Press.

Rasinski, T., & Padak, N. (2005). *Effective reading strategies: Teaching children who find reading difficult* (2nd ed.). Merrill-Prentice Hall.

Roundy, A. R., & Roundy, P. T. (2009). The effect of repeated reading on student fluency: Does practice always make perfect? *International Journal of Social Sciences, 4*(1), 54-59.

Ruskey, N. (2011). *Increasing fluency using Repeated Reading*. [Unpublished masters' thesis, University of Wisconsin-Stout].

Samuels, S. J. (1979). The method of repeated reading. *The Reading Teacher, 32(*5), 403-408.

Shaywitz, S. (2003). *Overcoming dyslexia: A new and complete science-based program for reading problems at any level.* Knopf.

Snow, C. E., Burns, M. S., & Griffin, P. (1998). *Preventing reading difficulties in young children.* National Academy Press.

Snowling, M. J. (2000). *Dyslexia* (2nd ed.). Blackwell Publishers.

Spinelli, C. G (2012). *Classroom assessment for students in special education (3rd ed.).* India: Pearson Education

Therrien, W. (2004). Fluency and comprehension gains as a result of repeated reading: A meta-analysis. *Remedial and Special Education, 25*(4), 252-261.

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Effectiveness of Self-Management Therapy in the Management of Psychological Distress among Adolescents with Hearing Impairment in Oyo State, Nigeria

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Abstract

Psychological wellbeing has been linked to wellness in all facets of life. However, these processes become altered when man becomes distressed because of some factors ranging from intra to inter personal factors influencing man's stable psychological wellness. Hence, such conditions need to be moderated. This study examined the effectiveness of self-management therapy in the management of psychological distress among adolescents with hearing impairment. The study employed quasi experimental pre-test-post- test design with a sample of 39 adolescents with hearing impairment purposively selected using Kesler Psychological Distress Scale with index scores of 19 and above as distress threshold. Clinical Outcomes in Routine Evaluation (Core-10) and Rosenberg Self-esteem Rating Scale were used for both pre and post- test among participants. Three hypotheses were tested in the study. The results revealed that there was a significant main effect of treatment (self-management therapy) on management of psychological distress among adolescents; there was a significant main effect of onset of hearing loss on participants' management of psychological distress and there was a significant interaction effect of onset of hearing loss and self-esteem on participants' management of psychological distress. Stakeholders in the education and care of adolescents with hearing impairment were encouraged to employ self-management therapy in reducing their psychological distresses.

Key words: Psychological distress, hearing impairment, self-management therapy, adolescents, onset of loss, self-esteem.

Introduction

Hearing impairment is a health condition associated with loss of auditory sensitivity to verbal or acoustic information due to anomalies of auditory frameworks whether in the outer, middle, inner and or part of the brain responsible for interpretation of auditory signal which can lead to partial or total hearing loss in the affected individuals. Hearing loss is challenging at any age, but it poses unique issues for the young adults especially those at the adolescents' age because it is a stage of identity formation and personality development. Most researches on children and adolescents with hearing impairment focused on speech and language development, because these individuals have auditory challenge in a sound-dominated world (Theunissen, Rieffe, Kouwenberg, Soede, Briaire &, Frijns 2011). However, the impact of hearing loss can be far reaching and can affect total life style of the affected.

Early onset of hearing loss in children not only leads to delay in speech development and language skills, its multiplying effects at later age negatively impact on the quality of life. Research in the area of quality of life of people with hearing impairment have revealed that loss or disability of hearing can likely cause social isolation, low self-esteem and depression (Hogan, Shipley, Strazdins, Purcell, & Baker 2011; Brown, & Cornes, 2015). The problem of hearing loss at any age is also linked with anxiety, poor self-esteem and value, cognitive decline and lower health related quality of life (Mehboob, Raf, Ahmed, & Mehjabeen 2019). These are symptoms of psychological distress in children, young adults and adults. Psychological distress is defined as the condition of emotional disturbance with feelings of anxiety such as restless and tense depression in the form of feeling of hopelessness and loss of interest in social interaction (Niazi, Ejaz, & Muazzam, 2020). Thus, psychological distress in broad term is regarded as a disturbance of the mood state, which is characterised by features of depression and anxiety (Abiola, Lawal & Habib, 2015). The condition is described as the basic component of mental health deficiency as both emotional and social wellbeing would be affected.

Generally, health is a state in which an individual is able to adapt to internal and external environmental stressors. This adaptation cuts across various facets of life which include thoughts, emotions and behaviours as they relate to age, status and cultural norms. Contrarily, to be mentally unhealthy indicates a psychological state that results in behavioural anomalies which affect daily functioning (Oyewunmi,

Oyewunmi, Iyiola, & Ojo, 2015). Psychological distress has serious consequences on adolescents and adults. The impact manifests in disruption in social and familial functioning, and poor school performance on the part of school adolescents and adults (Fergusson & Woodward, 2002; Alika, Akanni, & Akanni, 2016) as well as suicidal ideation across ages (Ogunwale, 2016). Even after symptoms are in remission, episodes tend to recur and interfere with the adolescent's ability to function both at home and school (Kovac, Feinberg, Crouse-Novak, Paulauskase & Finkelstein, 1984 as cited in Raheem, 2016).

Essentially, the major problem of individuals with hearing impairment is communication difficulty emanating from auditory dysfunctions that limit social interaction. The problems of communication and social interaction associated with hearing loss have significant impact on social and psychological well-being of adolescents with hearing impairment. Losing ability for conversation in the form of speech and being aware of this limitation can cause a great concern, for the growing adolescents with hearing impairment who are beginning to develop a sense of identity (Adeniyi & Kuku, 2016). The problems of communication, peer relation, self-esteem, social interaction and hosts of others may lead to isolation that can motivate a shift in the adolescents with hearing impairment's social and emotional approaches to the world around them and also their self-perception. Adolescents and most especially adolescents with hearing impairment who are unable to maintain social interaction in the form of talking, joking and picking up social cues may lose sense of identity and this may adversely affect their social and scholastic performance in the form of self-esteem and self-efficacy which may invariably result in poor academic achievement and social performance (Adeniyi & Kuku, 2016).

Like any other persons, individuals with hearing impairment are also psychologically distressed. The condition is often compounded and varied with the kinds of pathology they suffer from and the degree of severity, as well as the onset of hearing loss. Deafness acquired in the adulthood creates problems that are different from the problems of those who were born with hearing impairment or who lost their hearing during their early childhood (Munoz-Bael & Ruiz, 2000). Congenital deafness is more of a linguistic problem because people with hearing impairment most often do not learn any spoken language properly before the loss occurred. Their communication challenge may lead to social rejection, little education, low status job and low income which have a powerful

impact on their self-esteem (Strong and Shaver, 1991; Jambor & Elliott, 2005). On the other hand, deafness acquired at adulthood also has issues with self-esteem. Hearing loss (HL) at adulthood significantly changes the lives of such individuals. They have to learn to adjust and adopt new communication strategies and lifestyles. They have to establish a new identity and recreate their social relationships. Also, those with profound hearing loss cannot conduct a conversation where hearing and speaking are required. They need cues such as face-to-face communication with constant eye contact, lip reading and understanding of body language. These are rarely available encounters with hearing people, and they are likely to lose a lot of information during the communication process, even with the use of hearing aids (Adeniyi, 2012). Repeated experiences of ineffective communication lead to frustration and a feeling of deficiency that could diminish self-esteem of individuals with profound hearing loss (Jambor & Elliott, 2005) and thereby result in psychological distress. On the other hand, those with mild or moderate hearing loss are often caught in the middle since they do not define themselves as deaf.

Self-esteem is highly correlated with overall psychological wellbeing (Amos, Okoye, & Hamsatu, 2016), achievement (Ademokoya & Shittu, 2007) and ability to cope with stressful life events (Nwanko, Okechi & Nweke 2015). Self-esteem can manifest in different forms. It can be negative or positive, high or low depending on the situation, environment and circumstances of well-being. Studies suggest that factors such as mode of communication at home, type of environment, the onset of hearing impairment and severity of hearing loss can significantly affect self-esteem of people with hearing impairment (Adeniyi & Kuku, 2016). Also, it was reported that children with hearing loss may develop lower self-esteem than hearing peers due to differences in physical appearance such as wearing devices, physical differences related to a syndrome and communication difficulties (Warner-Czyz, Loy, Evans, Wetsel, & Tobey 2015). However, as important as self-esteem is in the life of individuals, studies have reported conflicting influence. While some studies have arguably reported low self-esteem in children with hearing impairment (Bat-Chava, 1993; Bat-Chava & Deignan, 2001; Huber, 2005; Tambs, 2004; Weisel & Kamara, 2005), others have posited equivalent esteem ratings across auditory status (Sahli, Arsian & Belgin, 2009; Percy-Smith, Caye-Thomasen, Gudman, Jensen, & Thomsen., 2008) and yet few others have revealed more positive self-esteem in children with hearing loss versus hearing peers (Cates, 1991; Kluwin, 1999).

Whichever position achieved by different authors at different times, self-esteem is nevertheless a psychological construct that makes up adaptive living of man and may be influenced by many factors within and outside the individuals.

Having presented the myriad of potential risk factors for exhibiting psychological distress among hearing impaired adolescent individuals, there is the need to evolve methods that could help these adolescents exhibit more effective interpersonal, cognitive and emotional behaviours that should lead to improved functioning outcomes (psychological wellbeing). There are a number of psychotherapeutic techniques that can be employed to manage psychological distress including cognitive therapy (Raheem, 2016), self-management therapy (Falaye, Ajibola & Afolayan, 2015), social skills training (Ibudeh, 1991), and self-efficacy building strategy (Okeke, 2009). For the purpose of this study, self- management therapy was employed. This was because the technique has been gaining credence in recent years.

Self-management therapy is a behaviour therapy for the management of psychological distress. This therapy, according to Rehm (1977), Fuchs and Rehm (1977) involves didactic presentations of instructional exercises to teach concepts and skills and application of those skills to the day-to-day lives of participants through homework/ assignments. Moreover, self-management therapy may aim at three outcomes; to help the client acquire more effective interpersonal, cognitive, emotional behaviour, to alter the client's perceptions and evaluate attitudes of problematic situations, and to either change a stress-inducing or hostile environment or learn to cope with it by accepting that it is inevitable. Self-management therapy is a strategy developed based on the cognitive theory. It is thought of as a procedure designed to promote one's awareness of behaviour and ability to function when he/she is aware of his/her own behaviour (Nelson, Smith, Young, & Dodd, 1991). There are three subtypes including self-monitoring, self-evaluation, and self-reinforcement (McCoach, 2008). Self-monitoring can be used in several self-management treatments which involves being aware of and correctly labeling a student's own negative behaviour (Baskett, 2001). This sub-skill is found useful because a client should be aware of his/her negative behaviour before attempting to correct it (Baskett, 2001). This makes the management of the undesired behaviour constructively interesting and achievable. Self-evaluation as a sub-skill involves comparing one's own behaviour against a self or externally

determined standard. Self-evaluation is not used alone in intervention but with one or more sub-skills of self-management for its effectiveness (McCoach, 2008). In its part, self-reinforcement as presented by Badura's social learning theory to involve self-determined standards, self- determination that the standards have been met and free, unrestricted access to reinforcers (Cole & Bambara, 1992). Research on self-reinforcement reported increase in positive behaviour, and improve academic performance (Cole & Bambara, 1992).

In self-management therapy, tasks and assignment take a central role. Tasks stress the importance of changing behaviours outside the helping relationship and help the client perceive the continuity between treatment sessions and daily life experiences. Assignments yield information about the client's skills and treatment objectives. Assignments are often presented as tentative and safe efforts to acquire new behavioural repertoires. They provide opportunities to experience new life patterns. However, there are four steps to follow whenever a client is asked to complete a task or assignment such as information, anticipatory practice or rehearsal, execution in natural settings and review. During the information stage, the requirements involve didactic instruction about a particular technique or discussion of how the technique can be tailored to the client's routine (Cole & Bambara, 1992). In rehearsal stage, the client imagines and practises the assigned task within the safety of the therapy and environment. Rehearsal provides opportunities for the helper to model various behaviours, clarify the details of the situation and the behaviour to be executed, and extinguish some of the anxiety associated with them. Role plays are commonly used during rehearsal. The anticipatory task is allowed to be performed in a natural setting that is devoid of emotional stress after which the client is allowed to review the process and take note of mistakes made during the process.

Studies have revealed the efficacies and effectiveness of self-management therapy in managing behaviour inimical to the wellbeing of people. For instance, Anyamene, Nwokolo and Azuji (2016) reported the effectiveness of self-management technique in managing test anxiety among secondary students. In a related study, Isiyaku (2016) employed self-management therapy on bully behaviour among secondary school students in Katsina State. The result of the study revealed that self-management is very effective in managing behaviour disorders among students. Also, in a systematic review examining the relationship

between self-management interventions and distress in adult cancer patients receiving active tumor-directed therapy in nine studies that met inclusion criteria out of 5,156 articles identified. The review suggested that self-management interventions may help address psychological distress in patients receiving cancer treatment. It can then be inferred that self-management can be used to reduce some unwanted and even self-injurious behaviour in both adults, young adults and even among children. Going by its efficacy and effectiveness in management of undesired behaviour among young adults and adults that are without hearing impairment, self-management therapy is feasible intervention for the management of psychological distress among adolescents with hearing impairment. This study, therefore, investigated the effectiveness of self-management therapy in the management of psychological distress among adolescents with hearing impairment in Oyo State, Nigeria owing to the fact that some students with hearing impairment in some secondary schools in Oyo state have been exhibiting some signs that can be likened to distresses between and among their classmates.

Hypotheses

1. There is no significant main effect of treatment (Self-management Therapy) on participants' management of psychological distress.
2. There is no significant main effect of onset of hearing loss and self-esteem on participants' management of psychological distress.
3. There is no significant interaction effect of onset of hearing loss and self-esteem on participants' management of psychological distress.

Methodology

The study adopted the pre-test-post-test control group, quasi-experimental design with the purpose of examining the effectiveness of self-management therapy on psychological distress management among adolescents with hearing impairment in Oyo State. The population for this study comprised adolescents with hearing impairment in Oyo State.

Two integrated secondary schools were purposively selected from two senatorial districts of Oyo State. Purposive sampling technique was used to select a total of 190 adolescents with hearing impairment. The Kesler Psychological Distress Scale with index scores of 19 and above was the screening tool used to determine hearing impaired adolescents with psychological distress. The numbers of adolescents with hearing impairment having psychological distress were 39 out of the

population of 190 adolescents with hearing impairment initially purposively selected. Male participants were 16 (41.03%) while female participants were 23(58.97%). The adolescents were in the 12 to 21 age range. The participants were randomly assigned to Self-management Therapy (SM, 17) and Control (22) groups in view of the location of the schools. The participants were required to satisfy each of the following criteria before they could be assigned to the two experimental conditions. That is, they should be having hearing impairment, should exhibit symptoms of psychological distress (A Kesler Psychological Distress scale with index scores of 19 and above), should not have the risk of self-harm, should be within 12 and 21 years of age and should be willing to participate without coercion. Three research instruments were used in this study. They included, Kessler Psychological Distress Scale (K10), Clinical Outcomes in Routine Evaluation (Core-10) and Rosenberg Self-esteem Rating Scale. The Kessler Psychological Distress Scale (Kessler, Barker, Colpe, Epstein, Gfroerer & Hiripi, 2003) is a 10-item one-dimensional scale specifically designed to assess psychological distress in population surveys. The K10 was designed with item response theory model to optimise its precision and sensitivity in the clinical range of distress, and to insure a consistent sensitivity across gender and age groups (Kessler et al., 2003). The scale evaluates how often respondents experienced anxio-depressive symptoms (for instance nervousness, sadness, restlessness, hopelessness, and worthlessness). Each item is scaled from 0 (none of the time) to 4 (all of the time) and the local score is used on index of psychological distress. Several studies showed no substantial bias for the K10 in relation to gender, education (Baillie, 2005) or age (OConnor & Parslow, 2010). For the purpose of this study, the instrument was revalidated by sharing it with experts in the areas of Clinical and Counselling Psychology and Special Education. The recommendations of the experts indicated that the i2nstrument is suitable for the distressed adolescents with hearing impairment. The reliability of the instrument was re-established through test-retest method. This method involved administration of the instrument to fifteen (15) distressed adolescents with hearing impairment, (other than those that were involved in the study) on two occasions of four weeks interval. The fresh Kessler Psychological Distress Scales internal consistency estimates yielded a mean coefficient of 0.63. The CORE-10 which is a brief outcome measure, comprising 10 items, is drawn from the CORE-OM (which contains 34 items). It was developed by Barkham et al (2013)

in UK. CORE-10 is measuring a single construct – psychological distress. The scale evaluated how often over the last week the respondents experienced anxiety, nervousness, and panic, among others. Each item was scaled from 0 (not at all) to 4 (all of the time). The scale was administered for both pre-test and post-test. The instrument was also revalidated by sharing it with experts in the areas of Clinical and Counselling Psychology, and Special Education. The recommendations of the experts favoured the suitability of the instrument for the distressed adolescents with hearing impairment. The reliability of the instrument was re-established through test-retest method. This method involved administration of the instrument to 15 distressed adolescents with hearing impairment (other than those that were involved in the study) on two occasions of four weeks interval. The fresh CORE-10 (psychological distress scale) internal consistency estimates yielded a mean coefficient of 0.71. Self-esteem scale which was developed by Rosenberg (1965) was adopted. The scale was constructed in four likert scale type ranging from Strongly Agreed (SA), Agreed (A), Disagreed (D) and Strongly (SD) with ten items. Samples of the items on the inventory include: (I feel that I have a number of good qualities; I feel I am a person of worth, at least on an equal plane with others). The scale is to enable the classification of the participants into high or low self-esteem. It was also revalidated with reliability index of 0.60. Bio-data scale was separately constructed to get the demographic variables of the participants in form of age, sex, state of origin, religious affiliation, family type (whether monogamy or polygamy), family status (whether intact or broken) and onset of hearing loss. The procedure for data collection was carried out in three phases. That is, pre-treatment phase; treatment and post-treatment or evaluation phase. In pre-treatment phase, permission to use the selected secondary schools was sought from the principal of each of the schools. After permission had been granted, adolescents with hearing impairment (HI) were contacted by the help of the principals, and class teachers in each of the selected schools. The adolescents with hearing impairment contacted were given the description of the study, including the key ethical issues associated with the research. Thereafter, the parents of those who wished to participate were contacted and the description of the study, including the key ethical issue, was also given to them. However, those adolescents who wished to participate in the study and the researcher negotiated for the next appointment date. On the appointment date, the researcher came into contact with the adolescents

with hearing impairment and previous activities were recapped having ascertained that they have hearing impairment through medical records in the schools which indicated the status of their deafness and degrees. Following this was the screening of the adolescents for the study eligibility. This was done by administering Kessler psychological distress scale (K-10). The context within which distress had risen was also established using the structural approach format (Questions on Distress). The treatment session started with the administration of the Clinical Outcomes in Routine Evaluation (CORE-10) to the two groups for the purpose of obtaining pre-test scores. Rosenberg's self-esteem scale was also administered to classify the participants into the two levels of self-esteem. Thereafter the participants in the experimental group were subjected to 10 weeks of the treatment protocol. The participants in the control group participated only in the pre- and post-treatment sessions. There was a session of therapy in each week and each session lasted for about 60 minutes. The participants in the experimental group were managed with self-management therapy, while control group were only exposed to distress education counselling during the treatment period. Self-management therapy is an adaptation from Falaye, Ajibola and Afolayan's (2015) self-management therapy. A weekly session that enables the distressed adolescents become skilled in the application of relevant learning principles to their problematic situation associated with having hearing loss was conducted. The techniques in the treatment protocol include acquiring basic skills needed for effective self-management therapy, obtaining reinforcement, self-monitoring, challenge test reward, and stimulus control. The treatment guide was supported by daily mood rating log sheets, questions on distress, daily record of dysfunctional thought, weekly self-monitoring record, and pleasant event sheet. The guide for control group consisted of only distress education. Clinical Outcome in Routine Evaluation (CORE-10) and Rosenberg's self-esteem scale were used to collect post-test scores from the two groups respectively. Ethical considerations include confidentiality of data collection, translation of protocol to sign language, beneficence, non-maleficence to participants and voluntariness. Data collected was analysed using analysis of covariance (ANCOVA).

Results

Hypothesis One

There is no significant main effect of treatment (Self-management Therapy) on participants' management of psychological distress.

Table 1: Summary of Analysis of Covariance (ANCOVA) of Post-psychological Distress by Treatment

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Square
Corrected Model	762.448a	2	381.224	77.341	0.000	0.811
Intercept	122.789	1	122.789	24.911	0.000	0.409
Core10_Pre	6.764	1	6.764	1.372	0.249	0.037
Treatment	744.378	1	744.378	151.015	0.000	0.808
Error	177.45	36	4.929			
Total	6508	39				
Corrected Total	939.897	38				

The result from Table 1 revealed that there is a significant main effect of treatment (self-management therapy) on management of psychological distress among adolescents ($F_{(1,36)} = 151.015$; $p<0.05$, partial $\eta^2 = 0.808$). Due to the value above, hypothesis 1 was rejected. In order to determine the magnitude of the significant main effect across the treatment groups, the estimated marginal means of the treatment groups were carried out and the result is presented in

Table 2: Estimated Marginal Means for Post-psychological Distress by Treatment and Control Group

Treatment	Mean	Std.Error
Self-management Therapy (SMT)	6.97	0.539
Conventional Therapy (CVT)	15.796	0.474

Result in Table 2 showed that participants exposed to Self-management Therapy (SMT) had the lowest adjusted post-psychological distress mean score (6.970) compared to their counterparts who were exposed to Conventional Therapy (CVT) which is the control group (15.796). This implies that the participants who were exposed to Self-

management Therapy had better result on psychological distress than the control group.

Hypothesis Two

There is no significant main effect of onset of hearing loss and self-esteem on participants' management of psychological distress.

Table 3: **Summary of Analysis of Covariance (ANCOVA) of Post-psychological Distress by Onset of Hearing Loss and Self-esteem**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Square
Corrected Model	625.49	6	104.248	10.61	0.000	0.665
Intercept	36.122	1	36.122	3.676	0.064	0.103
Core10_Pre	49.061	1	49.061	4.993	0.033	0.135
Onset of Loss	102.063	1	102.063	10.388	0.003	0.245
Self-Esteem	367.244	2	183.622	18.689	0.000	0.539
Onset*Esteem	83.565	2	41.783	4.253	0.023	0.21
Error	314.407	32	9.825			
Total	6508	39				
Corrected Total	939.897	38				

The results from Table 3 revealed that there is a significant main effect of onset of hearing loss on participants' management of psychological distress ($F_{(1,32)} = 10.388$; $p<0.05$, partial $\eta^2 = 0.245$). By implication, hypothesis two was rejected. This implies that onset of hearing loss had a main effect on the management of psychological distress.

Table 4: Estimated Marginal Means for Post-psychological Distress by Pre-Lingual and Post-Lingual Onset of Loss

Onset of Loss	Mean	Std. Error
Pre-Lingual	13.467	0.678
Post-Lingual	9.793	0.892

Result in Table 4 showed that participants that are of post-lingual onset of loss had the lowest adjusted post-psychological distress mean

score (9.793) compared to their counterparts who are of pre-lingual onset of loss (13.467). Hence, post-lingual onset of loss participants have low psychological distress.

Similarly, there is a significant main effect of self-esteem on participants' management of psychological distress ($F_{(2,46)} = 18.689$; $p<0.05$, partial $\eta^2 = 0.539$). The null hypothesis was rejected which implies that self-esteem had a main effect on the management of psychological loss. Table 5 shows the estimated marginal means which explains that participants that had high self-esteem had the lowest adjusted post-psychological distress mean score (8.782) compared to their counterparts who had moderate self-esteem (10.050) and low self-esteem (16.058)

Table 5: Estimated Marginal Means for Post-psychological Distress by Low Self-esteem, Moderate Self-esteem and High Self-esteem.

Self-esteem	Mean	Std.Error
Low Self-esteem	16.058	0.922
Moderate Self-esteem	10.05	1.121
High Self-esteem	8.782	0.813

Hypothesis Three: There is no significant interaction effect of onset of hearing loss and self-esteem on participants' management of psychological distress**.**

The results from Table 3 revealed that there was a significant interaction effect of onset of hearing loss and self-esteem on participants' management of psychological distress ($F_{(2,32)} = 4.253$; $p<0.05$, partial $\eta^2 = 0.210$). By implication, hypothesis three was rejected. This implies that onset of hearing loss and self-esteem had an interaction effect on the management of psychological distress. In other words, the effect of onset of hearing loss on the management of psychological distress depends largely on the self-esteem of the participants.

Discussion

The study revealed that that there is a significant main effect of treatment (self-management therapy) on the management of psychological distress among adolescents with hearing impairment. The implication of this is that self-management proved efficient in the management of distress among the participants. Since the experimental group was exposed to self-management therapy, the intervention was

found to have contributed significantly to the reduction in the psychological distress symptoms among the participants. The study corroborated a body of research that has used psychotherapeutic techniques such as self-management therapy for the management of psychological distress among individuals with hearing impairment. The result corroborated the study carried out by Anyamene, Nwokolo and Azuji (2016) who reported effectiveness of self-management technique on test anxiety among Secondary Students. The study also lends credence to Isiyaku (2016) study of self-management therapy on bully behaviour among secondary school students in Katsina State. The outcome of the study revealed positive impact of self-management on bully behaviour among the participants. In essence, self-management therapy can be seeing as very effective in reducing psychological distress among adolescents with hearing impairment who are psychologically distress.

The study further revealed that onset of hearing and self-esteem has effects in the management of psychological distress among adolescents with hearing impairment. This implies that both self-esteem and onset of hearing loss have implication on psychological construct of individuals. For instance, deafness acquired in the adulthood creates problems that are different from the problems of those who were born with hearing impairment or who lost their hearing during their early childhood (Munoz-Bael & Ruiz, 2000). Children born with deafness have more of a linguistic problem because they do not learn any spoken language properly before the loss occurred hence their communication disability may lead to social rejection, little education, low status job and low income which have a powerful impact on self-esteem (Strong and Shaver, 1991; Jambor & Elliott, 2005). On the other hand, deafness acquired at adulthood also has issues with self-esteem. Hearing loss (HL) at adulthood significantly changes the lives of such individuals because, they have to start a new life and learn how to adapt to a new situation. Repeated experiences of ineffective communication lead to frustration and a feeling of deficiency that could diminish self-esteem of individuals with acquired and profound hearing loss (Jambor & Elliott, 2005). Arguably, studies have revealed inconsistent impact of hearing loss on self-esteem. While some studies have reported low self-esteem in children with hearing impairment (Bat-Chava, 1993; Bat-Chava & Deignan, 2001; Huber, 2005; Tambs, 2004; Weisel & Kamara, 2005), others have posited equivalent esteem ratings across auditory status (Sahli, Arslan, & Belgin, 2009; Percy-Smith, Caye-Thomasen, Gudman,

Jensen, & Thomsen., 2008) and yet few others have revealed more positive self-esteem in children with hearing loss versus hearing peers (Cates, 1991; Kluwin, 1999). So, the implication of this may be because of different environmental variables. The results further established that there is interaction effects of self-esteem and onset of hearing loss in the management of psychological distress in adolescents with hearing impairment. These informed the need to find a way of stabilising the self-esteem of children with hearing impairment whether congenital or adventitious. This is because according to (Amos, Okoye & Hamsatu, 2016), self-esteem is highly correlated with overall psychological wellbeing.

Conclusion

This study investigated the effectiveness of self-management therapy in the management of psychological distress among adolescents with hearing impairment. The results revealed that self-management therapy is efficacious in the management of psychological distress among the participants and that self-esteem and onset of hearing loss have significant impact in the management of psychological distress among adolescents with hearing impairment and their interaction effect of the two variables in the management of psychological distress.

Recommendation

School counsellors, special education teachers and other stakeholders should consider using self-management therapy to manage some psychological problems that may be manifested by adolescents with hearing impairment and self-esteem of adolescents with hearing impairment should be boosted because this forms the basis of adaptive living. This can be done by helping them to develop positive and high self-esteem through self-management training.

References

Abiola, T., Lawal, I. & Habib, Z. G. (2015). Psychological distress due to academic stress among clinical students in a Nigerian tertiary institution: Comparison between medical and physiotherapy students. *Nigeria Journal of Basic Clinical Science, 12* (8), 1-5.

Ademokoya, J. A. & Shittu, B. A. (2007). Onset of hearing loss, gender and self-concept as determinants of academic achievements in

English Language of students with hearing disability in Oyo State, Nigeria. *Essays in Education*, 22, 65-74.

Adeniyi, S. O. & Kuku, O. O. (2016). Personal-Social factors as correlates of school interest among adolescent with hearing impairment in Lagos State, Nigeria. *The Lagos Counsellor, 9* (1), 11-26.

Adeniyi, S. O. (2012). Family life and HIV/AIDS related factors as prediction of knowledge of and attitude to HIV/AIDS among adolescents with hearing impairment in southwestern Nigeria. (Unpublished Ph.D. thesis), University of Ibadan.

Alika, H. I., Akanni, D. O. & Akanni, O. O. (2016). Parenting styles and family characteristics as correlates of psychological distress among Nigerian adolescents. *International Journal of Psychology and Counselling Academic Journals, 8* (9), 102-108.

Amos, A., Okoye, L. J. & Hamsatu, J. P. (2016). Self-esteem and academic performance among undergraduate students in the University of Maiduguri: implication for counselling. International *Journal of Operational Research in Management, Social Sciences and Education, 12* (1), 93-104.

Anyamene, A., Nwokolo, C. & Azuji, I. (2016). Effects of self-management technique on test anxiety among secondary school students. *The Journal of Social Science Research, 2(*9), 159-166.

Baillie, A. J. (2005). Predictive gender and education bias in Kessler's psychological distress scales (K10). *Social Psychiatry and Psychiatric Epidermiology, 40* (9), 743-748.

Barkham, M., Bewick, B. M., Mullin, et'al (2013). Clinical Outcomes in Routine Evaluation (CORE): Studies on the measures and their use in routine settings. *Counselling and Psychotherapy Research, 13*(1), 3-13. http://dx.doi.org/10.1080/14733145.2012.729069.

Barkham, M., Evans, C., Margison, F., McGrath, G., Mellor-Clark, J., Milne, D., & Connell, J. (1998). The rationale for developing and implementing core outcome batteries for routine use in service settings and psychotherapy outcome research. *Journal of Mental Health, 7*, 35– 47

Baskett, L. M. (2001). Self-monitoring in children: Accuracy and reactivity. *The Journal of genetic psychology*. 146, 107-116.

Bat-Chava, Y. & Deignan, E. (2001). Peer relationship of children with cochlear implants. *Journal of Deaf Studies and Deaf Education, 6* (3), 186-199.

Bat-Chava, Y. (1993). Antecedents of self-esteem in deaf people: A meta-analytic review. *Rehabilitation Psychology*, 38, 221-234.

Brown, P. M. & Cornes, A. (2015). Mental health of deaf and hard-of-hearing adolescents: What the students says. *Deaf Studies and Deaf Education, 20* (1), 75-81.

Cates, J. A. (1991). Self-concept in hearing and prelingual, profoundly deaf students: A comparison of teachers' perception. *American Annals of the Deaf, 36*(4), 354-359.

Cole, C. L., & Bambara, L. M. (1992). Issues surrounding the use of self-management interventions in the schools. *School Psychology Review*, 21, 193-201.

Falaye, Ajibola and Afolayan, J. A. (2015). Self-management techniques and disclosure of sero status. *Journal of Education and Practice, 6* (8), 72-80.

Fergusson, D. M. & Woodward, L. J. (2002). Mental health, educational and social role outcomes of adolescents with depression. *Achieve of General Psychiatry, 59* (3), 225-231.

Fuchs, C.Z. & Rehm, L.P. (1977). A self-control behaviour therapy programme for depression. *Journal of Consulting and Clinical Psychology, 45*(2), 206-215.

Godberg, J. I., Schulma-Green, D. Hernandez, M. & Nelson, J .E. (2019). Self-Management Interventions for Psychological Distress in Adult Cancer Patients: A Systematic Review. *West African Journal of Nursing Research*, 41(10), 1407-1422. doi: 10.1177/0193945919845104

Hogan, A., Shipley, M., Strazdins, L., Purcell, A. & Baker, E. (2011). Communication and behavioral disorders among children with hearing loss increase of mental health disoeders. *Australian and New Zealand Journal of Public Health, 35*(4), 377- 383. doi: 10.1111/j.1753-6405.2011.00744.x

Hubber, M. & Kipman, U (2011). The mental health of adolescents with cochlea implants, compare to normal hearing peers. *International Journal of Audiology. 50* (3), 146-154.

Huber, M. (2005). Health-related quality of life of Austrian children and adolescents with cochlear implants. *International Journal of Pediatric Otorhinoloaryngology 69*, 1089–1101.

Ibudeh, N.M. (1991). *The clinical efficacy of three behaviour therapy techniques in the psychological treatment of depression*. (Unpublished Ph.D. Thesis), University of Ibadan,

Isiyaku, L. (2016). *Effects of self-management and social skill counseling techniques on bullying behaviour among secondary school students in Katsina State, Nigeria*. Unpublished Ph.D. thesis: Ahmadu Bello University, Zaria.

Jambor, E. & Elliott, M. (2005). Self-esteem and coping strategies among deaf students. *Journal of Deaf Studies and Deaf Education, 10* (1), 63-81.

Kessler, R. C., Barker, P. R., Colpe, L. J., Epstein, J. F., Gfroerer J. C. & Hiripi, E. (2003). Screening for serious mental illness in general population. *Archieve of General Psychiatry 60* (2), 184-9.

Kluwin, T. (1999). Co-teaching deaf and hearing students: Research on social integration. *American Annals of the Deaf*, 144, 339-344.

McCoach, M. (2008). The effects of self-management strategies for high school students with disabilities. Rowan University, 1-51. http://rdw.rowan.edu/cgi/viewcontent.cgi?article=1729&context=etd

Mehboob, S., Raf, T., Ahmed, N. & Mehjabeen, N. (2019). Association of hearing loss with depression, anxiety and stress in patients suffering from Chronic Suppurative Otitis Media. *Pakistan Journal Medical Science, 35* (2), 510-514. doi:10.12669/pjms.35.2.152

Munoz-Bael, I. M. & Ruiz, M. T. (2000). Empowering the deaf: Let the deaf be deaf. *Journal of Epidemiology and community Health*, 54, 40-44.

Nelson, J. R.., Smith, D. J., Young, R. K. & Dodd, J. M. (1991). A review of self-management outcome research conducted with students who exhibit behavioural disorders. *Hammill Institute on Disabilities, 16* (3), 169-179.

Niazi, Y. & Ejaz, B. & Muazzam, A. (2020). Impact of hearing impairment on psychological distress and subjective well-being in older adults. *Pakistan Journal of Medical Science*, 36(6), 1210-1215.

Nwanko, C. B., Okechi, B. C. & Nweke, P. O. (2015). Relationship between perceived self-esteem and psychological well-being among athletes. *Academic Research Journal of Psychology and Counselling, 2* (1), 8-16.

Oconnor, D. W. & Parslow, R. H. (2010). Mental health scales and psychiatry diagnosis: Responses to GHQ-12, K-10 and CIDI across the lifespan. *Journal of Affective Disorders, 121* (3), 263-267.

Ogunwale, O. R. (2016). Determinants of Suicidal ideation among persons with hearing impairment in Federal College of Education (Special), Oyo. *European Journal of Multidisciplinary Sciences,* 1, 2421-8251

Okeke, B. O. (2009). *Social support seeking and self-efficacy building strategies in enhancing emotional wellbeing of informal HIV/AIDS caregivers in Ibadan, Oyo State*. (Unpublished Ph.D. Thesis), University of Ibadan

Oyewunmi, A. E., Oyewunmi, O. A., Iyiola, O. O. & Ojo, A. Y. (2015). Mental health and the Nigerian workplace: Fallacies, facts and the way forward. *International Journal of Psychology and Counselling, 7*(7), 106-111.

Percy-Smith, L., Caye-Thomasen, P., Gudman, M., Jensen, J. H. & Thomsen, J. (2008). Self-esteem and social wellbeing of children with cochlear implants compared to normal hearing children. *International Journal of Paediatric Otorhindoaryngology, 72* (7), 1113-1120.

Raheem, A.W. (2016). *Effects of two behaviour therapies on psychological distress among non-infected adolescents with HIV/AIDS infected parents in Oyo State Nigeria*. (Unpublished Ph.D Thesis), University of Ibadan.

Rehm, L.P. 1977. A self-control model of depression. *Behaviour Therapy, 8* (5), 787-804.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton.

Sahli, S., Arslan, U., Belgin, E. (2009). Depressive emotioning in adolescents with cochlear implant and normal hearing. *International Journal of Pediatric Otohinolaryngology, 73*(12), 1774-1779.

Strong, C. J. & Shaver, J. P. (1991). Modifying attitude towards person with hearing impairments: a comprehensive review of research. *American Annals of the Deaf*. 136, 252-260.

Tambs K. (2004). Moderate effects of hearing loss on mental health and subjective well-being: Results from the Nord-Trøndelag Hearing Loss Study. *Psychosomatic Medicine, 66* (5), 776-782.

Theunissen, S. C. P. M., Rieffe, C., Kouwenberg, M., Soede, W., Briaire, J. J & Frijns J. H. M. (2011). Depression in hearing-impaired children. *International Journal of Pediatric Otorhinolaryngology, 75*, 1313–1317.

Warner-Czyz, A. D., Loy, B. A., Evan, C., Wetsel, A. & Tobey, E. A. (2015). Self-esteem in children with hearing loss. *Trends in Hearing*, doi: 10.1177/2331216515572615

Weisel, H. & Kamara, A. (2005). Attachment and individuation of deaf/hard of hearing young adults. *Journal of Deaf Studies Deaf Education, 10* (1), 51-62.

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Role of Fieldwork in the Quality of Teaching and Learning of Geography in Senior High Schools the Upper West Region, Ghana

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Abstract

The study was undertaken to examine the contributions of fieldwork towards the teaching and learning of Geography in selected senior high schools in the Upper West Region of Ghana. The descriptive survey design was adopted for the study. The population comprised 360 students and three Geography teachers. Both questionnaire and interview guide were the instruments used to collect the data for the study. Quantitative data were analyzed using descriptive statistics and the qualitative data were organized into themes. Findings from the study revealed that the extent to which fieldwork was used by Geography teachers is small though it was affirmed by students and teachers that fieldwork is vital in the teaching and learning of geography. Further, it was recognized that challenges such as lack of financial resources, inadequate time, lack of support from school management and parents and lack of logistics and material resources such as vehicles to convey students to the field in most instances, deprived teachers from organizing fieldwork as a method of teaching and learning. The study recommended the following; the Ghana Education Service should organize workshops and seminars to equip teachers in the organization of workshops, availability of videos of field sites that are in line with the geography curriculum for senior high schools, teachers should also explore more on the fieldwork opportunities within their immediate school and community environment and all educational stakeholders should assist in the organization of fieldwork to enhance effective teaching and learning of geography in senior high schools.

Introduction

The purpose of education is to develop the knowledge, skills and character of students and it is for this reason that the Ghanaian educational system made Geography as a course in the curriculum of senior high schools with the purpose of developing the knowledge base of students about their environment. This goal of geography can only be achieved if the appropriate methods of teaching are employed by the teachers (Shakil, Faizi & Hafeez, 2011). As espoused by Aggarwal (2010), the abstract nature of certain topics of the curriculum of educational institutions necessitates fieldwork as the ultimate teaching technique to aid the teacher to clarify, establish and correlate accurate concepts and interpretations vividly and meaningfully to students' understanding. Further, Thomas and Munge (2015) hold a similar notion that fieldwork eliminates abstract thinking and encourages practical activities among students. Since fieldwork is keener on observing the issue, it tends to reduce abstract thinking; which the bookish method (text books) rather encourages. Students would be able to connect concepts and principles to the real world. In corroboration is the indication by Knapp (2002) that learning in a hands-on setting is one of the best ways to reinforce topics learnt in the classroom, to integrate academic and experiential learning. This implies that students grasp the meaning of concepts better when they complement the theoretical lesson taught with a practical experience. Consequently, fieldwork cannot be underestimated and should not be underutilized since it gives a practical aspect of the lesson taught in the classroom (Ababio & Dumba, 2014). Fieldworks are beneficial to both the teacher and the student in view of the fact that most of the concepts and phenomena are easily clarified. As a result, a good deal of energy and time of both the teacher and the students can be saved (Shakil & Hafeez, 2011). In addition, Myers and Jones (2004) observed that numerous research studies in science education have documented significant increases in participants' factual knowledge and understanding after participation in well–planned fieldwork. This also applies in the discipline of Geography, for instance, taking students to observe the natural environment when treating topics that relate to the environment will cause the students to comprehend both the theories and concepts of the topic. Geography studies the interrelationship of the individual, physical and social environment, both in spatial and temporal terms.

Issues of the environment are becoming increasingly important and geography, which studies the environment as a system, can and does provide solutions to environmental problems. Geography thus has a vital contribution to make towards the purpose of education in the form of solving problems and further providing critical foundation knowledge in the development of Ghana.

Geography in the senior high schools covers the planetary systems with emphasis on the earth as the planet habitable by humans, plants and animals. The principal issues concern the physical environment with the prospects and challenges of the human-environment relationships. The issue of understanding and interpreting maps, the geographical understanding of political divisions, identification and utilization of resources, livelihood activities that are and can be pursued in specific environment are also dealt with. For the purpose of teaching and learning and, examining at the senior high school level, geography as a subject has been organized into three interrelated branches as follows: Physical geography (Geomorphology, Climatology, and Biogeography), Human and Regional geography and Practical geography (Mitchel & Forer, 2010).

The introduction of fieldwork as a pedagogical skill in teaching and learning of Geography boosts the interest and understanding of students learning certain topics which are mostly taught theoretically therefore making the subject abstract and uninteresting in the classroom. It will also help teachers in the teaching profession and this might aid them to upgrade their existing knowledge, skills and abilities by way of professional development to effectively impart to students what is worthwhile to enhance their performance (Ababio & Dumba, 2014). It is in light of this background that the researchers conducted this work.

Statement of Problem

The prime aim of Geography as a subject of study is to impart and equip learners with the basic knowledge, skills, attitude and competence that can be used in solving the challenges they face in their environment. Scarce (1997) opines that appropriate methods of teaching must be adopted to enable students to connect classroom concept learning to real world situations. Hence, when the appropriate methods are used in teaching the student it will aid to help them put into

practice what they have been taught, thereby connecting conceptual learning to real world situation.

McLoughin (2004) further asserts that fieldwork tends to minimize a lot of expression in the classroom, thereby gives meaning to content and makes the subject matter more understandable, manageable, challenging and applicable for many members of the class. This implies that students should be given the opportunity to interact or visit places of importance to enable them understand some of the things they hear and learn about in the classroom so as to make them more practical in their thinking.

Further, as was envisaged in the final report of the President's Committee on Review of Educational Reforms in Ghana (2002), the education system should be focused on training students who will be intellectually and physically equipped with the requisite knowledge, skills, values and aptitudes for self-actualization, environmental sustainability and for the socio-economic and political transformation of the nation. It is in this phase that the Curriculum Research and Development Division (CRDD) of the Ghana Education Service (GES) developed the Geography syllabus in such a manner that each topic is assigned specific teaching and learning pedagogy or pedagogies.

The researchers' recent interaction with some Geography teachers in some senior high schools in Ghana, particularly the Wa municipality reveal that most of them do not undertake fieldwork as a teaching and learning technique. Nevertheless, research (Sithole 2010; Krakowkwa, 2012) has shown that fieldwork is essential for many reasons. But as to whether the teachers in the Wa municipality are fully aware of the benefits of fieldwork as a teaching and learning technique is a question that remains elusive. It is this problem that motivated the researchers to conduct a study that will investigate the extent and challenges in the use of fieldwork as a teaching and learning method in the teaching and learning of Geography.

Objectives of the Study

The general objective of the study was to examine the use and challenges of fieldwork as a teaching and learning method in the teaching and learning process. Specifically, the study sought to:

1. Assess the extent to which Geography teachers use fieldwork as a teaching and learning method in the teaching of Geography.
2. Evaluate the challenges Geography teachers face when organizing fieldwork.

Research Questions

In relation to the stated objectives enumerated above, the following research questions guided the conduct of the study:

1. To what extent do Geography teachers use field work as a method of teaching and learning Geography?
2. What are the challenges that teachers face when organizing fieldwork?

Literature Review

The concept of *fieldwork*

According to Pz'eazo (2005), fieldwork is an academic ground related to activities that serve educational purposes and occurs outside the classroom but at a location other than on a campus at which the course is regularly taught. For this reason, when it is organized away from the usual classroom confinement, it arouses students' interest on the topic being taught, thus, making the learning experience memorable. The term fieldwork is usually used when a person or a group of persons undertake a tour of places where they expect change from normal daily life (Shakil & Hafeez, 2011). When educational fieldworks are undertaken by students of an educational institution, the main aim is not only recreational and pleasure, but also for the students to gain additional knowledge through direct experiences (Shakil & Hafeez, 2011).

Knapp (2000) indicates that fieldwork strikes a balance between theory and real practice in any given field, and this suggests that there are certain learning experiences that necessitate learners to have a practical experience before they can practise in the real world. The use of educational fieldwork has long been a major part of the educational programme for both young and adults (Myers &Jones, 2004).

Fieldwork is an educational excursion that gets students away from the traditional classroom setting into a new mode of learning (Jonasson, 2011). In reference to geography, the teacher involved can take the students to a field where they would be allowed to observe operations in relation to the topic: land preservation and topography. When treating such topic, the teacher can decide to take students on a fieldwork to a site so as to make them have a practical understanding of the topic.

The concept of *teaching*

Teaching is quite a broad concept and many writers try to define it to suit their orientation and disposition as either a science or an art. Smith (2004) sees teaching as the process of carrying out activities that experiences have shown to be effective in getting the student to learn. Indicating that, the role of the teacher is very critical for the reason that it is the activities of the teacher that will inform the achievement of the desired goals intended in the student. From the perspective of Thring (2001), pouring out knowledge is not teaching. Having lessons is not teaching. Teaching is getting at the heart and mind so that the learners value learning and to believe that learning is possible in their own case. Teachers must therefore respect the intellectual prowess of their learners. Students must be actively engaged in the teaching - learning encounter since participation increases students' ability to grasp concepts.

Elaborating on this, Ababio (2013) indicated that teaching is a process whereby a teacher imparts knowledge, skills, attitudes and values to a learner or group of learners in a way that respects the intellectual integrity and the capacity of the learners with the aim of changing the behaviour of the learners. Ababio's assertion brings to mind that the activity of the teacher alone may not ensure learning. It is therefore incumbent on every teacher to assess how the students process information relating to how the students value information and how learner characteristics influence teacher dynamism in ensuring effective teaching.

As ascertained from the above definitions, it is clear that teaching is a process and not a one-shot activity that leads to the transmission of knowledge from a well - informed person to a lesser-known person with the intention of changing the behaviour, attitude and

skills of the learners. It also shows that teaching does not only deal with the impartation of knowledge, but how the learner receives the message, makes meaning out of it and puts it into practice.

The concept of *learning*

According to Kraiger, Ford & Salas (1993), learning is a change in the human exposition or capacity that persists over a period of time. This definition shows that it is only when a change takes place that learning has occurred. It is therefore possible for teachers to teach without learning taking place. The act of acquiring new or modifying and reinforcing existing knowledge, behaviour, skills, values or preference and synthesizing different types of information occur as a result of learning. Armstrong (2006) has also viewed learning as a process by which a person acquires knowledge, skills and capability. He posits that cognitive learning involves gaining knowledge and understanding by absorbing information in the form of principles, concepts and facts and then internalizing them. Others have also described cognitive learning as a powerful mechanism that provides the means of knowledge and goes well beyond simple imitation of others (Kraiger, et al. 1993). Many researches show that greater learning occurs when teaching methods and learning styles match. Fedler and Brent (2005) say that the teacher is not expected to tailor – fit his or her teaching method according to students' preferences. For example, if a teacher is inclined towards meeting the needs of students with different learning styles, some students will not feel left out. Also, students who are constantly taught through their dominant learning style will not know how to learn using their less preferred learning style. Thus, teachers should adopt balanced teaching methods to help more students learn effectively and become more flexible in the way they learn. To this end, a learner - centered teacher must employ different teaching methods to address students' varied learning needs. It can be deduced from the above definitions by the various authors that it is clear that learning is a process that takes place within a period of time and not a one-method that leads to the change in the disposition of the learners.

The use of fieldwork as a method of teaching and learning, especially in a practical subject like Geography is of great importance in the learning process. Fieldwork provides the students with experiences outside the everyday activities; helps students link concept

in learning experiences to real world situation; reduces non-figurative thinking; eliminates the bookish method of teaching and learning and encourages practical activities among students (Aggarwal & Green, 2011). As further emphasized by Knapp (2000), fieldwork increases the factual knowledge and conceptual understanding of students. Hence, they intimated that fieldwork as a method of teaching should be employed frequently by Geography teachers. Nonetheless, they stressed that it will be prudent for teachers to organize field work into pre, actual and post fieldwork stages. The scholars also stated that teachers must play the role of guardians, offering suggestions, supervising, directing and clarifying issues and concepts during the work. It is realized from the discussions that fieldwork is pertinent to the performance of students in Geography.

The purposively organized fieldwork provides an observational platform for students and experiences outside their everyday activities (Aggarwal & Green, 2011). As a result, students will have the first-hand experience empowering them to connect abstracts to reality. Sometimes normal classroom teaching and learning experiences are unable to connect conceptual and theoretical learning experiences to real world situations thus creating learning difficulties. As such, fieldwork in the long term, translates all the experiences to igniting the students' desire to take up a career in the field of Geography.

Challenges teachers face in organizing fieldwork

In spite of the numerous benefits of fieldwork as a method of teaching, it has challenges as well. It is as a result of these challenges that discourage many geography teachers from using it. Due to this, fieldwork is less patronized and neglected as a method of teaching. One major challenge is time. Pawson and Teather (2002) agreed that time constraint and inadequate support and cooperation from both headmasters and parents are elements which pose problems in the teaching of certain subjects in schools. They stated that fieldwork demanded a lot of time and parents' or guardians' permission, particularly when they are conducted very far away from the school compound. There is no doubt that fieldwork requires time to conduct from the onset to the end of it. Some geography teachers opine that fieldwork is time wasting. They support their argument with the assertion that Geography topics are copious and almost impossible to

complete within the stipulated time period. Consequently, teachers neglect the use of fieldwork when faced with varied options of methods of teaching.

Sithole and Lumadi (2013) stressed that most times, fieldwork fails to come off because of lack of support from the school management. Some school principals are at times hesitant to grant teachers the permission to conduct fieldwork probably due to the financial obligations involved (i.e. if the school would have to foot some of the expenses).

As affirmed by these scholars, although fieldwork plays a crucial role in the teaching and learning process, challenges such as financial constraints, time and attitude of people towards fieldwork impede teachers' efforts to use this method in teaching geography.

Methodology

The descriptive survey design was employed to help observe and describe the state of affairs regarding the reappraisal of fieldwork as a teaching and learning technique in the teaching of Geography. This descriptive study was a cross - sectional survey in which aggregate data were collected from different respondents at different points in time. The target population was all Geography teachers and students in senior high schools in the Wa Municipality. However, the accessible population consisted of Geography students and teachers in three selected senior high schools in the Wa Municipality. These schools were St. Francis Xavier Seminary, Wa Senior High School and Islamic Senior High School. The sample size for the study consisted of 160 respondents, made up of 160 Geography students from the selected schools. The proportionate approach by Seidu (2015), $nj = \left(\frac{Nj}{N}\right) * n$, where nj is the sample size for each school, Nj is the population size for each school, N is the total population size and n is the total sample size was adopted to determine the sample size for each school. St Francis Xavier Seminary 44 respondents, Islamic Senior High School 110 respondents and Wa Senior High School 166 respondents. The census method was employed to select the three Geography teachers; whereas the simple random sampling with the lottery technique was used in selecting the students from each proportion of sample assigned each school. This was used to ensure fair representation of the population and make sure that survey results statistically represented

the entire population under study. Interview guide and questionnaire were used by the researcher to collect data. Only teachers responded to the interview guide while students responded to the questionnaire which made use of descriptive statements based on the Likert type scale format. The researchers met the various headmasters of the selected schools to seek for their approval to conduct the research in their schools. The assistant headmasters for administration in the selected schools were assigned to help the researchers administer the questionnaire. The researchers introduced themselves to the teachers and students concerned to explain what the entire research was about and further responded to questions from both teachers and students. The questionnaire for students was administered and collected immediately they had finished completing them. It took the researchers three days to administer and collect a total of 160 copies of the questionnaires. This means that a return rate of 100% was achieved. The three teachers were interviewed separately for about 30 minutes and their responses were recorded accordingly. Data from the interview were transcribed and analyzed into thematic themes and that of the questionnaire were entered into SPSS to perform a descriptive analysis of data into frequencies, percentages and mean.

Results and discussions

Interview and questionnaire responses were analysed and discussed in this section. Data were presented to answer the research questions that guided the conduct of the study.

To what extent do Geography teachers use field work as a method of teaching and learning Geography? The results are presented in two parts. Part One presents the responses from the questionnaire while Part Two also looks at the results of the interview.

As presented in Table 1 (page 51), the responses show the several ways by which teachers get involved in organizing fieldwork as a method of teaching and learning Geography. It could be identified that all teachers teaching geography had used field work at least once 58 (35.8%) and 65 (40.1%) students affirmed "Agree" and "Strongly Agree" respectively. This will help to reduce the abstract nature of Geography subject. This finding consolidates the reason why the Geography syllabus in the Senior High Schools makes it explicitly clear that teaching methods such as fieldwork, use of resource persons,

project work, and group discussions among the likes are used. Though this finding is not in agreement with the findings of Sithole (2010), where out of six interviewees, three once took their classes for fieldwork, once in each case, and the other three had never used fieldwork.

Moreover, teachers also admitted using fieldwork though not frequently. Below are the responses of the Geography teachers on the use of fieldwork:

T1: *I* organized *a field work to the Mole National Park so students could learn how these natural elements are being preserved.*

T2: *I ever took students to the GHACEM cement factory and the Wa WADITH quarry to see some of the uses of rocks.*

T3: *I have organized a field trip only once to the mushroom rocks in Bulenga and the WA WADITH quarry the same day to see the nature of rocks and their uses. These two sites were visited the same day because they are both found on the same road.*

It was also revealed that all the necessary conditions to enhance activities on the field were all adhered to for a better understanding by the students. As was indicated by the study in Table 1 that; 65(40.1%) and 73(45%) agreeing and strongly agreeing that teachers hold discussions in class after the fieldwork, 67(41%) and 81(50%) also agreeing and strongly agreeing that teachers explain concepts and clarify misunderstandings during fieldwork, 76(47%) and 62(38%) agreeing and strongly agreeing to it that teachers play the role of guardians on the field as was further affirmed during the interview:

T1: *I have taken someone's child out. I am responsible for his or her safety till they get to back school.*

T2: *Guarding students was a requirement so I did as expected. Actually, I was protective of their welfare till I brought them back safely.*

T3: *Actually, because of the size of the class, I had to engage the National Service Personnel upon short briefing to go with us to enable me control and guard the students on the field.*

These are in conformity with Myers and Jones (2004), as the inclusive statement of their study asserted that teachers must play the role of guardians, offering suggestions, supervising, directing and clarifying issues and concepts during the trip. Further, in line with these findings of the study, Myers and Jones also affirmed that teachers should also function as guides other than directors. However, the study

interrogating the frequency of the fieldwork organization as in Table 1 identified that 48 (29.9%) and 81 (50%) respondents to the questionnaire disagreed and strongly disagreed respectively to the statement that fieldwork is frequently organized in the teaching and learning of Geography in senior high schools in the municipality. This, coupled with the aforementioned responses from the interviewees affirms that though field work is recognized as an important method in teaching Geography, its use as a method in the teaching and learning Geography is very rare in senior high schools in the municipality.

Table 1: Extent of Agreement of Students Regarding Teachers' Use of Field Work

Statement	Strongly agree N (%)	Agree N (%)	Strongly disagree N (%)	Disagree N (%)
Teacher has before used field work to teach once	65 (40.1%)	58 (35.8%)	15 (9.3%)	24 (14.8%)
Teachers always place students in groups when conducting field work	92 (57%)	61 (37.7%)	08 (5%)	1 (0.6%)
Teachers always inform the class on the learning materials to take along	76 (47%)	79 (49%)	6 (4.0%)	1 (0.6%)
Teachers play the role of guardian during field work	62 (38%)	76 (47%)	10 (6.1%)	14 (8.6%)
Teachers always conducts field work based on the concepts and theories in Geography	57 (35%)	89 (55%)	9 (6.0%)	7 (4.0%)
Teacher frequently uses field work to teach	15 (9.2%)	19 (11.7%)	81 (50%)	48 (29.9%)
Teacher always explains concepts and clarifies	81 (50%)	67 (41%)	8 (5%)	6 (4%)

misunderstanding during field work				
Teacher always holds discussions in class after the field work	73 (45.0%)	65 (40.1%)	13 (8.0%)	11 (7.0%)

What are the roles fieldwork plays in the teaching and learning of Geography?

As posited earlier, fieldwork plays several roles in the teaching and learning of Geography (Aggarwal & Green, 2001). This study revealed several roles played by fieldwork in the teaching and learning of Geography.

As shown in Table 2, majority of the respondents, 81 (50%) and 52 (30%) agreed and strongly agreed respectively that fieldwork makes learning of Geography interesting and exciting. This outcome from 80% of the respondents and the responses from the teachers as presented below affirms the stance of Scarce (1997) who emphasized that fieldwork is also a good method of engaging and even entertaining students, thereby helping students to make the educational experiences more enjoyable.

T1: *It enhances various massive students' participation in the teaching and learning process in the field.*
T2: *It takes out boredom, like having to teach theories and concepts and;*
T3: *It creates excitement in the children and this helps the teaching and learning a lot*;

Further, the finding agrees with Aggarwal (2003) who stressed that fieldwork as a teaching and learning method aids the teacher to clarify, correlate accurate concepts and interpretations which makes learning more concrete, effective and interesting.

Similarly, another benefit which is overwhelmingly an aggregate of 138 (85%) of the students strongly agreed and agreed, was that fieldwork encouraged them to observe, discover and gain meaningful information on the topics taught in the classroom while 24 (15%) of the students strongly disagreed and disagreed as presented in Table 2. Buttressed by the submissions of the teachers that;

T1: *Because the fieldwork is based on some theories taught in the classroom, it helps the students gain further information on those concepts.*
T2: *Most of the fieldwork is practice – based hence expatiate the classroom concepts; students gain extra knowledge.*
T3: *This technique gives students the practical experiences and makes it easy for them to understand abstract topics in the Geography Syllabus*

These revelations are incongruent with the opinion of Knapp (2002) which indicates that fieldwork aids students to collate meaningful understanding of concepts which reinforces topics learned in the classroom, to integrate academic and experiential learning. Students are able to grasp concepts through exploration and observations on the field when exposed to practical work on activities and demonstrations carried out during fieldwork.

As a recommendation from the students on the use of fieldwork in the teaching and learning of Geography, the results show that 85% endorsed the fact that fieldwork should be used frequently by teachers with only 15% disagreeing to the statement.

Table 2: Responses of students regarding the roles of field work in teaching and learning of Geography.

Statements	Strongly Agree	Agree	Strongly Disagree	Disagree
	Number (%)	Number (%)	Number (%)	Number (%)
It makes learning of Geography exciting and interesting	52 (32%)	81 (50%)	14 (9%)	15 (9.2%)
It engages me in the teaching and learning process	76 (47%)	79 (49%)	5 (3%)	2 (1%)
It encourages me to observe, discover and gain meaningful on the topic	62 (38%)	76 (47%)	10 (6%)	14 (9%)
It assists me to connect the concepts in Geography to real world situations	45 (28%)	87 (54%)	20 (12%)	10 (6%)
It does not make me rely solely on textbooks	83 (51%)	71 (44%)	6 (4%)	3 (2%)
It motivates me to learn Geography	70 (43%)	81 (50%)	6 (4%)	7 (4%)
It is a good method of creating an opportunity to move away from the usual classroom environme to a new environment	83 (51%)	71 (44%)	5 (3%)	3 (2%)
It encourages me to pursue a career in the field of Geography	65 (40%)	58 (36%)	15 (9%)	24 (19%)
It should be used by teachers frequently to teach	62 (38%)	76 (47%)	10 (6%)	14 (9%)

In consonance to these findings, the teachers also agreed to the recommendation. The objective was to unearth the roles played by fieldwork in the teaching and learning of Geography. It was ascertained that fieldwork makes learning of Geography interesting and exciting, gets students involved in the teaching and learning process, helps students to observe, discover and gain meaningful information on the topic, helps students connect concepts of Geography to real world situation, causes students not to solely rely on textbooks, motivates students to learn Geography and encourages students to pursue a career in the field of Geography.

What are the challenges that teachers face when organizing fieldwork?

Presented in this section are the challenges associated with organizing fieldwork. Data were collected using a structured interview guide. Three teachers in each of the three selected schools who agreed to participate in the study were interviewed regarding the challenges they face during the organization of fieldwork. The responses were analyzed and categorized into themes as they emerged in the responses. Common responses that emerged during the interview include;

Lack of financial resources: The availability of financial resources or money to finance the fieldwork is woefully inadequate and sometimes not available at all. This was expressed in the responses of the teachers when they were asked about the challenges they face. The teachers had this to say;

T1: *You know organizing fieldwork involves money and trust me it is expensive, so I have been able to organize just one to the Mole National Park to learn about plants and animal life.*

T2: *The last time I organized a fieldwork was a year ago, it is very expensive and there isn't any financial support from parents nor stakeholders. Sometimes students have to pay for the field work.*

T3: *It was not easy at all in getting the funds, though students made contributions, we have to write to the Parish Priest through the Rector for some funds to top up.*

These expressions from the study are inconsistent with the submissions of Nesper (2000). He mentioned that lack of funds forces many teachers to forgo fieldwork. It is also in line with the findings of Sithole and Lumadi (2013) when they studied the Improvisation of and

the use of Community Resources in teaching Geography. They found that some teachers had never organized any educational fieldwork because they admitted it was expensive.

Inadequate time: It was evidenced from the study that the course content/curriculum is so loaded and per the requirement of the school arrangement and preparation for examinations, the syllabus must be completed within the set time, hence, there is not enough time to go on a fieldwork. The teachers said the following;

T1: *Time constraint is a major challenge, the syllabus is too voluminous for the teaching and learning periods in the academic years, restricting me from thinking of organizing field trips*

T2: *The school management wants us to prepare the students to pass the exams, and there is not enough time to teach so we have no time to organize a fieldwork.*

T3*: I hardly finish that voluminous geography syllabus hence; it's always a challenge organizing a fieldwork. The time for the fieldwork is used for the classroom work.*

Inadequate time as a challenge in this study complements that posited by Nesper when he mentioned that standardized curriculum and overloaded schedules have forced many teachers to forgo fieldwork (Nesper, 2000). In addition, Pawson and Teather (2002), agreed that time constraint is an element which poses a problem in the teaching of certain subjects in schools. They opined that fieldwork demands a lot of time, especially when they are conducted far from the school compound.

Lack of support from school management and parents: The lack of support from the school management and parents was also implicated in the challenges confronting the teachers in their bid to organize fieldwork. Fieldwork must be approved by school authorities and sometimes the parents of the students. The respondents said this;

T1: *Most parents always welcome that, but the way, and manner you suffer before the school management approves your trip, most especially if it is out of the municipality.*

T2: *The school is not willing to allow students to go far for any social event including fieldwork.*

T3*: I don't take the students out for fieldwork because of lack of support from the school management. The school is supposed to assist in getting permission from the organization, but this is not done.*

Sithole and Lumadi (2013) also found similar results. Their study showed that the principals of schools at times hesitate to grant permission to undertake fieldwork probably due to financial obligation involved (if the school has to foot some of the expenses involved), safety and fear of misconduct. Moreover, it is always a must for teachers to seek the consent of the parents or guardian for participating students directly or through the Parent Teacher Association. However, Myers and Jones (2004) opined that oftentimes, some parents do not grant the request due to certain reasons such as distance, safety and cost involved.

Lack of logistics and physical resources: The responses from teachers also showed that they were constrained by the fact that vehicles are not easily available to convey students for the fieldwork. This is consistent with the findings of Sithole (2010) when he found in his study that some teachers have never organized a fieldwork due to unavailability of means of transport.

Conclusions and recommendations

Conclusions

The study was undertaken to examine the contributions of fieldwork towards the teaching and learning of Geography in selected senior high schools in the Wa Municipality. With regards to the extent of use of fieldwork, it was revealed that fieldwork has been used at least once by teachers teaching Geography and the necessary arrangements before, during and after the field work are duly recognized. Hence, making teaching and learning of Geography in senior high schools more interactive and understanding.

It was identified that field work interestingly and excitedly made teaching and learning understandable to students. As they expressed that it aided them to observe, discover and gain meaningful information on topics taught in the classroom. It was further revealed that fieldwork made students to easily connect concepts and theories in Geography and eliminated the sole reliance on textbooks. Indicating that field work plays a major role in the teaching and learning of

Geography, as it helped in the development of the cognitive, affective and psychomotor domains of the learners.

It is concluded that lack of financial resources, time, support from management, parents and guardians, and other resources were the main challenges teachers faced in using fieldwork as a method of teaching and learning Geography. Relegating them to the use of other teaching and learning techniques that are inexpensive to prepare students adequately for West Africa Senior Secondary Certificate Examination (WASSCE).

Recommendations

In relation to the extent of use of fieldwork, the Ghana Education Service (GES) should put in place measures that will further enhance the teachers' will and technical know-how in the organization of fieldwork. If this is done, Geography teachers would have an in-depth knowledge on the organization of fieldwork. Therefore, geography teachers would employ fieldwork as a method of teaching at least more than once in an academic year.

Also efforts should be made by the District Assemblies and the Ghana Education Service (i.e. the District Education Oversight Committee) to provide room for such activities in the senior high schools. This would undoubtedly generate a significant amount of interest in the school authorities as well as the teachers to enhance their understanding of the subject and further encourage them to frequently adopt fieldwork in teaching and learning of Geography.

Again, with regard to the roles of fieldwork, Geography teachers should be more resourceful and attempt to incorporate regular fieldwork as a method of teaching in their lessons due to its numerous benefits in the teaching and learning of Geography. This will in effect link Geography as a subject of study to real world situations, encourage students to gain and discover meaningful information, make learning exciting and interesting, motivate students to learn and create the opportunity to move away from the usual classroom environment to a new environment and many more.

To help combat the challenges of cost and time constraints faced by the Geography teachers when organizing fieldwork, Geography teachers should explore more about the fieldwork opportunities in their schools and communities since this would be more cost effective and

less time consuming. In addition, non-availability of funds and inadequate support from school authorities should not be used as an excuse for not organizing fieldwork in Geography studies. Notwithstanding, school authorities should provide teachers with the necessary logistics to help reduce the challenges Geography teachers face when organizing fieldwork.

References

Ababio, B. T. (2013). Nature of teaching: What teachers need to know and do? *International Journal of Innovation Education and Research*, *1*(3), 37-48.

Ababio, B. T., & Dumba, H. (2014). Assessment of the policy guidelines for the teaching and learning of geography at the senior high school level in Ghana. *Review of International Geographical Education Online*, *4*(1), 40-57.

Aggarwal, J. C. (2010). *Theory & principles of education*. Vikas Publishing House.

Aggarwal, J. C. & Green, R. (2011). *The role of education and skills in Australians' management practice and productivity*: Vikas Publishing House Ltd

Aggarwal, J. C., & Beichner, R. J. (1999). *Essentials of educational technology: Teaching learning innovations in education*. Hindustan Offset Printers.

Amstrong, D. G. (2006). *Teaching in the secondary school.* Pearson Education Ltd.

Felder, R. M., & Brent, R. (2005). Understanding student differences. *Journal of engineering education*, *94*(1), 57-72.

Jonasson, M. (2011). Framing learning conditions in Geography excursions. *International Education Studies*, *4*(1), 21-29.

Knapp, D. (2000). Memorable experiences of a science field trip. *School science and mathematics*, *100*(2), 65-72.

Knapp, D, (2002). Memorable experiences of science fieldwork. *School Science and mathematics Journal, 100(2)* 65-12.

Kraiger, K., Ford, J. K., & Salas, E. (1993). Application of cognitive, skill-based, and affective theories of learning outcomes to new methods of training evaluation. *Journal of applied psychology*, *78*(2), 311.

Krakowkwa, A. R, (2012), Field trips as valuable learning experience in geography courses. *Journal of Geography, 111(6)* 236-244.

McLoughin, A. (2004). Engineering active and effective field work. *The Clearing House Journal 77(3),* 160-16.

Mitchel, P. & Forer, P. (2010). Blended learning: The perceptions first-year geography students. *Journal of Geography in Higher Education, 34*(1), 77-89

Myers, B., & Jones, L. (2004). *Effective use of field trips in educational programming: A three stage approach*. University of Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, EDIS.

Nesper, J. (2000). School field trips and the curriculum of public spaces. *Journal of Curriculum Studies*, *32*(1), 25-43.

Pawson, E., & Teather, E. K. (2002). Geographical Expeditions: Assessing the benefits of a student-driven fieldwork method. *Journal of Geography in Higher Education*, *26*(3), 275-289.

Pz'eazo, M. (2005). Fieldwork is not the proper preserve of a lady. In M. Diaz-Andreu & M.L.S Sorensen (Eds.). *Excavating women: A history of women in European archaeology* (pp 198 – 204). Routledge

Scarce, R. (1997). Field trips as short-term experiential education. *Teaching Sociology*, *25*(3), 219-226.

Seidu, A. H. (2015). *Writing a thesis: A guide for social science students*. Supreme concept publications.

Shakil, A. F., Faizi, W., & Hafeez, S. (2011). The need and importance of field trips at higher level in Karachi, Pakistan. *International Journal of Academic Research in business and social sciences*, *2*(1), 1-16.

Sithole, B. M. (2010). Pedagogical practices of business studies teachers in Botswana junior secondary schools: Are teachers and curriculum planners singing from the same hymnbook?Ithuteng.ub.bw

Sithole, B. M., & Lumadi, M. W. (2013). Improvisation and the use of community resources in business studies teaching. *Journal of Social Sciences*, *34*(1), 1-7.

Smith, M. K. (2004). *Educational development in Ghana.* Unimax Publishers.

Thomas, G. J., & Munge, B. (2015). Best practice in outdoor education fieldwork: Pedagogies to improve student learning. In M. Robertson, G. Heath & R. Lawrence (Eds.). *Experiencing the outdoors: Enhancing strategies for wellbeing* (pp. 165-176). University of the Sunshine Coast, Queensland.

Thring, A. S. (2001). *Education, manpower and economic growth.* McGraw Hill.

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Assessing Teacher Motivation and its Outcome on Performance in Public Basic Schools in East Gonja District of Ghana

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Abstract

The study explored the extent and adequacy of motivation within the Ghana Education Service (GES) and its effect on teaching. The population for the study was all teaching staff in the East Gonja District. A Survey design was used in the study and a questionnaire developed by the researchers was administered to teachers in 25 schools out of 69 zoned schools giving a 36% representation of the entire population. Random sampling method was used to select four teachers from each of the selected schools to give a total of 100 respondents. The study revealed that promotion, salary increment, cash rewards and study leave with pay were motivating factors to teacher performance. The study also unraveled poor management commitment to teacher performance, and finally, the relationship between years of experience and job satisfaction depicted that teachers with more years of teaching experience were more motivated and satisfied than the youth. It is recommended that management pays attention to factors that motivate teachers so as to improve performance and also give some form of incentives/appreciation to especially longer serving and industrious teachers.

Key words: Teacher motivation, Performance, Satisfaction, Management, Demotivation, Years of experience.

Introduction

Teacher motivation plays an important role in the promotion of excellent teaching and learning. Generally, motivated teachers persuade students to learn in the classroom, to ensure the accomplishment of educational reforms and feelings of satisfaction and fulfilment. While teacher motivation is fundamental to the teaching and learning process,

several teachers are not highly motivated as compared to other professions and even teachers across various countries, school contexts, and subject fields (Sarpong, 2002; Claeys, 2011). Similar to some experts that are considered selfless, teachers in public pre-tertiary schools in Ghana are always given that age long encouragement that their reward is in heaven. However, in Ghana, a number of them hang about not satisfied because of poor working conditions (Osei, 2006). The situation is even worsened with teachers in the rural areas.

This has made a number of teachers resort to doing other jobs like selling of goods to support themselves and their families since their efforts at contributing massively to educational development in the country are not well compensated for to sustain them till another pay day (Mensah, 2011). Engaging in other works generate non-attendance in the classrooms (Salifu, 2013) and many of the teachers as a result, do not have time for co-curricular activities, teaching notes preparation and marking of exercises (Tawia-Armah, 2010; Mensah, 2011). Many others vacate, resign their position, or do not even resume post at all after leave of absence or sponsored study leave (Mensah, 2011). This implies that the Government may be required to spend a huge sums of money to prepare additional professional teachers to occupy the available spaces created.

In Ghana the teaching profession is not frequently seen as a monetarily pleasing one by the new age group graduates (Osei, 2006). A lot of Ghanaian intellectuals will prefer other professions to teaching because it is generally perceived as a low paying profession with poor conditions of service (Davidson, Powney, Wilson, Hall & Mirza, 2005). Generally, a large number of Ghanaians who get into the teaching profession do so when they fail to meet their dreams of pursuing other professions and eventually leave when they succeed (Agezo, 2010).

Although some studies have been conducted on teacher performance in Ghana (Mensah, 2011; Osei, 2006; Sarpong, 2002), there is still paucity of information on teacher motivation in schools in Northern Ghana most especially in the East Gonja District which encouraged the researchers to undertake this study. The current research therefore seeks to:

i. investigate the various factors that motivate teachers to increase performance in public schools within the East Gonja District

ii. unravel management commitment to teacher motivation and also
iii. examine the relationship between years of experience and satisfaction on the teaching job within the East Gonja District.

The findings of this study would assist management, affiliates and key stakeholders of the Ghana Education Service (GES) to recognize the current motivational confronts so as to draw appropriate strategies and policies to meet the needs and expectations of staff.

Significance of the study to educational delivery in Ghana

It is broadly anticipated that this study will impact on educational experts/specialists at the Ministry of Education, Ghana Education Service, Teachers, Academia, and all other stakeholders as well as the general public by giving a more dependable scientific measure and standpoint for describing teacher motivation and its consequence on performance.

It also provides a source of information that brings to the fore the switching plans of current and possible staff of GES, thereby providing pragmatic assistance for policy review and management of strategic decisions in numerous critical parts of their operations.

Review of Related Literature

'Motivation' was formally gotten from the Latin word 'movere' meaning 'to move'. However, Robbins (2003) posits that this might be an insufficient description for what it was intended. Vroom (1964) defines motivation as a process of governing choice made by persons or lower organisms among alternative forms of voluntary activity, and Akinwumi (2000) describes the term as "the modern-day influence on the vigor, direction and determination of action". Ifinedo (2003) also opines that worker motivation is a compound and complex term to define, hence an exact definition of this theory is indefinable as the idea comprises the distinctiveness of individual and condition in addition to the opinion of that circumstance by the individual. However, motivated and committed staff can be a determining factor in the success of an organization.

Theories in management (Gullat & Bannet, 1995; Tosti & Herbst, 2009) indicate a strong correlation between the workers'

contribution in the overall success and the level of motivation that exists in the organization.

The main purpose of motivating your workforce is to reduce dissatisfaction and to keep people within the association (Tosti & Herbst, 2009). There are so many factors that can motivate an individual employee; examples of such factors are interpersonal relations, technical supervision, working conditions, salary, status, job security and company policy (Tosti & Herbst, 2009). Steinmetz (1983) states that motivation is the commencement or the institution of goal-oriented behaviour and is of two main forms; intrinsic and extrinsic. The researcher further explained that motivation is intensely rooted in the essential needs to reduce physical pain and maximize happiness, or it may comprise particular needs such as resting and eating, a desired object, goal, hobby, ideal, state of being, or it may be ascribed to less-apparent explanations such as altruism, morality, and selfishness.

Intrinsic motivation is defined as doing of an action for its innate satisfaction instead of some distinguishable consequence. When inherently motivated, a person is stimulated to perform more willingly whether for enjoyment or challenge for outside pressure, prods, or rewards. Career development, voice, recognition and prestige are some factors outlined to intrinsically motivate teachers (Bennell & Akyeampong, 2007; Ramachandran & Pal, 2005). This trend of intrinsic motivation was initially recognized within investigational studies of animal behaviour, in which it was revealed that many organisms employ playful, exploratory and curiosity-driven behaviours in the lack of reinforcement or incentive (Weightman, 2008).

In humans, motivating intrinsically seems not to be the only method of motivation, or even of preferential activity, although it is a persistent and significant one. This is because the tendency to take interest in innovation, to actively understand, and to innovatively apply our talents is not restricted to childhood, although it is an important feature of human life that influences persistence, performance, and well-being across life's time (Reiss, 2004).

A study by Carnegie (1987) stated that extrinsic motivation comes from outside the performer. Remuneration and incentives, accountability, institutional environment, learning materials and facilities are also factors that motivate teachers extrinsically (Duflo, Dupas & Kremer, 2011). This is however contrary to a study conducted in Brazil by Delannoy and Sedlacek (2000) which depicted that across-

the-board salary increment was ineffective in increasing teacher performance.

Extrinsic motivation is a construct that pertains whenever an activity is done in order to attain some separable outcome. Although intrinsic motivation is clearly an important type of motivation, most of the activities people do are not strictly speaking, intrinsically motivated because after early childhood the freedom to be intrinsically motivated becomes increasingly curtailed by social demands and roles that require individuals to assume responsibility for non-intrinsically interesting tasks.

A study on the analysis of the key determinants of teacher motivation in the developing countries context by Michaelowa (2002), found that large class size, rural location, double-shifting, active parental involvement and high educational achievement negatively correlated with teacher job satisfaction in these countries. It was further revealed from the study that level of communication between teachers and school supervisors had no statistically important impact on teacher job satisfaction. On the contrary, a study by Urwick, Mapuru & Nkhobotin (2005) in Lesotho showed teachers professional relationships with supervisors as critical for teacher motivation and outweigh the influence of pay and facilities on motivation.

The pressure of class size on classroom relations in the rouse of Free Primary Education (FPE) in Kenya, established that FPE increased class sizes, heavy teachers' working load, shortage of teachers' leading to absence of teacher motivation (Parham, 2003). Further revelation showed that teachers were depressed with heavy workloads, extended hours of work and handling several lessons involving many pupils. The main critical result that surfaces from the studies was that significant proportions of primary school teachers, mostly in sub-Saharan Africa, have little levels of job satisfaction and are inadequately motivated. Millions of children are, thus, not being taught correctly and are not getting even a minimally adequate education. This was confirmed by Bennell and Muykanuzi (2005) who undertook a study in Tanzania and revealed that de-motivation of teachers is a key contributory issue to the appallingly poor learning attainments of primary school pupils.

Development in the Ghanaian educational system has a lot to do with teachers because of the important role they play. However, available research (Sarpong, 2002; Osei, 2006) have shown that those at the public pre-tertiary level mostly are not motivated during their

practice in their profession. Research has found a number of factors that affect teaching performance in our educational system. They include but not limited to the following: inadequate provision of facilities in schools for effective learning processes; irregular payment of teacher's salaries or lack of incentives to teachers; negative societal view and attitude towards teachers; inadequate supervision in school system (Brown, 2013; Buchanan, 2006). This notwithstanding, motivation of teachers is said to increase with increased years of experience (Esther & Marijon, 2008; Nagy & Davis, 1985).

However, George and Mensah, (2011) hypothesized that young Ghanaian graduates will prefer other professions to teaching because teaching is generally perceived as unattractive. In consonance with this, Wilson (2009) admonished that the best young people will be attracted to teaching as a lifeline career if working conditions of the teacher is comparable to those enjoyed by other professional groups. It has been argued that teachers do not receive fair treatment although they are most times regarded as potential agents of change (Osei, 2006). These problems of unfairness come down to these teachers having high Teacher-Pupil Ratio (TPR) of 1:70 instead of the stipulated TPR of 1:24 (Tanaka, 2010).

One of the main duties of successful managers is to aid their employees increase job performance on a continuous basis (Agezo, 2010). Managing teacher performance is therefore a continuous process which involves 'identifying, measuring, and developing the performance of individuals and teams and also aligning performance with the strategic goals of the organization since individual performance is seen as the building block of organizational success. Claeys (2011) holds that the assessment of teachers' performance is as important as the assessment of pupils. Certain managerial principles adopted by some principals are often seen to be authoritarian and are constructed on the basis of colonial rationality. With this, they refuse to involve the teachers in decision-making. For instance, they often take autonomous decisions and occasionally issue queries to teachers that are recorded on their files without allowing them any opportunity to defend their shortcoming (Agezo, 2010).

Studies by McClelland, Koestner and Weinberger (1989) revealed three types of motivational needs and encouraging factors to perform as the need for affiliation, need for power and need for achievement. Osei (2006) posited that aside the early promotion and

shorter serving period to qualify for study leave with pay for teachers in the rural areas, teachers who agree to go to these areas to teach do not receive any additional incentive package to motivate or put them on the same scale as those in the urban centres. This as aforementioned has made a number of teachers resort to doing other jobs (Mensah, 2011). This practice of taking on other jobs generate non-attendance in the classrooms since the educational system in Ghana does not offer room for urgent situation teacher substitution (Salifu, 2013).

Research Questions

To accomplish the objective of the study, the following research questions were answered.

1. Which factors motivate teachers in public schools within the East Gonja District?
2. How can management commitment to teacher motivation be unraveled?
3. What is the relationship between years of experience and satisfaction on the job?

Methodology

Research approach and design

The research is a quantitative study which adopted the survey design. Semi-structured questionnaires were administered to teachers through the support of field assistants. Closed ended questions in the form of multiple-choice questions, two-way questions as well as ranking scales were provided for respondents to choose the category that best describes their answer. This formed the primary data source. Secondary data was collated through the review of relevant journals, textbooks, articles, publications, magazines, internal records of GES and District Assembly.

Population and sample size

The GES in the East Gonja District boasts of 12 main circuits, 69 basic schools comprising 44 Primary and 25 Junior High Schools (Moro, 2018).

The study population comprised only the teaching staff of GES in the East Gonja District. The total number of basic schools in the District are 69. Using the simple random sampling method, specifically the lottery technique, 25 schools out of the 69 zoned schools

constituting 36% of the entire population were selected. This is a good representation of the entire population. This sample selection method was chosen because the researchers wanted to give each subject a fair chance of being selected. Four teachers from each of the selected schools were chosen to give a total of 100 respondents. To achieve this, teachers in each of the selected schools were assigned numbers. Using the fishbowl technique, four numbers were then randomly picked out of the total in each school. This procedure was repeated for all the 25 selected schools arriving at a sample size of 100. Names of schools covered were withheld due to ethical reasons.

An introductory letter was obtained from the District Education Office which allowed the researchers to move to the various schools. Appointments were made with head teachers and headmasters of the selected schools to seek their permission to undertake the research in their schools and also arrange for the dates for data collection. The questionnaire was divided into three different sections. Section A contained the background information of the respondents, Section B looked at motivational issue, whereas Section C contained items on performance measurement.

To ensure validity, the questionnaire was piloted in two schools involving six teachers who did not partake in the actual study. The pre-testing was done to ensure that this instrument precisely measure what it was designed to measure and that information acquired was a true indication of the variables under study (Mugenda & Mugenda, 2003). This therefore helped the researchers to modify items that were not clear before the actual field work was carried out.

Reliability of the tool was tested using the split-half method. This method entails scoring two halves normally odd and even objects of a test individually for grouping. Then the correlation coefficient for the two categories of scores calculated. The coefficient shows the extent to which the two halves of the test give equal outcomes and thus explains the internal consistency of the test.

Spearman Brown Prophecy Formula below was used to test the reliability of the instruments:

$$\frac{2 \times \text{Corr. between the Halve}}{1 + \text{Corr. between the Halves}}$$

$$r = \frac{2r}{r + 1}$$

Where r = reliability of the coefficient resulting from correlating the scores of the odd items with the scores of the even items. Orodho (2004) states that correlation co-efficient of up to 0.8 is high and adequate to evaluate the tools as reliable for research. After piloting, a correlation coefficient of 0.76 was attained and therefore considered the instruments reliable.

Data analysis

The questionnaires were retrieved, sorted and checked for completeness by the researchers. Quantitative data were later coded by assigning a code to every response. Descriptive statistics were used to summarize the data in the form of percentages, charts, etc. Likert scale was used and response categories ranged from strongly agree (0), agree (1), neutral (2), disagree (3) to strongly disagree (4). Statistical Package for Social Sciences (SPSS) version 16 was used for the analysis as it enabled the handling of large amount of data.

Results and Discussion

Demographic characteristics

Demographic characteristics of the respondents showed a 1:1.3 ratio of male to females, representing (47%) males and (53%) females. This indicates sufficient gender equilibrium although there was a slight female dominance which lend credence to the assertion that, women naturally exhibit patience, empathy and the care for mankind hence the field of teaching which is in consonance with a research report by Davidson, et al. (2005) in England in the United Kingdom.

Fig. 1: Ages of Respondents

Ages of the respondents ranged from 20 to 59 years. The modal age category was between 31 to 40 years representing (41%) of the respondents as shown in Figure 1. About (23%) were between the ages of 41 and 50 years while (21%) was for ages between 20 to 30 years and the remaining (15%) for age groups between 51 to 60 years.

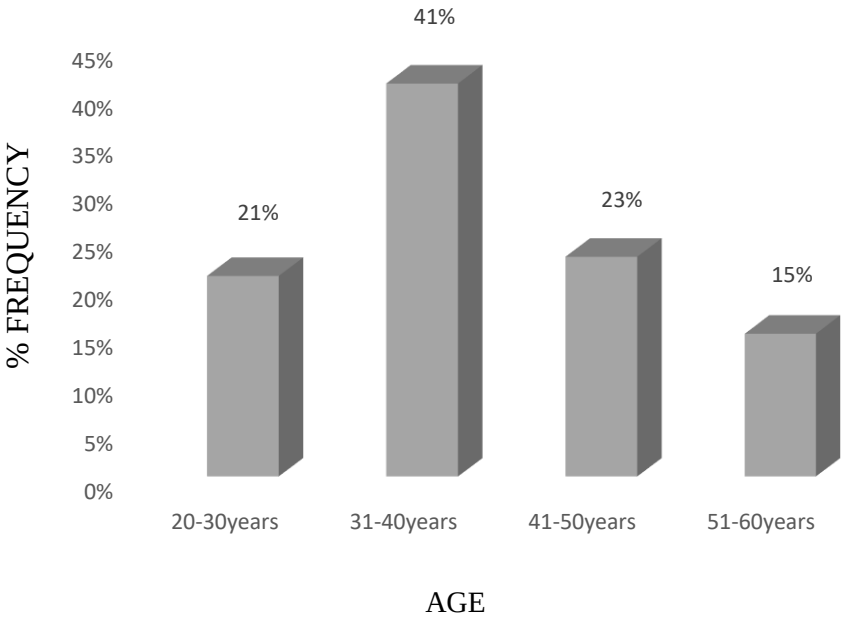


Fig. 1: Ages of Respondents

From the above statistics it can be deduced that the GES, East Gonja District has a youthful workforce and few aged. This exhibits an excellent mix of majority youthful, active and innovative staff with more skill and experienced than old people. It is also worth mentioning that the age of teachers has become younger in many countries due to the quick rolling out of primary and secondary school enrolments and/or high levels of teacher attrition. This confirms a study by Bennell and Mukyanuzi (2005) on teacher motivation crisis in Tanzania. The research established that teacher personality and character can also negatively have effect on motivation levels.

Ranks of Respondents were grouped into six main categories of the GES, namely, Principal Superintendent, Senior Superintendent I, Senior Superintendent II, Assistant Director of Education I, Assistant Director of Education II and Director of Education. The Senior

Superintendent I was the modal rank with (38%) representation, while Senior Superintendent II and Principal Superintendent registered (25%) and (21%) respectively. Assistant Director of Education rank aggregately registered (16%) for the senior rank level as presented in the Figure 2. This distribution of ranks was not surprising due to the more youthful nature of the respondents.

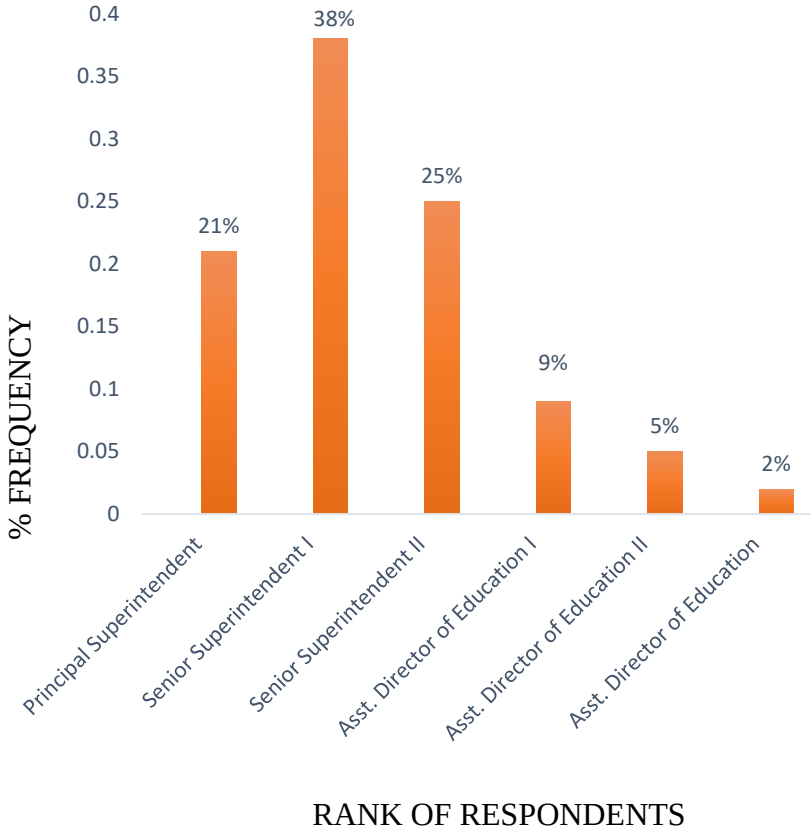


Fig. 2: Ranks of respondents

In relation to the academic qualification of respondents, the least qualification attained by respondents was Teacher certificate 'A' and the highest a Master's degree. It was noticed that respondents with Diploma and Certificate 'A' formed the majority representing (65%), while first degree holders and postgraduates recorded (21%) and (14%) respectively. This suggests that the staff were qualified/professionals,

well informed and competent in their area of operations which implies that they could be relied upon to act responsibly and professionally.

Teaching experience of respondents was also sought and from the responses it was revealed that (87%) aggregately had been with the GES for more than five (5) years, depicting that GES East Gonja has more experienced staff.

Factors motivating teachers in the East Gonja District

The first objective of the study was to identify the factors that motivate teacher performance. The study outlined four major factors that encouraged teachers to maximize their performances at the workplace. These factors were promotion, cash rewards, salary increment, and study leave with pay. Promotion as an encouraging factor to performance was selected by (53%) of the total. This was followed by cash rewards, (31%), salary increment (11%) and lastly (5%) for study leave with pay. This conforms to Osei (2006) who posited that early promotion as well as shorter serving period to qualify for study leave with pay are some motivating factors for especially teachers in the remote areas.

Investigation into whether respondents were satisfied with the motivational packages revealed that (78%) of the respondents were not satisfied with those factors, while (13%) assented and (9%) were indifferent as presented in Figure 3 and this confirms findings in the study by Sarpong (2002) who found that despite the motivational packages given to teachers, they are not well motivated during their professional practice which in turn affects their performance. 'Satisfaction to motivational packages' showed a strong disagreement to the notion with the distribution curve skewing more towards the disagreement side with a significant difference of (t= 57, p= 0 .000) meaning that motivational packages are woefully inadequate.

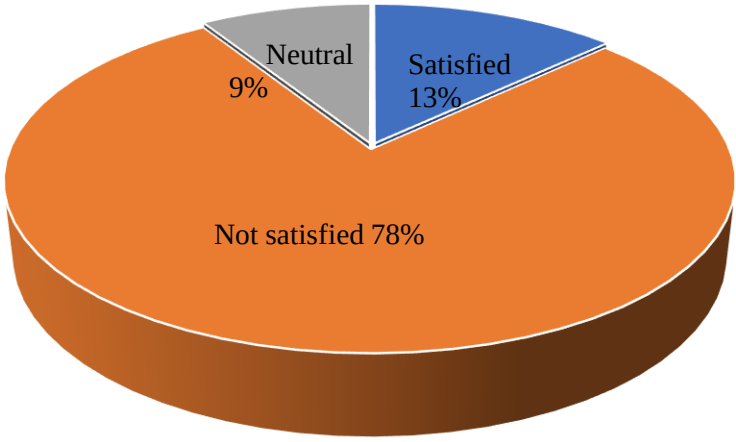


Fig. 3: Satisfaction with motivation package

This corroborates the findings of previous authors that the majority of the Ghanaian youth generally perceive teaching as a low paying profession with unattractive service conditions (Claeys, 2011; Davidson et al., 2005). Agezo (2010) and George and Mensah (2011) reiterate that because the teaching profession is less monetarily pleasing a lot of literate Ghanaians will prefer other professions to teaching. Therefore, a large number of young people who get into teaching do so when they fail to meet their dreams of pursuing other professions and eventually leave when they succeed.

The study also disclosed certain notable factors that demotivate teachers during the discharge of their duties. They included high Teacher-Pupil Ratio (80 pupils in a class), inadequate teaching aids for pupils and in certain instances, poor teacher-supervisor relationship, the unhygienic environment of the school premises-sometimes community refuse dumps close to school buildings. It was discovered from the study that (83%) of respondents were not motivated under such circumstances while (5%) felt motivated notwithstanding these challenges and (12%) indifferent to motivational tendencies. This finding supports Tanaka (2010) and Duflo et al. (2011) who found that certain factors such as remuneration and incentives, unhygienic institutional environment, learning materials and facilities when absent can demoralize teachers. In the context of developing countries, Michaelowa (2002), also found large class size, rural location, double-shifting system negatively correlated with teacher job satisfaction.

Management commitment to teacher motivation

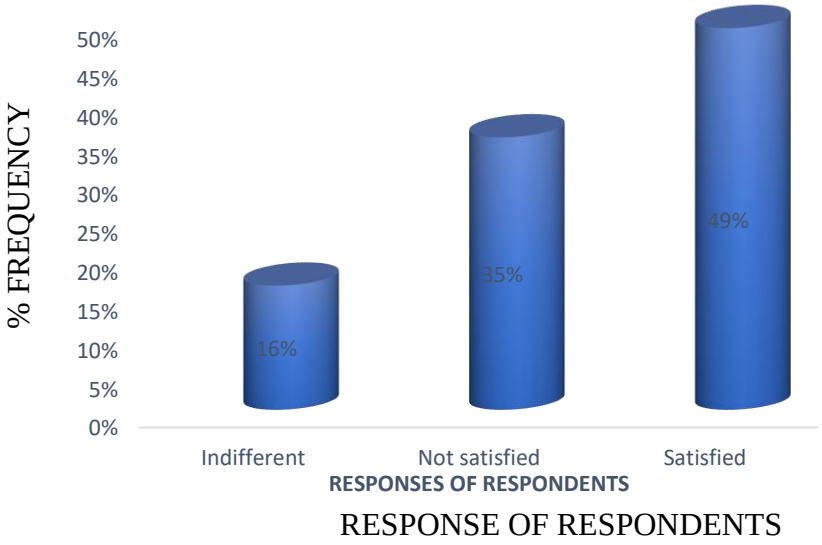
The second objective of the study was to unravel management commitment to teacher motivation. It was revealed from the study that management of GES was not committed to the implementation of teacher motivation issues. The research results showed (85%) dissenting view on the assertion that 'very high management's commitment to implementation of motivation' with significance level of (t= 46.528, p= 0.000). This gives an indication that management of GES East Gonja District were not committed to the implementation of teacher motivation which the respondents believe is affecting their performance. However, (15%) of the respondents were indifferent to this assertion. This result confirms the research by Urwick, Mapuru & Nkhobotin (2005) in Lesotho which reported that teachers' professional relationship with supervisors is critical for teacher motivation and outweigh the influence of pay and facilities on motivation. Mensah (2011) also disclosed that about 10,000 teachers in public pre-tertiary schools in Ghana disappear from the classrooms each year due to poor working conditions in the classroom.

Tosti and Herbst (2009) also pointed interpersonal relation with supervisors, technical supervision, and company policy as factors that motivate an individual employee. However, contrary to the findings of this current study and other researchers mentioned earlier, Michaelowa (2002), found no statistically significant value between the level of communication between teachers and school supervisors and that of teacher job satisfaction.

Relationship between teacher's years of experience and teacher job satisfaction

The relationship between teacher's years of experience and satisfaction on the job was the last objective of the study. Satisfaction with one's current schedule of work was used to measure the satisfaction level of their jobs. The study found that (49%) of the respondents liked their current schedule of work. They explained further that they like teaching because they were trained to teach and therefore were satisfied with the profession. They also indicated that they earned their living by teaching, and finally added that being in the classroom gives them enough time for doing their own businesses. However, (35%) did not like their current job, attributing it to remuneration which does not commensurate with the workload, job

being too monotonous without challenges to push them to the limit to deliver their best. Meanwhile, (16%) were indifferent about the situation as illustrated in Figure 4. This finding supports that of Mensah (2011) who discovered that some teachers as a result of poor working conditions, resort to doing other jobs. Salifu (2013) however discourages this practice since it generates non-attendance in the classrooms because the educational system in Ghana does not provide room for urgent substitution of teachers.



RESPONSE OF RESPONDENTS

Fig. 4: Preferred level of satisfaction with Current Schedule of work

Table 1 highlights the relationship between years of experience and job satisfaction. From the table, satisfaction with ones' job increases with increased number of years in the service, as respondents with more than 10 years of experience had (51%) job satisfaction level as compared to respondents with between 6-10 years of experience and job satisfaction level of (34%). Job satisfaction is drastically reduced to (15%) with less than 5 years of experience in GES. This means that as years of experience increases, there is a corresponding increase in job satisfaction indicating a direct relationship between years of experience and job satisfaction.

Table 1: Relationship between teacher's years of experience and job satisfaction

Years of experience	% Job satisfaction
Less than 5 years	**15%**
6 – 10 years	**34%**
More than 10 years	**51%**
Total	**100**

This finding confirms studies by Nagy and Davis (1985), and Esther and Marijon (2008) who found that motivation increases with years of experience, and therefore teachers with more teaching experience tend to be more motivated and satisfied than the youth who are less experienced.

Conclusion

The strategic role played by teachers in the socio-economic development of the country cannot be overemphasized. The Ghana Education Service of the Ministry of Education as a corporate entity cannot detach itself from the all-important concept of motivation. The study revealed four (4) factors: promotion; salary increment; cash rewards; and study leave with pay as factors motivating teachers. On the other hand, factors such as high Teacher-Pupil Ratio, inadequate teaching aids for pupils, poor environmental conditions can de-motivate teachers. It was also discovered from the study that management of East Gonja District GES show little or no commitment to teacher motivation issues. Finally, it was revealed from the study that teacher motivation increases with years of experience.

Recommendations

Based on the findings and conclusion, it is recommended that:

1. management of GES should be committed to teacher motivation factors by giving incentives such as decent accommodation, appreciable salary increments, expand Best Teachers Award Schemes, offer scholarship for teachers especially those working in the rural areas as well as industrious teachers to keep them in the classroom;
2. workshops, requisite logistics and modern laboratories for teachings and learning in contemporary times should be provided to achieve better performance; and

proper reward systems, for example substantial amount of money, building facilities, means of transport are very commendable for longer and outstanding staff.

References

Agezo, K. C. (2010). Why teachers leave teaching: The case of pre-tertiary institutions in Ghana. *International Journal of Education Reform*, *19*(1), 51-52.

Akinwumi, F.S. (2000). *Impact of motivation and supervision on teacher productivity in secondary schools in Oyo State Nigeria.* An Unpublished Ph.D. Thesis submitted to the Faculty of Education, University of Ibadan Nigeria.

Bennell, P., & Mukyanuzi, F. (2005). Is there a teacher motivation crisis in Tanzania? Brighton: knowledge and skills for development. (3rd Ed.). The McGraw-Hill Companies, Inc.

Bennell, P., & Akyeapong, K. (2007). Teacher Motivation in Sub-Saharan Africa and South Asia. Researching the Issues 71, Department for International Development: Educational Papers, 1-92.

Brown, W.S. (2013). Cutting the Strings. *Executive Excellence*, *10*(3), 52-60.

Buchanan, K. (2006). Job performance and satisfaction. Available at: URL http://eziniearticles.com .

Carnegie, D. (1987). Managing through people. Inc. *23*(8), 114-120.

Claeys, L. (2011). *Teacher motivation to teach and to remain teaching culturally and linguistically diverse students.* An Unpublished Ph.D. Thesis in Education and Human Development Bicultural-Bilingual Studies the University of Texas at San Antonio, Texas.192pp.

Davidson, J., Powney, J., Wilson, V., Hall, S., & Mirza, H. S. (2005). Race and sex: Teachers 'views on who gets ahead in schools. *European Journal of Teacher Education*, *28* (3), 311- 326.

Delannoy, F.W.E., & Sedlack, B. (2000). *Teachers' development and incentives: A strategic framework*. World Bank.

Duflo, E., Dupas, P., & Kremer, M. (2011). Peer effects, teacher incentives, and the impact of tracking: Evidence from a randomized evaluation in Kenya. *American Economic Review*, *101*(5) 1739-1774.

Esther, T. C., & Marjon, F. (2008). *Motivation to become a teacher and its relationships with teaching self-efficacy, professional commitment and perceptions of the learning environment.* University of Groningen Landleven 1, 9747 AD Groningen, the Netherlands.

George, D. D., & Mensah, K. D. (2011). *Perceived causes of teacher dissatisfaction in Sekondi– Takoradi District of Ghana.* Academic leadership training. Available at:URL http://www.buzzle.com.

Gullatt, D. E., & Bennett, R.M. (1995). Motivational strategies useful in enhancing teacher performance. *NASSP Practitioner*, *22*(2), 1-6.

Infinedo, P. (2003). *Employee motivation and job satisfaction in finished organization. A study of employees in the Oulu region, Finland.* Master of Business Administration thesis, University of London.

McClelland. C., Koestner, R., & Weinberger, J. (1989). How does self-attributed and implicit motives differ: *Psychological Review*, *96*, 690-702.

Mensah, K. W. (2011). *Motivation and job commitment among teachers in four selected senior high schools in the Ashanti Region of Ghana*. Commonwealth Executive Master of Business Administration, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

Michaelowa, K. (2002). *Teacher job satisfaction, student achievement, and the cost of primary education in Francophone Sub-Saharan Africa*. Discussion Paper 188, Hamburg Institute of International Economics.

Moro, E. (2018). *Effects of motivation on the performance of Ghana education teachers in East Gonja District, Northern Region*. Unpublished MPhil Thesis, University for Development Studies, Ghana.

Mugenda, O., & Mugenda, A. (2003). *Research methods: qualitative and quantitative approaches.* African Centre for Technology Studies Press Nakuru District strategic plan 2005-2010.

Nagy, S., & Davis, L. G. (1985). Burnout: A comparative analysis of personality and environmental variables. *Psychological Reports*, *57*(13), 19-26.

Orodho, J. A. (2004). *Essential of educational and social science, research methods.* Kenya: Masola Publishers.

Osei, G. M. (2006). Teachers in Ghana: Issues of training, remuneration and effectiveness *International Journal of Educational Development*, *26*, 38-51.

Parham, M. (2003). "Hostile work environments." Employee Development. In Broussard, S. C., & Garrison, M. E. B. (2004). The relationship between classroom motivation anacademic achievement in elementary school-aged children. *Family and Consumer Sciences Research Journal*, *33*(2), 106–120.

Ramachandran, V., & Madhumita, P. (2005). *Teacher motivation in India*. DFID and Knowledge and Skills for Development.

Reiss, S. (2004). Multi-faceted nature of intrinsic motivation: The theory of 16 basic desires, *Review of General Psychology*, *8*(3), 179–193. Available at URL http/www.worldcat.org/title/68770349?

Robbins, S. (2003). *Organizational behaviour:* International Edition. (10th edition) New Jersey: Prentice Hall.

Salifu, I. (2013). Improving teacher identity and professional practice: Does motivation matter? In Madden, J. and Smith R. (Eds.), *Teacher Education Dialogue:* Innovations: Proceedings of conference held from 2-3 August, 2012 at Southern Cross University, Australia.

Sarpong, M. (2002). Ghanaian teachers dying out of frustration. Available at URL http://www.newsfromafrica.org

Steinmetz, L. L. (1983). Nice Guys Finish Last: management myths and reality. Boulder, Colorado: *Horizon Publications Inc*, *16*(8), 43-44.

Tanaka, C. (2010). *An exploration of teacher motivation: A case study of basic school teachers in two rural districts in Ghana*. PhD Thesis, University of Sussex.

Tawia-Armah, G. (2010). *Teacher motivation in selected senior high schools in the Kwabre District of the Ashanti Region*. An Unpublished Master of Arts Degree in Human Resource Management, University of Cape Coast, Cape Coast, Ghana.

Tosti, D., & Herbst, S. A. (2009). Organizational performance and customer value, *Journal of Organizational Behaviour Management*, *29*(3), 294- 314.

Vroom, V. H. (1964). *Work and motivation.* Wiley. Available at URL http://motivearticles.com/?Why-learning-Motivation//idf =945902.

Weightman, J. (2008). *The employee motivation audit*: Cambridge Strategy Publications.

Wilson, N. F. W. (2009). Job satisfaction among Secondary School teachers in Tanzania: the Case of Njombe District; Department of Educational Sciences, Institute of Educational Leadership, University of Jyvaskyla, Tanzania.

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An Ethnomathematical Exploration of the Game of Ogiurrise – A Traditional Edo Game in Nigeria Schools

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Abstract

Games are part of human culture, and indigenous games have been an expression of local people, culture, and social realities over a period of time. Games cannot only be viewed from the aesthetic perspective of play, enjoyment and recreation but also from that of promoting learning. Games can promote the learning of Mathematics in an interesting and entertaining way as well as provide room for interaction and lend informality to learning school Mathematics. Apart from showing the historical and cultural perspectives of indigenous games, analyses of games will reveal the related mathematical ideas/concepts, school Mathematics curriculum connections and educational implications. This paper is an ethnomathematics exploration of the game of Ogiurrise, an indigenous traditional game played by the Edos of the Mid-Western part of Nigeria. A brief description of the Rules of the Ogiurrise board game, the mathematical strategies that can be applied in playing the game and some related mathematical concepts are analysed and presented. The general classroom connections between the Ogiurrise board game and the conventional school Mathematics curriculum are discussed.

Key words: Ethnomathematics; Ogiurrise game; Mathematical Strategies; Mathematical Concepts.

Introduction

There are some mathematics in every activity of the student which have immediate root in the way of life of the people in the community in which he/she lives. This type of mathematics that can be inferred, for instance, from the traditional games and practices of the indigenous people is the focus of an ethnomathematics study. Ethnomathematics

offers the possibility of the relationship that exists between the individual student and his social mathematics environment. Inherent in this view, according to D'Ambrosio (1988), is that individual conceptions of mathematical ideas or concepts develop out of the social interactions with his practices such as "counting, weighing, sorting, measuring and comparing" p.5. Furthermore, D'Ambrosio (2004), defined ethnomathematics as the mathematics of the identifiable cultural group, developed from quantitative ideas or even better mathematical practices of a different form. It reveals all mathematical practices of the day-to-day life of say preliterate cultures to the present and future generations to see how cultural and social factors shaped the different forms of doing mathematics or different practices of a mathematical nature or different mathematical cultural and traditional environment. This would support the art of explaining school mathematics in different contexts to the students so as to embrace mathematics as part of the culture and traditions of the people. This makes mathematics to be culture dependent and not value free as such. Bishop (1988, 1994) researched on the mathematical activities of indigenous people in Australia. He argued that, activities such as counting, measuring, locating, designing, playing and explaining are all present in some form in all cultures and these activities give rise to mathematics. That is, every culture does mathematics, although the mathematics is expressed in ways unique to that culture.

Generally, games are part of human culture, and indigenous games have been linked to the traditions of a cultural group. To Mosimege and Ismael (2004), indigenous games have been an "expression of a local people, culture and social realities over a period of time". Mosimege (2000) as cited in Mosimege and Ismael (2004), regards indigenous game as a culturally specific game and defined it as:

> *An activity in which one or more people may be involved, following a set of rules and the players engaged in this activity to arrive at certain outcomes. The outcomes may be the completion of a particular configuration, or the winning of a game. The importance of the game with it social and cultural implications would qualify this game to be a cultural game. Specific terminologies and languages used with different cultural groups further categorize this cultural game into a culturally specific game (p.31)*

According to Johnson and Rising (1972), games promote learning of mathematics in an interesting and entertaining way as well as providing room for interaction and lend informality to learning school mathematics. The traditional game can be an ideal device to involve the parent/guardian or community elders in out-of-class mathematics learning activities. The game can be sent home with the student to gain an informal setting where student and parents can work together at learning mathematics. According to Rogoff (2003) as cited in Cowan (2006), it aligns with the community - centred approach of learning, where children learn in an apprenticeship-type model by helping within the home or local community: learning from more knowledgeable others (peers, teachers, parents, elders) by enquiry, and at a pace and time that suit them. Therefore, ethnomathematics approach would promote open classroom teaching and learning of school mathematics through the use of indigenous games. These types of games are effective in lending variety and competition to classroom activities.

Ogiurrise is believed to be one of the oldest Traditional Sports that do serve for play, enjoyment and recreational purposes among different tribes in Africa. In Nigeria, there have been several attempts to go back to the tradition and try to understand the various cultural games. For example, as part of the process to revive the indigenous games in Nigeria, through the National Association of Traditional Sports (NATS), the Ogiurrise (Ayo) became a demonstration sport in Benue 1996, a scoring sport event at Imo 1998 producing two gold medals. At Bauchi 2000, it produced 3 gold medals (Afrotradosports, 2018). Often, schools organize Ayo competitions for pupils and students. Ayo and other traditional sports featured in the 2017 National Youth Games to help popularize and create awareness for the games (The Nation, 2017). Today, Ogiurrise (Ayo) is a fine and beautifully designed game that is part of the Nigerian culture (Taytronik, 2018). However, within the context of ethnomathematics research, the Ogiurrise and other indigenous games have not been identified and explored so as to know the mathematical and educational potentials of these games.

Review of Related Literature

One of the current challenges in mathematics education is how to link school mathematics to students' every day activities in order to improve the quality of students' educational experiences. Hence, Aboaye (2015) researched on understanding the mathematical practices of Kente weavers in Ghana. Drawing ideas from scholarship in ethnomathematics this study used ethnographic approaches to qualitative data collection to unravel the mathematical practices of the Kente Weavers. A diverse and purposeful sample of 15 Kente weavers and 5 mathematics teachers from Bonwire, Ashanti Region and Agotime, Volta Region were selected to represent a range of weavers as these helped to expose weaving patterns. The various stages and weaving patterns were observed to identify mathematical choices and reasoning they conveyed. It was followed by both informal and semi-structured interviews of the 15 Kente Weavers in the Kente industry. Series of meetings were organized for the 5 mathematics teachers in Bonwire to the potential classroom of the mathematical practices of the Kente weavers. The study placed emphasis on three of the Bishop's (1988) list for identifying mathematical practices in cultures- counting, measuring and designing as the data provided relatively little insight on the other three items on the list- locating, explaining and playing. Evidence of mathematical practices of the weavers indicated that irrespective of the mathematical experience of the weavers, they all employed a certain level of informal mathematics in counting, measuring and designing in the discharge of their duties as weavers. The study, however, noted that the level of mathematics employed in weaving a particular pattern depends on the complexity of the pattern.

Unodiaku (2013) conducted a study to ascertain the effect of Ethnomathematics teaching materials on students' achievement in mathematics. The study used native cylindrical Calabash cups to teach the concept of volume of cylinder and native Calabash plate for the volume of hemisphere. These Calabash cups and plates are found in the cultural practices and social activities of Igbo-Ekiti cultural group of South East zone of Nigeria, which are more prominent in their occupations and crafts particularly in their mode of measurements and counting system. The sample for the study was 156 senior secondary school two (SS2) students which were randomly selected from 16 Senior Secondary Schools in Igbo-Ekiti Local Government Area of Enugu state through multi-stage sampling technique. The instrument

used for the study was Ethnomathematics Achievement Test, and the data were analyzed using mean and analysis of covariance(ANCOVA). Findings from the study showed that the Ethnomathematics Achievement test was effective in enhancing students' achievement in mensuration with particular reference to volumes of cylinder and hemisphere. Students who were taught using Ethnomathematics teaching materials achieved better results than their counterpart students taught with conventional method. It was recommended among others that Ethnomathematics teaching materials should be incorporated in the Senior Secondary School mathematics curriculum as technique to be used by teachers in teaching the concepts of volumes of cylinder and hemisphere. The finding of this study may be owing to the notion that the interaction of culture and mathematical ideas can be mutually reinforcing, as the application of local culture situations to the mathematics classroom represents a way of helping students see relevance of mathematics in their culture.

Davis (2016) investigated cultural influences on Ghanaian primary school pupils' conceptions in measurement and division of fractions. The study investigated how pupils' notions of measuring and sharing in out-of-school setting reflect their conceptions and practices in school. Two focus group interviews were carried out with 16 primary school pupils, eight each from grade 4 and grade 6 in two average achieving schools (one each from rural and urban schools) in Ghana. Qualitative analysis of pupils' activities on measuring and division of mixed/decimal fractions showed evidence of cultural influences on the participants' conceptions and practices in the measurement of capacity and division of a mixed/decimal fractions by whole number in the real-life situations. Findings from the study appear to confirm the local aspect of mathematical knowledge and recommend the need to help pupils to draw on and integrate every day and school mathematics teaching and learning situation.

Davis and Chaiklin (2015) reported on a study that drew on aspects of radical-local approach to teaching and learning, to teach the idea of measurement to primary four school children from an average achieving rural school in Cape Coast metropolis of Ghana. Four teaching sessions with each drawing on the social and cultural practices of the children to help them form an idea of what measurement is and which physical properties could be measured from given objects.

Qualitative analysis of the teaching sessions revealed that the teaching approach enabled children to change their notion of measurements as involving measuring tables, chairs and human beings and so on. The study supports the idea that a radical-local approach can be used to teach measurement meaningfully to pupils and has the potential to be used for mathematics teaching more generally.

Davis, Seah and Bishop (2009) observe that Mathematics is a subject that appears to be studied in school curriculum all over the world. However, while in some societies mathematical practices reflects the mathematics that is studied in schools, in other societies some of the mathematical practices in the society differ from those in schools. They did a study on students' transition between contexts of mathematical practices in Ghana. The paper reports on some of students' transition experiences in mathematics in Ghana, where some of the mathematical practices in the society differ from school. It also discussed the effect of some of these transition experiences on students' mathematical conceptions in factions, and their implications for mathematics pedagogy in multicultural societies such as Australia. The finding from their study showed that majority of the students were able to identify half in the out- of-school activity, perhaps due that fact it is the only unit that has local name. However, the results further revealed that students experienced fractions differently in in-school and out of school activities. The implications of these findings are that students who experience one set of mathematics is in everyday setting and another set of mathematics is in the school setting are likely to relate practical mathematics activities in school with their everyday mathematical experiences. They are also likely to experience concepts which differ between school and everyday context differently in classroom. Therefore, students bring their personal everyday mathematics knowledge to learning situations in school. It can be deduced from the findings and implications of this study that Ethnomathematics research can reveal cultural differences, which should not be ignored rather they could be utilized to help students who transit between contexts of mathematical practices in out-of-school and in-school settings.

Esuong and Ibok (2022) believed that pupils felt and saw mathematics as an abstract topic that was hard to master as a result of the westernized teaching methods used to teach it in schools and its attendant impacts on student comprehension. Esuong and Ibok

therefore did a study to explore the various cultural practices of the Efik people of South South Nigeria that can assist the teaching and learning of mathematics. They listed and described the Ethnomathematics concepts that exist in Efik culture to include the following sub-topics: Numeration/Counting System, Basic Arithmetic Operations, Telling time/Days of the Week, Mathematical games, Rhymes and Geometric Concepts. The study described three mathematical games: The Nkpakana Game, The Nkonkor Game and The Nyeri Game. The Nkpakana Game is played by at least three children using plane bamboo sticks thrown gently on the floor. This game helps children to understand counting at very early stage. Its representations on the floor show the tally system of the frequency distribution table. The game also teaches probability and estimation as it has to do with chance and luck. The Nkonkor game is played among children of the same age bracket and up to about 3 persons. A long rectangular shape is drawn and divided into seven different rectangles each. The game teaches concepts of counting, rectangle and area of rectangles. The Nyeri game is played with seven seeds, one seed is used as a king for throw and caught. At each round of throwing, a certain number of seeds is picked from the remaining 6 on the floor. The Nyeri game can be used to teach counting and factors of 6. Thus, Ethnomathematics concepts and materials are richly embedded in Efik culture. The paper tried to reduce the Eurocentric mathematics beliefs of students and make them discover how best mathematics is learned from their cultural heritage. The paper recommended that teachers of mathematics should use examples of materials from the local environment to teach mathematics in order to improve students' understanding of the subject. Culturally based teaching of mathematics has shown to be a veritable option in classroom mathematics instruction.

Michael and Iyekekpolor (2013) had worked on the interplay of games and ethnomathematics by exposing some five indigenous games played in Taraba state, Nigeria, that could immensely be beneficial to Mathematics education in the primary and secondary levels. The games are the Ring (Rubber) game, Fehlo game, Buzz game, Brereng (Bamboo) game, and Ado game. These games could help the learner to think critically and logically on making moves to arrive at certain outcomes. These games have been translated into different local languages in Taraba State, Nigeria, but not nationally played. They

concluded that the use of games in mathematics education has enjoined a considerable amount of empirical support as being helpful and useful in reducing students' phobia and increasing their enthusiasm for the study of mathematics.

Besides other studies reviewed in this paper, the Michael and Iyekekpolor, and Esuong and Ibok studies in Nigeria have brought eight games to the foreknowledge of other researchers but fell short of outlining the specific class where each of these games can be played and taught pupils or students. In particular, Michael and Iyekekpolor did not list the indigenous games related mathematical ideas or concepts. To fill these gaps and within the context of ethnomathematics, this paper seeks to examine and explore the mathematical and educational potentials of a national and culturally specific game, like the Ogiurrise. The traditional Edo Ogiurrise game is a culturally specific game that can be adapted for use in a mathematics class at any grade level.

The Edo Indigenous Traditional Ogiurrise Game

The Edos are indigenous in Edo State in the Mid-Western part of Nigeria. Benin City is the traditional headquarters of the Edos who are also referred to as the Binis. *Ogiurrise* is a traditional recreational Edo game played on a carved-wooden board or dug into flat hard surface on the ground. The board is handy and portable with twelve holes as the field of play having six holes on each side of the board. Alternatively, round holes can be dug into a flat hard surface on the ground – clean enough for participants and spectators to sit on. The objects of play are forty-eight (48) seeds with four (4) seeds distributed into each of the twelve (12) holes. Traditionally, the most commonly used type of seeds among the Edos are the cowries (Ikpigho), cherry fruit seeds (Ikpotien), or para-rubber plant seeds (Ikparaba).

The Ogiurrise is a traditional game that is very common among the Nigeria tribes. Among the Yorubas in Western Nigeria, the Ayo plant seeds are used – hence, they named the game Ayo (Agbalajobi, Cooper & Sonuga, 1976). The Ogiurrise board game is popular and also known in other parts of Africa, however, with different versions. According to Mosimege & Ismael (2004), it is a mancala type game called moruba in the Limpopo province of South Africa played on the 4x36 board – that is a board of 4 rows of 36 holes each. It is called

Tchadji, played at Uhade Mocambique, a small island in the Northern Mozambican province of Nampula. Tchadji is usually played on wooden boards which have four rows of eight holes each (4×8 rows) carved into them. "AWELE-The Rules" (n.d.) http://s.helan.free.fr/awele/rules/ describes this type of Ogiurrise game with the version being traditionally played by adults and used for competitions all over West Africa and the Caribbean and known by different names. Some of these names are: "Ayoayo (Yoruba-Nigeria), Awale (Ivory Coast), Our (Cape Verde), Warri (Antigua, Barbados), Adji-Boto (Ewes-Ghana & Surinam), Awele (Ga's-Ghana & Ivory Coast)". The Ogiurrise is on 2×6 board.

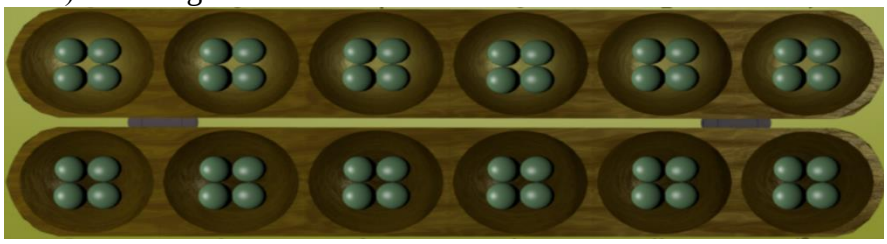

Figure 1*: A Simple Ogiurrise Board (Adapted from Taytronik, 2018)*

Theoretical Perspectives

This study is anchored on the constructivist theory that clearly identifies individual and social factors in the use of games to guide the conceptions of mathematical concepts held by each student. The constructivist theory includes aspects of Piagetian and Vygotskian learning theories, which states that knowledge is personally constructed but socially mediated. According to Trajkovick, Malinovski, Vasileva-Stojanovska and Vasileva (2018), in line with the concept of discovery learning, Piaget (1962) has developed a constructivist learning theory that places the learner at the centre of the educational process by promoting knowledge acquirement through active direct experience. That is, the acquired knowledge from playing traditional games, like the Ogiurrise, by each student guides his/her understanding of school mathematics concepts. Thus, learning is not viewed as transfer of knowledge from the teacher to the learner, but the student actively constructing or even creating his/her mathematical knowledge on the basis of the knowledge already acquired from playing traditional games. Though Vygotsky (1978) has shared Piaget's assumptions for

the way children learn, he emphasized the importance of social interaction through the right use of games, simulations and problem solving in the classroom. Vygotsky, as cited in Cakir (2008), argued for the cultural basis of cognition - that is, there is a relationship between the individual and the society, because the individual's mind develops out of social interactions. Hence, in the constructivist Perspectives, school mathematics knowledge could actively be constructed by students through the interaction with the physical and social environments around playing traditional games.

Constructivist theory as proposed by Piaget and Vygotsky aligns with the ethnomathematics approach, that school mathematics should be taught using the already existing mathematical activities in the students' environment and in their own lives as an identifiable group. Teaching and learning school mathematics involves negotiation and reinterpretation of the mathematical knowledge which the learner draws from his cultural background and personal experiences in playing the Ogiurrise game. In this study, the Ogiurrise is explored as a Game Based Learning (GBL) from the culture of Edo people for Nigeria students to enhance learning activities using a game as an interesting medium that captures and retains student attention and interest in learning school mathematics. Therefore, connecting school mathematics teaching and learning to the rules and mathematical strategies that evolve from playing the Ogiurrise game, the GBL scenarios will engage learners in interactive and problem-solving situations that encourage critical thinking, communication, collaboration and adaptability for functional mathematical knowledge acquisition.

Methodology

The Ogiurrise game is popular and played by Edo people in Nigeria. In order to be able to explore the mathematical and educational potential of the indigenous Ogiurrise game, the study was based on the personal experience of the researcher having observed over the years the Ogiurrise game played in the social traditional setting as participant and non-participant. In playing the Ogiurrise game, the researcher analyzed the educational prospects as well as the mathematical concepts and topics which learning objectives can be achieved via

learning based on the game. Since the Ogiurrise game involves a number of mental operations, the moves and strategies of playing the game were identified and analyzed. Thereafter, the rules of the game were outlined.

The Ogiurrise board has two rows and six columns. Therefore, a 2 × 6 matrix was assigned to the 12 holes in the fields of play. The rows were labelled 1and 2, and the columns as a, b, c, d, e, f (see figures 2, 3 and 4). To explain a player's moves and strategies, the game was played starting from each of hole a1, b1, c1, d1, e1 and f1. For each case, the number of seeds in each hole was recorded (see figure 4) in the two fields of play. Thereafter, possible number of seeds that can be won by Player A and Player B when Player A starts first were presented in Tables 1, 2, 3, 4, 5 and 6. From discussing the outcomes as presented in each table, conclusions were drawn based on the advantage/disadvantage of each strategy and moves to either Player A or Player B. Inferences were drawn on the Ogiurrise game-related mathematical ideas/concepts, and some preschool, primary school, and secondary School curriculum connections were outlined.

Rules of the Ogiurrise Game

The Ogiurrise game, among the Edos, is played by two players of same sex or different sexes. It is a recreational game played mostly in the evenings by elders, otherwise at any time of the day. Traditionally, it is a non-competitive game: winners are declared without prizes attached to it. The audience that could serve as spectators are members of the family, friends or acquaintances. They serve as referees, moderators or judges whenever dispute between players arises.

The following are the general rules of the game:

i. The Ogiurrise board is placed between two players who sit opposite to each other.
ii. The fields of play are of two territories (sides). The 6 holes on the side of each player form his/her territory.
iii. Four (4) seeds are arranged into each of the twelve (12) holes.
iv. Rules and regulations are determined and said to the players and the audience (if any). “The touch and play rule” apply while a

player takes turn to play, whatever hole(s) he/she touches, he/she must start from there (whether to his/her advantage or disadvantage). The audience is warned never to suggest strategy or moves to any player so as not to influence the outcome of the game.

v. On mutual agreement, one player starts the game from any hole of choice from his/her territory. And moving anticlockwise, he/she sows the seeds dropping a seed in each consecutive hole and stops until he/she comes to an empty hole.

vi. As the game is played, the empty holes are refilled to get to 4 seeds in a hole for the hole to be captured.

vii. A player captures the 4 seeds in a refilled hole in any territory if he/she terminates his/her play in that hole.

viii. Otherwise, the 4 seeds in any refilled hole not captured belongs to the owner of the territory.

ix. Therefore, each player plans strategy to make moves and sow seeds into the empty holes in his/her territory to make up to 4 so that he wins the seeds in the hole or sow seeds to terminate his play in a hole that adds up to 4 seeds in his territory or that of his opponent.

x. Each player plays to win all the seeds in a refilled hole or thwarts his/her opponent's moves to win the seeds in holes in either territory of the field of play.

xi. Each player takes turn to play and collects won seeds until the last group of four seeds are won. Then, each player is asked to count the number of won seeds in his/her reservoir.

xii. The game can end as follows:

  i. In a win for the player who won more seeds.

  ii. In a draw, without counting the seed gained by each player, when the game is stalemated as no one player can out-manoeurvre the opponent to win the game.

  iii. In a Technical Knock-Out (TKO) if all the seeds are in the territory of a player who takes turn to play and his opponent has no seed to play anymore. That is, the 6 holes in the opponent's territory are now empty of seeds. This opponent loses the game.

xiii. The game then enters another round of play, with each player spreading the seeds won into the holes. The player with more seeds can then capture holes from the opponent field of play. If a player wins 32 seeds for instance, he/she has 8 holes for his/her territory or field of play – capturing 2 holes from the opponent.

Mathematical Strategies

A sort of a matrix can be applied on the Oguirrise board to explain players' strategies and moves.

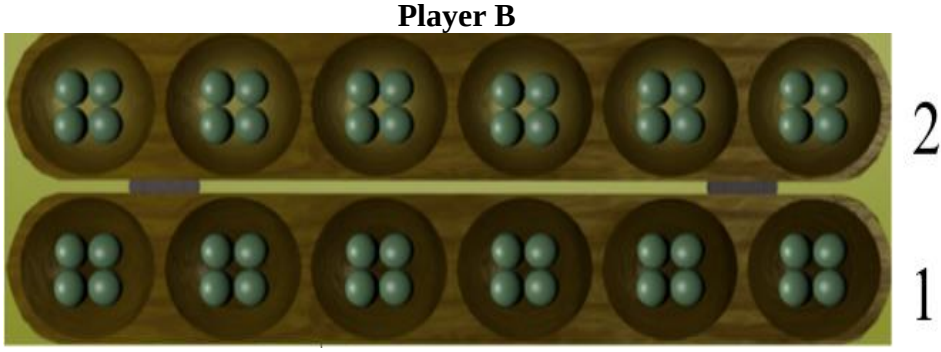

Figure 2*: The Ogiurrise Board with Players A and B ready to start a game*

Starting the game of Ogiurrise with a hole of 4 seeds (Figure 2), player A has 6 starting moves (from a1, b1, c1, d1, e1, or f1); and player B has 6 starting moves also (from a2, b2, c2, d2, e2 or f2). For instance, player A starting from hole a1, he/she sows the seeds and spreads them to cover the 6 holes in his/her territory and 5 holes of the opponent's territory (except hole d2) after making 26 moves which terminates in hole c1 (now an empty hole). This is illustrated in Figure 3.

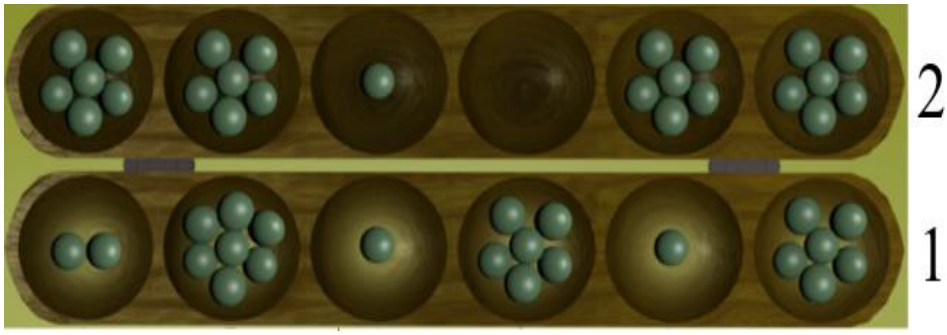

***Figure 3**: The Spread of the Seeds after play by Player A starting from hole "**a1**"*

The 26 moves involve the following steps:

i. Removing the 4 seeds in hole a1, player A sows and spreads the 4 seeds dropping 1 seed each into holes b1, c1, d1 and e1.
ii. The seeds now in e1 adds up to 5, player A moves further sowing the seeds into 5 holes to terminate in c2 in the territory of the opponent.
iii. Hole c2 now holds 5 seeds and player A moves still further to c1 which now holds 6 seeds.
iv. Again, player A moves from c1 through to d2 now holding 6 seeds.
v. Player A then moves from d2 through to c1 (an empty hole) and drops his/her last seed. Player A stops playing and the opponent takes over play.

The opponent (player B) strategies to start from any hole (a2, b2, c2, e2 or f2) to make moves that will help him/her to capture 4 seeds preferably from the side of player A. Player B sows the seeds round until play terminates in an empty hole or in a hole with 3 seeds and dropping the last seed, to make it 4. The player wins these 4 seeds for keep in his/her reservoir.

The game of Ogiurrise to some extent is deterministic. After the starting of the game by player A, an experienced player B only needs to count seven (7) holes from whatever hole player A started to win 4 seeds in a hole in the territory of player B (the opponent). For instance, as player A starts from a1, player B takes his/her turn by starting from e2 to make 17 moves to end play in a1 and capture the 4 seeds in the

opponent territory and thereby increasing the probability of the player B winning the game. This is illustrated in Figure 4.

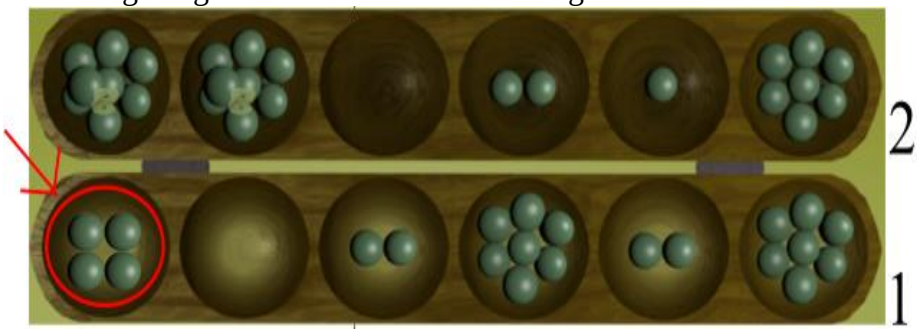

Figure 4*: Player B Capture the 4 Seeds in hole a1.*

As it now comes to the turn of Player A (the second time), he/she plays working out strategies and moves to either dislodge the seeds in the holes in the territory of the opponent, so that each never adds up to 4 (where he cannot capture them), or play to capture the 4 seeds from any hole and also win those in his/her territory.

Tables 1, 2, 3, 4, 5 and 6 present the possible wins of players A and B when player A starts from a1, b1, c1, d1, e1, or f1. Player B's probable moves are from a2, b2, c2, d2, e2, or f2.

Table 1: Possible Number of Seeds that can be won by Player A and Player B with Player A starting from a1.

Player B Moves From	Position of Holes from a1	Player A wins	Player B wins	Advantage A/B
f2	6th	8	4	A
e2	7^{th}	0	4	B
d2	8^{th}	Nil	Nil	None
c2	9^{th}	0	4	B
b2	10^{th}	4	0	A
a2	11^{th}	0	4	B

From Table 1, when Player A starts from a1, Player B has the advantage by moving from e2, c2 or a2 to win 4 seeds in each case. If Player B moves from f2, Player A has the advantage of winning 8 seeds with Player B winning 4 seeds. Therefore, Player B should not move from

f2 or b2 so as not to give the advantage to Player A. Note that Player B cannot start from d2 because the hole has no seed.

Table 2: Possible Number of Seeds that can be won by Player A and Player B with Player A starting from b1.

Player B Moves From	Position of holes from b1	Player A wins	Player B wins	Advantage A/B
f2	5^{th}	4	8	B
e2	6^{th}	8	4	A
d2	7^{th}	0	4	B
c2	8^{th}	Nil	Nil	None
b2	9^{th}	0	4	B
a2	10^{th}	4	0	A

From Table 2, when Player A starts from b1, Player B has the advantage by moving from f2, d2 or b2 by winning 4 seeds over and above Player A in each case. If Player B moves from e2 or a2, Player A has the advantage of winning 4 seeds over and above Player B in either case. Player B cannot move from c2 because the hole has no seed.

Table 3: Possible Number of Seeds that can be won by Player A and Player B with Player A starting from c1.

Player B Moves From	Position of holes from c1	Player A wins	Player B wins	Advantage A/B
f2	4^{th}	4	8	B
e2	5^{th}	4	8	B
d2	6^{th}	4	8	B
c2	7^{th}	0	4	B
b2	8^{th}	Nil	Nil	None
a2	9^{th}	0	4	B

From Table 3, Player B has the advantage of countering Player A by starting from f2, e2 or d2 to win 8 seeds in each case while Player A wins 4 each. Player B playing from c2 or a2 gives him/her the advantage of winning 4 seeds each with Player A winning zero seed. Therefore, Player A can choose not to start from c1 in order not to give the advantage always to Player B, the opponent.

Table 4: Possible Number of Seeds that can be won by Player A and Player B with Player A starting from d1.

Player B Moves From	Position of holes from d1	Player A wins	Player B wins	Advantage A/B
f2	3rd	4	4	A/B
e2	4th	4	4	A/B
d2	5th	8	4	A
c2	6th	8	4	A
b21	7th	0	4	B
a2	8th	Nil	Nil	None

From Table 4, when Player A starts from d1, Player B has the advantage by starting from b2 to win 4 seeds and Player A winning no seed. Player B moving from f2 or e2, each Player wins 4 seeds. However, it is to the disadvantage of Player B to move from either d2 or c2 as Player A will in each case win 8 seeds, 4 seeds more than Player B.

Table 5: Possible Number of Seeds that can be won by Player A and Player B with Player A starting from e1.

Player B Moves From	Position of holes from e1	Player A wins	Player B wins	Advantage A/B
f2	2nd	8	4	A
e2	3rd	4	4	A/B
d2	4th	4	8	B
c2	5th	8	4	A
b2	6th	4	8	B
a2	7th	0	4	B

From Table 5, when Player A starts from e1, Player B has the advantage by moving from d2, b2 or a2 to win 4 seeds more than Player A in each of these cases. Both Players have equal advantage when Player B moves from e2, but Player A has the advantage when Player B moves from f2 or c2.

Table 6: Possible Number of Seeds that can be won by Player A and Player B with Player A starting from f1.

Player B Moves From	Position of holes from f1	Player A wins	Player B wins	Advantage A/B
f2	1st	Nil	Nil	None
e2	2nd	8	4	A
d2	3rd	4	4	A/B
c2	4th	4	8	B
b2	5th	8	4	A
a2	6th	4	8	B

From Table 6, when Player A starts from f1, Player B has the advantage by moving from c2 or a2; they have equal advantage by Player B moving from d2. However, Player B losses the advantage to Player A by moving from e2 or b2. Note that, if Player B starts from f2, he/she will terminate his/her play in b1, a hole with no seed earlier but now with 1 seed.

Going through the Table, Player A has more advantage in starting from f1 (Table 6), for whatever hole Player B takes or moves from, A wins at least 4 seeds. In this case, for Player B to have the advantage over A, B has to start his/her moves from either c2 or a2 to win 8 seeds each while A wins 4. It is all to the disadvantage of the first player (Player A, in this case), to start from c1, as the opponent (Player B) will always win 4 seeds more than the first player in each case (See Table 3). It is more to the disadvantage of a player to start the game first, for the experienced second player would strategise to make moves from the hole he/she has absolute advantage over the first player (the opponent). However, every player has the opportunity to counter the moves of his/her opponent as the game continues. From the analysis of the Tables, knowledge of the basic mathematics principle of counting helps a player to assess the cardinal or ordinal position of a hole to make moves or counter the moves of his/her opponent. Therefore, knowledge of the basic mathematics operations would help a player to win more seeds and win the game.

Ogiurrise Game and Related Mathematical Ideas/Concepts

The analysis of the Ogiurrise game reveals a number of mathematical concepts. The following mathematical concepts are found in the analysis of Ogiurrise game:

i. **Counting:** The twelve holes with 4 seeds each have 48 seeds altogether. This illustrates counting from 1 to 12, and from 1 to 48.

ii. **Number Base 4:** Each of the 12 holes has 4 seeds. This is groupings in 4 and counting in number base 4.

iii. **Addition:** Summing in 12 groups of 4, i.e., $4+4+4+4+4+4+4+4+4+4+4+4 = 48$. Also, counting the seeds won by each player at the end of a game teaches the concept of addition.

iv. **Multiplication:** Multiplying 12 groups by 4: i.e., $12 \times 4 = 48$.

v. **Subtraction and concept of zero (0):** A player starting from a hole means subtracting 4 from 4 thereby making the hole empty of seeds (i.e., 4-4=0). This illustrates the principle of subtraction and the concept of zero (0).

vi. **Addition of integers:** Sowing 1 seed by a player into a hole with x seeds means addition of one (1) seed to each hole. That is, $(x+1)$ seeds always in a hole to be refilled, where x is a variable of integral values with $x = 0,1,2,3$. When the seeds in a hole add up to 4 they are captured by a player.

vii. **Equality:** 4 seeds in each hole teaches the concept of equality using groups of 4.

viii. **Division:** Sharing the field of play with 12 holes into 2 territories with 6 holes between the two players means dividing 12 by 2 (i.e., $12 \div 2 = 6$). Sharing the 48 into the 12 holes means dividing 48 by 12 to give 4 seeds in each hole (i.e., $48 \div 12 = 4$).

ix. **The concepts of greater than and lesser than:** The player with the more seeds wins the game, and that with the less seeds losses the game. This illustrates the concepts of greater than (>) and lesser than (<).

x. **Geometrical shapes and patterns:** The field of play in the board in each half has 6 hemispherical holes that are symmetrical. This illustrates geometrical shapes and patterns.

xi. **Cognition:** A player's ability to analyze and read a game by making the right moves and counter moves shows the level of his/her mathematical cognition. A player has knowledge of the specific facts of a game; comprehends a game by translating and interpreting his moves and counter-moves of his opponents; applies mathematical concepts and rules to establish relationship in his plan and judgment of the outcomes of the game.

xii. **Probability:** Playing Ogiurrise can be a game of chance and probability of the following events can be calculated:

- Prob (a win or a loss) = $\frac{1`}{2}$.
- Prob (starting from a hole) = $\frac{1`}{12}$
- Prob (picking a seed) = $\frac{1`}{48}$
- Prob (winning all seeds in a hole) = $\frac{1`}{12}$

Ogiurrise Game and School Mathematics Curriculum Connections

Ogiurrise is an excellent way to introduce pre-school and primary school pupils, and secondary school students to ethnomathematics in order to study the relationship between mathematics and culture.

Playing the Game

a. Divide the kids/pupils/students into two teams of 2 players for the activity. They can choose their partners based on the objectives of the lesson.

b. Teach teams how to play following the instructions below (Beyond the Chalkboard, n.d.):

i State the objective of the game- To capture as many seeds as possible and win the game.

ii How to sow seeds.

iii How to capture seeds.

iv How to end a game.

c. After each team has played once or twice, gather the children to talk about what they have discovered. Is it a hard or an easy game? Did anyone discover any strategies for playing well? Ask him/her to demonstrate such strategies.

d. Build on what they talked about by making it better. After playing a few times, teams can switch partners if they would like to play with someone else.

e. In higher classes, tables 1,2,3,4,5, and 6 can serve as Table of Problem-solving Matrix that is used to illustrate the possible number of seeds that can be won by Player A (Team A) and Player B (Team B).

f. The analysis of the Ogiurrise game will then reveal a number of mathematical concepts and relationships in the moves and strategies in playing the game.

Pre-school Curriculum Connections

Use a play based method to assign kids to individual roles in the game of Ogiurrise. By this method, children's interest in mathematics is aroused and learn mathematics concepts and principles while they play. A pre-school mathematics curriculum content is counting. The concept of addition, for example, can be taught and learnt by doing the following activities:

a. Counting the number of holes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 holes.

b. Counting the number of holes in each half territory: 1, 2, 3, 4, 5, 6 holes.

c. Counting the number of seeds for each hole: 1, 2, 3, 4 seeds.

d. Counting the total number of seeds for playing the game: 1, 2, 3, . . . 46, 47, 48.

e. Counting the number of groupings in 4s: 1, 2, 3, . . . 10, 11, 12 groups.

f. Counting the number of seeds sowed into each hole.

g. Counting the number of seeds captured each time.

h. Counting the total number of seeds captured at the end of the game.

Primary School Curriculum Connections

Building on the pre-school content and experience, according to Learn Math with Games (n. d.), below are some curriculum connections that fits the games in Grade 1 (Primary 1) and Grade 3 (Primary 3).

Grade 1: Numbers

a. Count the number sequence 0 to 100 by:
   - i 1s forward (counting on) between any two given numbers, say 0 to 48.
   - ii 1s backward (counting down) from 20 to 0.
   - iii 2s forward from 0 to 20.
   - iv 4s forward from 0 to 48.
   - v 5s and 10s forward from 0 to 100.

b. Demonstrate an understanding of counting by:
   - i. Indicating that the last number said identifies "how many".
   - ii. Showing that any set has only one count.
   - iii. Using counting on (counting down) count seeds.
   - iv. Using equal parts or equal groups to count sets of seeds.

Grade 3: Numbers

Demonstrate an understanding of division (limited to division related to multiplication facts) by:

- i Representing and explaining division using equal sharing and equal groupings.
- ii Creating and solving problems in context that involve equal sharing and equal groupings, say in 4s.
- iii Modeling equal sharing and equal groupings, say in 4s, using concrete and visual representation, and recording the process symbolically.
- iv Relating division to repeated subtraction. For example, 48÷4 means subtracting 4 repeatedly until you get to 0 to give 12 as answer. Relate it to dividing 48 seeds by 4 to get 12 (i.e., 4 seeds each distributed into 12 holes sum up to 48).
- v Relating division to multiplication (i. e., $48 \div 4 = 12$ means $12 \times 4 = 48$).

Secondary School Curriculum Connections

At this level, students may have become masters of the game with tested strategies and relating them to learn basic concepts and solve some mathematical problem. For example, Ogiurrise game can support

the teaching and learning of Numbers and Numeration process in the Junior Secondary School (say, JSS 1), according to Learn Math with Games, through Communication, Visualizing, Reasoning, Problem Solving, and, Mental Mathematics and Estimation.

a. Communication: Ogiurrise game offers students opportunity to learn or discuss mathematical ideas:

i Students may begin by speaking using their own vocabulary and the teacher or their peers can guide them towards the formal language and symbols of mathematics which represent ideas (e.g., placing more/less seeds is addition/ subtraction).

ii Students may need to communicate about concrete mathematical ideas happening within the game board, and also about the mathematical mental representations of potential moves.

b. Visualizing: Ogiurrise helps students to visualize their potential moves which requires them to know how many seeds would be in various holes if they distributed the seeds in a hole of the of their choice.

i. Students develop their visualization because it provides an excellent concrete example of counting, addition and subtraction. This will help students to develop their spatial sense and reasoning.

ii. The game of Ogiurrise has a strong connection with remainders - as students divide their seeds across the game board, they can calculate remainder to predict the placement of their last seed. When students can perceive these concrete ideas and transfer them into mental representation, they develop a deeper and more flexible understanding of the concepts of addition, subtraction and remainder.

c. **Reasoning:** During this game, students will gain experience analysing an unknown mathematical problem. That

is, as students discover effective playing strategies, they will develop confidence as they can logically explain their reasoning and thereby defend their conclusions.

d. **Problem Solving:** Playing Ogiurrise game poses problems for students to solve as they observe, listen, experiment and discuss multiple methods/strategies to gain seeds and win the game.

e. **Mental Mathematics and Estimation:** Ogiurrise game offers students' excellent opportunity to practise modular arithmetic. By mentally performing division of number of seeds they are sowing into the holes, students use the remainder to determine exactly where their last seed will land at the end of the turn relative to the starting hole. For example, if a student has 15 seeds in a hole, the remainder would be 2, and would mean the last seed lands 2 holes beyond their starting hole. In addition, at the secondary school level, Ogiurrise can be connected to the principle of developing mathematical formulae and rules and the concept of probability.

f. **Algebraic Rules:** In addition of integers, for example, $x + 1$ seeds are always in a hole to be refilled and captured, where x is a variable of integral values with x = 0, 1, 2, 3. Developing strategies and rules for problem solving to know possible number of seeds that can be won by a player with the opponent starting from a particular hole as presented in Tables 1, 2, 3, 4, 5 and 6. For example, from Table 1, player A starting from hole a1, player B (the opponent) starts playing from e2, c2, or a1 to win 4 seeds for player A not to win any seed. Tables of problem-solving matrix are prepared for players or teams to read and study and therefore take the most advantageous position (s) or moves to capture more seeds than the opponent and win the game.

g. **Probability:** Playing Ogiurrise game, though deterministic, could also be a game of chance and some statistical calculations are done to forecast and predict results of matches. The probability of following events can be calculated:

i Prob (a player or team starting the game) = $\frac{1`}{2}$

ii Prob (a player or team winning the game) = $\frac{1`}{2}$

iii Prob (a player or team starting from a hole) = $\frac{1`}{12}$

iv Prob (a player or team ending play in a hole) = $\frac{1`}{12}$

v Prob (a player or team capturing all seeds in a hole) = $\frac{1`}{12}$

vi Prob (picking a seed) = $\frac{1`}{48}$

vii Prob (winning the game) = Prob (losing the game) = $\frac{1`}{2}$

viii Prob (winning the game) + Prob (losing the game) = 1.

Discussion

The analysis of the Ogiurrise game has identified a number of mathematical concepts such as counting, addition, multiplication, subtraction, division, equality, probability, geometrical shapes and patterns, and the concepts of zero (0) and greater than/lesser than. Some of these align with the definition of D'Ambrosio (1988) of Ethnomathematics as the mathematics of the identifiable cultural group, derived from quantitative and qualitative practices such as counting, weighing, sorting, measuring and comparing. Identifiable cultural groups include group of people who share common and distinctive characteristics (e.g., code of conduct, behaviours, hopes, fears, language and culture) which are invented or evolved from activities as the needs arise. Such activities as counting, addition, multiplication, subtraction, division, etc, peculiar to playing Ogiurrise game can be translated into formal mathematics representations in the mathematics classroom. Ethnomathematics approach expects that when teaching mathematics to such groups, their characteristics in living, their way of doing things, reasoning etc should be reflected and taken into consideration. This will make what is taught to be meaningful and useful to them as well as being understood by them. The analysis of the Ogiurrise game also align with Bishop's (1988) idea of six mathematical activities of indigenous people. He argued that, activities such as counting, measuring, locating, designing, playing and explaining are all present in some form in all cultures and these

activities are necessary and sufficient for the development of mathematical knowledge. Every culture does some mathematics, although the mathematics is expressed in ways unique to that culture, as in playing the Ogiurrise game among the Edo people of Nigeria.

Another point to discuss is the players' mathematical cognition which describes the ability of each player to analyze and read a game by making the right moves and counter moves. This is explained in a 2×6 matrix of two rows and six columns assigned to the 12 holes in the field of play of the Ogiurrise board. These are displayed in figures 2, 3 and 4, and in tables 1, 2, 3, 4, 5 and 6. They present the possible moves and wins of player A and B, and in addition outlining the advantages/disadvantages to either of the players. From the analysis of the figures and tables, knowledge of the concept of counting would help a player to assess the cardinal or ordinal position of a hole to make moves or counter the moves of the opponent. Therefore, knowledge of the basic mathematics operations (addition, subtraction, multiplication and division) would help a player to win more seeds and win the game. The tables can be compiled into a ready reckoner that can serve as reference material a player can study to prepare, strategize and play the Ogiurrise board game. The tables also can serve as a Table of Problem-Solving matrix for students that illustrate the possible number of seeds that can be won by Player A (Team A) and Player B (Team B). Using mathematical cognition, a player would have knowledge of the specific facts of the game, comprehends by translating the moves and counter moves of the opponent, applies mathematical concepts and rules to establish relationships in his plans/strategies and judgement of the outcomes of the game.

The analysis of the Ogiurrise game and school mathematics curriculum connections revealed a number of mathematical concepts and relationships in the moves and strategies in playing the games. Preschool curriculum contents are revealed in counting and addition of number of holes and seeds in the field of play. Primary school curriculum connections were demonstrated in counting of the number sequence 0 to 100, and in the understanding of the relationship between

the basic operations of addition and multiplication, subtraction and division, and division to multiplication. These findings may align with that of Davis (2016) that pupils' activities on measuring and division of fractions showed evidence of cultural influences on their conceptions and practices in the measurement of capacity and division of fractions by a whole number in real life situations.

This study also revealed that the Ogiurrise game can support the teaching and learning of number and numeration process in the Junior Secondary School through communication, visualizing, reasoning, problem solving, mental mathematics, estimation and probability as students listen, observe, experiment, discuss mathematical ideas and multiple methods/strategies in making potential moves to gain seeds and win the game. These findings are supported by Esuong and Ibok (2022) paper that explored the various cultural practices of Efik people that can assist the teaching and learning of number and numeration, counting, basic arithmetic operations, probability and mathematical games. Some of these findings can infer support from the work of Aboaye (2015) on understanding the mathematical practices of Kente weavers in Ghana, that evidence of mathematical practices of weavers indicated that they all employed a certain level of informal mathematics in counting, measuring and designing in the discharge of their duties as weavers.

The findings of this study have confirmed that mathematics that was once regarded as culture and value free is no longer such: views about the nature of mathematical facts and practices being absolute have changed in recent times (Davis, Bishop & Seah, 2009; Unodiaku, 2013; Aboaye, 2015; Esuong & Ibok, 2022). The local aspect of mathematical knowledge used in playing the Ogiurrise game can help learners to draw on and integrate every day and school mathematics knowledge in teaching and learning situations. The Ogiurrise game is a veritable option to introduce preschool, primary school pupils and secondary school students to Ethnomathematics in order to study the

relationship between mathematics and culture using out-of-school and in-school activities.

School Mathematics Curriculum and Educational Implications

There could be a connection between conventional mathematics and the use of ethnomathematical ideas in the classroom by exploring how Ogiurrise game that is associated with cultural values and practices can have a role in the mathematics education of present and future generations of our children. The use of Ogiurrise game to support the teaching and learning of some basic concepts in school mathematics has the following curriculum and educational implications:

- The indigenous game enhances the teaching of mathematics from different social context and shows that school mathematics curricular contents are culturally based.
- The game can be used to teach basic concepts in mathematics such as, counting, number base, addition, multiplication, subtraction, and division of integers.
- The game can promote creativity in students thereby helping them to fulfill their potential and be raised to the highest of their capability.
- The Ogiurrise game can promote the learning of mathematics in an interesting and entertaining way. The game can enhance the right attitudes towards mathematics learning by creating fun and enjoyment for the students.
- The Ogiurrise provides for interaction among learners with the two players and other students serving as audience to watch them play; it enhances cooperative learning of mathematics.
- Also, the game turns informality to learning school mathematics. Assignments and project work can be given to students to involve the parents/guardians/elders in the community in out-of-class learning activities in school mathematics. It supports Open Classroom teaching and learning of school mathematics.
- The game provides a variety of teaching methods to the teacher. It can promote demonstration to students rather than giving them instructions to follow. It can also promote cooperative and

activity-based learning as students count, do calculations, make and predict moves, visualize situations and recognize different mathematical patterns and relations while playing the game.

- Ogiurrise, as indigenous game, provides local and cultural alternative resource materials that can enhance the teaching of mathematics in Nigeria Schools.

Conclusion and Recommendations

There is a great potential to use Ogiurrise as an indigenous game in the mathematics classroom. An example of a game that provides a challenge combined with concept formation and reinforcements can be found in the traditional Ogiurrise game. The learning activities can be analysed (mathematized) to reveal a variety of mathematical concepts that are useful in school mathematics.

The mathematics teacher is to appropriately use his mathematical knowledge and teaching strategies to translate the students' knowledge of Ogiurrise game into meaningful mathematical explorations within the context of the students/teacher's social environment. School mathematics curriculum should therefore include indigenous games (like Ogiurrise) as content and resource material to enhance the teaching and learning of mathematics.

References

Aboaye, S. (2015). Understanding the mathematical practices of Kente weavers in Ghana. A dissertation submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in the Graduate Academic Unit of Education, University of New Brunswick.

Afrotradosports (2018). *Ayo facilities at national sports festival in Nigeria.* Retrieved on March 21, 2020 from: https://afrotradosports.com

Agbalajobi, F.B., Cooper, R.L. & Sonuga, J.O. (1976). Investigation into the use of the African board game, Ayo, in the study of human problem solving. In J. Cea (ed), *Optimization technique modeling and optimization in the service of man, part 1.* Retrieved on February 9, 2020 from: https://www.springer.com/gp/book/9783540076223

AWELE-The Rules (n.d.). Retrieved from: http://s.helan.free.fr/awele/rules/

Beyond The Chalkboard (n. d.). *One Africa, many countries.* Retrieved on March 23, 2021 from: https://www.beyondthechalkboard.org/activity/one-africa-many-countries-ayo/

Bishop, A. J. (1994). Cultural conflicts in mathematics education: Developing a research agenda. *For the Leadership of Mathematics,* 14 (2), 15 - 18.

Bishop, A.J. (1988) *Mathematical enculturation: A cultural perspective on mathematics education.* Dordrect : Kluwer Academic Publisher.

Cowan, P. (2006). *Teaching mathematics: a handbook for primary and secondary school teachers.* London: Routledge.

D' Ambrosio, U. (2004). Preface: Ethnomathematics and Mathematics Education. In F. Faville (ed), *proceedings of the 10th international congress of mathematics education*, Copenhagen, Pisa; Tipografia Edditroce Pisana. V-x. Retrieved on January 24, 2020 from: http://people.dm.unipi.it/favilli/Ethnomathematics_Proceedings_ICME10.pdf

D'Ambrosio, U. (1988). Ethnomathematics: A Research Program in the History of Ideas and in Cognition. *International Study Group on Ethnomathematics, Newsletter* 4(1), 2-6, Oct.

Davis, E. K. (2016). Cultural influences on Ghanaian primary school pupils' conceptions in measurement and division of mixed fractions. *African Journal of Educational Studies in Mathematics and Science, 11, 1-18.*

Davis, E. K. & Chaiklin, S. (2015). A radical- local approach to bringing cultural practices into mathematics teaching in Ghanaian primary schools, exemplified in the case of measurement. *African Journal of Educational Studies Studies in Mathematics and Science, 11, 1-14.*

Davis, E. K., Bishop, A. J. & Seah, W. T. (2009). Gaps between in-school and out-of-school mathematics in Ghana. *Mathematical Connections,* 8, 1-15.

Davis, E. K., Seah, W. T. & Bishop, A. J. (2009). Students' transition between contexts of mathematical practices in Ghana. In D. Martin, T. Fitzpatrick, R. Hunting, D. Itter, C. Lenard, T. Mills & L. Milne (Eds.), *Mathematics of Prime Importance,* Melbourne: Mathematics Association of Victoria, 62-71.

Esuong, U. U. & Ibok, E. O. (2022). Expository narrative of the ethnomathematics concepts in that in the Efik cultural heritage: implication for teaching and learning mathematics. In Adebola S. Ifamiyuwa, *Stem education and 21st century skills,* 62nd annual proceedings of the Science Teachers Association of Nigeria (STAN), 151-158.

Johnson, D. A. & Rising, G.R. (1972). *Guidelines for teaching mathematics*. Belmont: Wadsworth Publishing Company Inc. Retrieved on October 10, 2019 from: https://www.amazon.com/Guidelines-teaching-mathematics-Donovan-Johnson/do/0534001890

Learn Math With Games (n. d.). *Resources for educators and families.* Retrieved on March 27, 2021 from: http://www.learnmathwithgames.com

Michael, A. & Iyekekpolor, S. A. O. (2013). Exposition of selected indigenous mathematical games in Taraba State of Nigeria: implication on ethnomathematics for national development. In J. S. Sadiku (ed), *proceedings of September 2013 annual conference of Mathematical Association of Nigeria (MAN),* 479-488.

Mosimege, M. & Ismael, A. (2004). Ethnomathematical studies on indigenous games: examples from Southern Africa. In F. Faville (ed), *proceedings of the 10th international congress of mathematics education*, Copenhagen, Pisa; Tipografia Edditroce Pisana. 119-137. Retrieved on January 24, 2020 from: http://people.dm.unipi.it/favilli/Ethnomathematics_Proceedings_ICME10.pdf

Piaget, J. (1962). *Play, dreams and imitation in Childhood.* Norton: New York.

Taytronik (2018). *Ayo: The Most Popular Local Game in Nigeria.* Retrieved on October 9, 2020 from: www.taytronik.com.

The Nation (2017). *Traditional Sports to Feature in 2017 National Youth Games.* Retrieved on March 21, 2020 from: https://thenationonlineng.net/traditional-sports-to-feature-in-2017-national-youth-games/

Trajkovik, V., Malinovski T., Vsileva-Stojanovska, T. & Vasileva, M. (2018*). Traditional games in elementary school: relationships of student's personality traits, motivation and experience with*

learning outcomes. PLoS ONE 13(8): e0202172. Doi: 10.1371/journal.pone.0202172

Unodiaku, S. S. (2013). Effect of ethnomathematics teaching materials on students' achievement in mathematics in Enugu state. *Journal of Education and Practice,* 4 (23), 70 - 77.

Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

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Providing Quality Education for All: The Dilemma of Deaf students in a Mainstream Technical University

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Abstract
Technical and Vocational Education and Training (TVET) requires that students comprehend and turn theoretical knowledge into practical skills within the shortest possible time, if not immediately. This dictate of TVET however, is a major challenge for most Deaf students who largely rely on others to benefit from classroom teaching because of communication challenges. It is for this reason that this study considered the experiences of the Deaf pursuing TVET programmes in a mainstream Technical University and how they could be supported. A qualitative approach (face-to-face interview) was adopted and thematic analysis was used in analysing the data. Generally speaking, the Deaf students had academic, financial and socio-cultural challenges. Nonetheless, what is so intriguing to read in this study is the communication challenges they experienced. The study's findings suggest the need for Sign Language (SL) to be promoted at least, among those who come into contact with Deaf students pursuing TVET in a technical university.

Keywords: Academic challenges, financial challenges, socio-cultural challenges, the Deaf, Sign language, TVET

Introduction
Providing quality education for all, including the socially marginalized has been a driving force behind many national and international laws, policies and regulations. The United Nations (UN) is at the forefront of this internationally. Marginalization is caused by many factors, nonetheless, disability is one of its leading causes (Wapling, 2016; the United Nations Educational, Scientific and Cultural Organisation, UNESCO, 2010). According to the United Nations (2006: 4), Persons with Disabilities (PWDs) are 'those with long-term physical, mental, intellectual or sensory impairments which

in interaction with various barriers hinder their full and effective participation in society on an equal basis with others.' These disabilities, among others, include various forms of visual impairment, physical disability, mental health conditions, intellectual disability, acquired brain damage, Deaf or hard of hearing. Worldwide, there are more than a billion people (about 15 % of the world's population) living with disability. Eighty percent (80%) of these reside in low-income countries (World Health Organization's report, 2015). In Ghana, PWDs constitute about 3% of the entire population. They are made up of the following: Visual impairment (40.1%), physical disabilities (25.4%), psychosocial disabilities (18.6%), intellectual disabilities (15.2%) and other forms of disability (0.7%) (Kassah, & Phillips, 2018; Casely-Hayford & Ghartey, 2007).

Globally, there is a general consensus that Technical Vocational Education and Training (TVET) is the key to expanding opportunities for PWDs. TVET is a comprehensive term covering those aspects of the educational process involving general education, the study of technologies and related sciences, and the acquisition of practical skill, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life (Ayonmike, Okwelle & Okeke, 2015; Murgor, Keter & Changa'ch, 2014). Its practical nature specifically, makes it easy for many PWDs to manage and get employment – either as an employee, self -employed or an employer. Accordingly, the International Labour Organization (ILO, 2017), emphasizes the importance of TVET by arguing that disabled people need skills in order to improve their labour market opportunities and/or engage in economic activities.

There are different approaches to educating the Deaf, based on the following three theoretical concepts - segregation, integration and inclusion. *Segregation* refers to separating the disabled from the non-disabled and providing them with special education. *Inclusion* encompasses the removal of all barriers that marginalise and limit the participation of both the disabled and the non-disabled (Amoako, 2019). *Integration* on the other hand, involves joining the disabled with the non-disabled in mainstream education but supporting them with the following to function effectively: tutoring, real-time captioners, FM systems for amplification, manual and electronic note-taking, Sign Language interpretation, one-to-one tuition, sign-supported English, spoken speech among others (Amoako, 2019; Cavender, Bigham & Ladner, 2009).

However, the theoretical concept examined in this study is the integration. The decision to examine the integration of Deaf students in Ghanaian Technical Universities in particular, stems from inadequate information and/or research on the concept especially, those told by Deaf students who have actually had the experience. It appears studies in this area have remained few (see Amoako, 2019; Casely-Hayford & Ghartey, 2007). While research evidence on the Deaf in Higher Education (HE) continues to increase worldwide (e.g. Kermit, & Holiman, 2018; Barnes *et al.*, 2007), it appears that is not the case in Ghana. Even that, most of these studies have focused on the: characteristics of Deaf students (e.g., hearing thresholds, language fluencies, mode of communication, and predicting the academic success of the Deaf. For instance, Powers (2003) examined some of the student and family factors that influence the educational achievements of Deaf students in mainstream England. Marschark, *et al*. (2015) on the other hand, investigated the academic achievement of the Deaf as indicated by the Woodcock-Johnson III subtests in passage comprehension, mathematics calculation, science, and social studies.

Moreover, a growing number of studies have focused on students with disability's access to higher education and little mention has been made of individual student experiences (Tinklin & Hall, 1999). Instead, country reports (see Cruz & Calimpusan, 2018; Babbidge, 1965) which often provide a general overview are available. In other words, the detailed experiences of students in specific institutions are usually missing and this usually works against providing specific interventions that fit the needs of specific institutions. This also, informed the decision to investigate how effective Ghanaian technical Universities have been in integrating the Deaf into its mainstream education.

The term Deaf, describes individuals with predominantly profound or severe hearing losses without the use of hearing aids, though many Deaf also use hearing aids in their pursuit of HE (Lang, 2002). According to the Head of the Disability Support Services Unit (DSSU) of Takoradi Technical University (TTU), the first Deaf student was received into the university in 1987. The student graduated without any formal support. 1n 2006, another student from a family of seven with three additional Deaf siblings; was admitted but this time, the family decided to a pay a part-time private Sign Language Interpreter (SLI) to assist him. Unfortunately, the interpreter was transferred just one year afterwards. Contact with the Ghana Education Service (GES)

for assistance was fruitless, given that per their policy, an interpreter could only be assigned when there are at least, 30 Deaf students in a university. SL teachers in the nearby School for the Deaf were subsequently, contracted privately by the family to assist. However, in 2009, one of the Deaf student's non-Deaf brothers became a staff of the university mainly to support his brother and other Deaf students. Currently, there are about 54 Deaf students at the university and a number of interventions has been put in place to support them. For instance, DSSU was set up in in 2017 to formalise support for PWDs on its campuses: Main campus at (Effia Kuma), the Business campus (Butumagyebu) and the Enginering campus (Akatakyi). The Student Representative Council (SRC) was also made to recognize the Association of Deaf Students in Ghana and to provide a slot on its Council for them. The current responsibilities of DSSU include (a) Developing data on PWDs from the admissions office and looking for scholarships for them; (b) Assessing their needs for academic success regularly and (c) Engaging them in social activities.

Issues with Deaf education

Educating the Deaf is challenging in Ghana, because the welfare of PWDs is not seen as a budgetary priority (Amoako, 2019). Inadequate teacher professional development, ineffective monitoring systems, limited resources, the negative attitude of hearing peers, rapid give-and-take, cultural differences, appropriate use of space (physical arrangements in the classroom), and social integration are some critical factors that affect their persistence in HE (Kassah, Kassah & Phillips, 2018; Lang, 2002). As a consequence, Kersting (1997) reported feelings of isolation, loneliness, and resentment to be most intense during orientation in their first year. Distraction from audio/visual noise, students, objects and the environment may distort effective communication. Interpreters with inadequate interpreting skills may also, omit key concepts necessary for understanding a lesson (Langer & Schick, 2004). Additionally, Deaf students with minimal SL competence (speaking, writing, reading) may not easily follow interpreters because of the differences in signing by the SL interpreter (Omugur, 2007).

Specialised support services for the Deaf

Many specialised support services are provided for the Deaf. These include:

Sign languages is a visual-gestured language which involves the use of hands, eyes, mouth, mimics, and body movements (World Federation of the Deaf, 1993). Often, teachers expect students to understand interpreted concepts in totality, however, this is often not the case. For example, when it comes to answering questions in the classroom some interpreters may misinterpret the sequences of utterances and create a time lag, thereby making it difficult for the students to answer (Gilakjani & Ahmadi, 2011).

Tutoring

Tutoring refers to a more individualised direct instructional approach, (group tutoring is also possible); rather than reinforcing classroom learning (Lang, 2002). The purpose is to improve the understanding, studying, writing and reading skills of the Deaf and to clarify notes taken. There is also a focus on developing their independent learning strategies, confidence, preparations for class, and other general learning skills (Lang, 2002)

Real-time captioning

Real-time captioning simultaneously converts spoken word into printed format using computer-aided translation that appears on a large screen for anyone to see (Kawas, *et al*., 2016). For example, what a lecturer says can automatically be transcribed near verbatim on the screen. One advantage is that transcripts produced may enhance teaching and learning and students can make up for missed lectures as well as corroborate the accuracy of notes taken during the lectures especially, if recorded audio/video and/or slides are available (Ranchal *et al.*, 2013).

Note taking

Note taking enables Deaf students to take their own notes. However, this can be a difficult task for most Deaf students because of the required language skills and the challenge of attending to multiple visual tasks (e.g., interpreters, teachers, students) at the same time. Stinson, Elliot and Kell, (2017), reported that in general, the notes were seen to be very helpful although some students did not integrate reading into their regular study routines.

The Purpose and Objectives of the Study

The purpose of the study was to emphasize the importance of TVET or skills development for PWDs if they are to engage in economic activities.

Research questions

The study had the following research questions:

1. What are the experiences of Deaf students in a mainstream Technical University using TTU as a case study?
2. What specific TVET career paths are chosen by the students?
3. How can Deaf students in TVET be supported during their study in a technical university?

Methodology

A letter detailing the purpose of the study and its use was sent to the Vice Chancellor of the University to gain approval for the study. The Head of the DSSU was accordingly informed by the Vice Chancellor. A follow-up on the Head of DSSU further, lead to verbal agreement to help us meet the Deaf by appointment. Another agreement between us and the Head of DSSU was that the real identity of the participants would not be made public - it would be hidden with acronyms with codes (alphabets) to safeguard their reputation.

The design of the study was phenomenological case study. This was done in recognition of the limitations of quantitative methods in providing holistic and in-depth explanations to social and behavioural issues. A phenomenological research deeply investigates what experiences mean to people. That is, it interprets participants' feelings, perceptions, and beliefs to clarify the essence of a phenomenon under investigation (Bliss, 2016). The design of phenomenological studies therefore, explores the views of those who have actually experienced a phenomenon; in this case, Deaf students in Takoradi Technical University. The case study approach used on the other hand, enabled a closer examination of the data collected within the specific context of TTU and the very few Deaf interviewed within the university.

The target populations were all 54 Deaf students, the three SL interpreters and the Head of DSSU. However, only six students, two interpreters and the head of DSSU participated in the study. The Head of DSSU, the interpreters and the students were chosen purposively because of the rich, deep and qualified views they had such that seeking their views was unavoidable.

Three separate semi-structured interview guides for the face-to-face interviews were respectively developed for the students, interpreters and the Head of DSSU. The face-to-face interviews proved very insightful – given that they encouraged the participants to talk at length, beyond what they would have ordinarily said, when a structured questionnaire was used. Simply put, the interviews provided an enabling environment for the participants to express themselves freely, while the researcher deduced the interviewees' feelings and thoughts through their facial expression and gestures (Byrn, 2013).

The first part of each of the instruments dealt with background information (e.g., faculty, department, programme, level, expected qualification, entry qualification, age, gender, parent's dead/alive, highest education & occupation of parents, number of people in the household, who pays fees, qualification of staff). The instruments for the students had an additional section divided into academic, financial and socio-cultural issues. The interviews with the interpreters had two additional sections (the challenges for student and the interpreters and recommendations for improvement). The interview with the Head of DSSU facilitated access to relevant information in addition to the provision of a detailed information on the history of the Unit and the management of the students. All the interviews were audio-recorded with the permission of the interviewees.

The data collection from the students started after the instruments had been pre-tested using three Deaf students. That of the interpreters was done using an interpreter who did not take part in the study. The piloting improved the quality of the instruments. For example, redundant items were removed and ambiguous items were reconstructed. The actual data collection was done between October and December, 2020. First, the details of the study were explained to individual participants to gain informed consent in the case of the deaf students through the SLI. Only those who voluntarily consented, were allowed to participate in the study. The participants were also assured of confidentiality.

After the data collection, a password was put on both the audio and transcribed data to prevent unauthorised access and confidentiality. The data from the face-to face interviews was analysed using thematic analysis. The thematic analysis involved the identification of themes through 'careful reading and re-reading of the data' (Rice & Ezzy, 1999: 258). In other words, emerging themes become the categories for the analysis. The final report was discussed (the document was sent to

them ahead of time) in a meeting to ensure the views presented were that of the interviewees. The data analysis involved the following five stages adapted from Fereday & Muir-Cochrane (2006).

Stage 1: Developing the code manual

The recorded audio was listened to and transcribed, read and summarized in order to put them into the categories, based on the objectives of the study. Five broad themes were generated and coded to guide the analyses. Details of the codes, definitions of main themes, what they encompass and from which respondent are provided on Table 1.

Table 1: The five broad themes, definitions and descriptions

Label	Definition	Description	Respondent
A	Access to University education	The experiences of the students with respect to how they got into the university.	Students
B	Academic Challenges	Comprehension difficulties due to challenges with fellow students, SL interpreters, non-signing teachers and practical work.	Interpreters/ students.
C	Career paths	The various programmes the students are pursuing in the university.	Students
D	Financial challenges	Difficulty in paying fees, strategies adopted by students and why.	Interpreters/ students.
E	Socio-cultural challenges	Relationship challenges.	Interpreters/ students.
F	Suggestions for improvement	Improvement suggestions for institutional managements, researchers and educators in general.	Head of DSSU, interpreters/students.

Results

The demographics of the respondents

In all 27 students, two SLIs (a male and a female) and the head of DSSU participated in the study. Many of the students (92%) were Higher National Diploma (HND) students made up of: first (41%), second (37%) and the third (22%) year students. The male students (56%) were more than the females (44%) and the majority (56%) were between 23 and 26 years. Many (74%) came from Senior High Schools instead of formal TVET institutions (14%) and traditional apprenticeship training (4%).

The experiences of the students are discussed under four key areas – access, academic, financial and socio-cultural challenges. Details are presented below:

A. Access to University education

The issue of access to University education is discussed from three key dimensions – The availability of institutions admitting Deaf students, entry requirements and programme options. Regarding the *availability of Ghanaian Universities accepting Deaf students*, the overall picture was that they were inadequate (see the comments of two of the students interviewed, SR3, SR5, SR8 and SR12 below). Bedsides, most of these universities are located in major cities or regional capitals, out of sight and knowledge of many Deaf students who like their counterparts in other parts of Africa, live in poor rural environments (Kiyaga & Moores, 2003). Besides, there are a limited number of directional signs on the location of some of the universities in Ghana. Hence, locating, getting information and accessing them were often problematic. The survey however, indicated that the majority of the admissions were facilitated by friends (30%), parents, and the University's outreach programme (22% each). See Table 1 in the Appendix. Below are some of the comments:

> *Student Respondent (SR) SR3: … "To some extent because if you are not living in the cities where technical institutions are located, accessing them become very difficult. 'If more technical institutions will be added to the existing ones, that will be fine.'*
>
> *SR5: 'To some extent because it seems they are located only in the regional capital cities of Ghana. If you are not living in the cities where technical institutions are located, accessing them becomes very difficult'*

With regards to *admission requirements*, two of the interviewed students indicated that poor grades in English and Mathematics (a key admission requirement for both hearing and non-hearing students) made their admission problematic. They therefore, had to re-write those papers or pass mature entrance examinations (if they were 25 years and above). Failure in English and Mathematics is a well-known problem that prevents not only Deaf students from entering tertiary education; but also, hearing students. This was one of the comments:

> *SR6: All my grades were very good except English Language so I had to rewrite them.*

According to the SLIs interviewed, the Deaf have difficulties with all spoken languages including the English language because, SLI only translates ideas and so when a deaf person is wringing in say, English language, the rules of the English language may not be respected. See the comment by a Sign Language Interpreter A (SLIA):

> SLIA: '*We don't sign exact English language to them. Sign Language, if you are translating it I may say it is like a Ghanaian language. For instance, if I am signing the sentence "I am going to school" it's too long so you sign it, "me go to school", However, this is a direct translation in Twi. So, if you an Ewe, you speak it in Ewe and it will march the sign language. Sign language is like a blocking English (pidgin language). So seriously I just pity the students sometime because you teach me in Twi or Ghanaian language and you expect me to reproduce accurately in English'.*

With respect to Mathematics, the SLI explained that the frequent use of symbols, makes understanding difficult for the Deaf. The reason is that there are no SL equivalences for most of the symbols used (e.g., $\pi 2$, $\sum x$ and so on). Hence, it may be extremely difficult for the SLI to sign to the understanding of the student. Unfortunately, most subject teachers assume that these symbols are known by, or are common to the Deaf students and so they are following whatever is being taught (they are there). Some lecturers may even move fast and clean the board quickly to the disadvantage of the Deaf. This makes it very hard for the Deaf to benefit from the lecture, especially, if they have to understand a first step to understand the rest of the lecture. The comment of the interpreters are stated below:

SLIA: 'This is because there is a possibility that not all that the lecturers are saying are interpreted to the students. There are certain terminologies that may not have certain things to sign and the interpreter will be compelled to break into parts to explain to the understanding of the students and by so doing some of the words will be left out.

SLIB: '*Another challenge has to do with mathematics. In mathematics, we don't have any sign language equivalences for π2, ∑x and so on. So, one day, I attended one Mathematics lectures at one of the lecture halls and this lecturer was speaking at a very fast pace. She will do like this 'do you get it and then she will clean the board', 'do you get it and then she will clean the board'. Let us go the second one ... and the deaf students were seating right at the front her. She will not take her time in lecturing let alone to pay special attention to the deaf students in the class. I think such way of lecturing is not fair to the deaf students.'*

With respect to *programmes available* to the Deaf, it was important to know that TVET was preferred by almost all the students. In fact, 89% of the interviewees were satisfied with the programmes they were pursuing. This was largely due to their perception that TVET provides a good platform for them to succeed in life. The students' decision to pursue various programmes at the University was informed by self-motivation. Two of the interviewed students mentioned that they had the inner motivation and confidence to come to the University despite the challenges. These were some of the comments by the students:

SR1: 'But me I don't think so. You can get access to the Universities if only you want'.

SR 4: 'I had the vision of pursuing my education to the highest level. So, I came here on self-motivation'.

Another factor was the *university's outreach programme* of visiting schools for the Deaf, churches and using WhatsApp platforms for Deaf students. this programme was highly appreciated and utilised by some of the students as it directs them to what they can do to further their education and the options available to them. In fact, all the students interviewed, saw the University's outreach programme as a great relief. All the students interviewed, except one, came to the University through that platform. One of the students commented:

SR3: 'When the Administrator of TTU came to my former school to market TTU, then I became relieved. I was now ok.'

RS5: 'One of the University workers came to my secondary school to talk to us about TTU.'

RS6: 'A worker of TTU came to my secondary school to market TTU to us and that is how I got to know TTU'

Career guidance further influenced the students' decision. Interestingly, while the majority (4 interviewees) indicated that they had career guidance from their teachers and families before applying to the University, the others indicated that they had no such guidance. Some of their comments were:

SR2: 'Yes. I got career guidance from one of my teachers'.

SR4: 'No. Nobody gave me guidance. Not even my teachers.'

SR5: 'Yes. I had access to career guidance from family members.'

B. Academic challenges

The first academic challenge mentioned by the students was inadequate interpreters during lectures and other teaching/learning activities. There were a number of sign-language related issues that affected the academic work of the students as argued by both the students and the interpreters. The views of the students and the interpreters are discussed together. According to the interviewed students, access to sign-language interpreters was a big issue. At the time of conducting this research, the University had three SLIs (two part-timers and one national service person). This number was sadly inadequate considering the total number of Deaf students, their different programmes, levels and time tables. Besides, the University's time table is often adjusted by individual lecturers when necessary. This usually results in clashes and difficulty in locating both students and interpreter during lectures especially, at the beginning of the semester. The comment below were given by some of the students and interpreters:

SR1: 'Even if you get admission, you will face the problem of lack of interpreters to interpret what the lecturer is teaching'.

SR5: 'Most times, I don't meet an interpreter the classroom'

SR9: 'I have not had an interpreter in my classroom ever since I started schooling here'.

SLIA: 'Our work as SLIs is part time so we are not always there for the students.'

Some of the lecturers who were aware of the Deaf students tried to help them by moving slowly so they could catch up. Nevertheless, there was a limit to the extent to which they helped because of time constraints and the volume of work to be completed in a given time Another challenge was that they could not directly communicate with the students to get feedback especially, if the SLI were not there. The problem became worse during practical session. Nonetheless, during a practical section, an immediate comprehension of what was taught was necessary to complete a given assignment and, in most cases, the Deaf students were found wanting or frustrated. (see the comments of the some of the students interviewed below).

SR4: 'Whenever we are having practical and I raise my hand to ask question or make enquiries, the lecturer will ignore me, sometime tell me to wait and I will wait but I will never be called to ask my question till we close'.

SR6: Most Lecturers do not care about our presence in the class or at the practical grounds.

According to the SLIs, the academic problems of the students could be seen from different perspectives. First, the University environment is completely different from what the students have known before coming to the university. Back at then, most of the people around them (e.g., staff and student) understood and communicated in SL. In fact, the medium of instruction was SL and posed no academic challenge. Some of the comments were:

SLI 2: 'Back at the Junior High School level and Senior High School level, the teachers there understand sign language and also know how to sign. The medium of instruction and communication is sign language. Therefore, the students (Deaf students) do not have any problem at all.'

SLI 1: 'When students who are Deaf on completion further their education to the tertiary level and there they lack lecturers or facilitators who can sign, then they have a lot of challenges understanding the lectures even when there is a sign language interpreter.'

Unfortunately, most of the people (staff and students) in the University community have no knowledge of, and interest in SL; and the number of interpreters is often inadequate. Second, even when the SLI is present, the interpreter may not possibly be able to accurately capture

all that a lecturer is saying because of not having adequate knowledge of what is being taught. Also, there could be certain terminologies that the hearing students might be familiar with but the Deaf might not (see comment below). The interpreter in this case, may be compelled to find a composite word, break it down or give a lengthy explanation for the Deaf to understand as the lecture is on-going. A possible consequence is that the interpreter may not be able to capture what is said while the unfamiliar terminology was being explained to the student. The student may as a result lose out on what was said within that period.

> *SLI 1: There is a possibility that not all that the lecturers are saying are interpreted to the students. This is because certain terminologies that may not have certain things to sign and the interpreter will be compelled to break into parts to explain to the understanding of the students and by so doing some of the key words or ingredients may be left out.*
>
> *SLI 2: 'The lecturer may mention some words and the hearing students might be familiar with it but the Deaf students will not be familiar with it so they will ask you the interpreter that what does it mean and you have to explain it to them.'*
>
> *SR7: In a situation where the interpreters do not have a good knowledge about the courses, they find it very difficult to interpret them well to our understanding.*

The problem of what is called 'teaching pace' was also experienced. This requires teachers not to move too fast or too slow, but at a pace that the Deaf can follow. Unfortunately, most University lecturers do not pay attention to this – they often forget that the Deaf are among the hearing students when teaching.

Additionally, SL has to do with focusing the eyes on an interpreter continuously, for a long time, say, one to three hours depending on the duration of the lecture. At a point, a student may get tired, move his eyes away from the interpreter, pay very little attention, begin to play with the phone and even dose off. Whatever, is said within this period is totally missed by the student. The interpreter may similarly, get tired because of the constant use of the hand and the other body parts used in communicating with the students. For instance, a SLI may on some days, sign for Deaf students from 7am to 7pm, because of having to attend to different students with different lecture times. In time, s/he may relax the hands at the blind side of the lecturer who may

go on teaching; and the student may lose out on what is said during this period. Per SL conventions, an interpreter should be replaced by another interpreter after signing for a maximum of two hours. However, because of the limited number of interpreters, an interpreter may continue to sign even after this period and that may result in the situation just described. Below are some of the comments:

> *SLIB: Imagine signing the whole day from 7am to 9am, 9am to 11am, 11am to 1pm, 1pm to 3pm and so on, the pain in your shoulder the whole day and the pain we will go through and next day is so much. But you still have to continue in the same manner as an interpreter the next day.*
>
> *SLIA: It is not their fault. As a human being, you can't gaze at a thing for more than thirty (30) minutes and the students go to lectures for more than 2 hours.*

Moreover, there could be differences in SL between educational levels and interpreters. Although SL is a distinct language with its own attendant characteristics - grammar, syntax and semantics; different schools/universities/persons may sign differently. The language also has parameters - signing space, hand shake and others that aid interpretation and understanding. For instance, the meaning of a signing space below the chest, is a little different from a signing space above the shoulder. These language characteristics often brings comprehension challenges to speakers from different environments (Murray, Klinger & McKinnon, 2007). For example, the preferred SL style of a student may not always correspond with that of the interpreter and this might create confusion or mitigate comprehension.

As earlier mentioned, the Real Time Captionist which translates and projects whatever is said on a screen for the students could have helped but, the technology is currently not operational in the country. Although there is a free app for the same purpose on the internet, the app has not attracted much attention because, practically, if a lecturer is not speaking clearly, the app may rather pick other clearly heard sounds around (perhaps from students and the surrounding environment) and translate them and this may end up confusing the student. Again, if a lecturer is speaking very fast, the students may not be able to cope with the space of translation and may be left behind.

> *SLIA: Almost all the Deaf on campus have this app. When I came here and saw that the interpreters were not many,*

> *I had a conversation with a friend who then recommended this app to me. So, I downloaded it and sent it to some of the Deaf and asked them to share it among their colleagues but because of the situations mentioned earlier the students do not benefit much from this app.*
>
> *… if an interpreter is unable to go to the lecture hall and the students are using this app, there could be problems. This is because English language is not their native language, and the app may be moving at perhaps, the faster pace of the lecturer and the student might be left behind.*

Hence, starting last year (2019), the SLIs went around all the examination centres and tried to interpret the questions into SL for the Deaf, based on the recommendation of DSSU. In this way, the Deaf were able to provide the kind of answers required by recalling what they read from their notes. For those who could not remember it from their notes, they were at least, able to remember what was being interpreted at the lecture hall.

> SLIB: "*I remembered one student, she didn't really read that area of her notes but she was able to remember what we interpreted to her so she was able to write something or the little she recalled from the SLI in the lecture hall. I read what she had written but I was not able to understand. So, I asked permission from the invigilator to correct the English but was not allowed. I guess the lecturer may similarly not understand when marking. I guess we should be involved in the marking of their examination scripts"*.

C. Chosen career paths

A critical look at the programmes pursued by the students indicate that the students mostly preferred Fine-Art related programmes (Graphic design, Fashion design), programmes in the Applied Sciences (Tourism, Statistics, ICT, Hospitality) and Engineering-related programmes (Interior Design, Construction Management, Welding, Mechanical and Electricals Engineering). The decision to pursue these programmes however, was influenced by the career guidance the students received before entering the university. While the majority (63%) of those interviewed indicated that they had career guidance

from their teachers and family the rest (37%) had no such guidance. Some of their comments were:

SR2: Yes. I got career guidance from one of my teachers.

SR4: No. Nobody gave me guidance. Not even my teachers.

SR5: Yes. I had access to career guidance from family members

The students additionally had financial challenges as suggested by the survey. Only one (female) student was on scholarship. The majority had their fees paid by their fathers (33%) mothers (15%), spouses, guardians and brother/sister and others (7% in each case). A few (15%) however, had to pay their own fees. Some in this category had to collect money from different sources – spouse, mother/stepmother, guardian and brother/sister. In order to pay their fees. Interestingly, all such students were males. Gender wise, only 47% of the male had their fees paid by their fathers; 27% shad to pay their own fees or had it paid by their mothers (20%) and others (7%). In contrast, none of the females had to paid her own fees. The fees were paid by fathers, mothers, spouses and others (see Table 2 in the Appendix). Below are some of the comments from the student interviewees:

the students' comments:

SR5: 'Yes. There was no money to be used to pay for the fees.'

SR7: 'My father couldn't get the fees for me so I had to raise the money myself'.

These financial challenges were perhaps due to the poor economic backgrounds of the students. In the first place, only about half (59%) of those surveyed had both parents alive. Those who were orphans constituted 11%. Nineteen percent (19%) had only their fathers alive and (11%) had only their mothers alive. Again, the majority (33%) of the parents had no formal education. The rest had up to basic (30%), secondary (15%), and University (11%) education. In terms of employment, the majority (37%) were self-employed while others were: professionals like nurses and teachers (19%), wage employees (11%) domestic workers (7%), casual workers (7%) and artisans (4%). A few (11%) were also unemployed. Taking up the financial burden of university education therefore might have been difficult for quite a number of them (see Tables 3 in the Appendix).

D. Socio-cultural challenges

The fourth major challenge faced by the Deaf was socio-cultural challenges. The fact that they could not communicate with the hearing students due to language barrier, brought them very few friends, mostly fellow Deaf students and the few who tried to communicate with them in some forms of SL. Interestingly, Deaf students are very curious about whatever happens around them – e.g., students laughing or complaining. The work of the interpreters therefore, goes beyond interpreting course content in the classroom. Even in the halls, outside class hours, the interpreters are expected to help the students. In fact, the interpreters become their guides and voices. They have to be with them most of the time – at lecture, halls of residence, churches, homes of friends and virtually, everywhere. They consistently act as the middle persons between the Deaf and any other person who cannot communicate in SL e.g., landlords and sellers. In the same way, if a department needs to have a discussion with them either by appointment or not, the interpreter must be there. These are some of their comments:

> *SLIB: 'We are like their voice and their guide. We go to the lecture halls, their churches, among their friends, their home, everywhere. For their accommodation and everything you have to be their middlemen or middle women where the Landlord will speak through you to them and they also speak through you to the Landlord. So, whenever the Landlord is having problem with them way, let say they are not keeping their washroom well, the Landlord will not talk to them directly but will call you the interpreter wherever you are to come and talk to them that this is what they are doing so they should stop. So, you have to be with them on Sunday as well to interpret for them. So is like everywhere. If a department is having a program whether they gave you a notice or not, once a deaf has call you or send you a message I need an interpreter and if you don't go, to them (the deaf students), you are an enemy or you a bad person.'*
>
> SR4: 'I sometimes fall on a friend in the class who is a hearing colleague and has a little bit knowledge in signing to sign some of the concepts to me during lectures and practical but when he signing to me, then the other hearing colleagues will be laughing at him and this discourages him from signing to me'.

Discussion

The following three key issues were isolated and discussed in corroboration with existing literature – (a) access to tertiary education for the Deaf; (b) the academic, financial, socio-cultural challenges faced by Deaf students and (c) the way forward.

One of the key findings of this study was that few Ghanaian universities are currently admitting deaf students into TVET programmes are few. For instance, at the time of doing this research, only three (3) out of the thirteen (13) Ghanaian public traditional Universities are admitting Deaf students. These are the University of: Education, Winneba (UEW), Cape Coast (UCC), and Ghana (UG). The UEW had 49 students, the highest among the three; because of the variety of support services provided (e.g., SL interpretation, notes-taking), programmes and the fact that it is an old University known for special education e.g., the training of special education teachers (Oppong & Fobi, 2019). Among the eight (8) Technical universities, it is only three of them – Cape Coast (2 students), Korforidua (7students) and Takoradi Technical University that admit deaf students (54 students). Thus, among both the traditional and technical universities in Ghana, TTU currently has the highest number of Deaf students. Perhaps, TTU has more students because of its efforts specifically, geared towards recruiting Deaf students (through university outreach programmes and that of DSSU). Another possibility is the many opportunities for the Deaf to get hands-on training in TVET provided by the university. As argued by Amoako (2019), opportunities to learn trade skills and vocational training is preferred by most Deaf students because of its hands-on nature. The Education for All (EFA) movement led by UNESCO (2014) and other international organizations therefore, call for skills training for the Deaf.

The low numbers of institutions admitting deaf students was however, expected. In fact, the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2009) had earlier reported that PWDs have specified discrimination and barriers to full engagement in skills training and employment programmes. In fact, although most institutions are required to adjust (physical infrastructure particularly, buildings and learning tools and machines) to the needs of PWD trainees, the reverse is what usually happens because very few institutions are willing to adjust their infrastructure to meet the special needs of PWDs (Mosalagae & Bekker, 2021); Tripney *et al.*, 2013).

Academically, the Deaf did not get as much in the classroom as their hearing counterparts. One reason for this was interpreter tiredness due to the continuous use of the hands, face and other body parts in communicating with the students depending on the duration of the lecture. Changing interpreters every two hours or doing team signing has been suggested as one of the ways to address this challenge (Siple, 1993). Nonetheless, Cavender, Bigham & Ladner (2009), argue that managing interpreting styles, interpreter's familiarity with course content and many visual sources of information can be a challenge for most Deaf students. Hence, it is recommended that interpreters should appropriately notify students of such changes, so that students can employ more beneficial observing strategies. Other support services that could help Deaf students in HE includes manual/electronic note-taking (Real time captioning), one-on-one tuition support, and spoken speech among others. These may not only help the students improve the clarification of their lecture notes, study skills, understanding of lectures, reading/writing skills but also, their course grades (Amoako, 2019; Kuyini & Desai, 2008).

As illustrated by this study, and other previous studies (Lang, 2002; Cawthon, 2001), University teachers are often not aware of the presence of Deaf students in their classrooms, not to talk of engaging them in classroom discussions. Foster *et al*. (1999: 225), for example, reported that college and University faculty 'generally made few if any modifications, for Deaf students. They rather saw the provision of support service as responsible for the success or failure of these students.' Whether this is the result of attitude, a lack of training, or inadequate guidelines/resources; it is difficult to tell until further research clarifies it. This notwithstanding, some departments within the context of the present study (e.g., the Fashion department) tried to support the students during both theoretical and practical sessions. One interpreter explained that the lecturers often came to him during practical work to ask how the students were getting along and whether they had any questions before continuing with the lectures. Simply put, they made sure that the students understood whatever was taught.

Another key finding of the study was that almost all the students were pursuing programmes involving hands on training. This finding agrees with the earlier findings of Malle *et al.* (2015) who asserted that only certain types of programmes particularly, those requiring 'hard skills' such as automotive, manufacturing, construction, and electricity are suitable for the Deaf. It was therefore not surprising that most of the

students pursued hands-on programmes such Graphic design, Fashion design, Interior design, Construction, Welding and Fabrication, Mechanical Engineering, Electrical Engineering, Tourism, Statistics, Information Communication and Technology (ICT) and Hospitality management. Only one student offered Accounting which to an extent, was also practical oreiented. Previous studies have suggested similar practical programmes including Catering, Hairdressing, Masonry, Block-making, Metal-work, Dressmaking, and Carpentry (Amoako, 2019; Kuyini & Desai, 2008).

Regarding financial challenges, a key finding was that both male and female students struggled with the payment of their fees. For instance, although none of the male students was an orphan, some students had to pay their own fees. The story of the females was not too different as they also had to seek the support of relatives, guardians, spouses in paying their fees. One possible explanation to this is that many Ghanaian ethnic groups abhor Deafness and believe it is a waste of money and resources to provide formal education for them. Other cultural prejudices such as the Deaf cannot learn or socialize, Deafness is a contagious disease, stigmatization and labelling from family members and their communities in general, are contributing factors. These factors cause many parents to be unwilling to educate their children (Oppong & Fobi, 2019). Another perspective is that people mostly attribute disabilities to spirituality or other superstitious beliefs. Hence, society doubts their capacities and have low expectation from them. These deep-seated stereotypes accounts for the lack of support for PWDs. Thus, they are often not given the necessary opportunity and support to access life necessities such as education (Kassah *et al.,* 2014; Baffoe, 2013).

Socially, the students had very few friends. The main barrier once again, was their inability to engage in effective communication with people in the hearing majority. This finding however, affirms the findings of Kersting (1997) who reported feelings of isolation, loneliness and resentment, most intense during orientation and the first year of education when interviewing Deaf students with little or no previous University cultural experience. Their alienation was from both Deaf and hearing peers. Murray, Klinger & McKinnon (2007) in another study testify that many Deaf people find themselves living and functioning in an environment where they are marginalized. The consequence has been decreased participation in socialization, learning,

and productive works. Nevertheless, many scientific papers have suggested that participation in sports, recreation and other extracurricular activities are beneficial in this respect (Nemček, 2016; Bendíková, 2014; Kersting, 1997).

Conclusion

This study has pointed to the fact that most Deaf students prefer TVET programmes because of its practical nature. Also, Deaf students in Universities may have academic, financial and socio-cultural challenges. Socio-culturally, the Deaf students have very few friends largely due to communication challenges. The value of supporting them in these respect therefore, can be priceless.

Recommendation

Based on the findings of the study, the following recommendations are made:

Policy wise, the government may in the future set up a special University for PDWs including the Deaf to ensure that their special needs are particularly, cared for.

Possibly, SL should be promoted within the University community especially, among those who daily come into contact with the Deaf in universities (e.g., faculty and administrative staff) so that at least, they can to an extent, communicate with them. Lecturers in particular, should try to identify Deaf students in their classrooms and try to meet their needs while teaching, particularly, during practical sessions.

The University should employ more SLI according to the needs of the students so that efficiency and effectiveness can be achieved in their effort to help the students. Perhaps, some consideration could be highlighted to appropriate faculties so, they can assist them in the acquiring technical knowledge. Also, inter-departmental discussions on best practices should not focus exclusively on only faculty staff but also hearing students.

Financially, the University should join hands with relevant bodies to sponsor these socially marginalized people. Socio-cultural activities that bring the students into contact with hearing students should be organized regularly. These may include sports, recreation and religious activities.

References

Amoako, S. F. (2019). Sixty years of deaf education in Ghana (1957-2017). *Communication Disorders Deaf Studies & Hearing Aids*, *7*(191), 1727-1790.

Ayonmike, C. S., Okwelle, P. C., & Okeke, B. C. (2015). Towards Quality Technical Vocational Education and Training (TVET) Programmes in Nigeria: Challenges and Improvement Strategies. *Journal of Education and Learning*, *4*(1), 25-34.

Babbidge Jr, H. D. (1965). Education of the Deaf. A report to the Secretary of Health, Education, and Welfare by his advisory committee on the education of the Deaf.

Baffoe, M. (2013). Stigma, discrimination & marginalization: Gateways to oppression of persons with disabilities in Ghana, West Africa. *Journal of Educational and Social Research*, *3*(1), 187-187.

Bendíková, E. (2014). Lifestyle, physical and sports education and health benefits of physical activity. *European Researcher*, (2-2), 343-348.

Barnes, L., Harrington, F., Williams, J., & Atheron, M. (2007). *Deaf students in higher education: Current research and practice*. Douglas McLean.

Bliss, L. A. (2016). Phenomenological research: Inquiry to understand the meanings of people's experiences. *International Journal of Adult Vocational Education and Technology (IJAVET)*, *7*(3), 14-26.

Casely-Hayford, L., & Ghartey, A. B. (2007). The leap to literacy and life change in Northern Ghana. *SfL Internal Impact Team*.

Cavender, A. C., Bigham, J. P., & Ladner, R. E. (2009, October). Class in Focus: enabling improved visual attention strategies for Deaf and hard of hearing students. In *Proceedings of the 11th International ACM SIGACCESS Conference on Computers and Accessibility* (pp. 67-74).

Cawthon, S. W. (2001). Teaching strategies in inclusive classrooms with Deaf students. *Journal of Deaf Studies and Deaf Education*, *6*(3), 212-225.

Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. In A.Tashakkori & C.Teddlie (Eds.), Handbook of mixed methods in social and behavioral research (pp. 209–240). Thousand Oaks, CA: Sage.

Creswell, J. W., Fetters, M. D., & Ivankova, N. V. (2004). Designing a mixed methods study in primary care. *The Annals of Family Medicine*, *2*(1), 7-12.

Cruz, F. W. S. D., & Calimpusan, E. C. (2018). Status and challenges of the Deaf in one city in the philippines: towards the development of support systems and socio-economic opportunities. *Asia Pacific Journal of Multidisciplinary Research*, *6*(2), 33-47.

Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, *5*(1), 80-92.

Foster, S., Long, G., & Snell, K. (1999). Inclusive instruction and learning for deaf students in postsecondary education. *Journal of Deaf Studies and Deaf Education*, *4*(3), 225-235.

Gilakjani, A. P., & Ahmadi, M. R. (2011). A study of factors affecting EFL learners' English listening comprehension and the strategies for improvement. *Journal of language teaching and research*, *2(5)*, 977-988.

Hanson, W. E., Creswell, J. W., Clark, V. L. P., Petska, K. S., & Creswell, J. D. (2005). Mixed methods research designs in counseling psychology. *Journal of counseling psychology*, *52*(2), 224.

International Labour Office (ILO). (2017). Making TVET and skills systems inclusive of persons with disabilities.

Kassah, B. L. L., Kassah, A. K., & Phillips, D. (2018). Children with intellectual disabilities and special school education in Ghana. *International Journal of Disability, Development and Education*, *65*(3), 341-354.

Kassah, B. L. L., Kassah, A. K., & Agbota, T. K. (2014). Abuse of physically disabled women in Ghana: its emotional consequences and coping strategies. *Disability and Rehabilitation*, *36*(8), 665-671.

Kawas, S., Karalis, G., Wen, T., & Ladner, R. E. (2016, October). Improving real-time captioning experiences for Deaf and hard of hearing students. In *Proceedings of the 18th International ACM SIGACCESS Conference on Computers and Accessibility* (pp. 15-23).

Kermit, P. S., & Holiman, S. M. (2018). Inclusion in Norwegian higher education: Deaf students' experiences with lecturers.

Kersting, S. A. (1997). Balancing between deaf and hearingworlds: Reflections of mainstreamed college students on rela-tionships and social interactions. *Journal of Deaf Studies and Deaf Education*, 2, 252–263.

Kuyini, A. B., & Desai, I. (2008). Providing Instruction to Students with Special Needs in Inclusive Classrooms in Ghana: Issues and Challenges. *International Journal of Whole Schooling*, *4*(1), 22-39.

Lang, H. G. (2002). Higher education for deaf students: Research priorities in the new millennium. *Journal of Deaf studies and Deaf Education*, *7*(4), 267-280.

Lang, H. G., Dowaliby, F. J., & Anderson, H. P. (1994). Critical teaching incidents: Recollections of deaf college students. *American Annals of the Deaf*, 119-127.

Langer, E. C., & Schick, B. (2004). How accessible is classroom discourse to deaf children using educational interpreters. In *Colorado Symposium on Deafness, Language, and Learning, Colorado Springs, CO*.

Malle, A. Y., Pirttimaa, R., & Saloviita, T. (2015). Inclusion of students with disabilities in formal vocational education programs in Ethiopia. *International Journal of Special Education*, *30*(2).

Marschark, M., Shaver, D. M., Nagle, K. M., & Newman, L. A. (2015). Predicting the academic achievement of deaf and hard-of-hearing students from individual, household, communication, and educational factors. *Exceptional Children*, 81(3), 350-369.

Mosalagae, M., & Bekker, T. L. (2021). Education of students with intellectual disabilities at Technical Vocational Education and Training institutions in Botswana: Inclusion or exclusion? *African Journal of Disability (Online)*, *10*, 1-13.

Murgor, K. T., Keter, K. J., & Changa'ch, J. K. (2014). Accessibility of technical and vocational training among disabled people: Survey of TVET institutions in North rift region, Kenya. *Journal of Educational Practice*, 5,200-207

Murray, J. B., Klinger, L., & McKinnon, C. C. (2007). The Deaf: An exploration of their participation in community life. *OTJR: Occupation, Participation and Health*, *27*(3), 113-120.

Nemček, D. (2016). Quality of Life of People with Disabilities from Sport Participation Point of View. *Acta Facultatis Educationis Physicae Universitatis Comenianae*, *56*(2), 77-92

Omugur, J. P. (2007). *Sign language interpretation services for children with hearing impairment in inclusive secondary high schools: a case study on the challenges faced by sign language interpreters in one secondary high school-Uganda* (Master's thesis).

Oppong, A. M., & Fobi, D. (2019). Deaf education in Ghana. *Deaf Education Beyond the Western World: Context, Challenges, and Prospects*, 53-73.

Powers, S. (2003). Influences of student and family factors on academic outcomes of mainstream secondary school deaf students. *Journal of deaf studies and deaf education*, *8*(1), 57-78.

Ranchal, R., Taber-Doughty, T., Guo, Y., Bain, K., Martin, H., Robinson, J. P., & Duerstock, B. S. (2013). Using speech recognition for real-time captioning and lecture transcription in the classroom. *IEEE Transactions on Learning Technologies*, *6*(4), 299-311.

Rice, P. L., & Ezzy, D. (1999). *Qualitative research methods: A health focus*. Australia: Melbourne.

Siple, L. A. (1993). Interpreters' use of pausing in voice to sign transliteration. *Sign Language Studies*, *79*(1), 147-180.

Stinson, M. S., Elliot, L. B., & Kelly, R. R. (2017). Deaf and hard-of-hearing high school and college students' perceptions of speech-to-text and interpreting/note taking services and motivation. *Journal of Developmental and Physical Disabilities*, *29*(1), 131-152.

Tripney, J., Roulstone, A., Vigurs, C., Moore, M., Schmidt, E., & Stewart, R. (2013). Protocol for a systematic review: Interventions to improve the labour market situation of adults with physical and/or sensory disabilities in low-and middle-income countries. *Campbell Systematic Reviews 20*(11), 121-134

UNESCO (2014). Disability and Education, Education for all, Global Monitoring Report, http://en.unesco.org/gem-report/sites/gem-report/files/GAW2014-Facts-Figures-gmr_0.pdf, 15.11.2016. "United Nations (2006): Convention on the Rights of Persons with Disabilities." Treaty Series 2515 3. Print.

UNESCO (2010). Education for All Global Monitoring Report: Reaching the marginalised, United Nations Educational, Scientific and Cultural Organisation 7 Place de Fontenoy 75352 Paris France, UNESCO

UNESCO, (2009). Teaching Children with Disabilities in Inclusive Settings. Embracing Diversity: Toolkit for Creating Inclusive, Learning-Friendly Environments Specialized Booklet 3 Bangkok: 109.

United Nations (2006). Convention on the rights of persons with disabilities. New York. Available at http://www.un.org/disabilities/convention/conventionfull.shtml.

Wapling, L. (2016). Inclusive education and children with disabilities: Quality education for all in low and middle income countries. *A systematic literature review of education systems in low-and middle income countries commissioned by CBM*.

World Federation of the Deaf. World Federation of the Deaf Report on the Status of Sign Language. Helsinki, Finland: World Federation of the Deaf Publications, 1993. World Health Organization. (2015). WHO global disability action plan 2014-2021: Better health for all people with disability. World Health Organization.

Zainal, Z. (2007). Case study as a research method. *Journal Kemanusiaan*, (9), 1-6.

Kiyaga, N. B., & Moores, D. F. (2003). Deafness in sub-saharan Africa. *American Annals of the Deaf*, 18-24.

Appendix

Table 1: How the students got into the university

Myself	Friend	Parent	Outreach	Church	Others/%
14.8	29.6	22.2	22.2	3.7	7.4

Table 2: Who pays your fees?

Payer	Me	Scholarship	Spouse	Father	Mother	Step Mother	Guardian	Brother/ Sister	Others%
Percentage	14.8	3.7	7.4	33.3	14.8	3.7	7.4	7.4	7.4

Table 3: The employment status of parents

Professional	Wage Employee	Self-Employed	Employer	Artisan	Domestic Employee	Casual	Unemployed/ %
18.5	11.1	37	3.7	3.7	7.4	7.4	11.1

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Teaching Mathematics in an Inclusive Basic School: A Case Study of the Experiences of Non-Special Education Teachers

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Abstract
There is a general notion that the teaching and learning of mathematics to all students is quite a daunting task. However, there is a general perception that the move towards inclusive education [IE] may present unique challenges to regular teachers who teach mathematics in inclusive schools. In this study, we explored the experiences of a group of professionally-trained mathematics teachers who teach in a school designated as an inclusive school located in the southern part of Ghana. This was done with the aim of uncovering the challenges these teachers face considering that they do not have extended preparation in teaching students with special educational needs (SEN). An illustrative case study design was employed. Data was collected through the use of a semi-structured interview guide containing both closed-and-open-ended items. It was revealed that the participating teachers faced a number of challenges including inadequate knowledge and skills in teaching students with SEN. Another challenge unearthed has to do with assessing students who are blind due to difficulties faced by some of the teachers and students in using Braille to facilitate teaching and learning. The implications of the findings to teaching and learning are discussed.

Keywords. Inclusive Education, Teaching, Mathematics, Visual Impairment, Ghana,

Special Education Needs

Introduction

Most educational systems separated students of school-going age with special educational needs (SEN) from their counterparts who did not need such a level of support and placed them in separate schools or different classes. In this case, students requiring special education

services were both socially and educationally separated from other groups of students leading to possible stereotyping and stigmatisation (Morley, Bailey, Tan & Cooke, 2005). The call for the education of students with SEN in the regular school setting with their peers without SEN gained attention during the Salamanca world conference which was held in Spain in 1994 (United Nations Educational, Scientific and Cultural Organization [UNESCO], 1994). According to the Salamanca Statement and Framework for Action (UNESCO, 1994), the recognition of IE practices is the most effective means of eliminating any form of discrimination, creating welcoming communities, building an inclusive society and ensuring that individuals with SEN have the same educational opportunities. Ghana and other countries all over the world are signatories to the Salamanca statement which calls for an IE system. The shift from a separate school setting to an IE setting demands that regular education teachers teach students with and without SEN in the same classroom setting. The policy shift meant that students requiring the provision of special education services will no longer be enrolled in special schools unless there is a compelling reason to do so (Vanderpuye, 2013).

In Ghana, several efforts have been made to ensure the same educational rights for persons with special education needs and disabilities (SEND). For instance, Article 25 (1) of the 1992 constitution of Ghana confers the right to equal educational opportunities and facilities to all persons; Convention on the Rights of the Child, Act, 560 (CRC, 1998) on the "right to education and well-being", clause 8(1) also states that "No person shall deprive a child access to education... or any other thing required for his or her development"; Persons with Disabilities Act, 2006 (Act 715) which was passed into law in 2012 among others. In the 2003/2004 academic year, Ghana started piloting IE in the Greater-Accra, Eastern and Central Regions in response to the Salamanca Statement and Framework for Action (Isaac & Dogbe, 2020; Gyimah & Vanderpuye, 2011). In 2015, Ghana implemented the IE policy (Ministry of Education, [MoE] 2015) to guide the implementation of IE at all school levels, especially, the basic school level.

With all these efforts to ensure the education of individuals with SEN in Ghana, most research on IE (For example, Gyimah & Amoako, 2016; Deku & Vanderpuye 2017; Tudzi, Buguri, & Danso, 2017; Ofori, 2018; Chitiyo, Kumedzro, & Ahmed, 2019; Okai, 2022) have pointed

out several challenges in the implementation of IE and enrolment of individuals with SEN in the basic school system. For example, with regard to the enrolment of individuals with SEN, available statistics reveal that they make up less than 0.5% of total enrolment in the basic school system despite constituting 1.6% of the total pre-tertiary population (Education Strategic Plan [ESP] 2018-2030, 2018). Ofori (2018) notes that the inability of the nation to achieve enrolment of all persons with SEN is partly due to the 'regular' schools declining to admit them. According to Senadza, Ayerakwa, and Mills (2019) one of the major challenges facing the smooth implementation of IE in Ghanaian schools is funding. Deku and Vanderpuye (2017) reported that inadequate teacher expertise in teaching students with SEN affects the implementation of IE. Other challenges are physical inaccessibility (Ackah-Jnr & Danso, 2019), lack of qualified Special Education Needs Co-ordinators [SENCOs] (Okai, 2022), poor parental involvement (Vanderpuye, 2013; Amponteng, Agyei-Okyere, Afriyie & Tawiah, 2019), shortage of qualified teachers (Chitiyo, Kumedzro, & Ahmed, 2019) negative attitude and prejudice mind (Nketsia, 2016) among others. Furthermore, Meijer (2019) opined that the provision of trained subject-based special education teachers remains a challenge to the successful implementation of the inclusivity policy. This point had previously been raised by Keefe and Moore (2004) who pointed out that teachers teaching in inclusive schools with generalist backgrounds face significant challenges, especially with the teaching of mathematics.

In Ghana, studies conducted over the years on IE, although focused on teachers, (for example, Abenyega & Deku, 2011; Nketsia, 2016; Deku & Vanderpuye, 2017; Chitiyo, Kumedzro, & Ahmed, 2019; Subbey, 2020), they did not consider teachers who taught subject-specific content such as Mathematics. This study, therefore, builds on previous studies conducted on teachers by exploring the teaching and learning of mathematics in an inclusive basic school. The focus on mathematics is because mathematical literacy is necessary for students irrespective of any learning need or disability (Durmus & Ergen, 2021). Despite the importance of mathematics, it can also shape an individual's "self-esteem" which can be positive or negative (Demo, Garzetti, Santi & Tarini, 2021, p.1) and provide motivation to pursue further studies in STEM-related disciplines (Ntow, Clarkson, Chidthachack & Crotty, 2017). Considering the role mathematics plays in most countries as a filter, it is crucial that mathematics teachers are

equipped with the requisite knowledge to "support students who have problems in mathematics … and to make the necessary adaptations for their development of mathematics skills" (Durmus & Ergen, 2021, p.174). An implication of this is that the teaching of mathematics, if not done well, can create learning disabilities by making some students have a sense of not belonging or inadequacies in their capabilities to pursue the subject. We, therefore, explored how professionally trained mathematics teachers without any significant preparation in special education, apart from their participation in yearly short-term professional development programmes, teach the subject in a school which was only recently designated as an inclusive education school.

The research question that underpinned this study is as follows: What are the experiences (i.e. challenges) of non-special education teachers of mathematics in an inclusive basic school?

In the next section, we review literature related to the current study.

Theory of Inclusive Education

The term inclusive education may have been defined by various authors separately; however, the focus remains unchanged. For instance, Halvorsen (2002) defined inclusive education as "a situation where children with disabilities are supported in their chronologically age-appropriate general education classes in their home schools and receive the specialized instruction delineated by their individualized education program (IEP) within the context of the core curriculum and general class activities" (p. 12). Also, Ankutse (2006) notes that inclusive education has to do with increasing the presence of all students, including those with disabilities in schools through the restructuring of school cultures, policies and practices to adapt to the diversity of all students in their class. Inclusion, therefore, involves the process of identifying and responding to the diversity of needs of all students through growing participation in learning, cultures and communities (Vuuro, 2016). For this study, by Inclusive Education, we refer to the practice of enrolling and teaching all students in the same learning environment, irrespective of their special educational needs in the same classroom, unless there are very compelling reasons to do otherwise. That is, every school must think of inclusion first unless the nature of the educational need requires the placement of the learner in a specially designated school to cater for the identified need.

However, as pointed out by Avoke and Avoke (2014), IE is not all about placement in the regular classroom rather it is the desired end state. Typically, this is done with adequate planning, training and assistance. The goal of inclusion is reached only when students participate in the activities of the class with the help and resources they require and have a sense of belonging in the learning environment and the entire school system. That means, both the physical school, classroom environment and the pedagogical approaches used by teachers should ensure that each learner, irrespective of the special educational need, makes sufficient learning at his or her pace. In effect, inclusive education should not be seen as a one-off event but rather, as a continuous engagement with all facets of the educational system to ensure that all students are provided with the requisite resources to enable them to make sufficient progress in their learning. For instance, Ainscow and Rahrinna (2006) argued that inclusion and exclusion are linked together such that inclusion requires an aggressive battle against exclusion, and inclusion can be seen as an ongoing process.

Although the move towards the adoption of an integrated educational system was welcome news, Sharma (2015) argues that the integrated system would lead to the exclusion of children with disabilities in regular schools if nothing significant is done about the organisational structure of the integrated schools as well as the adoption of inclusive teaching practices. That is, schools which previously practised 'segregated' systems would have to undergo significant changes in both the teaching and learning approaches and the entire school environment in order for any student requiring special educational needs to be enrolled in such a school to have a sense of belonging.

Indicators of Successful Inclusive Education Programmes

The implementation of IE is dependent on factors such as school structure and culture, teachers, and school leadership. Literature on implementing IE suggests that the first step in IE implementation is to help schools understand their own challenges (Booth & Ainscow, 2011; Rieser, 2012). Mitchell (2005) identified two characteristics of effective IE programmes. The first characteristic is the right to full participation in regular, age-appropriate classes in community schools and access to adequate aids, support resources and individualised programmes, with appropriately differentiated curriculum and

assessment practices. Based on the 2015 IE policy, students with visual impairment [VI], hearing impairment, learning disabilities, and autism, among others can be found in the IE setting. In Ghana, statistics show that out of 737,743 persons with disabilities, 40.1% are visually impaired (Ghana Statistical Service [GSS], 2014) and they form greater/ a majority for the sensory deviation category in the school setting. This means that considerations should be made in the school setting to meet their needs. According to Gerber (2003), the use of computers and assistive technology will dramatically improve the lives of students with VI by enhancing schooling and job prospects, enhancing social networks and promoting independence. The use of assistive technology for the teaching and learning of students with VI enhances their overall academic performance. (Kapperman, Sticken & Heinze, 2002; Michaels & McDermott, 2003; Strobel, Fossa, Arthanat & Brace, 2006). In the teaching and learning environment, teaching with instructional materials is important since they allow students to see, hear and manage what they read. Most students with low vision require some sort of material or equipment in order to understand. For instance, a strong felt pen in a particular colour will assist the child with low vision to see what has been written. Additionally, Ainscow (2005) identified four features of quality IE programmes including an ongoing process to find ways to adapt to diversity and learn how to live and learn from differences. However, teachers often feel that IE is something they are told to do often without support and resources and it becomes a top-down burden rather than a collaborative process (Singal, 2009).

Teacher's role in inclusive education

In the implementation of IE, regular education teachers are expected to teach both students with and without SEN in the same classroom setting. However, some teachers have negative attitudes and perceptions about teaching students with SEN in the regular classroom (Nketsia, 2016; Kiester, 2000). It is a common practice for teachers to prioritise their personal beliefs in the process of welcoming policies and practices and adapting to them (Pottas, 2015). Subban and Sharma (2006) reiterate that the perception and concerns of teachers teaching in IE settings have not been given the needed attention.

According to Meijer (2001), teachers' attitude toward the practice of IE influences the effectiveness of inclusion in schools. Based on the Standard and Guidelines for the Practice of IE in Ghana,

regular education teachers are expected to play the following roles: 1) Adapt the content of the national curriculum; 2) Set appropriate objectives and achievable targets for all students; 3) Use diverse strategies in teaching; 4) Use different communication techniques; 5) Provide appropriate and adapted games and recreational equipment; 6) Provide additional time for students with SEN to complete learning activities/tasks and assignment and; 7) Provide students with SEN opportunities to participate in all activities, both within and without the schools.

With regard to these enumerated roles of teachers in the implementation of IE, it is important for teachers to have the knowledge and skills to teach inclusive classrooms, as well as for school leadership to provide an inclusive and innovative environment for teachers to flourish. In summary, it is anticipated that regular education teachers meet the expected criteria and play their roles effectively to enhance the implementation of IE. This also means that beyond the IE policy, there is a need to ensure that teachers adopt and adapt teaching approaches that are inclusive. Although a number of studies have been conducted in Ghana focusing on IE as alluded to in previous paragraphs, what remains relatively under-explored are the experiences of teachers teaching mathematics in inclusive schools. Considering that these teachers have very little preparation for teaching in inclusive classrooms an issue which has been identified in the research literature to be problematic, the findings from this study will contribute to the field's understanding of the nature of the experiences of these teachers and ultimately offer suggestions to ensure the nation derives the intended gains from the policy. In the next section, we shall discuss the research methods employed in the study.

Methodology

Research Design

A case study design was employed in this study because it enables researchers to gain concrete, contextual, in-depth knowledge about the subject of the research. According to Teddlie and Tashakkori (2009), a case study design is a research technique and an empirical investigation that examines a phenomenon in a real-life context. The case in this particular study is the teaching of mathematics in an inclusive basic school. Specifically, the illustrative case study design was adopted with the aim of describing the experiences of teachers of

mathematics in an inclusive classroom to help uncover the challenges facing the selected teachers.

Population

The population of this study included all teachers teaching in Overcomers (pseudonym) Basic School located in a metropolitan area in one of the regions in the southern part of Ghana. At the time of the study, Overcomers Basic School was the only school practising inclusive education and had students who had been identified to be visually impaired enrolled in the school. The total population of teachers in the school was 31. However, the accessible population of mathematics teachers was 8.

Sample and Sampling procedure

The selection of the school and teachers followed the purposive sampling technique. According to Bryman (2012), purposive sampling involves the process where units of analysis are intentionally chosen so that instruments for the study can be administered. Teddlie and Tashakkori (2009) also added that the purposive sampling technique is able to address critical issues for which information may be obtained from the very people selected. Specifically, a critical case sampling strategy was adopted (Patton, 2002). Considering that Ghana at the moment uses teachers who have limited preparation in teaching special education in these inclusive schools, the argument is that the experiences of the participating teachers are more likely to occur in other inclusive schools in the country that do not have subject-based special education teachers. Considering that the accessible population was eight, census method was adopted.

Data collection instrument

A semi-structured interview guide was used to obtain information from the participants. The choice of the interview was to gain an in-depth understanding of the experiences of the participating teachers from teaching in an inclusive education school.

The semi-structured interview guide was also used to examine the difficulties faced by mathematics teachers in inclusive basic schools in terms of their instructional practices such that all their students learn adequately during mathematics lessons. The interview was divided into two parts. The first part examined the knowledge and perceptions of

mathematics teachers about inclusive education while the second part assessed the challenges these teachers faced in teaching of mathematics in Overcomers' Basic School. The participating teachers were interviewed individually. The interview guide was adapted from the study of Annan (2016) and comprised both four closed and 18 open-ended items. However, it was given to some lecturers in special education to validate it before usage.

Data collection procedure and Ethic clearance

Following the presentation of an introductory letter from the researchers' institution to "Overcomers Basic School" (pseudonym), permission was granted by the relevant educational authorities for the research to be conducted in the school. The participating teachers were also given an explanation of the purpose of the study before interviewing each of them. This took place during working hours so as to get all the participants. Additionally, each of the eight teachers consented to be part of the study. Also, the researcher assured them of confidentiality and anonymity which involved the use of unique identifiers so that non-members of the study could not identify the participants. Furthermore, the participants were informed that since their participation is voluntary, they could, at any point during the study withdraw their consent. Ethical clearance was also obtained from the Institutional Review Board of the researchers' institution.

Data Analysis

In order to answer the research question underpinning this study, that is, "What are the experiences (i.e. challenges) of non-special education teachers of mathematics in an inclusive basic school?", the qualitative data collected through interviews were first transcribed and coded. The codes generated were clustered into themes in order to gain insight into the experiences of the participating teachers regarding their teaching of mathematics in an inclusive school. In all, three challenges were identified as follows: pedagogical challenge, lack of teaching-learning materials and inadequate lesson duration. These themes are presented using charts (pie and bar), frequency counts and percentages and illustrative quotes.

Results

This section presents the results of the study. On the question "What challenge(s) do you face during lesson preparations?", there were three major themes namely; pedagogical constraint, access to relevant and appropriate teaching and learning materials and inadequate duration of lessons.

Concerning the first theme, Pedagogical challenges, there were two major sub-themes namely "Learners may not have experience with the Braille" and "Difficult to teach certain topics". From the results, four out of eight teachers (50%) said the students have little or no experience with the Braille. It appears that the teachers also do not have enough expertise in the reading of the Braille which also makes it difficult to assess what is brailed. This is illustrated in the following comment*: I need a bit more training on the teaching of special needs students especially, the visually impaired on the use of Braille."* In order to make up for this feeling of inadequacy, this teacher stated that the visually-impaired students are made *"to read out their Braille so she will correct them if there was any mistake."* It must be noted that at the time of the interview, there was no special education specialist in the school to assist this teacher.

Three of the teachers representing 37% of the respondents mentioned that generally, it was difficult for them to teach certain topics like multiplication of standard numbers and division in larger figures, due to the special educational needs students in the respective classrooms. It is not surprising that one respondent indicated that varied teaching methods were employed which may be at variance with best practices. This teacher ended with a call that: "*In-service training for teachers on how to handle students with disability be given frequently".*

Table 1 presents the results of the challenges teachers face.

Table 1: Pedagogical challenges teachers face

Responses	Frequency	Percent
Learners may not have experience with the Braille	4	50.0
Difficult to teach certain topics	3	37.5
Usage of varied teaching methods	1	12.5
Total	8	100.0

On the question of access to appropriate teaching and learning material during the individual semi-structured interviews, six out of the eight respondents highlighted challenges in accessing appropriate teaching aids for use during the teaching-learning process. With regard to the question, "what challenges do you face in terms of classroom management?" more than half of the teachers, 5(62.5%) said the school has no audio recorders and speakers in the classrooms. The lack of such teaching aids compels the teachers to shout in order that students, especially those with hearing impairment, hear what is being said. Two of the respondents 2(25%) said teachers need to walk around in order to get the attention of the students as one respondent (12.5%) states that "students sleep in class especially, the special needs students". Also, 37.5% of the teachers mentioned that the school lacked TLMs including tactile. Generally, teaching is made simple and understandable if there are available teaching and learning materials. Also, at the time of the interview, the Braille was found to be inadequate. Out of the 15 visually-impaired students, only nine students had the Braille suggesting that the remaining six students could not fully participate in any written form of assessment.

Table 2 presents the results of the challenges teachers face in relation to the availability of appropriate teaching aids.

Table 2: Challenges in access to appropriate teaching aids

Responses	Frequency	Percent
Computer and recorders are not available	5	62.5
TLMs	3	37.5
Total	8	100.0

With regard to the third theme, "inadequate duration of lessons", the two sub-themes were as follows: "Time is not enough for a lesson" and "Contact hours within the week are not enough". About three-fourths of the respondents, that is, six out of eight said that the time is not enough with the remaining two indicating that the contact hours per week are not enough. In a revealing comment, one of the teachers said that the special needs students may not have "learned much" from the lesson *"because the time allocation was not enough since the students need extra time and they also need more Braille for*

practice (T 1). This teacher explained further by stating that some of the objectives for the day's lesson were not achieved (compare and order rational numbers) because the period for the class was "*woefully inadequate*" and so "*could not finish with the lesson because they* (referring to the visually-impaired students) *need more time to cover what the sighted were able to cover*". The end result is that some teachers may end up lowering the content for students with special educational needs as illustrated. For example, when one of the participating teachers was asked how students with special educational needs are supported in her class to understand the lesson, she replied: "*Not to give them complex examples but simple examples to aid better understanding*."

Table 3 shows that teachers face challenges regarding the duration used for the lessons.

Table 3: Inadequate duration of lessons

Responses	Frequency	Percent
Time is not enough for a lesson	6	75.0
Contact hours per the week are not enough	2	25.0
Total	8	100.0

Discussion

With regard to the challenges faced by the teachers, the study found that mathematics teachers face many challenges in the discharge of their responsibilities. The first challenge identified through this study is pedagogical in nature. It was found that the teachers needed additional training since the short-term training they received is inadequate to equip them to teach diverse students. This finding is consistent with the claim that these short-term training programmes hardly lead to any major change (Kuroda, Kartika & Kitamura, 2017). There is, therefore, a need for tailor-made training in areas such as classroom management, teaching in diverse classrooms and the adaption of creative pedagogies. Also, the teachers' inability to read Braille meant that they were unable to provide the immediate feedback needed by their students. This challenge re-echoes the argument by Meijer (2019) for trained subject-based special education teachers to make IE successful. Gadagbui (2010) also indicated that when good and

creative teaching methods are used, it will make children with SEND feel part of the normal school system and will also give them a sense of belonging that will enable them to learn, contributing to growth and contribution to society.

A second challenge unearthed was the inadequate teaching aids such as Braille and other teaching and learning materials to support the work of teachers despite how crucial they are in helping the visually-impaired students in the classrooms understand the concept being taught. For instance, Simon et al. (2010) indicated that teaching aids are needed in an IE class for effective teaching and learning to take place. Similarly, Ofori (2018) argued that TLMs are very important for schools so that teachers are able to teach well.

The third challenge the participating teachers faced was the inadequate duration of lessons. The school followed the official teaching timetable for all basic schools without any modification despite the diverse needs of students in such an inclusive school. For example, Vuuro (2016) highlighted the lack of teaching aids and the availability of trained resource personnel as some of the challenges facing the implementation of IE. Even though IE practices may require individualised attention as indicated in the 2015 IE policy and the Standard and Guidelines for the implementation of IE, teachers in this study explained that additional time is critical for the teaching of Mathematics in IE. The call for additional time in teaching Mathematics in IE classrooms, especially to benefit students with VI can help teachers who teach Mathematics to provide the needed individual attention in the classrooms. Consistent with the call by Ankutse (2006) for the restructuring of school policies and practices to adapt to the diversity of all students in their class, there is a need for modification of the school teaching timetable to cater for students with SEN.

Another finding was that the mathematics teachers indicated that they used a lot of repetitions to help students with VI understand mathematical concepts. Even though mathematics teachers saw the use of repetitions as a challenge, it is one of the effective tools for teaching students with special educational needs (Okyere & Adams, 2003). This suggests the need for frequent refresher courses to enhance the knowledge and skills of mathematics teachers teaching in an inclusive classroom and to support students with VI (Sharma & Pace, 2019). In the next section, we present the conclusions and implications of the findings of this study.

Conclusions and Implications

This study explored the experiences (i.e., challenges) of teachers who are mathematics specialists without any significant preparation in special education teaching the subject in an inclusive basic school. An illustrative case study design was adopted with data collection carried out through the use of semi-structured interviews. The closed-ended items were analysed quantitatively using frequencies and percentages while the open-ended items were analysed qualitatively and supported with illustrative quotes.

From the findings, the following conclusions could be inferred. The mathematics teachers sampled for this study followed most of the expectations required of regular education teachers per the outlined expectation in the Standard and Guidelines for the implementation of IE. For example, the findings show that they used varied teaching approaches and gave verbal feedback to students. However, they were faced with numerous challenges that seemed to defeat the purpose of IE based on policy expectations. These challenges include: 1) mono communication strategy which conflicts with the role expectations of teachers in the implementation of IE since more than half of the mathematics teachers in this study indicated they could not use Braille in the teaching and learning process. 2) Inadequate TLMs and assistive technologies such as recorders, speakers, and Braille contradicts the IE implementation since teachers are expected to use varied and appropriate TLMs and assistive technology that can help them teach effectively. Additionally, the teachers' lack of expertise in the use of these devices used by students with SEN meant they were handicapped in the level of support they could offer for students with visual impairment in terms of monitoring students' learning and providing timely feedback to support their next learning. 3) Inadequate time in teaching Mathematics in an inclusive setting, considering the technicalities in mathematics when it comes to symbols and other signs. It is, therefore, important for consideration to be made to the time allocated for teaching mathematics in an IE setting.

It is therefore argued that it is not enough to be a subject expert, especially for those who teach in inclusive classrooms with students who are visually impaired, for example. Instead, the mathematics teacher should also have significant preparation in special education in order to support the learning of all students. This will help minimize if not prevent the situation where students who really need more

educational support are left with a sense of learning less compared to their counterparts. Such a move calls for the various teacher education institutions in Ghana to develop a curriculum that will lead to special education teachers who also have a subject specialisation. We contend that a special education teacher with a teaching major in mathematics would have been able to support the students who did not know how to use Braille contrary to what pertained in this study. On the challenge of inadequate duration of lessons, it is important that educational authorities such as the Ghana Education Service adapt the teaching timetable for schools practising IE, especially in the teaching of mathematics. Such a move will enable the teachers to offer more personalised assistance to all students so that they do not feel that some students are not learning enough as was the case in this study. While acknowledging that this is a single case study which may limit the extent of its generalisability, we argue that the challenges we have uncovered may pertain to other schools practising IE under the conditions described in this study, that is, inadequate professional development opportunities, non-special education teaching in IE schools and a general lack of required teaching and learning materials. There is, therefore, the need for policymakers to focus on the recommendations made to further strengthen the successful implementation of the IE policy in all schools designated as such. It is the expectation that the individual needs of the visually impaired students are met to avoid a situation where they are physically included in the classroom space yet academically excluded from accessing the mathematics on offer by the teacher.

References

Agbenyega, J., & P. Deku. (2011). Building new identities in teacher preparation for inclusive education in Ghana. *Current Issues in Education,14*(1). Retrieve d from https://cie.asu.edu/ojs/index.php/cieatasu/article/view/554.

Ahmmed, M., Sharma, U., & Deppeler, J. (2012). Variables affecting teachers' attitudes towards inclusive education in Bangladesh. *Journal of Research in Special Education Need*, 132-140.

Ainscow, M. & Rahrinna, S. (2006). Assistive technology for individuals with disabilities: A review and synthesis of the

literature. *Journal of Special Education Technology*, 21(2), 47-64.

Ainscow, M. (2005). Understanding the development of inclusive education system. *Journal of Research in Educational Psychology,*7(3), 5-20.

Alhassan, A. M. (2014). Implementation of inclusive education in Ghanaian primary schools: A look at teachers' attitudes. *American Journal of Educational Research,* 2 (3), 142-148.

Amponteng, M., Opoku, M. P., Agyei-Okyere, E., Afriyie, S. A., & Tawiah, R. (2019). Understanding of inclusive education practices among parents in Ghana. *Journal of Research in Special Educational Needs, 19*(3), 207-219.

Ankutse, N. (2006). *Inclusive education concept in Ghana*. Ghana Education Service, Ghana.

Avoke, K. N & Avoke, K. S. (2004). *Inclusive rehabilitation and transition services in special education.* Odenton. Maryland: Akpang Inc.

Avoke, M. (2012). *Promoting inclusive education in basic schools in Winneba Circuit: The role of school attachment programme.* http//www.isec2000.org.uk/abstract/papersm/ mawutor1.htm

Booth, T. & Ainscow, M. (2011). *The index for inclusion* (3rd ed.). Bristol: Centre for Studies on Inclusive Education.

Bryman, A. (2012). *Social research methods.* Oxford: Oxford University Press

Chitiyo, M., Kumedzro, F. K., Hughes, E. M., & Ahmed, S. (2019). Teachers' professional development needs regarding inclusive education in Ghana. *International Journal of Whole Schooling*, *15*(2), 53-79.

Deku, P., & Vanderpuye, I. (2017). Perspectives of teachers regarding inclusive education in Ghana. *International Journal of Whole Schooling*, *13*(3), 39-54.

Demo, H., Garzetti, M., Santi, G., & Tarini, G. (2021). Learning mathematics in an inclusive and open environment: An interdisciplinary approach. *Education Sciences*, *11*(5), 199.

Durmus, M. E., & Ergen, Y. (2021). Experience of Primary School Teachers with Inclusion Students in the Context of Teaching Mathematics: A Case Study. *International Journal of Progressive Education*, *17*(1), 172-196.

Gadagbui, G. Y. 2010. Inclusive education in Ghana: Practices, challenges, and the future Implications for all Stakeholders. Retrieved fromwww.schoolsandhealth.org/.../Inclusive%20Education%20in%20Ghana.pdf.

Gerber, E. (2003). The benefits of barriers to computer use for individuals who are visually impaired. *Journal of Visual Impairment & Blindness*, 97, 536-550.

Gyimah, E. K. & Vanderpuye, I. (2011). Inclusive Education in Ghana: What are the levers of Change? *In* Beckmann, J. A. and R. Aluko. Ch*allenges in Education in Africa-The need for a 'New' Teacher. Proceedings of the 3rd Biannual International Conference on Distance Education and Teachers' Training in Africa (DETA) held at the University of Cape Coast.* Cape Coast, Ghana, 6-10 August 2009. Pretoria: Business Print. pp. 87-100.

Gyimah, E. K., & Amoako R. (2016). Pre-service teachers' perceptions on procedures to identify and assess children with special educational needs and disabilities: The case of tutors' of colleges of education in Ghana. *Journal of Education Practice, 7*(21), 110-116.

Halvorsen, J. (2002). Do smaller classes change instruction? *Educational leadership,* 2, 91-92.

Isaac, O. N., & Dogbe, D. (2020). Examining pre-service teacher preparation for inclusive education in Ghana. *Communities, 3*(1), 33-42.

Kapperman, G., Sticken, J., Heinze, T. (2002) Survey of the use of assistive technology by Illinois students who are visually impaired. *Journal of Visual Impairment & Blindness, 96,* 106 - 108.

Keefe, E.B., & Moore, V. (2004). The challenge of co-teaching in inclusive classrooms at the high school level: What the teachers told us. *American Secondary Education, 32*(3), 77- 88.

Kuroda, K., Kartika, D. & Kitamura, Y. (2017). Implications for teacher training and support for inclusive education in Cambodia: An empirical case study in a developing country. JICA Research Institute Working Paper 148. Retrieved from: https://www.jica.go.jp/jicari/publication/workingpaper/wp_148.html

Lopez, M. E., & Caspe, M. (2014). *Family Engagement in Anywhere, Anytime Learning*. Cambridge

Meijer, C.J.W. (Ed.) (2019).*Inclusive education and effective classroom practices*. European Agencyfor Development in Special Needs Education. Retrieved From http://www.europeanagency.org/publications/ereports/inclusiveeducation-and-effectiveclassroom-practice/IECP-Literature-Review.pdf

Meijer, J. W. 2001, September. Inclusive Education and Effective Classroom Practice (2001 edition). Retrieved from European Agency for Development in Special Needs Education [EADSNE] website: http://www.europeanagency.org/publications/ereports/inclusive-education-and-effective-classroompractice/IECP-Literature-Review.pdf

Michaels, C. A., & McDermott, J. (2003). Assistive technology integration in special needs education teachers‟ preparation: program coordinators perception of current attainment and importance. *Journal of Special Education Technology*, *18*, 29-41

Mitchell, D. (2005). Introduction: Sixteen propositions on the contexts of inclusive education. *In*: D. Mitchell, ed. *Contextualizing Inclusive Education: Evaluating old and new international perspectives*. Routledge; London.

Morley, D., Bailey, R., Tan, J., & Cooke, B. (2005). Inclusive physical education: Teachers' views of including pupils with special educational needs and/or disabilities in physical education. *European Physical Education Review*, *11*(1), 84-107.

Nketsia, W. (2016). A cross-sectional study of pre-service teachers' views about disability and attitudes towards inclusive education. *International Journal of Research Studies in Education, 6*(3), 53–68.

Ntow, F. D., Clarkson, L. M. C., Chidthachack, S., & Crotty, E. A. (2017). Should I stay or should I go? Persistence in postsecondary mathematics coursework. *The Mathematics Educator*, *26*(2).

Obeng, C. (2007). Teacher's Views on the Teaching of Children with Disabilities in Ghanaian Classrooms. *International Journal of Special Education*, *22*(1), 96-102.

Ofori, E. A. (2018). *Challenges and Opportunities for Inclusive Education in Ghana*. (Master's dissertation), University of Iceland, Iceland.

Okai, M-P. (2022). *Roles of Special Educational Needs Co-ordinators in the Implementation of Inclusive Education in Southern Ghana*. PhD Thesis, University of Cape Coast.

Okyere, B. A., & Adams, J. S. (2003). *Introduction to special education: An African perspective.* Accra, Ghana: Adwinsa Publications Ltd.

Patton, M. (2002) Qualitative Research and Evaluation Methods, 3rd ed. Thousand Oaks, CA: Sage.

Rieser, R. (2012). *Implementing inclusive education: A commonwealth guide to implementing Article 24 of the UN Convention on the Rights of Persons with Disabilities*. London: Commonwealth Secretariat

Sharma, A. (2015). Perspectives on inclusive education with reference to United Nations. *Universal Journal of Educational Research, 3*(5), 317-321

Sharma, U., & Pace, E. M. (2019). Teachers' commitment to teaching in inclusive schools, preparation of. *MA Peters (a cura di) Encyclopedia of Teacher Education. Singapore: Springer Science and Business Media*, 1-6.

Simon, C., Echeita, G., Sandoval, M., & Lopez, M. (2010). *The inclusive education process of students with visual impairment in Spain: An analysis from the perspective of organizations*. Madrid: Alton Contents.

Singal, N. (2009). Inclusion in the real world: Practitioners making sense of inclusive education in Indian classrooms. In M. Alur & V. Timmons (Eds.), *Inclusive education across cultures: Crossing boundaries, sharing ideas* (pp. 210-219). Los Angeles: SAGE.

Strobel, W., Fossa, J., Arthanat, S., & Brace, J. (2006). Technology for access to text and graphics for people with visual impairments and blindness. *Journal of Vocation Rehabilitation*, 24, 87 – 95.

Subban, P., & Sharma. U. (2006). "Primary School Teacher Perceptions of Inclusive Education in Victoria, Australia." *International Journal of Special Education 21* (1): 42–52.

Subbey, M. (2020). Awareness of basic school heads in Agona Swedru towards the policy of inclusive education in the Ghana Education Service. *International Journal of Inclusive Education*, *24*(3), 341-350.

Tashakkori, A., & Teddlie, C. (2009). Integrating qualitative and quantitative approaches to research. *The SAGE handbook of applied social research methods*, *2*, 283-317.

Tudzi, E. P., Bugri, J., & Danso, A. (2017). Human Rights of students with disabilities in Ghana: Accessibility of the University built environment. *Nordic Journal of Human Rights*, *5*(3), 275-294.

UNESCO (1994). The Salamanca statement and framework for action on special needs education. Retrieved from http://www.unesco.org/education/pdf/SALAMA_E.PDF

Vanderpuye, I. (2013). *Piloting inclusive education in Ghana: Parental perceptions, expectations and involvement.* (PhD thesis), University of Leeds, England.

Vuuro, E. (2016). *Barriers of inclusive education: The case of Wenchi Senior High School in the Wenchi Municipality*. (Master's dissertation), Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

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Higher Education Financial Sustainability in Ghana: A Study of the Perceived Influential Factors

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Abstract

The quest by public higher educational institutions to increase access is heavily dependent on financial sustainability through sustained income and liquidity. This has necessitated these institutions globally to undertake revenue enhancement measures and cost management initiatives to close budgetary gaps. The study's primary focus is to examine critical management factors that impact on university's financial stability and competitiveness. This correlational survey study sought to establish the depth of the relationship between the following management factors; financing scheme, governance framework, and cost management, accounting information system, and pricing approach, on financial sustainability. The study's outcome established a statistically significant relationship between all of the five factors on one hand and financial sustainability on the other hand. The findings further showed that three of the five factors: governance framework, cost management and pricing approach were significant in predicting a best fit equation for financial sustainability. The study's recommendations should assist policymakers and higher education managers to review policies and legislations on cost and competitive fees structure of public higher education institutions in Ghana.
Key words: Financial Sustainability, Higher Educational Institutions, Financing Scheme, Governance Framework, Pricing and Cost Management, Accounting Information System, Ghana

Introduction

Universities and Colleges in Ghana have witnessed considerable growth in the past forty years ranging from accessibility, enrolment, staffing, improvement in physical infrastructure and Information and Communication Technology (ICT). Despite these achievements, Ghanaian universities are confronted with numerous challenges that threaten their future financial sustainability (Bonin, 2017; Botlhale, 2015; Effah, 2015; Klemencic & Fried, 2015). Some of these challenges as enumerated by Abugre (2018) and Antoninis (2017) include weak revenue diversification, budget deficits and funding constrain, ICT infrastructure deficiencies, quality issues and governance and management structures and systems challenges, equity, inadequate infrastructure and increased access to higher education. Critical among these challenges is the lack of a sustainable financing mechanism which poses a threat to the development of quality university education in the country (Awotwe, Sam & Tackie, 2020).

Many studies in the past have suggested that funding constraints, increased competition, weak systems and processes, and greater regulatory and legislative regimes have prompted Higher Education Institutions (HEIs) to develop and strengthen their innovative capacity in order to remain financially sustainable (Johnstone, 2014; Jongbloed et al., 2015; Toompuu & Põlajeva, 2014). These constraints have largely slowed the expansion drive of most public universities in Ghana (Goode, 2017). Data from the United Nations Education, Scientific and Cultural Organisation (UNESCO), Institute for Statistics (2018) suggest a relatively declining trend in government funding of tertiary institutions in the country. Expenditure on tertiary education as a percentage of total government expenditure and as a percentage of GDP showed a decline from 6.95% in 2012 to 3.83% in 2014 and 1.47% in 2012 to 1,13% in 2014 respectively. Expenditure on tertiary education as a percentage of government expenditure on education also witnessed a decline from 19.42% in 2013 to 18.27% in 2014. Table 1 gives the highlights of the trend from 2011 to 2014 with data from the UNESCO Institute for Statistics (2018).

Table 1: Percentage of Tertiary Education Expenditure trend in Ghana

Details	Academic Years			
	2011	**2012**	**2013**	**2014**
Expenditure on Tertiary as a % on Total government expenditure	6.02	6.95	4.12	3.83
Expenditure on Tertiary as a % of GDP	1.07	1.47	1.18	1.13
Expenditure on Tertiary as a % on government expenditure on education	13.13	18.52	19.42	18.27

Note. GDP=Gross domestic product.

Source: Author's analysis of data from UNESCO), Institute for Statistics (2018)

The interrelationship of these challenges and the lack of the right systems, processes and policies to address them holistically impede growth in the universities in the sub region.

The trend from the UNESCO's Institute for Statistics data suggests a shift to diversify public universities funding sources towards increasing the share of tuition fees, loans to students, and grants for research (Newman & Duwiejua, 2015). Hogan (2015) and Ekpoh and Okpa (2017) rightly articulated certain positive effects of financing diversification in higher education, and in research and development. These benefits according to them include harmonizing consultancy services, hiring and leasing university facilities and lands, establishment of agribusinesses and universities' farms, enhancing sources of university endowment earnings, partnering entrepreneurs to establish Small-to-Medium Scale Enterprises (SMEs), commercializing university sports arenas, and the provision of hotel and hospitality services among others. Barr and McClellan (2018) emphasised the importance of sound economic fundamentals for universities which eventually trigger full economic cost recovery opportunities resulting in the creation of the backbone for less volatile future and sustained financing regime for these institutions, hence less dependent on government subventions.

Secondly, financial information obtained from the 2016 financial statements of three public universities namely, Kwame Nkrumah University of Science and Technology (KNUST), University

for Development Studies (UDS) and University of Ghana (UG), showed a declining trend in relative terms of government funding of tertiary institutions in the country. Government's subvention to these public universities as a as a percentage of their total income, fees related income, operational expenditure, showed a decline from 46% in 2015 to 45% in 2016, 129% in 2015 to 128% in 2016 and 49% in 2015 to 48% in 2016 respectively. The ratio of government's subventions to income and cash surpluses of the three public universities revealed a gradual and steady improved earnings and liquidity cover. On the other hand, government's subventions as a percentage of the funding gap of the three universities increased from 98% in 2015 to 106% in 2016. Table 2 gives the detail overview of the trend between 2015 to 2016. The analysis generally suggests that the Ghana government's subventions to public universities have consistently witnessed steady increases in absolute terms but has seen a proportional decrease in relation to income sources and operational expenditures (Kwame Nkrumah University of Science & Technology (KNUST), 2016; University for Development Studies (UDS), 2016; University of Ghana (UG), 2016). Table 2 gives an overview of the funding sources of three public universities in Ghana.

Table 2: Financial Analysis of three Public Universities in Ghana

Details	**2015**	**2016**
Government's subvention as a % on total income	46	45
Government's subvention as a % on fees related income	129	128
Government's subvention as a % on total operating expenditure	49	48
Ratio of government's subvention to income surplus/(deficit) (times)	7.56	5.63
Ratio of government's subvention to cash surplus/(deficit) (times)	1.21	1.36
Government subventions as a % on funding gap	98	106

Source: Author's analysis of data from Audited Financial Statements for the 2016 financial year ending 31st December, 2016 of the three public universities.

This thus meant that a sustained regime of funding will very much be for government and public universities to work gradually

towards the full economic cost recovery (Marginson, 2018). Recent financing reforms being proposed for the tertiary institutions in Ghana seeks to deepen equitable allocation of government funding grants and financial performance of public universities. Newman and Duwiejua (2015) enumerated the proposed HEIs financing reforms to include base grants; institutional factor grants; innovation grants; performance funding grants and research grants, with emphasis on the student as the unit cost of production. The rationale as stated by Awotwe et al. (2020) for initiating the poposed reforms are categorized into five thematic areas, namely: (1) student enrolment expansion and institutional diversification; (2) fiscal pressure arising from increased student enrolment with associated increased funding requirements; (3) dominant market orientation and the quest for non-governmental revenue; (4) demand for greater enhanced accountability; and (5) demand for greater quality and efficiency. These recent developments are signals for public universities in Ghana to begin examining their governance, financial and management systems practices to achieve efficiency and full cost recovery so as to mitigate future financial risk and remain competitive.

Evidently, the future survival of universities globally and in Ghana depends largely on sustainable financial resources to meet the widening funding gap. Atuahene (2015) rightly pointed out that the government of Ghana remains the major funding body of public universities in Ghana. As stated by Jaafar, Jizat, Ismail and Yusof (2017) and Teferra (2013), government's subvention to public universities in Ghana declined from 61.34% to 56.54% between 1999 and 2000 leading to under recovery of cost and accumulation of financial deficits. Data obtained from Ghana's 2015 education sector performance report suggest that the proportion of tertiary education expenditure as a percentage of Ghana's GDP declined by about 0.47% between 2011 and 2014. Clearly, it is becoming increasingly impossible for the government of Ghana to continue funding public universities thus the need for these universities to consider other internal financing mechanism to effectively contain the cost.

Thus, improving access and quality of higher education requires that adequate financial resources are available to these institutions and are managed and applied in the most efficient manner. As such, financially sustainable HEIs have the capacity to fulfil current financial obligations without compromising their ability to meet future financial

commitments. Ntim, Soobaroyen and Broad (2017) alleged that the primary challenge for managers of HEIs is their ability to secure financial and academic sustainability at a time when government funding was gradually becoming highly competitive and challenging. Hence, there is the need for HEIs to be creative and innovative in developing programmes that will enhance the current financial condition to propel their financial sustainability. Eleftherakis (2021) revealed that six educational institutions in the Southern Asia-Pacific Division could not be self-supporting without appropriations. His findings suggested that leadership, insurance coverage, long-term investment, financial performance, generation of income, and the sustainable growth rate, were the areas that receive minimal attention from these institutions. De Lima, Soares, de Lima, Veras, de Andrade and Guerra (2020) suggested that HEIs should focus attention on governance, management and full cost recovery systems with particular reference to their impact on HEIs financial viability. Afriyie (2015) arguably settled on the following five management factors for assessing how well HEIs are financially sustainable, strategy for direction, sustainability by recovering all costs, generation of income by using networking and public relations, investment that maintains the appropriate level of productive capacity, and managing risk appropriately to avoid potential problems.

The current changing and competitive environment of the higher education landscape calls for the need to test new governance and management factors in this study, which has sparsely been considered in previous studies. The essence of this study therefore was to find new ways to improve financial sustainability and to identify the important drivers that enhance financial viability of HEIs. The study thus extends the governance and management systems factors already investigated to include: HEIs governance frameworks, financing mechanism, cost management approaches, robustness of accounting information systems, and the pricing mechanism in assessing the wellness of Ghanaian public HEIs' financial sustainability. Hence, analysis done in this study sought to establish how these governance and management systems impact on Ghanaian public HEIs on their financial sustainability. The study adopted a quantitative study approach with data collected from seven public universities in Ghana to test the hypotheses; there is a significant relationship between the five factors and Ghanaian public HEIs financial sustainability.

Purpose of the Study

The primary objective of the study was to examine the impact of the management factors on the overall financial sustainability of Ghanaian public HEIs. The specific objectives were to,

1. Measure the relationship between financing, governance framework, cost management, pricing and accounting information systems, and Ghanaian public HEIs financial sustainability,
2. Examine the strength of the relationship between financing, governance framework, cost management, pricing and accounting information systems, and Ghanaian public HEIs financial sustainability,
3. A predictive model for financial sustainability based on the strength of the factors for Ghanaian public HEIs.

Research Questions and Hypotheses

The study focused on the following three key research questions and related hypotheses: (a) what is the relationship between financing scheme, governance framework, cost management, accounting information systems and pricing approach, and Ghanaian public HEIs financial sustainability? and (b) what is the relative combined effect of the factors contribution in achieving best fit equation model for Ghanaian public HEIs financial sustainability?

The related Hypotheses are: (H_0): there is no significant relationship between the factors and Ghanaian public HEIs financial sustainability, and (H_1): there is a significant relationship between the factors and Ghanaian public HEIs financial sustainability

Review of Relevant Literature

Contributing Factors and Financial Sustainability

In carrying out this study, the five most relevant contributing factors identified from the literature may well assist in unveiling appropriate ways of improving the financial sustainability of HEIs in Ghana. The review of the relevant literature below relating to the factors of this study have sought to emphasise their importance to HEIs financial sustainability.

While there is no agreement on the one best financing scheme for higher education, Botlhale (2015) enumerated some higher education financing mechanisms that have been tried in recent times to include Public-Private-Partnership (PPP), Non-Traditional Finance,

Education for all Fast Track Initiative, Education Tax Credits, Global Education Bond, Diaspora Education Bonds, and Education Voucher. Hillman et al. (2014) rightly stated that public universities and colleges have principally been financed from government and tuition reserves with supplementary funding from the State and students' financial aid. The wide range of literature available focuses on three key financing models namely, 1) endowment funding (Nguyen & Mogaji, 2022), 2) cost sharing practices (Liu, Chen, Wang & Wang, 2020), and 3) students loans and grants financing model (Montalto, Phillips, McDaniel & Baker, 2019).

Governance comprises the structure and processes of decision-making, the establishment of policies to guide the work of the institutions, and the constitutional forms and processes through which universities govern their affairs (Hladchenko et al., 2017; Kwiek, 2015; Shattock, 2013). Higher education system of governance is an essential ingredient in ensuring higher education financial sustainability. HEIs with loose oversight may give rise to low quality education with minimal investment return to students, parents and guardians, the general public and the overall economic development of the country (Erkkilä & Piironen, 2014). The intense demand for elaborate accountability from government, students, parents, guardians and partners of higher education has become more pronounced as HEIs continue to source for funding from these stakeholders (Sam, 2016).

HEIs cost management systems are critical ingredients in ensuring funding sustainability. Estermann and Claeys-Kulik (2013) posit that tertiary institutions must be able to identify and better understand the cost of all their activities and projects. Unlike Ghana, there has been considerable effort by HEIs in the USA and Europe to develop a harmonised costing framework that promote greater degree of transparency and fairness in determining institutional cost build-up (Kostic, Jovanovic & Juric, 2019). The impact and implications of an effective cost management system is the recovery of full economic cost (Darren & Lang, 2017) relating to academic activities. Increased deficits, insufficient resources, increased competition, low students' and parents' satisfaction rate and the likely government policy review are compelling factors for public HEIs in Ghana to implement effective cost management systems (Baum, Ma, Bell, & Elliott, 2014; Dragija & Lutilsky, 2016).

The pricing policy of public universities is pivotal to the financial sustainability and growth of these institutions (Sinclair, Erb, & Braxton, 2016). The three potential pricing options available to public universities are: cost-based pricing, demand (competitor) based pricing and value-based pricing (Amir, Auzair, Maelah, & Ahmad, 2016; Barr, 2015). There is persistent worrying absence of pricing guidelines to serve as a benchmark for public universities in Ghana in pricing their academic activities. Effective pricing of academic activities propels growth and financial sustainability.

The novelties of accounting information system positively affect the efficiency (Akgün & Kiliç, 2013) of higher education management. The emerging software applications for accounting information processing seeks to provide tertiary institutions many opportunities to simplify task and enhance service delivery (Savilla, 2017). A good number of HEIs in Ghana are still using legacy AIS that appears to be costly and has minimal capacity to process today's HEIs information requirement. AIS ensures effective management of cost centres, cost measurement and influences quality managerial decision in providing timely relevant reports (Moghadam, Jorge, & Pirzade, 2017) for effective financial planning.

Many of the studies reviewed have clearly acknowledged the relevance of the individual contributing factors' influence on HEIs financial sustainability with minimal focus on the combined effect of these contributing factors (Amir et al., 2016; Barr, 2015; Moghadam et al., 2017; Rowlands, 2017; Shah, 2015). This thus points to an obvious research gap in the literature, of which this study intends to address by assessing the relative strength of the relationship of these factors and their combined effect on financial sustainability.

Ghana's public universities's financial performance.

African countries in the sub-Saharan sub-region including Ghana are confronted with escalating higher education costs, funding needs and limited available government revenue (Johnstone, 2014). Consequently, governments are gradually shifting the higher education cost burden to students and parents as a means of dealing with the ever widening funding gap (Masaiti, Mwelwa, & Mwale, 2016). Collins (2014a) stated that the most effective and sustainable revenue stream that can support universities' mission is students' tuition fees. The degree and effectiveness of factors such as higher education funding

policy, governance and regulation, the costing method, the accounting information system and the pricing mechanism as noted by Erins and Erina (2017), Lucianelli and Citro (2017) and Upping and Oliver (2016) to a large extent influence how public universities in Ghana accurately measure cost per student leading to full economic cost recovery as they strive to achieve financial sustainability. An assessment of Ghana's higher educational cost sharing policy reveals a number of policy shortcomings notable among them are stagnant educational expenditure, inefficiency in the higher education system with little impact on quality (Nourani, Singh, & Singh, 2015) and financial sustainability (Newman & Duwiejua, 2015).

Funding of higher education in Ghana has evolved over the years. As stated by the National Council for Tertiary Education (NCTE (2012), sustainable financing of tertiary education: building Ghana's future, higher education was fully funded by government between 1948 to the 1970s, and in the 1980s partial funding by way of academic facilities and residential user fees were introduced owing to a barrage of challenges faced by public higher education at the time. The government of Ghana's direct funding of public tertiary institutions has in recent times witnessed general decline in relative terms. Government funding focus is gradually shifting towards infrastructure provision while systematically reducing funding for recurrent expenditure (Awotwe et al, 2020; Newman & Duwiejua, 2015).

Methodology

Research Design

The study adopted quantitative research design to assess the relationship between the dependent and independent variables. Various studies on higher education financial sustainability (Bhayat, 2015; Cernostana, 2017; Chatama, 2014; Sazonov et al., 2015) have long-established the relevance of the quantitative approach and the relative importance of the five independent constructs (financing scheme, governance framework, cost management, accounting information systems and pricing) influence on the dependent construct (financial sustainability). The study further considered quantitative technique as the more preferred due to the possible generalization of the study outcome (Pandey & Pandey, 2021).

Population and Sample Strategy

The target population for this research is the vice chancellors or their deputies, the registrars or their deputies, and subject experts in the finance and internal audit departments and the quality assurance officers of the seven major public universities established on or before the year 2005. The study focused on 85 out of a population of 220 individuals with managerial responsibilities such as vice chancellors, pro vice chancellors, registrars, deputy registrars, finance directors, deputy finance directors, internal auditors, deputy internal auditors, management accountants, budget officers, accounting systems analyst or systems accountants, and quality assurance officers. The population selection is very much similar to Afriyie's (2015) study of higher education financial sustainability. The study employed judgemental sampling technique in the selection of respondents for this study. The selection criteria considered respondents' managerial responsibilities and roles, and the level of experience in their respective institutions. The judgemental sampling technique follows similar approaches by Oanda (2013) on his study of alternative higher education financing in Kenya. Fifty-three (53) valid responses were received out of the estimated sample size of 85 derived from the population of 220, yielding a response rate of 62.35%. The final sample size of 85 was well above the minimum sample size of 30 for parametric statistical analysis.

Research Instrument and Ethical Considerations

The study employed a self-designed validated survey instrument in the collection of the discrete survey data through emails from experts mainly from the vice chancellors or their deputies, finance, internal audit and registry departments of the sampled public universities, due to their level of expertise of the study focus. To validate the study instrument, ten subject area experts from the finance departments of three non-participating tertiary institutions reviewed the research instrument in order to identify deficiencies in the instrument wording, syntax, construct, and content validation. The modified instrument based on the suggestions received was further piloted among 10 subject area experts from the NCTE and NAB. Minor corrections mostly related to instrument wording and syntax errors were carried out in the instruments based on their feedback thus validating the instrument before administering. The researcher conducted a test-retest

reliability by undertaking a pilot study among 10 respondents from the sample over a 7-day period. The reliability test results produced a coefficient of $r = .723$, which was well within acceptable limits and consistency (Creswell & Creswell, 2017).

The data collection and analysis were based on a web-based survey instrument in which respondents provided answers to all the items on a 5-point Likert-type scale (strongly disagree, disagree, not sure, agree, strongly agree). The researcher had prior telephone conversations with respondents and emails were subsequently despatched which included an electronic link respondent were to double click to access the web-based survey instrument for this research. According to Schoenherr, Ellram, & Tate (2015), this approach simplified the survey administration and made the efficient collecting of the data faster than the use of mailing, telephone or physically administering the questionnaire.

The research data obtained through emails was subjected to statistical analysis using correlation and multiple regression analysis to establish the relative importance of the factors to higher education financial sustainability. The study settled on these factors for further validation of their level of influence using multiple regression analysis due to earlier emphasis by previous studies of these factors importance to financial sustainability (Amir, Auzair, Maelah & Ahmad, 2016; Erins & Erina, 2017; Marovah, 2015; Moghadam, Jorge & Pirzade, 2017).

The study sought adequate permissions from respondents and the sampled institutions. The researcher obtained informed consent from the study research sites and participants through official correspondences. All responses were treated confidential and the research participants were adequately assured of complete anonymity.

Results and Discussions

Demographic Statistics

The demographics of the study were in two categories namely participants and institutional demographics. The participants' demographics included their institutions, current job position, participants' age group, gender, participants' academic or professional qualifications, and their relevant professional experience. The participating institutional demographics comprised the institutions students' enrolment and accreditation status. The summary of the

demographics is presented in a tabular format as detailed below in Table 3.

The distribution of job positions of respondents was skewed towards the functional and middle level management. The highest responses (n = 20) were received from the functional level management representing 37.73%. The lowest responses were participants within the executive level management (n = 14) representing 26.42% of responses. A good number of the respondents were within the age bracket of 41 to 50 years (n = 23) representing 43.40% mainly due to the level of expertise required of participants. The breakdown of respondents' gender was mainly skewed towards males. Forty-four (44) of the respondents were males whiles 9 were females. The level of academic or professional qualifications of the respondents is an ample testimony of the qualification level required of the executive management positions. Majority of the respondents (n = 33) representing 62.26% of respondents had a combination of undergraduate, masters and professional level qualifications, 13 (24.53%) had both undergraduate and masters level qualifications while 6 participants (11.32%) had undergraduate, masters and PhD/Doctorate qualifications. One participant (1.87%) had master's degree and other qualifications. The breakdown of the level of professional experience in the demographics aligned well with the management level expertise required of respondents. Majority of the respondents (n = 32) representing 60.38% had 11 or more years of relevant professional experience. Three (3) (5.66%) had between 6 to 10 years of relevant experience while 13 and five (5) had either 5 years or below and over 20 years of professional experience respectively (see table 3 below).

Table 3: Demographic Information of Participants

Demographics	Participating Institutions							*N*
	GIMPA	KNUST	UDS	UCC	UEW	UG	UPSA	
Job Positions								
Executive Level Management	3	4	2	1	1		3	14
Functional Level Management	2	4	3	3	4	2	2	20
Middle Level Management	3	3	4	3	3	2	1	19
Age Group								
31-40 Years	4	2	1	2	2	1		12
41-50 Years	2	4	6	3	3	1	4	23
51-60 Years	2	5	1	2	2	2	1	15
Over 60 Years			1				1	2
Under 30 Years					1			1
Gender								
Female	3	3	1		1	1		9
Male	5	8	8	7	7	3	6	44
Academic/Professional Qualifications								
Degree & Masters	3	1	3	1	3	0	2	13
Degree, Masters & Professional Qualifications	4	7	5	5	4	4	4	33
Degree, Masters & PhD/Doctorate	1	2	2				1	6
Degree, Masters & Other qualifications	1							1
Professional Experience								
11-20 Years	3	10	7	2	3	2	5	32
1-5 Years	1				2			3
6-10 Years	4		1	4	2	2		13
Over 20 Years		1	1	1	1		1	5

Source: Author's analysis from research field data

The demographics of the participating institutions were made up of students' population and institutional accreditation status. The population of students in the seven participating tertiary institutions constituted close to 50% of the total population of tertiary students in Ghana. The University of Education, Winneba had the highest number of undergraduate students' population of 56,612 (32.96%) whiles the Kwame Nkrumah University of Science and Technology had the highest postgraduate students' population of 5,806 (28.53%). GIMPA had the lowest students' population of 5,109 and 2,612 undergraduate and postgraduate students respectively but recorded the highest (2,554)

number of students studying diploma/certificate programmes. The University of Ghana had the lowest number of diploma/certificate students of 200. Table 4 gives summary position of the institutional students' statistics.

Table 4: 2017/2018 Students Population of Participating Institutions

Participating Institutions	Students Enrolment			
	Diploma/Certificate Programmes	Undergraduate Programmes	Postgraduate Programmes	Total Population
Ghana Institute of Management & Public Administration	2,554	5,109	2,251	9,944
Kwame Nkrumah University of Science & Tech	2,443	35,508	5,806	43,757
University for Development Studies	2,049	15,347	2,442	19,838
University of Cape Coast	1,200	18,746	1,012	20,958
University of Education-Winneba	-	56,612	3,304	59,916
University of Ghana	200	33,503	5,546	39,249
University of Professional Studies-Accra	1,585	8,378	718	10,681
Grand Total	10,031	173,203	21,079	204,313

Source: Author's analysis from research field data

All the seven participating institutions had valid institutional and programme accreditation. All seven institutions (100%) had Ghana national accreditation while six out of the seven institutions had both national and other international accreditations. Almost 72% of participants (n = 38) confirmed that all seven institutions had valid Ghana national accreditation whereas 28% (n = 15) indicated that their institutions possess both Ghana accreditation and other international accreditation status (see table 5).

Table 5: Participating Institutional Accreditation

Accreditation Status	No. of Institutions	*n*
National & Other Accreditation	6	15
National Accreditation only	7	37
Other Accreditations only	- [a]	-
Grand Total		53

Note. [a] No responses were found for 'Other Accreditation only'
Source: Author's analysis from research field data

Descriptive statistics

The descriptive analysis revealed that the variables, accounting information system and governance framework were significantly higher among the respondents (M = 27.45, SD = 3.76) and (M = 26.77, SD = 4.93) respectively. The mean values of the variables, financing scheme, cost management, pricing approach and financial sustainability were fairly distributed (M = 18.96, SD = 4.60), (M = 21.38, SD = 4.44), (M = 18.72, SD = 6.24) and (M = 22.77, SD = 4.71) respectively among the participants. The variance and range of the variable financing scheme was significant at (Var = 38.90, Range = 24.00*)* compared to the rest of the variables. The variable governance framework had the highest range of dispersion of 28.00 and a variance of 24.29. The test of skewness between the variables were sufficiently normal for the purpose of this study. Table 6 provides the details.

Table 6: Participants overall Response Ratings on Financial Sustainability

Variable	*N*	*M*	*SD*	*Var*	Range	Skew
Financing Scheme	53	18.96	4.60	21.19	21.00	-0.46
Governance Framework	53	26.77	4.93	24.29	28.00	-1.38
Cost Management	53	21.38	4.44	19.70	18.00	-0.31
Accounting Information Systems	53	27.45	3.76	14.14	21.00	-0.87

Pricing Approach	53	18.72	6.24	38.90	24.00	-0.88
Financial Sustainability	53	22.77	4.71	22.14	23.00	-0.08

Source: Author's analysis from research field data

Correlation analysis

The results of the correlation analysis revealed a relative degree of positive correlation between the independent variables financing scheme, governance framework, cost management, accounting information system and pricing approach and the dependent variable of financial sustainability. A Pearson's rank correlation analysis showed a significant positive correlation among the variables. The variables governance framework and cost management showed large positive correlation effect of $r = .574$ and $r = .570$ respectively, while financing scheme, accounting information systems and pricing approach revealed medium correlation effect of $r = .329$, $r = .365$ *and* $r = .400$ respectively. The relative degree of relationship or association between the independent variables and the dependent variable was found to be significant at $p < .05$. The following constructs: financing scheme, governance framework, cost management, accounting information system and pricing approach have a positive influence on financial sustainability (see table 7 below). The Spearman's *r* data analysis also revealed large built significant correlation between cost management and financial sustainability, governance framework and accounting information system at $r = .570$, $r = .570$ and $r = .422$ respectively.

Table 7: Summary of Intercorrelation between the Variables

	Variable	1	2	3	4	5	6	*M*	*SD*
1	Financial Sustainability	-	.329*	.574**	.570**	.365**	.400**	22.77	4.71
2	Financing Scheme	.329*	-	.498**	0.216	0.101	.290*	18.96	4.60
3	Governance Framework	.574**	.498**	-	.399**	.298*	0.229	26.77	4.93
4	Cost Management	.570**	0.216	.399**	-	.422**	0.211	21.38	4.44
5	Accounting Information Systems	.365**	0.101	.298*	.422**	-	0.227	27.45	3.76
6	Pricing Approach	.400**	.290*	0.229	0.211	0.227	-	18.72	6.24

M	22.77	18.96	26.77	21.38	27.45	18.72
SD	4.71	4.60	4.93	4.44	3.76	6.24

Note. $*p < .05$, $**p < .01$.

Source: Author's analysis from research field data

The correlation analysis enabled the study to establish whether there was any statistical relation between: financing scheme, governance framework, cost management, accounting information system, and pricing approach and financial sustainability. The analysis revealed a highest correlation of $r = .574$ at p value $p < .01$ significance level for governance framework, followed by cost management with $r = .570$ and pricing approach with $r = .400$. Accounting information system and financing scheme had the least correlation of $r = .365$ and $r = .329$ respectively. The correlation analysis suggests that there is evidence of statistical relationship between: financing scheme, governance framework, cost management, accounting information system and pricing approach and financial sustainability (see table 7 above). The analysis depicts that there is a positive impact between: financing scheme, governance framework, cost management, accounting information system and pricing approach and financial sustainability, while cost management impact positively on financial sustainability. The significance of the relationship was tested using regression analysis.

Regression analysis.

The researcher conducted regression analysis using SPSS version 25. The regression results further enabled a derivation of a regression equation for financial sustainability (Y_{FS}). The coefficient of determination (R^2) and the p value further enabled the best-fit model to be determined. The independent contributing factors for financial sustainability were financing scheme, governance framework, cost management, accounting information systems and pricing approach were the determinant in predicting the dependent variable (financial sustainability). A test of significance was undertaken using multiple regression analysis which yielded a coefficient of $r = .723$, F (5, 47) = 120.21, $p = .001$, $R^2 = .522$. From the analysis (see Table 8), three of the variables: governance framework, cost management and pricing approach) were found to be significant in predicting financial sustainability with p values $p = .006$, $p = .004$, $p = .039$ and beta

weights of .349, .374 and .174 respectively. Financing scheme (p = .992) and accounting information systems (p = .633) were not considered in determining the best-fit model since p values were above the threshold of $p < .05$. The results revealed that there was a significant positive relationship between the independent variables (governance, framework, cost management and pricing approach) and the dependent variable (financial sustainability) F (5,47) = 120.21, p = .001 and R^2 = .522. The results also showed the variables (governance framework, cost management and pricing approach) with the significant p values had 95% confidence positive intervals of .590, .625 and .338 respectively while the variables (financing scheme and accounting information systems) with the insignificant p values had 95% confidence negative intervals of -.247 and -.219 respectively.

Table 8: Regression Coefficient for Financial Sustainability

Variable	Coefficient	Std. Error	*B*	-95% CI	+95 % CI	*T*	*P*
(Constant)	0.340	3.986		-7.678	8.358	0.085	0.932
Financing Scheme	-0.001	0.122	-0.001	-0.247	0.244	-0.011	0.992
Governance Framework	0.349	0.120	0.365	0.107	0.590	2.904	0.006
Cost Management	0.374	0.125	0.353	0.123	0.625	2.997	0.004
Accounting Information Systems	0.069	0.143	0.055	-0.219	0.356	0.481	0.633
Pricing Approach	0.174	0.082	0.230	0.010	0.338	2.129	0.039

Note. CI = Confidence Interval

Source: Author's analysis from research field data

The results of the regression analysis revealed notable similarities with the results of the correlation analysis in relation to the variables with significant outcome and the degree of positive correlation.

The best-fit regression equation for financial sustainability is Y_{FS} = a + β_{GLR} + β_{CM} + β_{PA},

Where Y_{FS} = financial sustainability (predictor variable),

a = constant value

β_{GLR} = governance framework (independent variable),

β_{CM} = cost management (independent variable), and

β_{PA} = pricing approach (independent variable).

Hence regression equation for Y_{FS} = 2.324 + 0.365β_{GLR} + 0.353β_{CM} + 0.230β_{PA}.

Discussion

The results of the study showed that participants had varied opinions about the level of influence of the individual factors (financing scheme ($1H_0$), governance framework ($1H_0$), cost management ($3H_0$), accounting information systems ($4H_0$) and pricing approach ($5H_0$)) on financial sustainability. Most participants alluded to the importance of financial sustainability in addressing their institutional set objectives. Previous studies found similar outcomes (Afriyie, 2015; Lucianelli & Citro, 2017; Sazonov et al., 2015). While similar studies in the past suggest a relationship between the individual factors (financing scheme, governance framework, cost management, accounting information systems and pricing approach) and financial sustainability (Amir et al., 2016; Bhayat, 2015; Brandas & Stirbu, 2013; Chatama, 2014; Collins, 2014) the results of this study show statistical evidence to support three out of the five factors as having statistically significant relationship.

Many studies relating to HEIs governance framework focused on its relevance to institutional growth and development but failed to address the effect on financial sustainability (Hornsby & Osman, 2014; Williams, 2015; Van Damme & Van der Wende, 2018) which may affect the future financial stability of the HEIs. This study sought a further understanding of the relationship between HEIs governance framework, and financial sustainability of public universities.

Another critical challenge confronting financial sustainability of public universities in Ghana is weak and ineffective cost management (Araújo & Rodrigo Gonçalves, 2014; Toopuu, 2015). This study established a clearer understanding of the relationship between cost management and financial sustainability leading to a reliable cost accumulation practice by public universities in Ghana. The study also concluded from the many previous research findings that Activity-Based-Costing (ABC) emerged as the most preferred and reliable cost management (Araújo & Rodrigo Gonçalves, 2014; Mahal & Hossain, 2015; Hoozée & Hansen, 2017) contrary to the standard cost management implemented by public universities in Ghana. A third major constraint is the challenges associated with pricing of HEIs activities which impacts directly on financial sustainability. This study sought to further enhance the studies conducted by Baum, Ma, Bell, & Elliott (2014), Mahal and Hossain (2015) and Perks (2013) about the management factors' importance to HEIs financial sustainability. The study established a better understanding of the relationship between the pricing approach ($5H_0$) and financial sustainability of public universities in Ghana.

All the five fundamental research sub questions of the study sought to determine whether there was a statistical relationship between financing scheme, governance framework, cost management, accounting information systems, and pricing approach and financial sustainability. The results established medium to large positive correlation between the independent variables and public universities financial sustainability. The correlation results sufficiently provided evidence that there was a relationship between financing scheme, governance framework, cost management, accounting information systems and pricing approach and financial sustainability as earlier observed by Amir et al. (2016), Chatama (2014), Hoozée and Hansen (2017) and Kwiek (2015). Further analysis to determine significance level of the variables: financing scheme, governance framework, cost management, accounting information systems and pricing approach to financial sustainability presented results that supported the rejection of the null hypothesis: $2H_0$, $3H_0$ and $5H_0$. The results thus illustrate significant relationship between governance framework, cost management and pricing approach on financial sustainability as Al-Haddad and Yasin (2018), Baum et al. (2014) and Toopuu (2015) earlier found in their studies. The finding of weak relationship between

the individual factors: financing scheme and accounting information systems, and financial sustainability contradicts many previous studies (Botlhale, 2015; Brandas & Stirbu, 2013; Nyahende, 2013).

The relevance of this study provides interesting findings which impact on HEIs, governments, government agencies HEIs regulatory institutions and donor agencies. The study should afford institutions in the education field to develop a deeper appreciation of the following constructs: financing scheme, governance framework, cost management, accounting information systems and pricing approach in developing a more robust and sustainable funding mechanism for HEIs in Ghana. Many studies in the past (Afriyie, 2015; Atuahene, 2015; Sazonov et al., 2015) have emphasised the individual importance of the factors to financial sustainability whiles paying less attention to the relevance of the interlinkages of these governance and management systems factors to HEIs financial stability. This study has however established the relative importance of the combined effect of the factors on HEIs financial sustainability of which not much past studies can be found in academic literature.

Conclusion

There is no doubt HEIs financial sustainability has been of great concern to university management, government, policy makers, and donor agencies among others (Almagtomea, Shakerb, Al-Fatlawic & Bekheetd, 2019). However, the difficulties in understanding the effect of the study factors on sustainable financing of HEIs is of increasing concern to many governments globally (de Lima et al, 2020). With the varied opinions expressed by participants relating to the factors influence on financial sustainability, developing a deeper appreciation of these determinants on HEIs financial viability should be of utmost importance to key stakeholders. The study identified significant relationship between governance framework, cost management and pricing approach, and financial sustainability, while establishing an insignificant relationship between financing scheme and accounting information systems and financial sustainability.

The findings challenge HEIs experts and the government of Ghana to develop a set of policies and legislations with emphasis on enhancing the governance frameworks of public tertiary institutions, refining the current costing systems and adopt pricing approach that support the overall sustainable growth of these institutions. The rather

surprising weak relationship results contrary to many finding from past studies (Barr & McClellan 2018; Nyahende, 2013) between financing scheme and financial sustainability calls for closer examination of the attribute by experts and researchers. The overall reported significance level from the analysis lends credence to previous studies (Carnoy et al., 2014; Dragija & Lutilsky, 2016; Morrison & Webb, 2015), which emphasised the importance of the individual factors to HEIs financial sustainability. The predictive model derived based on the strength of the significant level of the combined effect should influence management of HEIs in Ghana to focus attention on the relevance interlinkages of the factors on financial sustainability.

Practical recommendations.

The outcome of the study reveals a number of useful practical recommendations relating to HEIs financing schemes, governance, accounting information system, cost management and pricing which is worth considering by HEIs practitioners and experts.

1) Government HEIs financing policy reforms: The findings showed that the current financing scheme was not strong in influencing financial sustainability. The Ministry of Education may consider it worthwhile refocusing funding policy direction towards addressing skills gap in, science and technology and research. This may require funding to be allocated based on the specific needs input or research outcomes other than the current discretionary approach to funding allocations in Ghana (Newman & Duwiejua, 2015). The government through the Ministry of Education and the Ghana Tertiary Education Commission (GTEC) could develop a transparent costing guidelines to guide HEIs in implementing fair and transparent full cost recovery systems for academic programmes and activities similar to the guidelines prescribed by Estermann and Claeys-Kulik (2013), as the available literature suggest some significant lapses in the current Ghanaian public HEIs costing approach (Dragija & Lutilsky, 2016).

2) Governance review: Based on the findings there is a strong link between HEIs governance framework and financial sustainability, the ministry of education may cause to be reviewed current Acts establishing HEIs in Ghana with the view to incorporating current

best governance practices drawn from the African System (Ellis & Steyn, 2014) and the UK (Hogan, 2015), for example. Secondly, the current legal regime of HEIs in the country does not permit such institutions to independently determine and fix fees of academic programmes. This makes it impossible for HEIs in the country to ensure academic programmes are financially sustainable.

3) Costing implementation: HEIs administrators may have to re-engineer their current costing processes to adequately support accurate and reliable measure and aggregation of cost of academic programmes and activities. The standard costing method implemented by most public HEIs in Ghana is flawed with deficiencies in measuring cost per student accurately and effectively. A review of data from the 2012 NCTE on sustainable financing of higher education and the Ministry of Education (MOE) Education Sector performance report for 2015 revealed high levels of negative variations between the unit cost per student for public HEIs for the 2008/2009 and 2009/2010 academic years. For instance, in 2008/2009 academic year, actual unit cost per student stood at GH¢2,763 (MOE, 2015), while the standard cost estimate per student was GH¢7,899 (NCTE,2012), indicating a negative variation of 186% of actual unit cost. In 2009/2010, the actual unit cost for HEIs was GH¢2,620 and standard estimated unit cost per student of GH¢7,113, representing a variation of 172%.

4) The literature reviewed in the study points to the widely adoption of ABC in European, South Africa, Asia and a good number universities in the USA (Baum, Ma, Bell, & Elliott, 2014; Dragija & Lutilsky, 2016; Kostic, Jovanovic & Juric, 2019). The study consequently recommends the implementation of ABC for public HEIs in Ghana. Effective implementation of an activity-based-costing (Estermann & Claeys-Kulik, 2013), requires the implementation of an appropriate ICT support infrastructure and an enterprise wide accounting information systems (Ceran et al., 2016).

5) Pricing guidelines: The study found that public universities in Ghana were not permitted to price their academic programmes realistically. This current practice appears to be promoting

inefficiencies in the management of public universities and does not promote healthy competition among these institutions. The government, the Ministry of Education, university administrators and policy experts may have to reconsider a review of the current mechanism by allowing for realistic pricing of academic programmes and activities by developing an approach similar to what has been implemented in the UK (Perks, 2013), with the aim to achieving financial sustainability. This can best be initiated by the NCTE by engaging services of consultants to draft a blueprint for the consideration of stakeholders through a round table dialogue.

6) ICT systems infrastructure: The study discovered that ICT systems of HEIs in Ghana did not support effective enterprise reporting. There has been some effort in recent times aimed at enhancing the ICT infrastructure of these institutions. Most of these systems are stand-alone systems rather than Enterprise Resource Planning (ERP) that has proven to be efficient in the management of institutional Strategic Information Systems (SIS), Management Information Systems (MIS) and Tactical Information Systems (TIS) (Noaman & Ahmed, 2015). ERP deployed for HEIs in Ghana should be tailored to meet the specific needs, scope and functionalities of these institutions.

7) Student loans and grants review: The study established that students' loans and grants granted tertiary students were not sufficient in supporting their education expenditure. Whereas the average academic fees charged per semester per programme by HEIs in Ghana ranges from Gh¢2,000 and Gh¢2,500, the maximum loan students can access every semester is Gh¢1,500. A review of the current regime in line with similar students' loan schemes practised in the UK and Europe (Rakhmonov, 2016), should consider a loan amount sufficient to cater for students' academic fees (user fees), hostel or accommodation charges and living expenses in every academic year.

8) GETFund disbursement criteria: The study found that GETFund disbursement to public tertiary institutions in Ghana were aimed at mainly developing academic infrastructure, students' loans funds

releases to the Student Loan Trust Fund (SLTF) for disbursements to students' loan beneficiaries, and disbursements to support faculty staff development. The criterial for disbursement could not be established. Secondly, private tertiary institutions were not being considered in the current GETFund disbursement criteria. The current disbursement arrangement does not promote transparency and accountability, and is generally open to political interference as stated by Kwasi-Agyeman (2015). A review should aim to develop clear and transparent disbursement criteria to public tertiary intuitions. Private tertiary institutions that are Not-for-Profit by their establishment could be considered for some form of support in the areas of staff development, research, ICT and E-learning resources.

Recommendation for Further Research

There are substantial future research potentials worthy of examination in the area of higher education financial sustainability. The results of such future studies will be useful to researchers, higher education policy makers and educational administrators and regulators, and may well provide further elaboration on the study factors influence on financial sustainability. Notable future research areas relating to this study worthy of recommendation include

1) The limitation on the number of public higher education institutions requires further examinations. The study focused exclusively on only seven public universities in Ghana. Future research may well assess the factors' influence on higher education financial sustainability in all public higher educational institutions. The inclusion of all public higher educational institutions in the country will further provide a clearer insight on the relationship between the factors and financial sustainability.

2) The restrictions on the population and sample size of this study could well be examined in future research work. This may offer explanations relating to the factor's relationship with higher education financial sustainability. The scope could be widened to include experts from the regulatory agencies, the ministry of education and other notable higher education think tanks in Ghana.

3) Another potential future research area is considering the factors' influence on private university colleges' financial sustainability in Ghana. This study is based mainly on seven public universities, thus generalising the study outcome to include private university colleges may pose challenges.

4) In view of the time constraints, this study was limited to only five determining factors affecting public higher education financial sustainability. Future studies could explore the possibility of increasing the factors to establish an in depth understanding of their influence on higher education financial sustainability. Such factors as students' perceptions, quality, competitive strategy, leadership and performance management.

Finally, future research may consider conducting factor analysis to determine the factors importance to financial sustainability. Factor analysis should assist in eliminating factors that are less important to HEIs financial sustainability and rather subject critical factors to further test to determine their statistical significance.

References

Abankina, I. V., Vynaryk, V. A., & Filatova, L. M. (2017). The State Policy of Funding Higher Education under Public Budget Constraints 1. *Russian Education & Society*, *59*(3–4), 135–173.

Abugre, J. B. (2018). Institutional governance and management systems in Sub-Saharan Africa higher education: developments and challenges in a Ghanaian Research University. *Higher Education*, *75*(2), 323-339.

Adom Boafo & Associates. (2012). Consolidated financial statements 2012. Kwame Nkrumah University of Science and Technology (KNUST). KUST Kumasi

Afriyie, A. O. (2015). Financial Sustainability Factors of Higher Education: A Predictive Model. *International Journal of Education Learning and Development*, *2*(3), 17–38.

Ahmad, A. R., & Soon, N. K. (2015). Balanced scorecard in higher education institutions: What should be consider? In *Technology*

Management and Emerging Technologies (ISTMET), 2015 International Symposia (pp. 64–68).

Akgün, A. İ., & KILIÇ, S. (2013). The effect of accounting information system on the efficiency of business management. *Journal of Management and Economics*, *20* (2), 21-36.

Al-Haddad, S., & Yasin, A. (2018). Governance Reform in Higher Education Institutions in the Arab World: An Institutional Initiative. *Higher Education Governance in the Arab World*, 83–104.

Almagtomea, A., Shakerb, A., Al-Fatlawic, Q., & Bekheetd, H. (2019). The integration between financial sustainability and accountability in higher education institutions: an exploratory case study. *Integration*, *8*(2), 202-221.

Amir, A. M., Auzair, S. M., Maelah, R., & Ahmad, A. (2016). Pricing for higher education institutions: a value-based approach. *International Journal of Educational Management*, *30*(6), 929–940.

Angel, P., Lai, C., Gibson, P., & Muthaly, S. (2014). Becoming an education provider of choice in Hong Kong: an inquiry into student decision making. *International Journal of Education Management*, *28*(5), 590–609.

Annand, D. (2015). Developing a sustainable financial model in higher education for open educational resources. *The International Review of Research in Open and Distributed Learning*, *16*(5).

Antoninis, M. (2017). Education in Sub-Saharan Africa gets a very poor report card. *Business Day*. *Accessed:* 10th may, 2022, *Retrieved from:* https://www.businesslive.co.za/bd/world/africa/2017-10-25-education-in-sub-saharan-africa-gets-a-very-poor-report-card/

Araújo, M., & Rodrigo Gonçalves. (2014). Costing systems for use in public universities: The Brazilian and international context. *International Journal of Education and Research*, *2*(12), 1–12.

Arthur, P., & Arthur, E. (2016). Tertiary institutions and capacity building in Ghana: challenges and the way forward. *Commonwealth and Comparative Politics*, *54*(3), 387–408.

Asafu-Adjaye & Partners. (2012). Audited financial statements 2012. University of Cape Coast (UCC). UCC Cape Coast.

Atuahene, F. (2015). Higher education finance in Ghana. *International Higher Education*, 20–21.

Awotwe, E., Sam, P. A., & Tackie, D. A. G. (2020). Higher education financing in Ghana: A review of gaps in Practice. *IOSR Journal of Humanities and Social Science*, *25*(10), 57-65.

Barr, M. J., & McClellan, G. S. (2018). *Budgets and financial management in higher education*. San Francisco, California, USA: John Wiley & Sons.

Baum, S., Ma, J., Bell, D., & Elliott, D. C. (2014). *Trends in College Pricing*. *Trends in Higher Education Series*. College Board.

Bhayat, I. (2015). *University budgeting models and impacts on organisational performance*. Australia: Macquarie University.

Bolarinwa, O. (2015). Principles and methods of validity and reliability testing of questionnaires used in social and health science researches. *Nigerian Postgraduate Medical Journal*, *22*(4), 195.

Bonin, H. (2017). The potential economic benefits of education of migrants in the EU. EENEE Analytical report. *European Commission*. https://doi.org/10.2766/276860.

Botlhale, E. (2015). Financing tertiary education under fiscal stress in Botswana. *Africa Education Review*, *12*(4), 647–663. https://doi.org/10.1080/18146627.2015.1112155

Boyce, B. A. (2013). Philanthropic funding in higher education: Carrot and/or stick. *Quest*, *65*(3), 255–265.

Braine, J. W. (2016). The Need to Bring Finance and Accounting into the Digital Age.

Brandas, C., & Stirbu, D. (2013). Integrated approach model of risk, control and auditing of accounting information systems. *Inƒormatica Economică*, *17*(4), 87–96.

Bullock, L. (2017). Online accounting now a 'ticket to play.

Carnoy, M., Froumin, I., Loyalka, P. K., & Tilak, J. B. G. (2014). The concept of public goods, the state, and higher education finance: a view from the BRICs. *Higher Education*, *68*(3), 359–378. https://doi.org/10.1007/s10734-014-9717-1

Ceran, M. B., Güngör, S., & Konya, S. (2016). The role of accounting information systems in preventing the financial crises experienced in businesses. *Economics, Management and Financial Markets*, *11*(1), 294-302.

Cernostana, Z. (2017). *Financial sustainability for private higher education institutions*, *17*, 1-10. http://hdl.handle.net/10419/219840

Chan, R. Y. (2016). Facilitating higher education growth through fund raising and philanthropy. In *Studying philanthropy and fundraising in the field of higher education: A proposed conceptual model*. IGI Global, Pennsylvania, USA, 1-27. https://doi.org/10/4018/978-1-4666-9664-8.ch001

Chatama, Y. J. (2014). Financing of higher education: An evolution of cost sharing approach in Tanzania, *Developing Country Studies 4*(9), 86-97.

Collins, C. S. (2014). An overview of African higher education and development. *The Development of Higher Education in Africa: Prospects and Challenges*, 21–65. https://doi.org/10.1108/S1479-3679

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approach* (5th ed.). USA: Sage publications.

Dayal Saini, P. (2018). Popular System of Costing. *Inspira-Journal of Modern Management & Entrepreneurship (JMME)*, *8*(1), 149-154.

de Lima, C. R. M., Soares, T. C., de Lima, M. A., Veras, M. O., de Andrade, J. B. S. O., & Guerra, A. (2020). Sustainability funding in higher education: a literature-based review. *International Journal of Sustainability in Higher Education, 21*(3). 441-464.

Deering, D., & Lang, D. W. (2017). Responsibility center budgeting and management" lite" in university finance: why is RCB/RCM never fully deployed? *Planning for Higher Education*, *45*(3), 94.

Deering, D., & Sá, C. M. (2014). Financial management of Canadian universities: adaptive strategies to fiscal constraints. *Tertiary Education and Management*, *20*(3), 207–224.

Dragija, M., & Lutilsky, I. D. (2016). Development of cost accounting in higher education institutions in the Republic of Croatia. *Eurasian Studies in Business and Economics*, *3*(2), 81–96.

Dunbar, L. (2017). Back to basics: the cloud for accountants. Retrieved March 5, 2018, from https://www.accountantsdaily.com.au/columns/10158-back-to-basics-the-cloud-for-accountants

Dwivedi, R., & Chakraborty, S. (2015). An activity-based costing

model for an engineering department of an Indian university. *International Journal of Accounting and Finance, 5*(62–81).

Efendi, J., Park, J. D., & Smith, L. (2014). Do XBRL filings enhance informational efficiency? Early evidence from post-earnings announcement drift. *Journal of Business Research, 67,* 1099–1105.

Effah, P. (2015). *Towards Quality higher education in Ghana*. *Senior academic leadership training (SALT) programme*. Accra, Ghana: Woeli Publishing Service.

Ekpoh, U. I. & Okpa, O. E. (2017). Diversification of sources of funding university education for sustainability: Challenges and strategies for improvement. Journal of Education, *Society and Behavioural Science, 21*(2), 1-8. doi:10.9734/JESBS/ 2017/ 34494

Eleftherakis, C. F. (2021). *Examining International-Mindedness in the International Baccalaureate Theatre Program* (Doctoral dissertation, University of Hawai'i at Manoa).

Ellis, M., & Steyn, G. (2014). The regulatory context in private higher education in South Africa. *Mediterranean Journal of Social Sciences*, *5*(20), 258–271.

Erins, I., & Erina, J. (2017). Assessment of the factors influencing higher education funding policies. In *Proceedings of the 21st World Multi-Conference on Systemics, Cybernetics and Informatics (WMSCI 2017)* (pp. 37–42).

Erkkilä, T., & Piironen, O. (2014). Shifting fundaments of European higher education governance: Competition, ranking, autonomy and accountability. *Comparative Education*, *50*(2), 177–191.

Estermann, T., & Claeys-Kulik, A.-L. (2013). *Financially sustainable universities: Full Costing - progress and practice*. *European Universities Association*.

Famade, O. A., Omiyale, G. T., & Adebola, Y. A. (2015). Towards improved funding of tertiary institutions in Nigeria. *Asian Journal of Humanities and Social Sciences*, *3*(2), 83–90.

Ghana GETFund. Ghana Education Trust Fund Act 2000, Act 581, Ministry of Education § (2000). Republic of Ghana: Parliament of Ghana.

Ghana SLTF. Students Loan Trust Fund Act, Act 820, Ghana MOE § (2011). Ghana: Parliament of Ghana.

Goode, F. K. (2017). *Approaches to Ghana's higher education*

challenges drawn from the US community college model (Doctoral dissertation, Walden University).

Heale, R., & Twycross, A. (2015). Validity and reliability in quantitative studies. *CrossMark*, *0*(0), 13–15.

Hillman, N. W., Tandberg, D. A., & Gross, J. P. (2014). Performance funding in higher education: Do financial incentives impact college completions? *The Journal of Higher Education*, *85*(6), 826–857.

Hladchenko, M., Antonowicz, D., & de Boer, H. (2017). Understanding the changes of the higher education governance in Poland and Ukraine. *The University as a Critical Institution*, 55–74.

Hogan, J. (2015). Reshaping the university: the rise of the regulated market in higher education. *Policy and Practice i n Higher Education*, *19*(1), 33–34. https://doi.org/10.1007/s11336-017-9589-2.

Hoozée, S., & Hansen, S. C. (2018). A comparison of activity-based costing and time-driven activity-based costing. *Journal of Management Accounting Research*, *30*(1), 143-167.

Hornsby, D. J., & Osman, R. (2014). Massification in higher education: Large classes and student learning. *Higher Education*, *67*(6), 711–719. https://doi.org/10.1007/s10734-014-9733-1

Jaafar, H., Jizat, J. E. M., Ismail, R., & Yusof, R. (2017). The internationalization of higher education: An estimation of cost using activity based costing method. *International Journal of Academic Research in Business and Social Sciences*, *7*(7), 763–780. https://doi.org/10.6007/IJARBSS.

Jogn, G., & Wittenloostuijn. (2014). Regulatory red tape and firm performance. *Public Administration*, *92*(4).

Johnstone, D. B. (2014). Tuition Fees, Student Loans, and Other Manifestations of Cost Sharing: Variations and Misconceptions In *The forefront of international higher education*. 42, 235-244. Springer, Dordrecht. http://doi.org/10.1007/978-94-007-7085-0_17

Jongbloed, B., de Boer, H., Kolster, R., Kottmann, A., Vossensteyn, H., Benneworth, P., Lemmens-Krug, K. (2015). *Performance-based funding and performance agreements in fourteen higher education systems. Report for the Ministry of Education, Culture and Science.* Nederland.

Klemencic, M., & Fried, J. (2015). Demographic challenges and future

of the higher education. *International Higher Education, 47*, 12–14.

Kostic, M. D., Jovanovic, T., & Juric, J. (2019). Cost management at higher education institutions-cases of Bosnia and Herzegovina, Croatia and Slovenia. *Cent. Eur. Pub. Admin. Rev.*, *17*(1), 131-148.

Krickl, O., & Geertshuis, S. (2015). Perceived service value: implications for the viability of continuing education programmes. *Universities and Engagement*, 104–113.

Kwasi-Agyeman, F. (2015). *Organizing higher education funding in Ghana: The case of Ghana Education Trust Fund (GETFund)*. Master's thesis, University of Oslo.

Kwiek, M. (2015). The unfading power of collegiality? University governance in Poland in a European comparative and quantitative perspective. *International Journal of Educational Development*, *43*, 77–89.

Liu, S., Chen, X., Wang, E., & Wang, X. (2020). Diversifying funding sources for public higher education in China during massification. *Education as Change*, *24*(1), 1-26.

Lucianelli, G., & Citro, F. (2017). Financial conditions and financial sustainability in higher education: A literature review. In *Financial sustainability in public administration*, Rodriguez Bolivar, M. (Ed.), Palgrave Macmillan Cham, 23–53. http://doi.org/10/1007/978-3-319-57962-7_2

Mahal, I., & Hossain, A. (2015). Activity-based costing (ABC)–An effective tool for better management. *Research Journal of Finance and Accounting*, *6*(4), 66–74.

Marginson, S. (2018). Global trends in higher education financing: The United Kingdom. *International Journal of Educational Development*, *58*, 26-36.

Marovah, T. (2015). Higher education and philanthropy in Africa. In *higher education funding excellence conference* (pp. 1–14).

Masaiti, G., Mwelwa, K., & Mwale, N. (2016). Shifting from government bursaries to a loan scheme in higher education: Exploring the Zambian experience in student financial aid. *International Journal of African Higher Education*, *2*(1), 1–99.

Moghadam, S. K., Jorge, N., & Pirzade, F. (2017). Examine barriers to implementing accounting information system (AIS) at the university of Payam Noor in Khuzestan, Ilam and Lorestan.

International Journal of Scientific Management & Development, *5*(6), 257–265.

Montalto, C. P., Phillips, E. L., McDaniel, A., & Baker, A. R. (2019). College student financial wellness: Student loans and beyond. *Journal of Family and Economic Issues*, *40*(1), 3-21.

Monyoncho, R. M. (2015). Perception of corporate governance practices at the university of Nairobi. *DBA Africa Management Review*, *5*(1).

Morrison, E. E., & Webb, D. J. (2015). UK health technology assessment and value based pricing. *Pharmaceutical Prices in the 21st Century*, 371–388.

National Council for Tertiary Education. (2012). *Tertiary education series*. *NCTE*.

NCTE. (2012). *Sustainable financing of tertiary education: Building Ghana's future*. *NCTE*.

Newman, E., & Duwiejua, M. (2015). *Funding of higher education: models for innovative funding of higher education in Africa–the case in Ghana*. *Lomé, Togo: Hotel Eda Oba*.

Nguyen, N. P., & Mogaji, E. (2022). Universities' endowments in developing countries: The perspectives, stakeholders and practical implications. In *Re-imagining Educational Futures in Developing countries* 261-282. Palgrave Macmillan, Cham.

Noaman, A. Y., & Ahmed, F. F. (2015). ERP Systems Functionalities in Higher Education. In *Procedia Computer Science*, 385–395. https://doi.org/10.1016/j.procs.2015.09.100

Nourani, M., Singh, K., & Singh, J. (2015). Postgraduate conference on economics, public administration and business (pcepab). In *Financing Higher Education through Waqf Institution: An Alternative Approach*, 1–465.

Novgorodov, P. (2018). Value-based approach for measuring the intellectual capital of the university. In *Economic and Social Development (Book of Proceedings), 27th International Scientific Conference on Economic and Social*, 763.

Ntim, C. G., Soobaroyen, T., & Broad, M. J. (2017). Governance structures, voluntary disclosures and public accountability: The case of UK higher education institutions. *Accounting, auditing & accountability journal*.

Nyahende, V. R. (2013). The success of students' loans in financing higher education in Tanzania. *Higher Education Studies*, *3*(3), 47–

61. https://doi.org/10.5539/hes.v3n3p47

Oanda, I. O. (2013). Implications of alternative higher equity and quality: The Kenyan. In D. Teferra (Ed.), *Funding Higher Education in Sub-Saharan Africa* (pp. 98–129). Palgrave Macmillan.

Okebukola, P. A. (2015). *Towards Innovative models for funding higher education in Africa*. Accra: Association of African Universities, 45-75.

Ovaska-Few, S. (2017). Drones set to invade accounting profession. *Journal of Accountancy*, *Retrieved*: January 17, 2017, from http://www.journalofaccountancy.com/newsletters/2017/jan/drones-invade-accounting-profession.html

Owusu-Mensah, I. (2015). Promoting quality university education in Ghana: The challenges of mentoring private universities. *British Journal of Education, Society & Behavioural Science*, *8*(2), 104–116.

Pandey, P., & Pandey, M. M. (2021). *Research methodology tools and techniques*.Romania: Bridge Centre.

Perks, S. (2013). *The transparent approach to costing (TRAC): A short introductory guide for senior managers and governors*. *British Universities Finance Directors Group (BUFDG)*.

PricewaterhouseCoopers. (2012). Financial statements 2012. University of Ghana (UG). UG Accra.

Rakhmonov, D. (2016). Trends of financing higher education in Uzbekistan. In International Conference on Business and Economics. *Korea Distribution Science Soceity*, Korea, 509-511

Raymaekers, W. (2014). Cryptocurrency Bitcoin: Disruption, challenges and opportunities. *Journal of Payments Strategy & Systems*, *9*(1), 1–40.

Riddell, C. (2015). Digital disruption transforming the finance sector. Retrieved March 5, 2015, from https://www.acuitymag.com/opinion/digital-disruption-transforming-the-finance-sector

Rowlands, J. (2017). University governance models. In *academic governance in the contemporary university*, Singapore: Springer, 111-128.

Sam, C. (2016). Governing higher education institutions in Singapore: An agency framework, *11*(1), 55–68. https://doi.org/10.5937/sjm11-7497

SAS Institute. (2017). Big data – what it is and why it matters. Retrieved March 5, 2018, from https://www.sas.com/en_au/insights/big-data/what-is-big-data.html

Savilla, H. (2017). Accounting, ethics, and the digital age. Retrieved March 5, 2018, from http://www.doublerule.com/u/blog-accounting-ethics-and-the-digital-age

Sazonov, S. P., Kharlamova, E. E., Chekhovskaya, I. A., & Polyanskaya, E. A. (2015). Evaluating financial sustainability of higher education institutions. *Asian Social Science*, *11*(20), 34–40. https://doi.org/10.5539/ass.v11n20p34

Schoenherr, T., Ellram, L. M., & Tate, W. L. (2015). A note on the use of survey research firms to enable empirical data collection. *Journal of Business Logistics*, *36*(3), 288–300.

Shah, P. J. (2015). Regulatory structure of higher education in India. *Centre for Civil Society Report*.Shattock, M. (2013). University governance, leadership and management in a decade of diversification and uncertainty. *Higher Education Quarterly*, *67*(3), 217–233.

Sinclair, M. S., Erb, N. M., & Braxton, J. M. (2016). Building cultural capital in first-year students at residential colleges and universities. *Strategic Enrollment Management Quarterly*, *4*(1), 2-13.

State Enterprise Audit Corporation. (2012). Audited financial statements 2012. University for Development Studies (UDS). UDS Tamale.

Tatikonda, L. U., & Tatikonda, R. J. (2001). Activity-based-costing for higher education institutions. *Management Accounting Quarterly*, *2*(2), 18–27.

Teferra. (2013). *Funding higher education in Africa: state, trends and perspectives* (D Teferra, Vol. 11). Palgrave Macmillan.

Thelin, J., & Trollinger, R. (2014). *Philanthropy and American higher education*. Springer.

Tilak, J. B. G. (2015). Global Trends in funding higher education. *International Higher Education*, 5–6. https://doi.org/10.1111/j.1475-5890.2012.00159.x

Toompuu, K. (2015). *The full costing model and Its Implementation at universities: The Case of Tallinn University of Technology*. TUT Press.

Toompuu, K., & Põlajeva, T. (2014). Theoretical framework and an overview of the cost drivers that are applied in universities for allocating indirect costs. *Procedia-Social and Behavioural Sciences*, *110*, 1014–1022. https://doi.org/10.1016/j.sbspro.2013.12.948

UNESCO Institute for Statistics. (2018). Tertiary education. Retrieved February 1, 2018, from www.uis.unesco.org/country/GH

Upping, P. U. P., & Oliver, J. (2016). Factors influencing management accounting change: a case of Thai public universities. *The Indonesian Management & Accounting Research (IMAR)*, *10*(2), 1-22.

Van Damme, D., & Van der Wende, M. (2018). Global higher education governance. In *Handbook on the Politics of Higher Education*. United Kingdom: Edward Elgar Publishing.

Watjatrakul, B. (2014). Factor affecting students, intention to study at universities adopting the 'student-as-customer' concept. *International Journal of Education Management*, *26*(6), 676–693.

Wiek, A., Bernstein, M. J., Rider, W. F., Cohen, M., Forrest, N., Kuzdas, C., Withycombe, L. (2016). Operationalising competencies in higher education for sustainable development. *Handbook of Higher Education for Sustainable Development*, 297–317.

Williams, M. (2015). *The relationship between organizational governance and faculty governance in higher education: A national study of shared*. Texas A&M University-Corpus Christi).

Yang, L., & McCall, B. (2014). World education finance policies and higher education access: A statistical analysis of world development indicators for 86 countries. *International Journal of Educational Development*, *35*, 25–36.

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