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Educational Research and Reviews

August 2020
ISSN: 1990-3839
DOI: 10.5897/ERR
www.academicjournals.org

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Vol. 15(8), pp. 433-437, August, 2020
DOI: 10.5897/ERR2020.3965
Article Number: 47B6AFD64445
ISSN: 1990-3839
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Educational Research and Reviews

Full Length Research Paper

Exploring challenges of preparing authentic English language tests in secondary and preparatory schools: The case of Gamo, Gofa and Konso zones in Southern Ethiopia

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Received 23 March, 2020; Accepted 3 July, 2020

The main objective of this research was to study challenges of preparing authentic English language tests in Ethiopian six secondary schools. The focus was to assess current challenges in the preparation of authentic and communicative language tests. To this end, interviews and FGD with English language teachers were made and hence, 61 teachers were taken as the sample for the study from six secondary schools: Arba Minch, Chamo, Konso, Chencha, Gidole and Sawla secondary and preparatory schools using available sampling technique. Finally, the finding of the study shows that teachers have problems in preparing authentic language tests because of six main challenges: Large class size, student's low motivation, teachers' language proficiency, the test setting and absence of authentic materials.

Key words: Challenges, test, authentic test.

INTRODUCTION

English is the lingua-franca with which more than half a billion people speak as a second language. To be competent in today's "Golobal Village", it is true that understanding English language and communicating by this language is a prime requirement for the international economic transactions and international relationships, and digital communications. Accordingly, the primary goal of teaching English as a foreign language (TEFL) in most EFL programs is to ease the communication throughout the world. Therefore, there is the curriculum of teaching English as a subject from grade one and making her a medium of instruction starting from high school through the University of our Country (Ethiopian) is an evidence for this argument.

Basically, the four macro-language skills: reading, writing, listening and speaking are the focus for improving student's language proficiency in the classroom teaching learning atmosphere. Thus, the advancement and

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development of the student's language proficiency can be ensured when these language skills are taught in a way they are designed to be taught. However, teaching only cannot realize the students' achievements of these basic language skills. Hence, students' performance and achievement of the language should be assessed through language testing mechanism.

It is impossible to focus on teaching alone without focusing on testing parallely. Scholars like Bachman (1990), Alderson (1991), Weir (1993) cited in Teshome (1995) and others agree that testing plays a considerable role in teaching-learning process. Testing aids teaching learning in that it helps teachers encourage their students towards learning and assists teachers to monitor their students' progress in learning, etc. Moreover, feedbacks from tests provide information to the concerned bodies to revise a program or curriculum. In line with this idea, Nuru (1992) explains "Testing is assumed to play a considerable role in such important matters as the development of curriculum objectives as well as the production of textbooks and other instructional materials." Similarly, Weir (1993) says, "A test contributes to the improvement of curriculum." In a general sense, we can say a test is another continuum of teaching and they are like two sides of the same coin.

These days, the approaches of teaching all language skills are based on the theory of communicative language teaching. Therefore, the evaluation of the students' achievements of the language skills should be based on the theory of communicative language testing, which is designed based on the theory of communicative language teaching.

Therefore, the process of realizing the students' achievement of particular language skills should be addressed through different mechanisms of communicative language testing.

It is stated that the quality of teaching English language skills can be affected by the quality of the tests. Therefore, the qualities of testing English language should be parallel to the qualities of teaching methodologies.

A number of studies were conducted on the issue of testing English language skills both at international and national levels. In connection to this, studies that are quietly related to this research work are revised, and the gaps that this study touched are addressed.

In our country, especially in higher educational institutions, scholars made a number of studies to improve the qualities of teaching and learning from time to time. In line with this, the issue of keeping the quality teaching and learning through standardized test is not well addressed. Most of the previous studies conducted in these areas were not focused on the challenges in preparing tests through communicative approach. Some of them focused on the match between teacher made test and syllabus (Abreham, 2010) and the others focused on assessing the content validity tests (Asmare, 2016; Nigussie, 2010). However as far as the researchers' knowledge is concerned, these studies were not focused on the teachers practices and perceived practices of keeping the quality of tests through authenticating the language tests. Therefore, the current study has focused on exploring the challenges in preparing the authentic language tests at secondary school level of some Gamo and Gofa high schools in Ethiopia.

MATERIALS AND METHODS

Research design

This study aimed to explore challenges of preparing authentic English language skills-tests at high school level and it was exploratory research in nature. In order to achieve the objective of the research, the researchers used qualitative data gathering methods. Specially, interview was employed to access the required data on the challenges of preparing the communicative language tests.

Sample and sampling method

The target populations of this research study were high school English teachers who were teaching grades 9 to 12 in the selected schools. Among six high schools which were selected for the study, a number of English teachers were 72. English language teachers of the schools who were teaching at high school level were taken through simple random sampling. Furthermore, schools were taken conveniently due to the assumption that schools at different sites might have different testing mechanisms, and schools of the same area might share the same experiences on their testing mechanisms. This may in turn question the validity of the research result. Accordingly, six high schools were selected as the researcher's study areas. In connection to this, Williams (2008) suggests that when the research site is convenient for the researcher, it has its own effect in determining the quality of the final findings. As a result, Chamo, Arba Minch, Sawla, Konso, Gidole and Chencha secondary schools were taken as the focus of the study areas. Therefore, the researcher took 24 English language teachers of the selected high schools using simple random sampling technique.

Data collecting tools

Since this research was qualitative in nature it used tools which are appropriate for the objectives of the study. Accordingly, the researchers used two qualitative data gathering instruments: interviews and focused group discussion.

Interview for teachers

Interview was used as the main research tool by which the required qualitative data were gathered. Information about the way in which teachers authenticate their language tests was collected using unstructured interview. The tool had enabled the researchers to collect an in-depth information face to face. Nunan (2004), Gass and Mackey (2005) and Franklin (2012) suggest that interview is flexible and you can produce extraordinary evidence about what you do not get in questionnaire. Secondly, interviews were highly interactive and responsive to the language and concepts used by the interviewee (Fontana and Frey, 2005). Thus, four English

teachers were selected for interview from each sample school. Therefore, interview was made with 24 English language teachers concerning issues connected to the practices and challenges of authentic language test preparation.

Focused group discussion (FGD)

In order to follow up the data collected through interviews, the researchers used focused group discussion. The very purpose of FGD was to get better and more in depth understanding concerning information collected through interviews. As a result, the researchers took three samples from each selected secondary schools.

Methods of data analysis

Interviews and FGD were transcribed. Then responses were classified under the coded main theme. Finally, the analysis was narrated in the way it organized under the themes or topics of the discussion.

Ethical consideration

Before starting this study, its research proposal was officially evaluated, and constructive comments were forwarded for its effectiveness. Upon the approval of the reviewers, acceptance letter was obtained from Arba Minch University Research Directorate office, and the research work was started officially. Again before collecting the research data, both the school teachers and the schools were asked for cooperation. As soon as we get the voluntariness of all study participants, data were collected, and the confidentiality of the research participants was also secured. Therefore, teacher's name was not written on the research paper, and each person was given a code.

RESULTS

The data collected through interviews and FGD was discussed. It was focused on the challenges in preparing the authentic English language tests.

I2C: Interviewee two at Chamo Secondary and Preparatory School
I2K: Interviewee two at Konso Secondary and preparatory School
I1S: Interviewee one at Yela Sawla Secondary and Preparatory School
I1A: Interviewee one at Arba Minch Secondary and preparatory school
I1G: Interviewee one at Gidole Secondary and Preparatory
I2A: Interviewee two at Arba Minch Secondary and preparatory school

To get fruitful information about the test authentication, 24 teachers chosen from the schools were interviewed to share their experience. Particularly, they were asked about, the main challenges in the authentication of tests of the four macro skills (speaking, listening, reading and writing) and the efforts they make to the minimization of the problems. Accordingly, they all confirmed that the conduct of the language test is not in practice, and even the communicative teaching approach is at a beginning stage. The interviewee-teachers explicitly stated many obstacles in the preparation and authentication of the test which results in the failure of conducting the communicative test on the ground. Above all, the interviewee teachers highly focused on six issues that challenged them in conducting the real-life language tests. Likewise, large class size, student's low motivation, teachers' language proficiency, the test setting and absence of authentic materials are the top listed problems that magnified the problem. Therefore, the following subtopics are the categorized themes based on the data gathered from the research participants.

Large class size

According to the information collected from the school teachers, having large number of students in a language class was a main challenge for the authentication of language test. As to interviewee *I2C* stated, language class is not the same as another subject class, for it needs an interaction with every student in a class. Interviewee I2K has also added that in a language class where he was teaching more than 60 students in a single class, he could not even control the misbehaving students in the language class. He said:

It is quite difficult for the language teachers to give test within a single class. For me I worry about the large number of my students before coming to the class because it is exposed to cheating and dependency. For me, a language class must not hold more than 20 students since the teacher has a chance of using only 40 minutes for a single class period. Since the classroom time could not allow me to use real life-like language test, I prefer to prepare a test which all the students can exposed to within a given time.

As of other interviewee teachers, testing the language skills they need to assess the student's performance independently where the intended use of test is to see the progress of the students. This process is quite difficult in a large class size, where it is challenging for language teachers.

Students' low motivation

Another headache of the language teachers in the language test was the students' low motivation in the course of making the test communicative. Taking speaking and writing skills tests as example, interviewee I1S, said that preparing the real life-like language test is a

headache for the teachers since students are not volunteering to make interaction in a classroom. The cumulative idea of the interviewee shows that the low motivation of the students during classroom instruction has a direct effect on the teacher's preparation of the tests. Interviewee I1A has confirmed the idea of S1 by saying, "students do not like to take spoken test or a written test as this type of test needs everyone to take a part. Rather they need to hide themselves behind some active students to be covered by their motives and efforts."

Absence of authentic teaching aid

Thirdly, absence of authentic teaching aid is raised by the interviewee focusing on both teaching and testing the four macro language skills. To illustrate, I1S has underlined the necessity of using tape recorder to imitate the native like pronunciation in teaching and testing the pronunciation which is presented in the language curriculums. As to interviewee I2C, teachers could not compare the way they pronounce some English words found in the text book and the correct pronunciation of words in English language. For this reason they lack confidence to teach and test in such a traditional way. School libraries were also not a source for variety of authentic reading materials from which teachers can prepare authentic reading texts, and thus they were dependant only on student's textbooks or some old library books.

Absence of reserved class for language students

Lastly, school setting was among the main challenge for the authentication of language test. By underlining the importance determining time and places (when and where) of the language test, the interviewees have claimed that preparing the real life language test is difficult since this kind of test is time consuming and impractical in a class of 50 or 60 students. Interviewee *I1G* said:

I personally cannot expect a real life performance from my students, where I am unable to present such kind of language teaching approach in a language classroom. There are no special classrooms prepared for the students to practice in their extra time, or additional time is not budgeted for the language teachers by which students exposed to target language use interactions.

Interviewee I1G has claimed the importance of free classroom arranged for the language class, and this is true for language class by itself needs extra places and free time in which both teachers and students got the opportunity to practice real life-like language. Hence, the absence of such facilities can directly affect the preparation of authentic language test.

Teacher's professional deficiency

Furthermore, some teachers have also pointed their fingers towards themselves for the causes of limitation on the language test authentication. They claimed that there are various problems associated to the teachers, and one reason is that teachers have not got access to short-duration trainings and continuous language professional development. Because of this they could not update their language teaching and testing methodology. According to interviewee A2A, there is no alternate reference to teacher's guide, and even, some teachers did not use teacher's guide as roadmap to teach and give a test under the umbrella of communicative language teaching and testing.

Results from the FGD also confirm that there is a misconception of teachers on test content validation. Most of the discussion groups confirmed that they do not make their emphasis on the test item representation of the syllabus objectives. Rather, they focus on the categorization of the test items into chapters of the book of syllabus. For instance respondent *I3A* stated that:

I subdivide the books chapter's as my guide of the continuous assessments. For example, if I covered chapter one in this week: might be week one or week two or whatever, I prepare a test from that chapters. I continue my work until I finish the continuous assessment from fifty percents. But I keep reserve the last two or three chapters for final exam.

From these statements, we can infer that, the content validation of the item is not a representation of item specification based on the objectives of the curriculum or syllabus. Dividing the tests by chapters can help us not to repeat the same contents on the tests in different repetitive tests (that is, continue assessments). However, the final year or semester based exam is holistic in nature and the content of the exam should be representative of all chapters' or syllabuses' objectives.

DISCUSSION

Large class size is the main issues addressed by the interviewees in the research. It was found that large class size is the cause for the academic dishonesty because it is beyond the teacher's capability to control the misbehaving students during the test. One class has more than 60 students and this number is difficult for classroom management. Therefore, the nature of authentic test needs the real life language test which needs more interactive environment.

Another important point raised in the aforementioned interview was the issue of student's motivation. In the authentic classroom atmosphere, student's motivation takes the lion share because authenticating both the language teaching and testing is impossible without student's participation. Additionally, it was found that speaking and writing skills are underlined as the neglected skills in the course of test authentication because these skills need the participation of each student and these two skills are productive skills.

Furthermore, it was found that teachers were not teaching the pronunciation in their classroom. This vacuum is created because teaching pronunciation needs direct native speakers or real like native speakers. Since the falling and rising tone can change the meaning of words, it is difficult for teachers to teach pronunciation in the absence of records of English words that are presented in the curriculum. Teacher's inability of test authentication is more exposed when the sample teachers explicitly talked about their professional gap. Accordingly, absence of continuous professional development programs, the limited reference materials in the school brought the teachers inefficiency in test authentication. In general, the discussed points were presented as the challenges for language test authentication.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

ACKNOWLEDGEMENT

The authors appreciate Arba Minch University for funding this research.

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Vol. 15(8), pp. 438-453, August, 2020
DOI: 10.5897/ERR2020.3961
Article Number: 004924E64453
ISSN: 1990-3839
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Full Length Research Paper

Development of the choir team perception scale

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Received 19 March, 2020; Accepted 13 July, 2020

The purpose of this study is to develop a valid and reliable scale to measure the team perception levels of choir members. In the first step, a draft scale comprising 54-items was administered to 332 choir members. With the KMO (Kaiser-Meyer-Olkin) test for sampling adequacy, KMO value was found to be 0.936. Factor analysis on the scale items showed that the scale comprised 34 items and 5 factors, namely choir and conductor relation, team spirit, negative emotions, responsibility and effort, emotional support and cooperation and total variance explained was found to be 56.368%. Internal consistency analysis conducted for reliability of the scale demonstrated a Cronbach alpha coefficient of 0.935 and a test retest reliability coefficient of 0.779. Linguistic equivalence tests showed that the scale and its sub-scales are adequate for both languages. Results of the study showed that the "Choir Team Perception Scale" was a valid and reliable assessment scale for measuring the team perception among choir members.

Key words: Choir Team Perception, team, teamwork, scale development.

INTRODUCTION

What is the common point of a choir and a team? Many people are not aware that both of them offer the same experiences. Teams are formations where all team work skills including leadership, cooperation, and responsibilities can be learned. One of the most important particulars relating with being in a team is to learn how to work together. Each individual should know how to work with his teammates, when to take a step or when to take a step backward. The same thing applies for a choir. All the members of a choir should learn how to use their voices, when to sing a song or when to support another sound band (Greiner, 2019). In this respect, a choir can be accepted as being a team.

Members of a choir benefit from physical, mental and social activities of the team they are part of. As being similar to various other events, being in a choir creates a platform for people to meet with other people having similar areas of interest and this can create new friendships and a fuller social environment (Kerr, 2017). There are some researches showing that singing in a choir does not only help in creating social bonds but that it also especially acts as a perfect icebreaker in a rapid way at the same time. Singing as a group is an ideal formation to join big groups and to create wider social networks (Launay and Pearce, 2015).

Findings of a research being conducted show that singers in a choir perceive choir psychologically in a more meaningful way when compared with how sporters perceive their teams. This has been explained with the feeling of being part of a group in harmony with

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synchronized performance, rather than being individuals having their own roles in a sports team. Furthermore, members singing in a choir have stated that they considered their choir to be a more consistent and meaningful social group with respect to how team sporters consider their teams (Stewart and Lonsdale, 2016). In another research, factors affecting the level of trust among choir singers have been examined and it was found out that peer interactions of choir singers had positive impact on performance quality perceived, benefiting from choir experiences, and level of trust among choir singers. Dimensions such as trust and harmony, musical and moral support, encouragement and affirmation, peer modeling, informal mentoring have been identified as important aspects of choral singers' interaction in rehearsals and performances (Bonshor, 2016). Common point desired to be emphasized in these two researches is related with positive impacts created by the feeling of being part of a team on choir members. It is required for choir members to be part of a harmonized team in order to have a good performance. However, maintaining the team's existence can sometimes create conflicts and difficulties. It can be possible to overcome these difficulties with the awareness of team structure and characteristics.

A team is constituted of people having complementary skills in line with their mutual responsibilities with regards to their common goals, performance targets, and approaches (Katzenbach and Smith, 1998). Teams enable the cooperation required to achieve the objectives exceeding individual strengths of people having adequate skills, experiences, and information; they promote their critical thinking, they include their members in events in fulfilling complex tasks requiring social support, they enable individuals to expend their limits and to achieve more success by means of social mutual dependency (Scarnati, 2001; Kocabaş and Gökbaş, 2003; Leshed, 2009; İlhan and İnce, 2015).

Members in a team can create a positive synergy by means of coordinated work. As a result of this situation, individuals coming together to realize a certain work in line with the team purpose, attain a relative freedom to manage themselves by taking responsibilities. Hence, individual efforts of team members reveal a performance level that is higher than total value of their single individual inputs. Team members make job distribution based on work sharing and they get detailed information about the works they will realize. In this way, each team member knows his area of authorization and responsibility and he can exhibit behaviors in conformity with this situation (Başaran, 2000; Çetin, 2009; İlhan and İnce, 2015).

Characteristics of a team

Characteristics of a good team member can be defined as being open to learning, diagnosing and analyzing a problem, paying attention to details, influencing, using initiative, willingness to work in an authorized environment, verbal communication, planning and organization, teamwork and cooperation, technical and professional competence, coping with stress, training, orientation and guidance, empathy, and high level of inner motivation (Baltaş, 2004). In this context, the features required to form an effective team can be listed as common goals, communication, appropriate team composition, leadership, trust, sharing of values and responsibilities and team spirit.

Team members need to know the common objectives relating with the team and future of project. Members who are interconnected, channeled within the framework of common goals, who strive intensely in achieving the goals and aim at high level of success constitute successful teams. (Ensari, 1999; Tarricone and Luca, 2002; İnce et al., 2004). Communication, being another characteristic of teams, is a tool enabling information and opinion exchange among team members and coordination of efforts and feedback (Pinto and Pinto, 1990). Another important dimension playing a role in the success of a team is related with establishment of an appropriate team. Supporting honest, trustworthy, team-respectful and affiliate members' ability to work effectively with each other and developing appropriate working methods to help reveal and improve the hidden aspects and creativity of members is important for creating successful teams (Tarricone and Luca, 2002; Öztürk, 2003). There is need for an effective leader for the management of information and skills of team members and for determing specialization requirement in a team and how to meet such requirement (Hoegl and Gemuenden, 2001; Faraj and Sproull, 2000). Leadership bears vital importance for team success with respect to important processes such as motivation of team members, development of work activities, decision taking, and problem solving (Tarricone and Luca, 2002). Team members' having trust in each other enable them to share their information and opinions more freely and to have more positive communication with each other. Having trust in a team creates a platform that enables members to cooperate in relation to dimensions of task conflicts, constructive criticism with different opinions, determination of mistakes, and elimination of problems in a mutual way. It is required for team members to be open to opposing opinions of one another and to be able to benefit from opportunities for creativity and learning revealed by these opinions (Kostopoulos and Bozionelos, 2011). Values are shaped according to different perspectives of team members relating with objectives and assignments and they influence team performance with regard to the efficiency, effectiveness and sustainability of team. In order for team members to share the same mission and vision, it is required for them to bear the same responsibility in relation to working rules

and team assignments. Shared responsibility network leads the individual to create an environment of a higher team (İnce et al., 2004; Weimar et al, 2017). Team members have an emotional and personal bond with the team in order to have a cooperation of high quality. This loyalty is the concept which is defined as team spirit and which constitutes the team's motive to act together. Motivations required to achieve team objectives is dependent on the feeling of belonging to the team. Without having this feeling, it is not possible for the individual to communicate with other members (Ensari, 1999; Weimar et al., 2017).

Choir as being a team

Chorus music aims for the individual to establish healthy relations with his musical environment by singing songs with correct and clean sounds and having musical sensitivity in a group, for him to participate in music consciously as being an interpretor and listener, and for him to contribute in cultural development by using song language (Çevik, 1997; Apaydın, 2006). Singing songs together causes important contributions to be made such as calling together, needing to speak and talk together, meeting / gathering / being a community, being in unity, organizing, giving the individual the habit of working collectively, contributing to eliminating others' mistakes and seeing their own shortcomings, being respected by respecting others, socializing, understanding the necessity of democratic values in community, developing a world view in national and international communication in art (Apaydın, 2006; Uçan, 2001).

Participating in a choir is similar to participating in a team. All the individuals in a choir are responsible for each other with regard to topics such as getting prepared and timing. Working on creating the beauty stipulated by the composer of work while signing in a choir requires a long time. Everyone signs his own part and each sound is equally important but the astounding thing is that members come together as a whole to sing in harmony without coming to the forefront individually. All choir members must be open-hearted and generous in order to present each note, sentence and melody in harmony. This situation requires one to learn to listen to others. Voice of each choir member can be correct and powerful but he should not sing louder than other choir members standing on both of his sides (Griswold, 2017; Greiner, 2019; Grummet, 2020).

Choir is a formation requiring team work and discipline. Getting prepared for concerts require much more than being disciplined to participate in weekly practices. Members coming together with the feeling of a specific purpose, develop their skills relating with listening in choir, having concentration, team work and having trust and they develop their feelings of belonging and community (The Rockville Bach Academy, 2020).

Communicating with other members, respecting and valuing them, being part of the team are some of the skills gained while signing in a choir (Griswold, 2017; O'Brien, 2018).

Choir functions as a whole but it is also a complex organism at the same time. This organism, consisting of subgroups (sopranos, altos, tenors, basses) as a whole, works only with synergistic teamwork. Each member contributes to the whole and they need to work together. As the team spirit is established, members feel more comfortable in communicating and working to evaluate each subject and to solve problems. Furthermore, members learn about each other's strong and weak aspects. In team work, individual weaknesses are covered with strong aspects of other members. In a choir, an individual feels the happiness of achieving things, which he can not achieve alone, as being part of a team. A gap created by a member is tried to be compensated without affecting the quality of the performance. Just like the case in any effective team, there is also the opportunity of cross learning in a choir. Some of the members may read music well or they may know techniques not applied by others and they can transmit fundamentals relating with them to choir members wishing to learn these (O'Brien, 2018; Laforet, 2010). The situation of testing a team is related to performance. Each practice in a choir creates an opportunity to learn team skills but a choir is not present for only making practices. Product of a choir is related with quality of sound. During the performance, it is never allowed for excitement or nervousness to shadow the works. These moments are the product of everything done by choir members and their working times and is highly important (Laforet, 2010).

Choir conductor as team leader

An important share of the choir's gains to the individual concerns the choir conductor. Individual differences in a choir are gathered under a common goal with the leadership of choir conductor and they are transformed into success. In order to make the group he is leading become successful, choir conductor should monitor the capacities and needs of individuals who are group members and he should focus on group objectives. He must know individual skills of choir members well and he shoul know each one of them closely. He should be a leader who does not act unethically and who makes continuous observations (Ersoydan and Karakelle, 2014).

Managing a choir effectively requires good organizational skills. Particulars relating with new beginners in a choir such as preparation of assessment form, rehearsal plans, space reservations, performances, and membership management, can be achieved by making planning and management in a good way. Besides, dealing with a group of people will inevitably

include being confronted with various different characters and preferences. When he is confronted with a problem, choir conductor is required to remain calm and to approach the group in a fair and diplomatic way. Another feature of a choir conductor is related with time management. It is important for him to be prepared for rehearsal before choir arrives. Furthermore, sense of wonder is one of the most important skills that a choir conductor should have. A motivated choir conductor creates exciting opportunities, he makes rehearsals become pleasant, and he always strives for development (Hopkins and Mulgrew, n.d.).

Choir conductor has a vision and an internal objective about how a work will be performed and how a sound will be created. Choir conductor provides coaching for the group and gives hints to help the choir understand what is important and where it is and finally, he is responsible from the outcome relating with the work. For this reason, choir conductor keeps the tempo which synchronizes the choir. This large, bulky organism takes action through the metronomic activity of the choir conductor. This can only be realized when choir members focus all their attention on the conductor. Allowing the choir conductor to guide the choir enables choir members to reach their goal. Following the choir conductor does not only enable coordination of everyone's efforts but it also opens new ways to review the targets and to interpret them or be successful (Laforet, 2010; Griswold; 2017).

The success of a choir under leadership or a conductor depends on the level of integrity, concentration and the ability of the team members to work with a team mindset. In this regard, certain dimensions are viewed as crucial in terms of the success of the choir. These dimensions include members' awareness of the goals of the choir and each other's skills, members' perception with regard to solving problems collectively, sharing feelings for success and failure, having a sense of trust and responsibility towards other members and the conductor, willingness to work, and being happy and proud to be a part of the choir (Küçük and Halvaşi, 2019). As a result of literature review being done, few number of studies emphasizing importance of team work in music can be found. In the study he conducted, Sağer (2002) emphasized that music education institutions must be evaluated as an organization and that it is required for this organization to bear the identity of a learning organization in order to be able to develop continuously; and he stated that this could be achieved with music education organizations allowing wide room for team work. In his study, Bulut (2006) stated that raising of quality music teachers required team work and that each worker constituting the team had an important role in the raising of quality music teachers as he would establish team spirit, motivation, performance and corporate loyalty. Uludağ (2015) determined that the group for which team work based strategies were applied in school instruments education lesson (guitar) was more successful with respect to the group for which traditional method was applied, fulfillment of responsibilities and working and interpreting the works on time. In the music lesson where Student Teams-Success Departments Technique being among Collaborative Learning Techniques and traditional teaching technique were applied by Kocabaş (2000), it was investigated whether there was a difference between self concepts of students or not. As the conclusion of research it was determined that music education provided with Student Teams-Success Divisions Technique has had positive impacts on their emotions, beliefs, attitudes, perceptions and behaviors and that it improved their self concepts (Kocabaş, 2000). As the conclusion of study conducted by Sevinç (2017) to investigate the impact of team work based teaching on the academic success of students in Music Education Main Department Branch 3rd Class Choir Class, it was observed that students in experiment group worked in the form of small groups and achieved learning by helping each other and that they had face to face interactions, that group members borne learning responsibility with regards to each other, and that there was a good working relationship among members to enable learning of each member of group at the best degree. It was found out that team work based learning had positive impact of the academic success of students. In the study conducted by Apaydınlı and Şentürk (2012), on the tendency of general high school students to behave illegally and to participate in extracurricular musical activities in their own schools, it was concluded that students who did not participate in extracurricular musical activities tend to behave more illegally than students who participated in choral and orchestral activities. In accordance with this conclusion, it was determined that a student's singing in a choir or playing an instrument in the orchestra would give him the feeling of belonging to a group and that it would transform the desire of student to make himself be accepted by aiming for violence or any illegal behavior to a positive situation by working on music together (Apaydınlı and Şentürk, 2012).

It is seen that above mentioned studies generally focus on music education and especially on team work relating with choir education and importance and impact of team perception. In this regard, availability of a measurement tool for determining effectiveness of team work and team perception bears importance. As a result of literature review being made, it was determined that general purpose scale development studies on team perception were available but that there was no private scale development study relating with the area of team perception of choir members.

Atılgan et al. (2010) aimed to determine the level of perception of elementary school managers about themselves as a team together with their teachers. To find out whether the scale having 32 items could measure the general structure (team perception) and the three

dimensions named by the experts as Loyalty and Cooperation, Team Spirit, and Job Satisfaction and Trust, a valid and reliable team perception scale made up of a general factor and three sub-factors was obtained. Lower et al. (2015) designed a Team Work Scale for Youngsters to measure the perceptions of youngsters with regards to their competencies relating to team work; it was determined that the scale was a valid and reliable measurement tool. Akın et al. (2016) conducted validity and reliance study relating with the Team Work Scale for Youngsters; it was developed by Lower et al. (2015) in Turkish form on the adolescents. The results showed that Turkish form of Team Work Scale relating to Adolescents was a valid and reliable measurement tool that could be used in academic studies. In the study conducted by Henry et al. (1999), it was determined that Group Identity Scale was a valid and reliable measurement tool of 7 degrees, having 13 items; it consisted of three factors: Affective, Behavioral, and Cognitive factors. Tendency to Team Work Scale was developed by Tuncer (2008) to determine the team members' tendency towards team work. Team Effectiveness Audit Survey development study was conducted by Bateman et al. (2002) to explain attempts to go beyond team building and associate organizational development with team activity by attaching importance to the benefits of team building activities in achieving both team and organizational effectiveness.

As it can be understood from the studies above, scale development studies relating to team work and team perception have been realized in domestic country and abroad. However, a valid and reliable measurement tool to determine team perceptions of choir members has not been found. Choir members are people coming from different cultural environments, having different creation features and expectations, and being assigned in a very important musical formation. Each one of the members forming the choir develops their own levels and knowledge accumulations by realizing both individual and collective works within this musical formation. Hence at this point, importance of works done to make choir members reach their goal, singing together while becoming a choir, and creating an integrity out of this unequal structural difference comes out (Halvaşi, 2016; Çevik, 1997). It can be stated that adoption of positive common living particulars such as production, sharing, communication, trust, loyalty, mutual support and cooperation, problem solving, friendship, and love considered to have important impact on the performance success of choir, by the choir members can be achieved by establishing team consciousness. As being the sum of these dimensions, feelings of belonging come to the forefront. In this respect, it is important to know and reveal the viewpoints of choir members relating to the team and whether they perceive themselves as part of the team or not. Hence, a need arises for a measurement tool to determine the team perception levels of choir members. Determining the team perception level of choir members will create awareness; it is an important dimension regarding choir performance and it will be possible to determine the deficiencies and probable problems regarding this subject. Based on these reasons, the study aims to develop a valid and reliable measurement tool to measure the team perceptions of choir members.

METHODOLOGY

This is a qualitative study to test validity and reliability of the potential assessment tool to be designed for demonstrating the team perception levels among choir members.

Study group

Study sample comprises a total of 332 individuals who are members of seven different choirs in Turkey, Croatia and Bosnia and Herzegovina. Study data were collected in 2018. Table 1 shows distribution of the study group members based on gender, age and choir name.

As seen in Table 1, 64.5% of the study group are females and 35.5% are males. 41.9% of choir members are in the 14-17 age group, 41% are in 18-21 age group and 17.2% are in 22 and above age group. Of the choir members comprising the study group, 16.6% are in MEF University Choir, 15.7% in Marmara University Polyphonic Choir, 3.9% in Mato Bucar Choir of Crotia, 21.1% in TRT İstanbul Radio Polyphonic Youth Choir, 3% in Bosnia and Herzegovina Bugojno Choir, 14.2% in Kocaeli University Polyphonic Choir and 25.6% in Aşık Veysel High School of Fine Arts Choir.

Validity and reliability analysis

As part of the validity analysis of the "Choir Team Perception Scale (CTPS)", the 32-item Team Perception Scale for Elementary School Administrators developed by Atılgan et al. (2010) was used to develop the draft scale and a pool of 65 items was obtained by analyzing the literature regarding team perception. For the draft scale, content analysis was carried out by three choir experts and reliability across expert views was calculated. As part of Construct Validity analysis, 54 items in the draft scale were administered to 332 choir members and exploratory factor analysis was carried out on the data obtained. In order to assess the distinctiveness of the scale items, every item in the scale and sub-scales was analyzed based on total scores and independent t-test analysis was carried out to determine the differences among the upper and lower groups. As part of the reliability analysis of the scale, for the scale as a whole and for each sub-scale, Cronbach Alpha coefficients were calculated and internal consistency analysis was conducted. For test-retest reliability, the draft scale was administered to a group of 30 individuals for a period of two weeks and Pearson Correlation Analysis was conducted to determine the relationship between two administrations. In order to ensure linguistic equivalence of the scale, Turkish and English versions of the scale were administered to a group of 30 individuals with 2 weeks period between administration of two versions and Pearson Correlation. Analysis was conducted to determine the relationship between two administrations and related sample t-test was carried out to determine the differences between two administrations of the scale. As part of the validity and reliability analysis of the scale, exploratory factor analysis and item analysis were carried out using

Table 1. Genders, age and choir names of study group.

Gender	f	%
Female	214	64.5
Male	118	35.5
Total	332	100
Age	**f**	**%**
14-17	139	41.9
18-21	136	41
22 and above	57	17.2
Total	332	100
Choir name	**f**	**%**
MEF University Choir	55	16.6
Marmara University Polyphonic Choir	52	15.7
Mato Bucar Choir of Croatia	13	3.9
TRT İstanbul Radio Polyphonic Youth Choir	70	21.1
Bosnia and Herzegovina Bugojno Choir	10	3
Kocaeli University Polyphonic Choir	47	14.2
Aşık Veysel High School of Fine Arts Choir	85	25.6
Total	332	100

SPSS 24 software and significance level for all statistical processes was assumed to be 0.05.

FINDINGS

Here, validity and reliability analyses of the Chorus Team Perception Scale are included in accordance with the purpose of the research.

Validity studies

Within the scope of validity studies, experts' opinions, content validity, construct validity, explanatory factor analysis, and discriminant validity analyses were performed.

Content validity

A 65-item scale draft created to measure the perceptions of the choir members was evaluated as content by three experts in the choral field. Reliability among expert views obtained to determine weather or not the items in the draft scale are appropriate for the target scale structure; it was calculated using the "Reliability= Consensus/Consensus + Disagreement x 100" formula defined by Miles and Huberman (1994; as cited Tavsancil and Aslan, 2001) as the internal consistency formula. Based on the coding audit that provides internal consistency, consensus among the expert views need to be at least .80 Miles and Huberman, 1994; Patton, 2002; as cited Baltacı, 2017). 11 items that remained below this rate were removed from the draft scale as a result of which the draft scale came down to 54 items following experts' views.

Exploratory factor analysis and construct validity

Exploratory factor analysis was conducted to determine the factor loads of the draft scale. Data fitness for factor analysis was determined using Kaiser-Meyer-Olkin (KMO) coefficient and Barlett Sphericity test. Kaiser-Meyer-Olkin (KMO) coefficient and Barlett Sphericity test are used to measure the adequacy of the sample to which factor analysis is applied. Kaiser-Meyer-Olkin (KMO) values falling between 0.5 and 1.0 are deemed to be acceptable values. In case the KMO value is less than 0.5, no factor analysis is applied to the data. Barlett Sphericity test is a statistical test that analyzes the levels of significance for all correlations in the correlation matrix. A statistically significant result from the Barlett Sphericity test indicates that the data are fit for use in the factor analysis (Bayram, 2004; Büyüköztürk, 2004; Altunışık et al., 2005).

Analyses conducted showed a Kaiser-Meyer-Olkin (KMO) value of 0.936, and a significance value of 0.000 ($\chi 2 = 5567.388$, $p< 0.000$) from the Barlett Sphericity test. These two values found to be statistically significant indicate that the sample size is sufficient and that factor analysis can be applied to the data. Eigenvalue is a

Table 2. Variance rated explained by the factors of CTPS

Factor	Eigenvalue	Variance (%)	Cumulative variance (%)
Factor 1	11.928	35.084	35.084
Factor 2	2.537	7.461	42.545
Factor 3	2.100	6.176	48.721
Factor 4	1.413	4.156	52.876
Factor 5	1.187	3.491	56.368

coefficient that is used both in calculating the variance explained by the factors and in deciding on the number of important factors (Yaşlıoğlu, 2017). Factors with eigenvalue of 1 and above are considered to be significant. The criteria in selecting this threshold value is that a factor should have an equal value at least with one of the variables with a variance of 1.00 (Büyüköztürk, 2002). Factor analysis conducted showed that the scale came from a five-factor structure. Table 2 summarizes the factor eigenvalues and the explained rates of variance as a result of the analyses conducted.

In Table 2, it is seen that the explained variance value for the first factor is much higher than the other factors. Eigenvalue of the first factor is 11.928, and its explained variance value is 35.084%. Eigenvalue of the second factor is 2.537, and its explained variance value is 7.461%. Eigenvalue of the third factor is 2.100, and its explained variance value is 6.176%. Eigenvalue of the fourth factor is 1.413, and its explained variance value is 4.156%. Eigenvalue of the fifth factor is 1.187, and its explained variance value is 3.491%. The total variance regarding the scale explained by these five factors is 56.368%. It is stated that the variance explained by the factor analyses needs to explain 2/3 of the total variance and that variance values ranging between 40 and 60% are accepted as sufficient (Büyüköztürk, 2004; Şencan, 2005). Because the explained variance being high is interpreted as the related concept or the structure being measured quite well (Büyüköztürk, 2002), one can conclude that the total variance of 56.368% reflects a good ratio and that it is an acceptable level for use in social sciences.

In the Scree Plot graph which is created based on the eigenvalues of the factors, the factor which shows rapid declines with high velocity gives the number of important factors. In the graph, number of factors is decided based on the point where slope disappears (Büyüköztürk, 2004; Bayram, 2004). Accordingly, below is the eigenvalue based Scree Plot graph of CTPS factors.

In Figure 1, a five-factor structure is observed. In the graph, a rapid decline is observed after the first factor. Also, it is seen that the factors after the fifth factor do not have much affect on the variance and that the contributions of the variances they bring are close. To test this observation, with the goal of associating the factors with the items, Varimax vertical rotation method which is one of the most preferred vertical (orthogonal) rotation methods was used. In this method, the angle between factor axes is ensured to be a right angle and prevailing factors are created independently (Altunışık et al., 2005). Factor load values for items under the five factors obtained as a result of the analysis conducted are given in Table 3.

Factor loading is a coefficient that explains the relationship between the items and the factors. A factor loading of 0.45 or above is a good criterion for selecting an item; however, this threshold value can be brought down to as low as 0.30. (Büyüköztürk, 2004). In this study, all of the factor loading values are above 0.54. According to analysis results, the first factor contains 9 items with factor loading values between 0.760-0.563; the second factor contains 10 items with factor loading values between 0.768-0.549; the third factor contains 7 items with factor loading values between 0.742-0.577; the fourth factor contains 4 items with factor loading values between .705-.573, and the fifth factor contains 4 items with factor loading values between 0.718-0.614. Items 2, 9, 14, 15, 16, 19, 21, 22, 23, 24, 25, 26, 29, 31, 32, 34, 41, 46, 51 and 54 were not included in any sub-dimension in terms of factor loading and were removed from the scale after factor analysis. As a result the scale that had 54 items before the factor analyses was reduced to 34 items. Following calculation of factor loading values, the next step was naming the factor dimensions obtained. The contents of the items that loaded the factors were evaluated and emphasis was placed on giving the name that would best describe the intended meaning.

Accordingly, the first sub-dimension comprising items 1, 2, 3, 4, 5, 6, 7, 8 and 9 was named Choir and Conductor Relationship. Choir and Conductor Relationship sub-dimension expresses the trust that the choir members have towards the conductor, emotional integrity and motivation created between the choir and the conductor, and the integrity achieved in terms of problem solving, success focus and musical performance. This sub-dimension contains statements such as “We fully trust our conductor for his innovative and creative ideas”, "Our conductor is always tolerant and constructive towards our mistakes” and “We would be in an emotional integrity with our conductor during the concert.”

The second sub-dimension comprising items 10, 11,

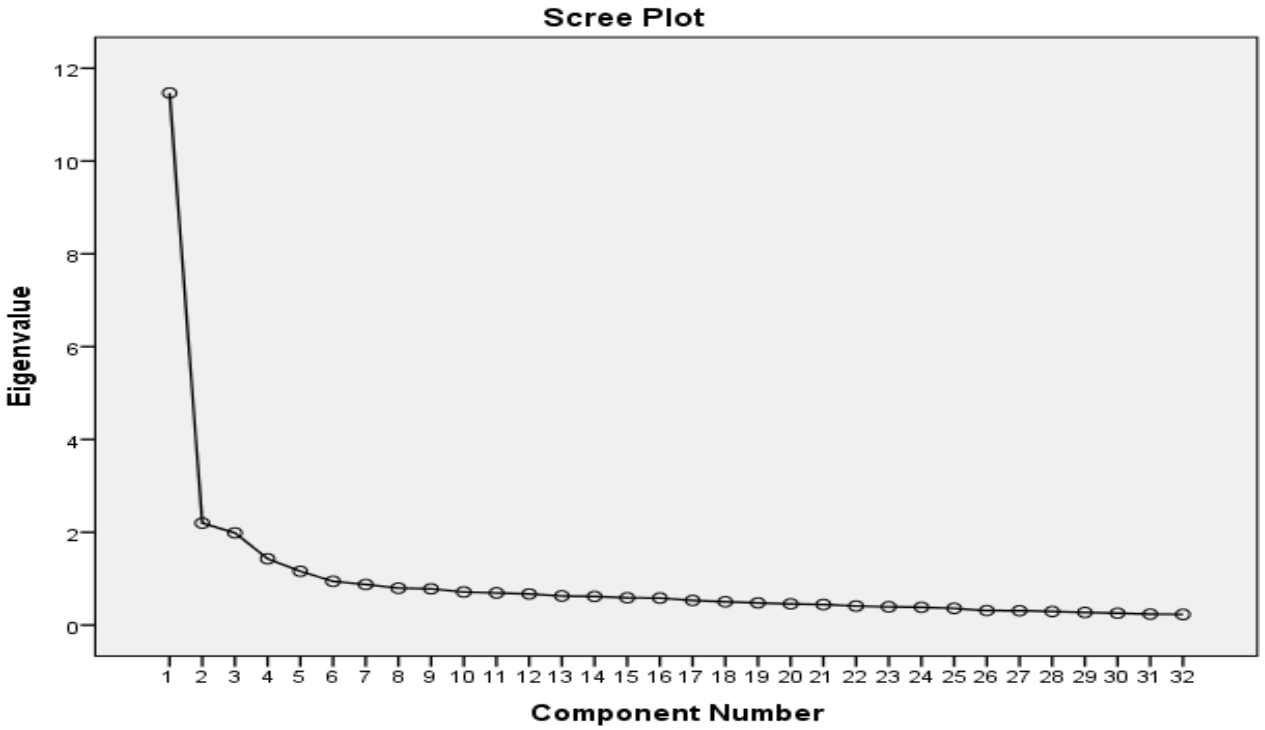

Figure 1. Scree plot graph for the eigenvalues of CTPS factors.

12, 13, 14, 15, 16, 17, 18 and 19 was named Team Spirit which indicates the awareness of being a team. Team spirit sub-dimension contains statements of choir members related to their perceptions such as happiness, pride, joy, excitement, desire to success and sense of ownership which they had as a result of being a part of the choir. This sub-dimension contains statements such as “We all support each other in order to have successful concerts”, “We get excited when singing the pieces together.” and "We enjoy being together during choir rehearsals.”

The third sub-dimension comprising items 20, 21, 22, 23, 24, 25 and 26 was named Negative Emotions which emphasizes the challenges faced during team work and the way these challenges are perceived. In another way of expressing it, expressions containing negative approaches of members, having difficulty in solving communication problems among choir members and musical mistakes, being in conformity with rules that are unique to choir, and respecting emotions and opinions and not being in conformity with them are specified under this sub-dimension. This sub-dimension contains statements such as “When we face a communication-related problem during rehearsals, we have hard time finding a solution”, “We have hard time solving our musical mistakes” and “We don’t believe emotional and mental unity is important in our rehearsals.” After the item contents of the items 27, 28, 29 and 30 in fourth sub-dimension are analyzed, this sub-dimension was named Responsibility and Effort. This sub-dimension comprises statements related to choir members’ perceptions regarding their efforts and participation in solving problems seen among choir members and regarding the sense of responsibility for reaching the success goal. Statements such as “When faced with a musical problem, we try our best until the problem is solved”, “We never miss any choir rehearsal” and “As we perform the pieces successfully, we all strive to do our parts in the best way possible” represent the Responsibility and Effort sub-dimension.

The fifth sub-dimension was named Emotional Support and Cooperation due to the meaning that items 31, 32, 33 and 34 making up this sub-dimension convey. Emotional Support and Cooperation sub-dimension defines sharing of happiness and sadness relating to the success and failures experienced by choir members as a team and the support they provide to each other to eliminate performance worries. This sub-dimension contains statements such as “We share our sadness after an unsuccessful concert”, “Performance anxiety we experience during rehearsals is minimized thanks to the support we give each other” and “We always support our soloist colleagues during concerts”. Following naming of the factor dimensions, relationships across the whole scale and among sub-dimensions were calculated. Table 4 provides the results of Pearson Correlation Analysis for overall CTPS and sub-dimensions. As seen in Table 4, a statistically significant relation with significance level of

Table 3. Factor load values for CTPS items

Item	Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
47	We fully trust our conductor for his innovative and creative ideas.	0.760				
49	We would be in an emotional integrity with our conductor during the concert	0.738				
50	Our conductor contributes a lot to our success	0.736				
45	Our conductor always guides us in the right way	0.682				
53	We agree with our conductor because of his/her musical interpretation of the pieces we sing	0.654				
43	We are a one with our conductor	0.644				
52	Our conductor is always tolerant and constructive towards our mistakes.	0.642				
44	We seek solutions together with our conductor in case of a problem.	0.591				
48	Performance anxiety we experience prior to a concert would be eased thanks to motivation provided by our conductor	0.563				
5	We all support each other in order to have successful concerts		0.768			
6	We all become proud of each other when we succeed		0.720			
7	We enjoy being together during choir rehearsals		0.694			
4	We get excited when singing the pieces together		0.692			
8	Each of us is responsible to ourselves and our colleagues during concerts and rehearsals		0.645			
3	We strive to be successful in our concerts and rehearsals		0.641			
1	We are aware of the goals of our choir rehearsals		0.584			
20	We are happy to be members of the choir		0.561			
10	We try to provide support to our colleagues who might have difficulty singing the pieces		0.551			
11	We are happy to be sharing the success we achieve in our concerts		0.549			
30	When we face a communication-related problem during rehearsals, we have hard time finding a solution			0.742		
39	We have hard time solving our musical mistakes as a group			0.662		
28	It is difficult for us to apply all the rules during rehearsals			0.637		
27	We don't trust each other's performance during live performances of the pieces we rehearsed together			0.628		
33	We don't believe emotional and mental unity is important when working together			0.612		
40	We are negatively effected by the musical mistakes of our colleagues in the group			0.595		
42	It is boring to wait and not sing while other groups rehearse.			0.577		
18	When faced with a musical problem, we try our best until the problem is solved				0.705	
17	In all our musical activities, we all strive to do our best.				0.663	
13	As we perform the pieces successfully, we all strive to do our parts in the best way possible				0.608	
12	No choir member ever misses a rehearsal				0.573	
36	We discuss the possible causes of the failures we experience during concerts and work together to fix our shortcomings					0.718
35	We share our sadness after an unsuccessful concert					0.654
38	Performance anxiety we experience during rehearsals is minimized thanks to the support we give each other					0.630
37	We always support our soloist colleagues during concerts					0.614

Table 4. The relationship of CTPS and sub-dimensions with each other

Scale and Sub-dimensions	Choir and conductor relation	Team spirit	Negative emotions	Responsibility and effort	Emotional support and cooperation
Team spirit	0.629*				
Negative emotions	0.356*	0.362*			
Responsibility and effort	0.558*	0.674*	0.372*		
Emotional support and cooperation	0.567*	0.588*	0.337*	0.569*	
CTPS	0.862*	0.828*	0.645*	0.775*	0.738*

*p<0.01.

0.01 was found between CTPS and its five sub-dimensions and among its five dimensions. After this step, discriminant validity of the items was calculated.

Discriminant validity

Discriminant validity analyses were applied to determine the extent to which the items of CTPS can discriminate between individuals based on the qualification measured. Based on scores obtained from the scale, the significance of the variances between item scores of upper 27% and lower 27% groups was assessed using the independent t-test. Variances in the desired direction among groups being significant is seen as an indicator of the internal consistency of the scale. Analysis results show the extent to which the items are able to discriminate individuals in terms of the behavior measured (Büyüköztürk, 2004). As part of discriminant validity analysis, scores obtained by 332 participants using the scale were sorted from highest to lowest. An intersection point was determined for the upper group which comprised the 90 participants that received the highest scores based on 27% value and the lower group comprising 90 participants that received the lowest score.Independent t-test was applied on the item scores, total scale scores and all sub-dimension scores of the participants in the lower and upper groups. Findings are summarized in Tables 5 and 6.

Tables 5 and 6 show that inter-group variances for scale item scores, and total scale scores and total sub-dimension scores are statistically significant. The results indicate that the items are able to measure the desired qualification within the context of the scale and all sub-dimensions. In line with these results, it can be said that the Chorus Team Perception Scale items can distinguish the choral members at a high level in terms of team perceptions.

Reliability studies

As part of CTPS's reliability assessment, internal consistency analysis and test-retest reliability calculations were made.

Internal consistency analysis

In order to calculate the reliability of the scale and all its sub-dimensions internal consistency analyses were conducted. Accordingly, Cronbach alpha coefficients for the scale and its sub-dimensions were calculated and findings are summarized in Table 7. Reliability coefficient calculated for this test being .70 and higher is perceived as being sufficient to ensure reliability of test scores (Büyüköztürk, 2004). Cronbach alpha coefficient of 0.935 calculated for CTPS in total, shows that the scale has a high level of reliability. It is seen that the Cronbach Alpha coefficient calculated for the sub-dimensions of the scale range between 0.779 and 0.904. Accordingly, it was found that sub-dimensions of the scale as well provide a sufficient level of reliability.

Test-retest reliability

Another test applied to measure the reliability of a scale is the test-retest reliability test (Altunışık et al., 2005). Accordingly, the final version of the Choir Team Perception Scale was administered to 30 choir members with two weeks of intermittence. For test-retest reliability, Pearson Correlation analyses were applied to determine the relation between two administrations of the scale and findings are summarized in Table 8.

According to Table 8, there are statistically significant relations between CTPS and sub-dimensions scores. This finding showed that CTPS and its sub-dimensions offered time-dependent test-retest reliability.

Linguistic equivalence analyses

Turkish and English versions of CTPS and its sub-dimensions were administered to the same group of 40 choir members with 2 weeks of intermittence and the variances and relations between two administrations were determined. Findings are summarized in Table 9. As seen in Table 9, while there is no statistically significant variance between the Turkish and English administrations of the CTPS and its sub-dimensions, a highly significant relation was found between the two

Table 5. Independent t-test results on CTPS's item discriminant validity

Item	Groups	n	x	sd	df	t	p
1	Upper Group	90	3.9222	0.26932	109.266	10.196	0.000
	Lower Group	90	3.0222	0.79291			
2	Upper Group	90	3.9444	0.27483	111.590	9.854	0.000
	Lower Group	90	3.1000	0.76511			
3	Upper Group	90	3.7889	0.50823	148.103	9.360	0.000
	Lower Group	90	2.8333	0.82448			
4	Upper Group	90	3.9222	0.26932	107.016	12.637	0.000
	Lower Group	90	2.7444	0.84216			
5	Upper Group	90	3.9444	0.23034	104.895	12.099	0.000
	Lower Group	90	2.9222	0.76772			
6	Upper Group	90	3.9556	0.20723	102.234	13.281	0.000
	Lower Group	90	2.8556	0.75790			
7	Upper Group	90	3.9000	0.30168	115.846	11.246	0.000
	Lower Group	90	2.9222	0.76772			
8	Upper Group	90	3.8222	0.38447	129.868	11.519	0.000
	Lower Group	90	2.7667	0.77966			
9	Upper Group	90	3.9889	0.10541	93.403	13.521	0.000
	Lower Group	90	3.0222	0.67003			
10	Upper Group	90	3.4556	0.67310	177.115	9.394	0.000
	Lower Group	90	2.4778	0.72248			
11	Upper Group	90	3.9222	0.26932	117.478	13.380	0.000
	Lower Group	90	2.9111	0.66442			
12	Upper Group	90	3.9667	0.18051	100.655	15.666	0.000
	Lower Group	90	2.7667	0.70392			
13	Upper Group	90	3.8111	0.47154	154.439	10.982	0.000
	Lower Group	90	2.8222	0.71230			
14	Upper Group	90	3.9778	0.14823	96.300	13.279	0.000
	Lower Group	90	2.9333	0.73132			
15	Upper Group	90	3.7000	0.62621	166.157	10.598	0.000
	Lower Group	90	2.5444	0.82327			
16	Upper Group	90	3.4889	0.72274	171.129	7.470	0.000
	Lower Group	90	2.5889	0.88552			
17	Upper Group	90	3.4667	0.69022	174.622	9.318	0.000
	Lower Group	90	2.4333	0.79394			
18	Upper Group	90	3.8111	0.49479	141.732	12.813	0.000
	Lower Group	90	2.4667	0.86375			

Table 5. Contd.

19	Upper Group Lower Group	90 90	3.6889 2.7333	0.55373 0.73132	165.804	9.882	0.000
20	Upper Group Lower Group	90 90	3.8556 2.8222	0.35351 0.78723	123.491	11.360	0.000
21	Upper Group Lower Group	90 90	3.9222 3.0778	0.26932 0.69067	115.454	10.806	0.000
22	Upper Group Lower Group	90 90	3.8778 2.7556	0.32938 0.75418	121.759	12.936	0.000
23	Upper Group Lower Group	90 90	3.5444 2.5667	0.58369 0.80797	162.011	9.306	0.000
24	Upper Group Lower Group	90 90	3.7667 2.9000	0.58155 0.56190	177.790	10.167	0.000
25	Upper Group Lower Group	90 90	3.2000 2.2111	0.86375 0.85452	177.979	7.721	0.000
26	Upper Group Lower Group	90 90	3.9889 2.9667	0.10541 0.75625	92.457	12.701	0.000
27	Upper Group Lower Group	90 90	3.9556 2.9778	0.20723 0.61768	108.786	14.238	0.000
28	Upper Group Lower Group	90 90	3.9111 2.9444	0.46554 0.72455	151.785	10.648	0.000
29	Upper Group Lower Group	90 90	3.9444 2.7889	0.27483 0.74191	112.974	13.856	0.000
30	Upper Group Lower Group	90 90	3.7444 2.8889	0.75790 0.66102	174.772	8.071	0.000
31	Upper Group Lower Group	90 90	3.8556 2.8778	0.48716 0.71623	156.832	10.709	0.000
32	Upper Group Lower Group	90 90	3.9889 3.0556	0.10541 0.69284	93.118	12.634	0.000
33	Upper Group Lower Group	90 90	3.8222 2.9556	0.57236 0.73303	168.114	8.841	0.000
34	Upper Group Lower Group	90 90	3.9333 2.7222	0.25084 0.71936	110.328	15.081	0.000

administrations. This finding showed that the scale and its sub-dimensions are suitable for use with both languages.

DISCUSSION

A team is generally related to the act of improving quality

Table 6. Independent t-test results on discriminant validity of CTPS and its sub-dimensions.

Factors and CTPS	Groups	n	x	sd	df	t	p
Choir and conductor relation	Upper Group	90	39.7111	0.45579	91.258	26.795	0.000
	Lower Group	90	28.2111	4.04607			
Team spirit	Upper Group	90	35.8889	0.31603	90.591	30.489	0.000
	Lower Group	90	25.1000	3.34210			
Negative emotions	Upper Group	90	25.1778	1.59759	148.448	31.248	0.000
	Lower Group	90	15.1778	2.58160			
Responsibility and effort	Upper Group	90	15.7333	0.44469	105.908	33.651	0.000
	Lower Group	90	10.4000	1.43629			
Emotional support and cooperation	Upper Group	90	15.8111	0.39361	99.538	29.933	0.000
	Lower Group	90	10.5667	1.61489			
CTPS	Upper Group	90	128.9667	3.54886	113.901	32.218	0.000
	Lower Group	90	94.8667	9.39304			

Table 7. Reliability coefficients for CTPS and its sub-dimensions

Factors and CTPS	Number of Items	Cronbach alpha coefficient
Choir and conductor relation	9	0.895
Team spirit	10	0.904
Negative emotions	7	0.784
Responsibility and effort	4	0.798
Emotional support and cooperation	4	0.779
CTPS	34	0.935

and efficiency at organizational level, by a group of people sharing and combining their skills, talents and information. Without doubt, to achieve this development, it is required to give authorization and responsibilities to team members. Furthermore, basic components such as common and shared goals, commitment, values, norms, rules and work habits, and mutual responsibility and cooperation are also required (URL, 2019).

Music is present in all human cultures in the world. Presence of music in social environments ranging from religious rituels to football games in a frequent way, makes one consider that music can be an evolved behavior to create communal harmony. People are interested in the unity and sincerity seen by singing songs with others and in the connections they have with one another. Choir makes people come together with a feeling of purpose. It makes people of every age and region to become informed about life experiences of other people in the choir and to form bridges for social gaps. Members in the choir gain a very special value by contributing to the success of a group through singing together while it would not be possible for them to achieve this individually (Launay and Pearce, 2015; O'Brien, 2018; The Rockville Bach Academy, 2020).

In this study, concepts of choir and team have been identified and common points among these two groups have been emphasized. In this respect, Choir Team Perception Scale has been developed to determine their opinions about whether they perceived themselves as a part of the team or not and whether they possessed the skills required for being a team. Choir Team Perception Scale (CTPS) measures team perception levels of choir members in relation to the choir. When the literature is reviewed, it was seen that there are scale development studies with general purpose to measure team perception (Henry et al., 1999; Bateman et al., 2002; Tuncer, 2008; Atılgan et al., 2010; Lower et al., 2015; Akın et al., 2016), but that there was no team perception scale which was developed as being private for choir area. For this reason the study bears importance with respect to developing a scale that is private for the field.

The draft scale comprising a total of 65 items went through content analysis by 3 choir experts; 11 items which were found not to be adequate for the targeted

Table 8. Findings of pearson correlation analysis.

CTPS and factor	Pearson correlation coefficient	
	r	p
Choir and conductor relation	0.849	0.000
Team spirit	0.434	0.017
Negative emotions	0.881	0.000
Responsibility and effort	0.846	0.000
Emotional support and cooperation	0.758	0.000
CTPS	0.779	0.000

Table 9. Findings of related group t-test and pearson correlation analysis

Scale	Group	Related group t test						Pearson correlation coefficient	
		n	Mean	sd	df	t	p	r	p
CTPS	Turkish	30	115.000	10.65	29	0.326	0.747	0.768	0.000
	English	30	114.566	10.71					

scale structure were removed and validity and reliability analyses were started on the initial trial version with 54 items. As a result of the KMO (Kaiser-Meyer-Olkin) test of sample adequacy applied to determine the adequacy of the draft scale for factor analysis, KMO value was found to be .936. As a result of the factor analysis conducted, it was found that CTPS explained 56.368% of total variance and comprised, 34 articles (Annex Table 1) and five sub-dimensions. Sub-dimensions were named as Choir and Conductor Relation, Team Spirit, Negative Emotions, Responsibility and Effort, Emotional Support and Cooperation. Highly significant relations were found across the overall scale and among its sub-dimensions. Item discriminant analyses of the scale showed that variances among groups for item scores, total scale scores and total scores for all sub-dimensions were statistically significant and measured the intended qualification. Cronbach Alpha coefficient of the scale was calculated to be 0.935. It was found that the scale provided test-retest reliability and the linguistic equivalence analyses showed that the scale was adequate for use with both languages. The scale is a 4-point Likert type assessment tool using responses of “StronglyAgree”, “Agree”, “Disagree” and “Strongly Disagree”. The highest score that can be obtained from the scale is 136 while the lowest is 34. High scores obtained indicate that the choir members have high level of team perception. Based on these findings, it is found that Choir Team Perception Scale (CTPS) developed to measure team perception levels among choir team members is a valid and reliable assessment tool. With its current format, the scale qualifies for use in assessment of choir team perception levels among members of polyphonic youth and adult choirs.

Conclusion

In the studies to be conducted in the future, CTPS can be used as a measurement tool to determine probable differences between team perceptions of choir having different cultural structures and to determine the relationship of team perception with concepts such as emotional intelligence and organizational communication. Furthermore, it can be recommended that CTPS should be used as a data collection tool to evaluate affective dimensions of approaches in experimental researches aiming to determine the impacts of cooperative learning and team based learning approaches on the success of choir.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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Annex Table 1. Choir team perception scale (CTPS).

Item No	Items	Strongly Disagree	Disagree	Agree	Strongly Agree
1	We are aware of the goals of our choir rehearsals.				
2	We strive to be successful in our concerts and rehearsals.				
3	We are happy to be sharing the success we achieve in our concerts.				
4	We have hard time solving our musical mistakes as a group.				
5	We seek solutions together with our conductor in case of a problem.				
6	We are happy to be members of the choir.				
7	We always support our soloist colleagues during concerts				
8	We don't believe emotional and mental unity is important when working together.				
9	Performance anxiety we experience prior to a concert would be eased thanks to motivation provided by our conductor.				
10	In all our musical activities, we all strive to do our best.				
11	Our conductor contributes a lot to our success.				
12	No choir member ever misses a rehearsal.				
13	We all become proud of each other when we succeed.				
14	We try to provide support to our colleagues who might have difficulty singing the pieces.				
15	Our conductor always guides us in the right way.				
16	When we face a communication-related problem during rehearsals, we have hard time finding a solution.				
17	As we perform the pieces successfully, we all strive to do our parts in the best way possible.				
18	We enjoy being together during choir rehearsals.				
19	We are negatively effected by the musical mistakes of our colleagues in the group.				
20	We would be in an emotional integrity with our conductor during the concert.				
21	We share our sadness after an unsuccessful concert.				
22	It is difficult for us to apply all the rules during rehearsals.				
23	Our conductor is always tolerant and constructive towards our mistakes.				
24	We all support each other in order to have successful concerts.				
25	We don't trust each other's performance during live performances of the pieces we rehearsed together.				
26	We fully trust our conductor for his innovative and creative ideas.				
27	We discuss the possible causes of the failures we experience during concerts and work together to fix our shortcomings.				
28	We get excited when singing the pieces together.				
29	We are a one with our conductor.				
30	It is boring to wait and not sing while other groups rehearse.				
31	Performance anxiety we experience during rehearsals is minimized thanks to the support we give each other.				
32	We agree with our conductor because of his/her musical interpretation of the pieces we sing.				
33	When faced with a musical problem, we try our best until the problem is solved.				
34	Each of us is responsible to ourselves and our colleagues during concerts and rehearsals.				

Vol. 15(8), pp. 454-464, August, 2020
DOI: 10.5897/ERR2020.4018
Article Number: B2CC28C64493
ISSN: 1990-3839
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Assessment of stakeholders' views on accessing quality and equity of basic education in rural communities of Abia State, Nigeria

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Received 13 June, 2020; Accepted 28 July, 2020

This study aims to analyze the views of stakeholders on access to quality and equity in Basic Education in selected rural communities of Abia State, Nigeria. The study used mixed method design (quantitative and qualitative) in drawing views of a stratified sample of 432 stakeholders in the quantitative study and 72 participants of six focus group discussions. The study found out that access to quality and equity in Basic Education in the rural communities was significantly inadequate ($p < 0.025$) resulting from lack of qualified teachers, inadequate safety of the environment, poor facilities, very little involvement by government in maintaining the schools, learners reluctance to do their works and indiscipline, little or no stakeholders' involvement in the schools affairs. Stakeholders' involvement (most of who are parents) and their level of education were shown to be significant indicators of access to quality and equity in Basic Education although the schools were not exploiting these assets. The study concludes that if access to quality Basic Education is to become real in the rural communities, the Ministry of Education, Local Government Education Boards, stakeholders and communities need to establish strong collaboration and coordination of the activities to improve the conditions of the schools. Programmes that can assist parents and assist learners in their homework and instil morals in the learners need to be worked out by the education authorities.

Key words: Challenges, rural communities, quality education, equity, access.

INTRODUCTION

A good quality education is one that provides all learners with capabilities they require to become economically productive, develop sustainable livelihoods, contribute to peaceful and democratic societies and enhance individual well-being. Slander (2016) defined Quality Education as one that is pedagogically and developmentally sound and educates the learner in becoming an active and productive member of society. A Quality Education is not one that is measured purely by a test score or by how many words per minute a 5-year-old can read (Slade, n.d). Two leading educational organisations, Association for Supervision and Curriculum Development (ASCD) and Educational International (EI) defined quality education as: "Education

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that focuses on the whole child-the social, emotional, mental, physical, and cognitive development of each learner regardless of gender, race, ethnicity, socioeconomic status, or geographic location (equity). It prepares the child for life, not just for testing. It provides resources and directs policy to ensure that each child enters school healthy and learns about and practices a healthy lifestyle in an environment that is physically and emotionally safe for students and adults. The child has to have access to personalized learning and is supported by qualified, caring adults, and is challenged academically and prepared for success in college or further study and for employment and participation in a global environment (Slander, 2016; Slade, n.d). A quality education provides the outcomes needed for individuals, communities, and societies to prosper. It allows schools to align and integrate fully with their communities and access a range of services across sectors designed to support the educational development of their learners" (Slander, 2016; EFA Global Monitoring Report, 2005; UNICEF, 2000). The Jomtien Declaration in 1990 and more particularly, Dakar Framework for Action in 2000 recognized that Education for All policy cannot be achieved without the improvement of its quality.

There are three key pillars that support quality education: access to quality teachers; use of quality learning tools and professional development; and the establishment of safe and supportive quality learning environments. A study by Ng (2015), which examined how middle leaders in Singapore schools understand 'quality education' and how they think quality education can be achieved, referred to quality education as one that emphasises holistic development, equips students with the knowledge and skills for the future, inculcates students with the right values and imbues students with a positive learning attitude. Such quality education must be delivered by good teachers, enabled by good teaching and learning processes and facilitated by a conducive learning environment and stakeholders' participation.

Access to quality and equity in Basic Education means that personal or social circumstances such as gender, ethnic origin or family background, are not obstacles to learners attending schools and that all individuals reach at least a basic minimum level of skills (OECD, 2012). Motala (2015) argues that despite improvements in both quality and practice, and significant resource allocation, educational access can be hampered by level of attendance, limited in terms of grade progression, unsatisfactory in terms of the age grade norms, poor in terms of quality and inefficient in terms of learning outcomes. Dryden-Peterson (2009) identified barriers preventing access to primary education to include under-investment in education, exclusion related to individual and group level characteristics, and systemic discrimination in policies and practice. Thus physical access to primary school is not meaningful unless it results in sustained enrolment and regular attendance, progression through the appropriate ages and meaningful learning that has utility (Dryden-Peterson, 2009).

Quality education is a complex issue that cannot be easily quantified by test scores or examination grades but embraces a conglomeration of issues such as good environment, health care situation of the learners and an assessment of outcomes on how well the learners are performing after they have left the educational institution; government spending on education, student/teacher ratios, teacher qualifications, test scores, and the length of time students spent in school (Slade, n.d.; ASCD and EI, n.d.).

The rural community schools represent those schools that are usually neglected by most governments in terms of infrastructure, environmental care, access roads, water and sometimes electricity and quality teachers (du Plessis and Mestry, 2019). Yet they have many learners who are expected to write the same examinations and move into the same job market as those from schools in urban areas, where the conditions are far better. Hardly has there been any effort to assess the level of access to quality and equity in the rural schools of Abia State, Nigeria. An assessment of the access to quality and equity in Basic Education requires that we focus on a number of issues: Quality Learners, Good Health and Nutrition of learners, Family Support for Learning, Regular Attendance for Learning, Quality Learning Environments, Class size, Quality of school facilities, Peaceful, Safe Environments, especially for girls, Inclusive environments, Teachers' behaviours that affect safety, Life Skills, Teacher Competence and School Efficiency, Continuing Support for Student-centred Learning, School management and Professional Learning for Teachers (Madani, 2019).

Many studies conducted on quality education by Seginer (2006); Barge and Loges (2003); and Madani (2019) have concentrated on role of parents and learners' academic performance without consideration of the holistic views of the stakeholders from the rural communities and outside the community including education officers and inspector of schools. Yet stakeholders' participation especially those at the community level ensure, among others, that community members are sensitized and educated on the importance of education and education policies. They take measures to assist in providing and monitoring educational facilities and activities, embark on school projects through communal labour, provision of teaching and learning materials for pupils, ensure adequate supply and motivation of teachers, They sometimes meet to draw action programmes for school improvement; can check punctuality and regularity of both teachers and pupils to school; ensure good sanitation and security in schools, and monitor school activities to address their problems if given the opportunity (GES, 2000;GAIT II, 2005). The opinions of the stakeholders are key to the formulation of appropriate policies to enhance access to quality and

equity in Basic Education. Stakeholders, when they partner with schools and school management, can contribute to learning achievement in schools as setters of policy and providers of support (Deep Dive Report, 2016). It is important that their views on current position of access to quality and equity especially in the rural communities are analysed. This view, which is based on the Human Relations School of organization theory (Scott, 1998), believes that if stakeholders, in a particular decision outcome, are involved in crafting the decision, they will understand the decision better and be more committed to making it work.

This paper, which is an off-shoot of a larger study, analyzes the views of stakeholders (parents, teachers, learners, community leaders, inspector of schools and politicians) on access to quality and equity in Basic Education in selected rural communities of Abia State, Nigeria. The paper specifically answers the following questions: 'Do the rural community schools have access to quality and equity in Basic Education?' What are the challenges that the rural communities have in accessing quality and equity in Basic Education? Do the socio-demographic characteristics of the stakeholders have any effect on the access to quality and equity in Basic Education? The outcome of this analysis of stakeholders' views can pave way for new interventions and policies by the Ministry of Education to improve access to quality and equity in Basic Education in the rural communities. The stakeholders can also become more conscious of what constitutes their roles in the education of their children and what constitutes quality in education.

Conceptual framework

This paper is conceptualized based on Epstein (2011)'s theory of "overlapping spheres," which highlight the overlapping roles of parents, schools and communities. The framework is also based on the management theories. Ansell and Gash (2007) define the conditions necessary for collaborative governance and brings public and private stakeholders together in collective forums with public agencies to engage in consensus-oriented decision making, while Kania and Kramer (2011)'s theory of collective impact outlines the conditions for effective collaboration for positive, community change. The theory illustrates an example of collective impact, the commitment of a group of important actors from different sectors to a common agenda for solving a specific social problem. Epstein's overlapping spheres of influence model places the child/student in the middle while the spheres of influence are: school, family, and community. Thus the stakeholders' roles in ensuring quality and equity in Basic Education require the partnering of different groups and demands that each be assigned specific tasks to be accomplished in the interests and well-being of the learners. In the bid to create access to quality and equity in Basic Education, the family, parents, community, schools, Education Managers, each has defined roles in making the child become a useful product, but the different activities and assignments are not mutually exclusive but act jointly to achieve the overall goal of child development.

METHODOLOGY

The study used the mixed method research design (quantitative and qualitative), and targeted all stakeholders from six rural communities in Arochukwu and Ohafia Local governments areas of Abia State, Nigeria. The Creative Research Systems (2012), a sample size calculator, gave a statistically acceptable sample size of 516 for the population of Abia State, Nigeria, at 95% confidence interval and a margin of error of 5%. The qualitative and quantitative methods are used simultaneously to complement each other (Teddlie and Tashakkori, 2009; Denzin, 2009) in order to get reliable results.

A multi-stage stratified sampling was used in the study. At the first stage, Abia State was purposively selected from the 36 States in Nigeria because of its peculiarity in having backward rural communities. At the second stage, two Local Government Areas, Arochukwu and Ohafia were randomly selected from the 17 Local Government areas of the state. In the third stage, six rural communities, two from Ohafia and four from Arochukwu Local Government areas were randomly selected for the study. The sample size of 516 stakeholders was equally allocated to the six rural communities ((Table 1).

The snow ball sampling technique (Vogt, 1999) was used in identifying stakeholders from the selected rural communities because of non-availability of sampling frames for this population of stakeholders. However, only 432 stakeholders responded to the survey (Table 1) giving a response rate of 84%. This is very much higher than Arber (2001), who recommended an achievable and acceptable rate of approximately 75% for interviews and 65% for self-completion postal questionnaires (Kelley et al., 2003). There was however an oversampling from Okpo rural community to make up for the shortfalls from the other communities as a result of reluctance to participate by stakeholders

Data were collected using questionnaire administered to the selected stakeholders by trained research assistants who were recruited from the rural communities. The questionnaire was translated into the local language (Igbo) to facilitate use by those who might not understand English Language. The content of the questionnaire and objectives of the study were explained to the stakeholders and they were informed that participation was not compulsory and assured of confidentiality of the information supplied and anonymity, as the questionnaire did not contain any names of participants. Those who accepted to participate in the study completed a consent form before the interview. One Focal Group Discussion (FGD) was held in each of the six rural communities with 12 members in each group. The Cronbach's alpha reliability of the instrument was calculated as 0.89. The collected quantitative data were analyzed using descriptive (percentages, means and correlations) and inferential statistics (multinomial logistic regression analysis, Chi-square and t-tests). The qualitative data were analyzed using content analysis.

Ethical review

The study was approved by the Abia State Institutional Research Review Board of the Ministry of Education before being

Table 1. Distribution of sample size to studied population.

State	Population	Local government area {LGA}	Rural communities	Proposed sample size	Achieved sample size
Abia	3,256,600	Arochukwu	Okpo	86	102
			Umuzomgbo	86	79
			Achara	86	73
			Umuchiakuma	86	59
		Ohafia	Elu Ohafia	86	68
			Ebem Ohafia	86	51
Total				516	432

administered on the stakeholders.

RESULTS

Knowledge of access to quality education

To determine perception of the stakeholders on access to quality and equity in Basic Education, they were asked the question: 'Do you think that you have access to quality Basic Education in your community schools?' Participants were given three choices to respond to the question, namely: 1=Yes, 2 = No and 3 = Don't know. Two in every three males (67.7%) and a little more than three in every four females (78.8%) answered yes.

Adequacy of access of access to quality and equity in basic education

To determine whether or not access to quality and equity in Basic Education is adequate, the stakeholders in the field study were asked to ascertain how adequate certain characteristics (indicators of quality and equity in basic education) were in the rural community schools using thirty seven items question response on a five-point Likert scale, 1=Very inadequate; 2= Inadequate; 3= Undetermined; 4= Adequate; and 5= Very adequate.

The mean responses to each item and the standard error (standard deviation of the mean) were computed using the SPSS programme. Means that are less than three indicate that access is either inadequate or very inadequate while means that are greater than three indicate that access is adequate or very adequate. The following null (H_0) and alternate (H_1) hypotheses were tested.

H_0: Access to quality and equity in Basic education in the schools of the selected rural communities is significantly adequate;
H_1: Access to quality and equity in Basic education in the schools of the selected study rural communities is significantly inadequate.

In order to test the hypothesis, a t-test was run to determine whether there is adequate access to quality and equity in Basic Education in the rural communities. The t-value for each item was obtained from the formula (1),

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}} \quad (1)$$

Where $\bar{\times}$ is the mean response for each item and μ is the hypothetical mean which in this case is equal to 3 (the average of the scale 1, 2, 3, 4, 5); *s* is the standard deviation of the scores on each item and *n* is the number of cases per each item. A test of hypothesis of the adequacy of access to quality and equity in Basic Education is carried out using the t-values calculated from equation (1) at the 5% level of significance. A negative t-value is an indication that item mean is less than the theoretical mean of three and therefore access is inadequate. A positive value of t indicates that access is adequate. The p-values (significance probabilities) generated by the SPSS are compared with the 5% level of significance. A p-value less than 2.5% (two tailed test) means that the test is significant whereas a p-value greater than 2.5% implies that the test is not significant. The results are shown in Table 2.

The mean scores of the participants were obtained and two-sided t-tests were carried out for each of the items that were used as indicators of quality and equity in Basic Education. A 95% confidence level was set for the difference in mean score of each indicator. The results show that all the t-values are negative which meant that the mean score for each indicator is significantly less than three; that is, access to quality and equity in Basic Education in the rural schools is significantly inadequate ($p < 0.025$). This is supported by the 95% confidence intervals which do not contain the value zero in the difference between the mean scores and the test value of three, but are all negative (less than zero). The mean difference between the item means and the test means of

Table 2. Test of adequacy of access to quality and equity in Basic Education in the rural communities (Test value: mean = 3).

Indicators of quality and equity in Basic education	Description of indicators	Mean $(\bar{\times})$	Standard error of the mean $\frac{s}{\sqrt{n}}$	Mean difference $(\bar{x}-\mu)$	T= $\left(\frac{\bar{\times}-\mu}{\frac{s}{\sqrt{n}}}\right)$	d.f.	p-value (2-tailed)	95% confidence interval of the difference	
								Lower	Upper
Security	Safety of teachers and learners	2.55	0.062	-0.45	-7.26	426	0	-0.57	-0.33
	Crime free area	2.33	0.054	-0.67	-12.58	430	0	-0.78	-0.57
Environment	Pipe borne water	1.88	0.044	-1.12	-25.29	429	0	-1.21	-1.04
	Electricity supply to the school	1.72	0.045	-1.28	-28.81	430	0	-1.37	-1.19
	Access to healthcare	1.76	0.042	-1.24	-29.38	430	0	-1.32	-1.16
	Access to good toilet system	1.75	0.041	-1.25	-30.75	425	0	-1.33	-1.17
	Access to good road to the school	1.84	0.048	-1.16	-24.25	429	0	-1.26	-1.07
	Availability of transport to school	1.83	0.041	-1.17	-28.65	430	0	-1.25	-1.09
	Playground/fields for games	1.96	0.048	-1.04	-21.67	411	0	-0.68	-0.44
	Ventilations in each classroom	2.03	0.049	-0.97	-19.80	430	0	-0.89	-0.67
	Number of schools in the community	2.03	0.043	-0.97	-22.56	428	0	-1.13	-0.95
Teacher	Quality teachers	2.05	0.048	-0.95	-19.79	425	0	-1.06	-0.87
	Number of teachers in the schools	2.18	0.050	-0.82	-16.40	430	0	-1.05	-0.88
	Number of qualified teachers	2.48	0.055	-0.52	-9.45	424	0	-1.04	-0.85
	Use of local language for instruction at the lower classes.	2.47	0.055	-0.53	-9.64	425	0	-0.77	-0.57
	Good adaptation to the national curriculum	2.22	0.055	-0.78	-14.18	424	0	-0.79	-0.6
	Record keeping by teachers and head teachers	2.44	0.060	-0.56	-9.33	423	0	-0.44	-0.23
	Teaching as well as practice of equity in dealing with students	2.02	0.048	-0.98	-20.42	425	0	-0.36	-0.12
	Number of subject teachers e.g. Maths, Physics, Chemistry, Biology and others	1.93	0.048	-1.07	-22.29	429	0	-0.92	-0.72
Facilities	Capacity of each school	1.63	0.039	-1.37	-35.13	429	0	-0.63	-0.41
	Number of classrooms	1.58	0.040	-1.42	-35.50	427	0	-0.64	-0.42
	Good Principal /Headmaster's office	1.61	0.040	-1.39	-34.75	427	0	-1.08	-0.89
	Good Teachers' offices	1.64	0.039	-1.36	-34.87	427	0	-1.16	-0.97
	Computers for students and teachers	1.72	0.044	-1.37	-31.05	428	0	-1.44	-1.29
	Laboratories for science lessons	1.80	0.048	-1.20	-25.00	427	0	-1.50	-1.35
	Library facilities	2.02	0.053	-0.98	-18.49	429	0	-1.47	-1.31
	Supply of quality books to students/learners	1.77	0.044	-1.33	-30.30	429	0	-1.44	-1.29

Table 2. Contd.

	Supply of writing materials (exercise books)	1.78	0.048	-1.22	-25.42	427	0	-1.37	-1.2
	School buildings	2.08	0.050	-0.92	-18.40	426	0	-1.30	-1.11
Discipline	Discipline in the schools	2.28	0.043	-0.72	-16.74	426	0	-1.08	-0.87
Government involvement	Assistance to learners from Government	2.01	0.046	-0.99	-21.52	428	0	-1.32	-1.15
	Assistance to the schools from Government	2.09	0.046	-0.92	-20.00	355	0	-1.32	-1.13
	Parental assistance to learners at home	2.28	0.047	-0.72	-15.32	424	0	-1.02	-0.83
Parental involvement	Social economic status of the parents.	2.33	0.050	-0.68	-13.60	425	0	-0.81	-0.64
	Parental involvement in learners' education	2.31	0.048	-0.69	-14.38	425	0	-1.08	-0.9
	Parental level of education	2.66	0.053	-0.34	-6.42	423	0	-1.00	-0.82
Learner	Learners' commitment to their studies.	2.76	0.059	-0.24	-4.07	424	0	-0.81	-0.62

three are also negative further supporting that the access to quality and equity Basic Education is inadequate.

The results show that although the stakeholders think that they have access to quality and equity in Basic Education but what constitutes quality education, namely safety of learners and teachers, facilities, quality of teachers and teaching, discipline, governance of schools, parental involvement in the schools and learners' commitment to their studies are all grossly inadequate.

Furthermore, in this section the study answered the question, 'Do the socio-demographic characteristics of the respondents have any effect on the access to quality and equity in Basic Education?' The Multinomial Logistic Regression Model was fitted to the responses with access to quality and equity in Basic Education as the dependent variable and gender, marital status, highest educational qualification of the respondents, parental involvement in education and distance to school as independent variables. The log odds of the outcomes are modelled as a linear combination of the independent variables. Table 3 shows the coding of the dependent and independent variables.

The means of the gender, marital status, highest educational qualification of the respondents and distance to school as independent variables attributes have been combined to provide a common mean for the independent variables thus forming the covariate in the fitting of the model. The overall fitted model was tested using the Likelihood Ratio tests and shown to be adequate in explaining access to quality and equity in Basic Education. Thus jointly, gender, marital status, the highest educational level of stakeholders, parental involvement and distance to school contribute significantly ($p < 0.05$) in explaining access to quality and equity in Basic Education (Table 4). However, the variables explained only 24% of the variation in access to quality and equity in Basic Education ($R^2 = 0.24$) showing that there are other variables (not considered in this study) which also help to explain access to quality and equity in Basic Education. The test of significance of individual variables (independent variables) in predicting access to quality and equity in Basic Education is shown in Table 5.

The test of significance of the individual demographic variables shows that highest educational qualification, parental involvement and distance of learners' homes from school significantly ($p < 0.05$) predict access to quality and equity in Basic Education when the other variables are held constant; whereas gender and marital status are not significant ($p > 0.05$). This means that highest educational qualification of the stakeholders, who are mostly parents and their involvement/participation in the children's education (paying their fees, morally supporting them, communicating expectations to them, providing food and taking them to school) have great impact in the children performing well in

Table 3. Coding of variables.

Variable type	Variable	Coding
Dependent	Have you access to quality and equity in Basic Education?	1=Yes, 2=No, 3= Don't know
Independent	Gender	1= Male; 2 = Female
	Marital status	1=Never married; 2 = Married; 3 = Divorced/Widowed
	Highest educational level	1=Primary Certificate; 2= Secondary School Certificate; 3 = GCE O'Level; 4 = Diploma;5 = Degree;6 = Higher Degrees
	Parental Involvement	1= Strongly Disagree; 2= Disagree; 3= Undetermined; 4=Agree; 5= Strongly Agree
	Distance to school	kilometres

Table 4. Overall model fitting of access to quality and equity on demographic variables.

Model fitting information				
Model	**Model fitting criteria**		**Likelihood ratio tests**	
	-2 Log Likelihood	**Chi-square**	**df**	**Sig.**
Intercept only	528.733			
Final	448.821	79.912	26	0.000

Table 5. Test of significance of individual variables.

Likelihood ratio tests				
Effect	**Model fitting criteria**		**Likelihood ratio tests**	
	-2 Log likelihood of reduced model	**Cchi-Square**	**df**	**Sig.**
Intercept	448.821			
Gender of respondent	454.616	5.796	2	0.055
Marital Status	456.183	7.363	6	0.289
Highest Educational Qualification	488.848	40.027	14	0.000
Parental Involvement	455.218	6.397	2	0.041
Distance of school from home	465.474	16.653	2	0.000

class and boosting the image of the school and education in the state. When the distance to school is far from home, by the time the learners get to school they are tired and rate of absorption is low and so cannot perform well. Concerning the parental level of education, when parents are not well informed/educated and lack the knowledge, the learners' future can be jeopardized. However, gender of the participant, as well as their marital status might not be contributing so much in determining access to quality and equity in Basic Education.

Focus group discussion

When the issue of adequacy of access to quality and equity in Basic Education was raised during FGD, the participants mentioned challenges such as shortage of teachers, inadequate teaching and learning materials as well as inadequate school infrastructures, learners' inability to perform well, low level of government involvement in funding education in rural areas, insecurity of the school environment and poor parental/community involvement in the education of their children as impediments to quality and equity in the rural community schools. Participants' responses were counted on each indicator and displayed in Table 6.

The interviews that were conducted on the teachers show that teachers are neglected and cannot take care of their families with their salary alone which is not paid on time. Many of the teachers resort to other means of financial support for their families. The extra engagement takes away their attention from their primary duty of teaching and so the learners are the ones who suffer the

Table 6. Distribution of opinions of participants on lack of access to quality basic education.

Challenges mentioned	Frequency	% out of 72
Lack of quality teachers	55	76.4
Teachers' low morale	57	79.2
Teachers' salaries not paid in time	54	75.0
Poor infrastructure	56	77.8
Insecurity of school environment	53	73.6
Low level of government involvement	50	69.4
Learners' inability to perform well	52	72.2

consequences in the end. With this type of attitude, no effective learning can take place. For instance, when the teachers were asked about adequacy of access to quality and equity in Basic Education in their rural communities, two teachers from one of the rural community (Elu Ohafia) had the following to say, *'We are neglected as teachers in this rural community'. 'We cannot take care of our family needs because of our meagre salary*'. Echoing a similar sentiment, a teacher with a long service record from Okpo rural community said: *'we have not been paid any salary for the past six months yet we have our families to feed, how does one expect us to discharge our responsibilities creditably well?'*

A teacher from Umuzomgbo community who teaches Science complained that they do not have the proper equipment to teach science to the students. *'There are no chemicals/materials to conduct simple practical in chemistry or physics'*. A teacher from Umuchiakuma commented that the poor educational outcome in their school is because, *'Many of their teachers lack the expertise to teach the subject they are currently teaching '*. A background paper in Education International (EI) workshop 4 (Education International (EI), n.d) noted that there are many examples of teachers trying to do their best in spite of lack of support from local and national authorities. Such situations most often end with stress and the burn-out of the teachers. There are also bound to be problems in a system with an excellent curriculum, but where teachers are not provided with the necessary moral and financial support needed to implement it. In order to enhance teachers' participation to provide quality Basic Education, government and relevant education authorities must see that teachers have a salary comparable with other professions requiring the same level of qualifications and responsibility; and ensure that teachers receive the moral recognition appropriate to their level of qualifications and responsibilities. Teachers and schools must be provided with the resources necessary to offer quality education.

The supervisors in the FGD had the following to say on the issue of adequacy of quality and equity in Basic Education. Despite the supervisors not discharging their duties of visiting and monitoring the teachers' activities in the rural community schools, the supervisor from Ebem Ohafia blamed the government for not cooperating with them (supervisors) in the running of the rural community schools. The few supervisors that were interviewed from Achara said that, *'there are no good roads to the rural communities, so we do not go for supervision as we are supposed to go*'; In Okpo, another supervisor added that, *'there is no transport to visit the rural communities because of the bad roads'*. It can be argued that when there is no corporation between the government and supervisors, the rural schools are the ones who bear the consequences. More so, it can be said that there is so much gap in communication on how to improve access to quality and equity in Basic Education in the rural communities between the supervisors and the government.

The community leaders responding to the same question of adequacy of access to quality and equity in Basic Education indicated as follows: The community leaders in Umuzomgbo blamed the school administration for not allowing the parents to have access to the school in order to help the teachers build moral conduct of the learners and assist in the daily running of the school. One of the community leaders said, *'Parents are not fully involved in the running of the rural schools'.* In Achara, a community leader attributed the inadequacy of access to quality and equity in Basic Education to some parents being uninformed about the essence of education, and so do not take particular interest in their children's education and children from such homes lack encouragement and financial support.

In Okpo community, one of the super chiefs whose name is withheld said, *'We need a senior secondary school in our community so that our children will not be going to other villages to attend school. Our children get tired walking to and fro school. Sometimes they do not go to school because they are tired and so perform badly in the examinations'*. In Umuchiakuma, a community leader said, *'The teachers we have are young and still new in the field. So we need long serving teachers*', while, in Elu Ohafia, a community leader said, *'We have been settling disputes between parents and teachers because the parents are complaining of teachers abusing their children physically and verbally. These are all as a result*

of young, untrained and unqualified teachers'.

The parents' opinions are summarized as follows: A parent from Okpo said, '*our hard earned money is not put in proper use and we are not satisfied with the teachers' performances in their communities'*. Two parents from Umuzomgbo had this to say concerning adequacy of access to quality and equity in Basic Education:

Parent 1: *'The school demands a lot from our children; we are poor and cannot meet up with the educational demands for our children'*.
Parent 2: *'We try to make sure that we provide for the teachers through contributing food so that they can stay longer in our community but still they leave for the cities'*.

In Achara community, a parent said, *'We, the parents are not satisfied with the state of the laboratories and library in the school'*. A parent in Okpo said *'My daughter never comes back from school with any homework because their teacher is never in class'* Another parent added that, *'My son complained to me that most of the days, another teacher comes into their class to take them on one or two lessons, because their teacher is absent'*.

In Umuchiakuma, two parents had this to say:

Parent 1: *'The teachers do not involve us as parents in any decision making about our children or in running the affairs of the school'*.
Parent 2: '*The roofs of the classrooms in our community school are leaking and our children come back from school wet when it rains while they are at school'*.

In Elu Ohafia and Ebem Ohafia, parents simultaneously said the same things thus: *'Our school does not have qualified teachers. We (the parents in this community) are not involved in the running of the school even though we are the ones who maintain the school structures' and 'We (the rural community parents) are responsible in renovating our school because the government is not concerned about the rural community school'*. The learners' participants were not left out as they had also their own experience on adequacy of access to quality and equity in Basic Education as shown below.

Learners in Umuzomgbo had this to say concerning adequacy of access to quality and equity in education, *'When I was still in school, there was no proper discipline; sometimes the learners fight with our teachers. Teachers do not care about the learners in this community'*. In Achara, a learner reported that, many parents send their children to the cities for proper education. Okpo had two learners who also reported that, *'Many of our learners do not come to school because they are exhausted from house chores and some are not able to pay some assigned fees by the teachers'*. Learner 2 said, '*Many children drop out of school because they could not meet up with school financial issues'.*

A learner from Umuchiakuma had this to say, *'Education in my community is not of quality because our children do not perform well in their final academic assessment'*. In Elu Ohafia a learner added, *'We do not have qualified teachers in my school because some of the subjects were not properly thought and all the learners were complaining about the subject'*. In Ebem Ohafia a learner complained that, *'Our library is not functioning and there are no laboratories for science subjects. We also have no books and no proper school settings'*.

DISCUSSION

This paper set out as its objectives to obtain the views of stakeholders from six rural communities of Arochukwu and Ohafia Local Government Areas of Abia State, Nigeria on the challenges facing rural communities in accessing quality and equity Basic Education. The stakeholders answered the following questions: 'Do you think that you have access to quality Basic Education in your rural community schools?' What are the challenges that the rural communities have in accessing quality and equity in Basic Education? Do the sociodemographic characteristics of the stakeholders have any effect on the access to quality and equity in Basic Education?

It is evident from the quantitative and qualitative analyses that the teachers' roles are key to access to quality and equity in Basic Education in the rural community schools and have been identified by the stakeholders as major challenge to access to quality and equity Basic Education. Teachers have to be of quality and be there for the learners all the time for them to acquire the necessary knowledge and basic skill they need. Unfortunately, the study found that teachers were most of the time absent from class, not qualified to teach, lacked discipline and were never interacting with parents and the community. These attributes of teachers in the rural schools run contrary to Education International (EI) (n.d) that identified some competences that a good teacher should have to, which include, organizing students' learning opportunities; managing students' learning progression; developing students' commitment to working and learning and working in teams. Other characteristics were teachers participating in school curriculum and organization development; promoting parent and community commitment to school; using new technologies in their daily practice; and tackling professional duties and ethical dilemmas and managing their own professional development. It is important that government and educational authorities should endeavor to employ teachers based on some of these competences.

The welfare of teachers should be treated with utmost concern to get out the best from them in terms of motivation to do the jobs. The teachers in the studied rural schools were owed salaries and when they are paid, it often comes late. This accounted for the teachers'

consistent absence from school. This result agrees with the findings of a study organized by Education International on Ghana that found that few teachers manage on their salary to the end of the month. When all basic costs are paid, there is nothing left and in many cases the salary has already disappeared before these costs are paid. To manage their families, most employees in the education sector have to look for additional income and have little time left to concentrate on their jobs (Fredriksson et al., 1999). It is important that teachers' welfare and well-being be given top priority in the affairs of child development and learning outcome.

What appeared to be a conflict in the opinions of the stakeholders, where about 70% of them indicated that they have access to quality and equity in Basic Education in the rural community schools, yet the overwhelming indication that all the indicators of quality and equity in Basic Education were inadequate was clarified during the focus group discussions. The majority of the stakeholder participants in the FGD believed that there was lack of quality teachers, teachers had low morale, teachers' salaries were not paid in time, poor infrastructure, insecurity of school environment, low level of government involvement, and learners' inability to perform well. All these factors combined constitute barriers preventing access to Basic Education (du Plessis and Mestry, 2019). Parents are always more comfortable with the quality of education their children are receiving, and consequently, families will become more willing to support children's learning. The school gets a better reputation from the community when the schools involve them in the affairs of the schools.

Furthermore, it has been shown that demographic characteristics of the respondents, namely highest educational level, parental involvement and distance to schools jointly significantly predict access to quality and equity in Basic Education. Thus, when parents are highly educated, are committed to assisting the learners with homework, promptly pay their fees and monitor the learners' class work, and when the distances to schools are short, learners perform better in school. The performance of learners would boost the quality of education and image of the schools. Additionally, the qualitative and quantitative analyses show that access to quality and equity in Basic Education is grossly inadequate. The results are in line with Abu et al. (2017) who stated that 'well educated parent would always have the right attitude toward education and provide learning materials such as television, videotapes, novels books, and journals that could facilitate the learning processes'. The motivation of any intelligent child towards learning is accelerated by the positive influence of his/her environment while others who lack motivation are negatively affected.

The study findings attribute the low access to quality and equity in Basic Education in the rural communities to the high level of pupils' absenteeism and drop outs, inaccessibility of most of the rural community schools, unavailability of schools in some communities and the high poverty level in the rural communities. Others include the problem of insufficient professional teachers in Basic Sciences coupled with their high attrition rate of quality teachers, poor facilities, inadequate Teacher Learner Motivations, low level of supervision, low levels of parents and community participation in school activities and more significantly the skewedness in the distribution of educational resources and personnel, These results are supported by Ukeje (1970); Fafunwa (1969); Vermeersch and Kremer (2004); Chaudhury et al. (2004, 2006) and Abadzi (2007).

Conclusion

It is evident from the study that the three key pillars that hold access to quality and equity in Basic Education, namely, access to quality teachers; use of quality learning tools and professional development; and the establishment of safe and supportive quality learning environments are inadequate in the rural community schools. For instance, the views of the stakeholders on access to quality and equity in Basic Education in the rural communities indicate that generally access to qualified and motivated teachers, good environmental conditions of the schools, good roads, good infrastructures and partnerships between the teachers, schools and parents are inadequate. The stakeholders are hardly involved in school decision making and formulation of school policies. Although there are Parent Teachers' Associations set up for each school, these associations are inactive with lack of clarity on what they should be doing. It is shown in this study that parental involvement in matters concerning the learners and schools is a significant contributor to access to quality and equity in Basic Education, yet the schools and teachers are distanced from parents and communities on matters of academic performance of the learners and governance of the schools. Parental involvement in schools that directly or indirectly influence children's cognitive development and school achievement is absent in the rural schools. Parents ought to be involved in parent-teacher conferences, PTA, volunteer in school, help in the classroom, discuss school activities with the child, as well as monitor child's school progress, encourage and provide rewards to learners for good grades, and reading with the child. They should contact the school in case of problems, monitor the child's out-of-school activities, and talk regularly with the child. Most stakeholders are parents and the schools cannot afford to lose their expertise in the learners' academic development.

The study, therefore, concludes that if access to quality Basic Education is to become real in the rural communities, the Ministry of Education, Local Government Education Boards, stakeholders and communities need to establish strong collaboration and

coordination of the activities to improve the conditions of the schools, employment of teachers, community participation in supervision of performance of teachers, assistance of communities in maintenance and renovation of schools and maintenance of access roads to the schools. Programmes that can assist parents and learners in their homework and instil morals in the learners need to be worked out by the education authorities.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Vol. 15(8), pp. 465-472, August, 2020
DOI: 10.5897/ERR2020.4001
Article Number: 519798364495
ISSN: 1990-3839
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Performance ranking in school mathematics in Kenya: A device that conceals and naturalizes inappropriate teaching strategies

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Received 13 May, 2020; Accepted 15 July, 2020

Teaching strategies have a significant influence on students' academic performance. This paper presents results from a qualitative study that examined the effects that performance ranking in Mathematics has on teaching strategies employed in Mathematics classrooms. In particular, the paper demonstrates how performance ranking disguises and legalizes inappropriate Mathematics teaching strategies. The participants for the study were Mathematics teachers and students in secondary schools in Embu County in Kenya. Face-to-face semi-structured interviews and focus group discussions were employed in data collection. Results showed that due to competition by teachers to achieve a higher mean score, they engaged in examination malpractices such as leaking examination questions to students. Secondly, teachers' desire for excellence in their subjects, and achieving top rank to receive prizes was found to be another reason behind teaching students to pass examinations rather than for conceptual understanding. Additionally, the study revealed that performance ranking promoted private tuition to offer assistance to the weak students in Mathematics to improve performance in the subject. This paper recommends that the practice of ranking should be tailored to include all the aspects.

Key words: Performance ranking, mathematics, teaching strategies, learning.

INTRODUCTION

Teaching strategies are generalized plans for a lesson that is inclusive of the lesson structure, desired learner behavior in terms of the goals of the instruction, and an outline of planned tactics necessary to implement the strategies (Gill and Kusum, 2017). Most importantly, teaching strategies are techniques teachers employ to help students become independent strategic learners. Strategic learners make meaningful connections between skills, ideas, and real-life situations if appropriate teaching strategies are employed in classroom discourses. In this regard, appropriate teaching strategies promote an effective learning environment for students learning (Macsuga-Gage et al., 2012).

Studies have shown that teaching strategies can be influenced by performance ranking in examinations if sanctions are attached to students' performance

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(Kellaghan et al., 2009). In such a case, performance ranking data becomes an operation for the school administrators with a variety of rewards or punishments for teachers attached to students' performance. The teachers may receive rewards in the form of presents for students' excellent performance comparatively and may be demoted in case of low students' performance (Kellaghan et al., 2009). This practice motivates the teachers to modify teaching strategies in the requirements of sanctions. The strategies may seem appropriate because of the student's excellent performance when in the fact they are inappropriate. The practice of performance ranking differs across countries in the world.

In the Kenyan context, the performance ranking of schools and students in examinations began in 1940 (Bogonko, 1992). In 1940 there were three categories of schools namely, local native schools, government schools, and missionary schools. The ranking was meant to compare performance across the three categories of schools. Up to 2014, before the ban on performance ranking, there have been seven categories for ranking schools. These were: best overall, National schools, Provincial schools, District schools, Private schools, most improved, and students' categories (Amunga et al., 2010). The modality of ranking was only based on achievement in national standardized examinations, Kellaghan et al. (2009) unlike modalities used in other countries that look at other factors that contribute to an all-round student (Harris, 2011).

To enhance equity and quality of education, the report on Totally Integrated Quality Education and Training (TIQET) in 1999 recommended the abolishment of the ranking of students and schools (Republic of Kenya, 1999). The reason for the recommendation was that ranking was based on high stakes testing ignoring the other important factors of schooling such as co-curricular activities, student's entry behavior and social-economic background of learners (Wanzala, 2014). One of the recommendations of the report which was not implemented was the abolishing of the performance ranking of students and schools (Lelei and Weidman, 2012).

Performance ranking in standardized national and internal examinations at the national, County and sub-County levels continued until 2014 when the Kenya government banned the practice (Wanzala, 2014). The ban was as a result of unethical examination malpractices such as cheating in examinations among others (Ocholla, 2011). Despite the ban on performance ranking, the malpractices persisted in 2015 (Murori, 2016). Therefore, performance ranking was not the main cause of the examination malpractices. Moreover, performance ranking may have had a great influence on teaching and learning. The ban on performance ranking generated heated debate and as a result of the pressure in 2016, the government lifted the ban but with a significant change in the modalities of inclusion of co-curricular activities (Republic of Kenya, 2016). The recommendation on the new way of ranking is yet to be implemented (Nyamwembe, 2020).

Ranking of schools and students was meant to disseminate information on students' performance and promote healthy competition between schools which would motivate teachers to improve their instructional practices (Shindler, 2010). However, the publication of results has had several effects on teaching and learning. It led to a change of content to which students are exposed to in order to emphasize short-term or superficial strategies like memorization, teaching for factual knowledge and rehearsing. Furthermore, there was a devotion of a significant amount of time to test preparation activities and a focus on students who are more likely to succeed at the expense of the average and slow learners (Kellaghan et al., 2009). Existing literature has examined performance ranking in national examinations in Kenya. For example, a study carried out by Amunga et al. (2010) focused on perceptions of teachers and students on the ranking of students and schools in national examinations. This paper takes the conversation a little further by investigating the effects of performance ranking on teaching strategies employed in Mathematics classrooms.

LITERATURE REVIEW

Several studies have shown that performance ranking has some effects on the pedagogical strategies employed in teaching and learning with effective teaching strategies linked to students' achievement (Schedsmo and Huber, 2019). Opponents of performance ranking contend that performance ranking has made students, teachers and schools desperate for top positions hence encouraging cheating in national examinations (Anderman and Murdock, 2007). In their effort to obtain a better rank position, teachers resorted to various forms of cheating designed to give a student or a school undue advantage over others (Njue et al., 2014). According to a study by Njue et al. (2014), the examination malpractices takes many forms such as teachers aiding students to answer examination questions during an examination, collusion between school principals and examination supervisors and purchasing of examination materials. Ochola (2011) observes that the ranking of schools by the media is one of the factors affecting the management of the Kenya Certificate of Secondary Education (K.C.S.E) examinations negatively. Subsequently, it contributes significantly to examination irregularity cases in Kenya. Similarly, Nyamwange et al. (2013) argue that the issue of examination malpractice is a continuous recurrence issue in the educational discourse in Kenya. This scourge has led most of the stakeholders to be at a loss as to the right action to take that will generate useful results on the

matter pertaining to ending examination malpractices (Adow et al., 2015). Most importantly, it has been observed that 9 out of every 10 students indulge in one form of examination malpractice or another (Murori, 2016). The situation becomes more worrisome when teachers who should be custodians of moral code of conduct increase students incentives to cheat to ensure that they shine in their final examination results (Ramberg and Modin, 2019).

Additionally, performance ranking motivates teachers to change their pedagogical strategies for their students to appear at the top of the league tables. A study by Limangura et al. (2017) observed that ranking motivates teachers to speedily cover the syllabus, change institutional practices and focus their teaching activities towards test-taking skills neglecting other aspects of education. The practice denies the students the opportunity to develop creativity and innovations during the learning process.

Furthermore, Kivilu (2004) observed that ranking in Africa resulted in low completion rates as many schools kept on skimming only the best students and the rest were required to either repeat or leave such schools. There was a lot of wastage of human resources where children were labeled as failures when in fact they had the potential for further education. Teaching dominated school time while co-curricular activities were forgotten and time increased for instruction beyond the ones laid down by the Ministry of Education. For example, some schools increased tuition by introducing evening classes and holiday tuition in desperation for a top rank (Wanyama and Njeru, 2004). Teaching was also characterized by frequent testing to identify performance gaps and to improve test-taking skills so that the schools improved their rank.

On the other hand, several studies have shown the need to rank and publicize schools based on examination results. Kellaghan and Greaney (2003) stated that performance ranking provides information on the performance of secondary schools in various subjects. Through the information from the rank data, underperforming schools are identified and the reason for under-performance investigated. The practice leads to the provision of practical advice regarding the skills to be developed and the types of targets to be set. If the conclusion is that poor performance is a result of a lack of teaching/learning resources, then the matter can be addressed through the relevant authorities.

Furthermore, proponents of performance ranking contend that the issue of assessment is critical to the functioning of schools. It serves as a motivator of students' performance and provides feedback to the teacher on the effectiveness of the teaching methods. Therefore, the teacher can use the feedback from the students' assessment to adjust the teaching methods for students learning. Besides, the ranking data communicates to the students, parents, and other stakeholders on the level of the students as far as teaching and learning is concerned (James, 1998).

METHODOLOGY

Research approach and design

The study aimed at gaining insights into the effects of performance ranking on Mathematics pedagogical strategies in participant's natural settings. The study, therefore, adopted a qualitative approach and a case study design. The qualitative approach enabled the researchers to have in-depth information by exploring participants' views in more depth (Creswell and Clark, 2011).

Participants and context of the study

The study was carried out in Embu County in Kenya. In Kenya, there are forty-seven counties and in each County there are two categories of secondary schools; namely, public and private. The public secondary schools are further grouped into four categories: National, Extra County, County and Sub-County schools; depending on students' performance and teaching and learning resources available (Makori et al., 2015). The secondary education cycle in Kenya is divided into four grades, called Forms (Form 1, 2, 3 and 4). Simple random sampling was employed to determine the schools, teachers and students that will take part in the study. Random number generator was used to sample the particular secondary schools which took part in the study. The researcher accomplished this by listing and assigning numbers to schools then used an online random generator to get the final sample. The same procedure was done with teacher and students participants. The participants were teachers and students of eight public secondary schools (One National, one Extra County, two County and two Sub-County) and two private schools.

Data collection and analysis

The study employed multiple data collection methods namely; face-to-face semi-structured interviews and focus group discussions (Plano and Creswell, 2008). A total of fourteen face to face semi-structured interviews lasting between 40 to 60 min were conducted with Mathematics teachers and students. Six were conducted with students' participants and eight with teacher participants. One focus group discussion was conducted with teachers and three with students lasting between 40 to 60 min. Data collected were transcribed and subjected to qualitative data analysis. During the analysis, the transcripts were analyzed, categorized through the back and forth analytical process (Suter, 2012). The research participants were guaranteed anonymity and quotations from the interviews reported accordingly (Sim and Waterfield, 2019).

RESULTS AND DISCUSSION

The face-to-face semi-structured interviews and focus group discussions focused on a range of topics, from the methodology of performance rankings to their impact on teaching strategies employed in Mathematics classrooms. In brief three major themes emerged from the analysis of the interviews and focus group discussions: while (1) performance rankings were an encouragement for teachers to engage in examination malpractices, and (2) private tutoring, (3) it was also a

motivation for teachers to teach for factual knowledge as opposed to teaching for conceptual understanding.

Teachers engagement in examination malpractices

Students' views on whether performance ranking in Mathematics encourages examination malpractices among teachers revealed that during the examination season Mathematics teachers taught areas included in the examinations. The strategy denied students the opportunity to gauge their level of preparedness in the Mathematics examination; a practice that was not appreciated by the students as revealed during the interviews.

Student's high scores as a result of cheating do not benefit at all, because educational excellence is not only about passing examinations but should be focused on acquiring adequate Mathematics knowledge and skills. During examination season Mathematics teachers engaged students in test-taking skills and students scored highly (Form 4 student in a private school).
… Sometimes our teacher would revise questions only to find them in the internal Mathematics examinations (Form 4 student in a County school)

A focus group discussion with Mathematics students revealed that during the national examinations, Mathematics teachers positioned themselves in strategic places during the examination so that they get opportunities to present the answers to the students through collusion with the invigilators. The students would excuse themselves to get out of the examination room under the guise of visiting the washrooms. In this way, they would get an opportunity to obtain the answers to the difficult questions in the test from the teacher.

In the last year, during the end of the secondary course examination, a Mathematics teacher was caught by the examination supervisor in a strategic area aiding students in answering examination questions. The students pretended to have gone out to the washrooms only to get where the teacher was to obtain the answers (A form 3 student in a County school).

A focus group discussion with Mathematics teachers revealed that there was a practice of teachers organizing to obtain the examination tests prior to the examination and hold discussions with the students at night on the eve of the examination. Furthermore, the school principals purchased the national examinations so that their schools emerge at the top of the rank when the results are announced through the media. The practice brought out the idea of the marketization of education where students were viewed as commodities and grades as the outputs.

…..Performance ranking puts pressure on Mathematics teachers because the administration requires them to ensure their classes get a mean score of C+ and above to benefit from any internal appointments in the school. The teachers, therefore, employed all means including obtaining the examination question paper in advance and revised with students before the real examination time. This is a common practice in this school (A teacher in an Extra- County school).

In line with the study findings, Greaney and Kellaghan (1995) opined that a worrying aspect of ranking is the examination malpractices. In their effort to obtain a better rank, teachers employed all examination cheating strategies to give a student undue advantage over others. The examination malpractices take many forms such as copying from other students during an examination, collusion between teachers and examination supervisors, purchasing of examination materials among others (Njue et al., 2014). When students' performance in examinations is highly consequential for teachers and administrators, the pressure by the examinations sometimes results in cheating by teachers and administrators breaking of standardized procedures associated with examinations (Berliner, 2011). Sometimes the teachers engage in curriculum narrowing to accommodate the pressure for obtaining higher examination scores from the students. The pressure of higher mean score also results in teachers engaging in vast amounts of examination writing techniques with their students which cause validity of examination to be compromised. The purpose of an examination is to provide feedback to the education stakeholders on the level of knowledge acquisition and retention by the students. Any form of examination malpractice distorts this feedback mechanism and gives a false outcome of the learning process. This may be the most important lesson to be learned by schools using performance ranking data in the evaluation of teachers' teaching strategies. Therefore, the factors that trigger the practice should be addressed through the relevant bodies. From the results of the study, one of the main factors that encourage examination malpractices is performance ranking in subjects.

Private tuition

It was the interest of the study to find out the teachers and students' views on whether performance ranking in Mathematics promotes the practice of private tuition in secondary schools. Private tuition is supplementary instruction in academic subjects arranged by an individual or the guardian (Kim and Lee, 2010). Private tuition normally takes place in the morning, evening, weekends when the school is in session and full days of the week during school holidays especially for the examination class. Sometimes a parent or a guardian

arranges for private tutoring for his or her daughter from a belief that such an arrangement allows students to improve knowledge or skills more rapidly than in a classroom setting where the teacher is expected to divide their attention across many students (Mutua et al., 2015).

Interviews with Mathematics teachers revealed that performance ranking in Mathematics promotes private tuition practice. The aim is to ensure that the class emerges the best after students sit for an examination. In some schools, the study found out that the teacher of the class at the top of the rank is awarded during school prize giving days. Thus being a motivation for teachers to engage students outside the stipulated teaching time. It could have been during the lunch break, in the evening and weekends.

Mathematics teachers have bad blood with other teachers in the school because they want to teach form 4 students in the evening after supper and in the morning before breakfast. The Mathematics teachers argue that for students to do well in other subjects they must be good in Mathematics but the motivation is to have many students scoring top grades. During the school annual prize-giving day teachers whose students scored B (plain) and above are given tokens of appreciation (Mathematics teacher in an Extra- County school).

I rank my Mathematics students using total marks after every Mathematics examination. I do this to bring out the positive competition and encourage Mathematics students to embrace hard work in their studies. Those who improve are proud and wish to continue working hard. I schedule extra time with weak students to assist them to improve their grades. (Form 2 teacher in a private school)

So far there is an indication that performance ranking promotes the practice of private tuition in Mathematics in secondary schools. The practice is for the teachers to offer assistance to the weak Mathematics students. Once the weak students improve their performance, the teachers are sure their Mathematics class will be at the top of the rank. Consequently, there is the enjoyment of the benefits associated with it. In tandem with the study findings, Mburugu (2012) observed that private tuition has been on the increase as a result of performance ranking.

Similarly, focus group discussion with the Mathematics students revealed that parents arrange for private tuition for students to improve their rank in Mathematics. A study on private supplementary tutoring undertaken by Bray (2017) revealed that private tuition is often conducted in the evenings and weekends while holiday tutoring is offered during school holidays for the students to improve on their performance.

…in my class I am always at the bottom of the rank in Mathematics. I wish my parents have money to arrange for a teacher to assist me in my weak areas in Mathematics during the holidays as it happens with top achievers (Form 4 student in a sub-county school).

Furthermore, focus group discussion with Mathematics teachers revealed that teachers teach students Mathematics at night because it helps them to cover the work not covered during normal school days. The weak students are assisted, facilitating the Mathematics syllabus coverage and improves students' performance in Mathematics.

Mathematics syllabus is so wide and it's impossible to complete it in the four years without teaching extra time. I care for my students and my wish is to have all of them scoring a C+ and above at the end of the secondary course national examination. Secondly, there are "baby" classes to assist the weak students to attain the target grades (Form 4 teacher in a national school).

Private tuition practices bring out the issue of inequity in education as some students do not benefit from the arrangement because of the socio-economic status of their guardians. Besides, a good proportion of guardians may not afford to pay tuition fees for their sons and daughters. Therefore, the practice favors students from a section of the families in the Country. The outcome of the ranking data in that connection reflects the socio-economic status of the students' backgrounds instead of the students' achievement in Mathematics. Thus concealing the inappropriate teaching strategies employed by Mathematics teachers in Mathematics classrooms. According to Hallak and Poisson (2007), private tuition presents a financial burden to the guardians because of the extra payment for their children to benefit from the practice. Additionally, some teachers created the demand by teaching part of the curriculum leaving what is perceived to be important for private tuition classes. Those students from low socio-economic backgrounds are left out there by introducing injustice and inequity in accessing education. According to Adams Equity theory, there should be fairness in teaching and learning where all the students are exposed to similar conditions; otherwise, ranking data would display the socio-economic backgrounds of the students instead of students' abilities (Akareem and Hossain, 2016).

Teaching for factual knowledge

Teaching for factual knowledge denies students the opportunity to develop critical thinking skills making it impossible to evaluate what a student knows thereby diminishing the validity of test scores (Puspita and Aloysius, 2019). The strategy appears very appropriate to concerned stakeholders because it leads to the

improvement of students' performance in examinations. The stakeholders fail to realize that the strategy fails in developing higher-order thinking skills and students are not able to make meaningful connections between skills and ideas in real-life situations. Teachers of Mathematics interviewed observed that teachers teach verbatim memorization of facts in Mathematics which is not necessarily accompanied by an understanding of the facts. There exists a stiff competition amongst Mathematics teachers as teachers whose students obtain a high mean score in Mathematics are rewarded during the school annual prize-giving day.

I teach students techniques required for them to pass Mathematics examinations not necessarily understand because Mathematics syllabus is so wide and it is not possible to teach for understanding. This is because it would take a long time which is not possible in the four years. If the government wants students to be taught for understanding, then they should revise the Mathematics curriculum. Teachers teach for examinations and not knowledge (Teacher in a county school).

Teaching methods are characterized by intense revision of past Mathematics papers coupled with test-taking skills and fortnightly, Mathematics tests. The students in the examination class were taught throughout the day and were not left out to study on their own and no time for extracurricular activities. It is interesting to note that teachers sometimes compete for students during personal study time at night.

Teachers teach for examinations, that is, examination-oriented at the expense of other important issues in schooling. Some will teach at break time, lunchtime and even the time the learners are supposed to be out for games. Other teachers will teach at night for the boarding schools. Teachers fight to get learners during their free time, thereby suffocating learners with content. In one incident there was a commotion in one of the classes because of Mathematics and Chemistry teachers wanted to have the learners at the same time (Head of Mathematics department in a sub-county school).

The responses revealed that the facts taught to students were meant to help them to score highly in Mathematics examinations. This proves disadvantageous to the students because they are not able to solve Mathematical problems involving applications of the concepts taught. Still, the students are unable to interpret unfamiliar Mathematical information and relate to their context. Therefore, teachers geared their teaching towards passing examinations thereby encouraging teaching for factual knowledge. A focus on teaching for factual knowledge in Mathematics classrooms is consistent with the view of learning as knowledge acquisition in which students seek to add new Mathematical information to their memories. This should not be the only focus because meaningful learning in Mathematics requires that instruction goes beyond a simple presentation of factual knowledge by presenting tasks that will provoke learners' critical thinking. The assessment tasks should be tailored to require more of students than simply recalling or recognizing factual knowledge like the application of the learned concepts. Moreover, pressure from examinations and ranking of schools according to performance should be blamed for lack of depth in learning and the teaching process (Mugi and Mwangi, 2018). Focusing on examination results ignored many other important outcomes of schooling like physical wellbeing, life skills, confidence, and extracurricular activities.

Furthermore, the teacher employed a test-taking skills strategy to benefit during the prize-giving day. The teacher rewards given during the schools' annual prize-giving days were based on comparative students' scores. Tying teachers rewards to students' test scores can discourage teachers from wanting to work in schools with below-average students with a large variation in the results and their perceived unfairness can undermine the morale of teachers. Additionally, the practice can discourage teacher collaboration in teaching and learning. Appropriate teaching strategies encourage collaboration where teachers work across classroom boundaries towards the common goal for educating all students to their full potential (Baker et al., 2010).

Summary of the study

This paper examined the effects of performance ranking on the teaching strategies employed in Mathematics classrooms. Data were analyzed from interviews and focus group discussions with students and teachers of Mathematics drawn from eight public and two private secondary schools in Embu County of Kenya. The analyses of the data were guided by the back-and-forth analytical process of Suter (2012). The results of the analyses demonstrated that performance ranking influenced the pedagogical strategies used by teachers of Mathematics in their instruction. In particular, the teachers tended to teach for examinations rather than for conceptual understanding. The teachers focused more on repetition and review, with superficial coverage of contents so as to achieve good grades in the final examination. It was observed that the teachers were keen on manipulating the examination process to favor their students. Teachers flouted the laid examination rules during the examination season by aiding students in answering questions. The practice encouraged unfairness in the assessment of the students' performance as opposed to serving as a foundation of the teacher's credibility when it comes to fostering the

moral and ethical development of their students. Besides, in their effort to improve students' academic performance in the final examinations, teachers engaged students throughout the day denying them the opportunity to attend to co-curricular activities with the pretext of covering the syllabus. In some situations, teachers engaged students during the school holidays to assess each student's learning needs and set the pace necessary to achieve the best results for their benefit.

Conclusions

The objective of this paper was to demonstrate how performance ranking in school Mathematics disguises and legalizes inappropriate teaching strategies. This paper has shown that teachers taught factual knowledge as opposed to teaching for conceptual understanding hence engaged the students even in the time meant for co-curricular activities. Furthermore, the study established that, due to competition by teachers of Mathematics to register a high mean score, the teachers engaged in examination malpractices such as leaking examination to students. Besides, the teachers positioned themselves strategically during the national examination to guide students on how to answer examination questions. The practice made students fail the examinations since they did not prepare adequately, with the hope that they would be able to engage in such examination malpractices. Finally, this paper has shown that performance ranking promoted the practice of private tuition, a move that was intended to offer assistance to the weak students in Mathematics to improve performance in the subject.

The findings of the study indicate several implications of performance ranking on pedagogical strategies in Mathematics classrooms. First, as opposed to facilitating examination malpractices, the teacher should seek to support student active learning following the guidelines provided by Kenya Institute of Curriculum Development and to uphold high moral standards in their teaching practice. Thus relevant agencies should devise ways of curbing examination malpractices to guarantee a level-playing ground for all learners. Secondly, there is a need to come up with a methodology for performance ranking that does not over-emphasize the final examination so as to discourage examination malpractice and superficial teaching. This can be achieved by ensuring that students assessments are tailored to include all the aspects that the school nurtures instead of focusing on academic performance only. The grading system should be in such a manner that it rewards everything that the school nurtures including talents with teachers' promotion not pegged on students achievement in final examination only. Furthermore, in bridging the gap between the top-performing and low performing student's, remedial work should be tailored to each student's needs, involving topics and materials related to the syllabus giving room for the students to take part in co-curricular activities. In this way, the student's interest is taken care of in the learning process showing ways of applying learned knowledge in real-life situations.

Recommendations

This paper has shown that the practice of performance ranking disguises and legalizes inappropriate teaching strategies employed by the Mathematics teachers. This is because of the strategies employed lead to the students displaying excellent achievement in high stakes testing which obscure the evidence regarding manipulation and outright cheating in examinations. The effects were felt when the students failed to apply learned knowledge in other areas. Therefore, this paper recommends that the practice of ranking should be tailored to include all the aspects that the school nurtures instead of focusing on academic performance in high stakes tests and position in the league tables. In this way, everything that the school nurtures, including talents will be rewarded. Moreover, the inappropriate teaching strategies are forgotten and teachers focus on the broader aims of education instead of the position in the ranking data.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

ACKNOWLEDGMENTS

The authors appreciate the immense support from the Office of the County Director of Education Embu County to gain entry to secondary schools in Embu County to collect data. Additionally, the authors are grateful to the school administrators, Mathematics teachers, and students who participated in the study.

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Vol. 15(8), pp. 473-486, August, 2020
DOI: 10.5897/ERR2020.3972
Article Number: CC615BF64501
ISSN: 1990-3839
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Effects of teacher mentoring on the classroom practices of lower grade primary school teachers in Kwale County, Kenya

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Received 1 April, 2020; Accepted 8 July, 2020

Teacher classroom practices have been identified as the key contributing factor to the low learning outcomes of primary school grades in Kenya. Teacher mentoring has the potential to improve classroom practices and this study sought to determine its effects on the classroom practices of primary school teachers in Kwale County, Kenya. Using One Group Repeated Measures Quasi-Experimental Design, one cohort of 40 teachers in 22 public primary schools was mentored for 20 months, from May 2016 to October 2018. A classroom observation tool was used in data collection during this period. The tool achieved a Cronbach's Alpha reliability coefficient of 0.84, 0.81 and 0.79 in 2016, 2017 and 2018 respectively. Data was analysed using Repeated Measures ANOVA and teacher mentoring had a statistically significant effect on mean classroom practice score at F=6.282, df=2, p=0.003. Significant mean differences were located between 2016 and 2017 in favour of 2017, and between 2016 and 2018 in favour of 2018. There was no significant mean difference between 2017 and 2018. In conclusion, teacher mentoring is effective in improving teacher classroom practices and should be integrated into the formal school programme in Kenya.

Key words: Teacher mentoring, classroom practices, teacher quality, learning outcomes.

INTRODUCTION

Quality of education in Kenya

In January 2003, the Government of Kenya introduced Free Primary Education (FPE) opening opportunities for more children to enter into primary schools. A report by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) noted that this strategy raised enrolment from 6.1 million in 2002 to 7.2 million in 2003, increased Net Enrolment Rate (NER) from 77.3 to 80.4%, and Gross Enrolment Rate (GER) from 88.2 to 102.8% (UNESCO, 2004). However, the introduction of FPE in Kenya led to increased teaching load for teachers, large class sizes, and poor performance of learners at primary school grades (Gakure et al., 2013; Oketch and Mutisya, 2013). For instance, less than 40% of grade three children attained the desirable competency level for a

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grade two English reading task in a national reading assessment in 2015 (Twaweza, 2016). The problem is more pronounced in rural and remote areas of Kenya. For instance, only 17% of grade three children attained the desirable competency level for a grade two English reading task in Kwale County (Twaweza, 2016; Glennerster et al., 2011). Furthermore, the overall mean score in the Kenya Certificate of Primary Education (KCPE) examination at grade eight in Kenya remained below the average of 250, out of a possible 500 scores from 2003 to 2014 (Oketch and Mutisya, 2013; Karongo and Orodho, 2014). This situation requires an intervention to break the cycle of low learning outcomes.

The learning outcomes at the early primary grades are critical for continued retention and success in upper primary grades. For instance, children who master reading skills in the lower grades are more likely to remain in school, attain better academic performance in future, and have more social and economic prospects (Patrinos and Velez, 2009; Musen, 2010). The key factors contributing to low learning outcomes are low teaching subject mastery and pedagogical content knowledge among teachers, which are attributed to inadequate pre-service and in-service teacher training, and insufficient teacher pedagogical support (Wanjiru, 2017; UNICEF, 2016; Oketch and Mutisya, 2013).

Teacher quality

Teacher quality is a key determinant of student learning outcomes, and teachers will play a key role in closing the gap between poor and good quality education, by maximizing the benefits of learning in every classroom for every child (UNESCO, 2014; Bold et al., 2017). Furthermore, children are more likely to attend and remain in school when the quality of teaching in high (UNESCO-UIS, 2006). Therefore, to achieve quality education, more efforts should increasingly focus on teacher quality, as many teachers are unqualified or underprepared to meet the educational demands of the 21st Century (UNESCO, 2014). Some of the questions that frequently comes up are whether teachers have adequate subject content knowledge, understand how students learn, have ability to plan for teaching, can perform adequately in classrooms, and learn from the teaching experience Bold et al., 2017).

Sub-Saharan African countries have the highest proportion of teachers that lack adequate mastery of both teaching subject content and pedagogical content knowledge (UNESCO-UIS, 2006). For instance, only 34% of lower grade teachers in Kenya demonstrated minimum subject content knowledge of the language subject they are teaching (Bold et al., 2017). Bold (2017) further notes that the teachers had poor pedagogical content knowledge and the ability to assess students' learning, which was attributed to low standards for entry into pre-service teacher training and low-quality of teacher training programmes. The implication is that teachers are poorly prepared to deliver lessons and use inappropriate teaching methodologies which translate into low learning outcomes (Wanjiru, 2017).

Teaching practice during pre-service teacher training produces more effective teachers and higher learning outcomes (Hightower et al., 2011; Co et al., 2016; OECD, 2009). It is therefore important that pre-service teacher training programs should incorporate adequate time for teachers to practice in a real classroom situation. However, little time is allocated for classroom practice during pre-service teacher training in Kenya, with only six weeks of teaching practice assigned for teachers of primary schools (Bold et al., 2017; Wasonga et al., 2015). Furthermore, teachers in the rural and remote areas of Kenya have few opportunities for professional development, which is attributed to resource constraints (Wanjiru, 2017; UNICEF, 2016; Oketch and Mutisya, 2013. The need for in-service professional development to improve and retain high quality teachers and ensure high standard of teaching and learning is undeniable.

Teacher professional development

Teacher professional development is one of the important strategies for addressing the challenge of teacher quality. The Organization for Economic Cooperation and Development (OECD) defines teacher professional development as the activities that develop a teachers' knowledge, skills, expertise and other desirable characteristics of a teacher (OECD, 2009). It is a long-term process that involves systematic provision of opportunities for growth and development in the profession focused at improving teacher competency (Villegas-Reimer, 2003). It involves critically examining teaching, attending workshops, professional meetings, mentoring and reflection sessions, sharing with other teachers, reading publications and thereby gaining valuable experiences in the profession (OECD, 2009; Villegas-Reimer, 2003).

Competency based models are increasingly being used to design high quality professional development programs as they clearly defines the desirable competencies in terms of the knowledge, personal capabilities, skills, attitudes and traits that jointly enable an individual to perform their jobs at the desired standards of performance (Lucia and Lepsinger, 1999; Marrelli et al., 2005). Marrelli et al. (2005) further notes that competencies are measurable capabilities, the building blocks for effective work performance, and most tasks requires a combination of competencies to be executed (p. 534). Therefore, for organizations competencies of employees for specific work (Chouhan and Srivastava, 2014; Rozdi et al., 2016). Consequently, to succeed, they must identify, nourish and utilize the

a competency-based model is an important tool in teacher professional development initiatives as it informs those competencies that will be addressed for improving the teacher classroom practices.

Studies have shown that changes in pedagogy have the strongest effect on student performance (Conn, 2014). Furthermore, the most effective pedagogical intervention programmes are those that provide teachers with opportunities to; focus on what students are expected to learn, reflect on their practices, identify challenges that need to be addressed, try out new teaching approaches, and offer follow-up mentoring support (Ingvarson et al., 2005). Therefore, changes in teacher practices are not incidental but occur through systematic engagement in discussions, collaborations, and reflections that enables a deeper understanding of their pedagogical practices (Schrum and Levin, 2012). Consequently, pedagogical interventions for teacher professional development are more likely to have better outcomes when the teachers are engaged in identifying areas where they need improvements and they have opportunities to choose what to improve on. From the foregoing, it is evident that teacher mentoring has the potential to improve teacher classroom practices as it focuses on the specific context of each individual teacher.

Teacher mentoring

Teacher mentoring is not well understood and despite the many mentoring programmes in teacher education, there is little consensus on the exact meaning of a mentor (Koki, 1997). It is common to find them being referred to as supervisors, coaches, and peer trainers (West, 2016; Koki, 1997). Furthermore, there is little consensus on the actual role that mentors play or what distinguishes mentoring from other forms of teacher support, and even how the mentoring process is managed (Cullingford, 2016; Rebecca, 2016; Martin, 2006). However, there are common threads across different schools of thought that collectively provide an understanding of what teacher mentoring constitutes. It is a professional development strategy where a mentor who is more experienced in classroom instruction, support a teacher in improving their classroom practices by devising interventions customised to the needs of the specific teacher (Nel and Luneta, 2017; Australian Council for Educational Research, 2016). It is a formal relationship for supporting and encouraging professional learning that is based on trust between the mentor and the teacher (State Government of Victoria, 2010). Teacher mentoring is a flexible process, allowing teachers to challenge themselves in ways that are specific to their diverse needs based on their context (Collet, 2016). The structure, content, duration, and intensity of the mentoring program varies widely from a single one off meeting between a mentor and a teacher to frequent highly structured meetings over several years (Ingersoll and Strong, 2011).

In teacher mentoring, the mentor conducts classroom observations, hold a meeting with the teacher to reflect on the observations, and support the teacher in identifying strategies for improvement on areas that were found to be challenging (American Institutes for Research, 2020; Australian Council for Educational Research, 2016; Holloway, 2001). Furthermore, mentors develop trustful relationships with the teachers that create an environment for instructional improvement (Irby et al., 2017). The overriding objective of the mentoring process is to advance a teacher to the proficient and expert levels of teaching (Wasonga et al., 2015). Meanwhile, the mentors need appropriate training and opportunities for discussing ideas, problems and solutions with other mentors (Holloway, 2001).

Effects of teacher mentoring

Teacher mentoring is associated with improved teacher retention rates and improved pedagogical skills (National Foundation for the Improvement of Education, 1999). It has a positive impact on teacher commitment, classroom instructional practices, and student achievement (Ingersoll and Strong, 2011; Australian Council for Educational Research, 2016; Amin et al., 2018; Ochanji et al., 2017). This is because mentoring is an empowering process that enables teachers to learn from their professional colleagues, reflect on their beliefs about teaching, and improve their classroom practices through gradual integration of theory and practice (State Government of Victoria, 2010; Arnesson and Albinsson, 2017). Aside from the teachers, the mentors also benefit from the mentorship process in terms of self-satisfaction derived from helping others, earn respect, nurture collaboration, and gain new ideas (Holloway, 2001; Ochanji et al., 2017; Wasonga et al., 2015).

Classroom practices

Classroom practices have the greatest contribution to student learning outcomes because the classroom is the venue where students and teachers interact and decisions as to what to do in this venue most strongly affect student learning outcomes (Wenglinsky, 2001). Classroom practices are those teaching and learning activities and interaction processes within a classroom system that enable contextualization of the content that is taught and learnt (Li and Oliveira, 2015). Wenglinsky (2001) identifies 21 specific classroom practices in high school mathematics classrooms, while Li et al. (2015) identifies eight themes of classroom practices. Classroom practices are characterized by elements and processes of teaching, with the elements being the goals,

objectives, tasks, discourse, and interactions, while the processes are the planning for instruction, implementation of the plan, assessment, and reflection (Kahan et al., 2013). Therefore, effective classroom practices should focus on the intersection of the elements and processes of teaching and learning.

Planning for instruction within a specified time duration in a classroom calls for a teachers' competence in planning for learning objectives, appropriate instructional resources, interactions, and innovative learning activities (Marzano, 2005; Broemmel et al., 2016; Price and Nelson, 2014; Jackson, 2011). Innovative learning activities are a critical determinant of good classroom practice and their use improves classroom practice (Hirsch and Supple, 1996; Bleakley and Carrigan, 1994; Herr, 2001). Such innovative activities include incorporating learners' previous experiences in planning for a lesson, use of locally available resources, use of project-based learning, and encouraging learners to apply knowledge and skills in solving problems in their surroundings (Herr, 2001; Bleakley and Carrigan, 1994; Sharma, 2016). Furthermore, ability to meaningfully engage learners through the learning activities, questions and answer interactions, experimentation, as well as practical activities defines good classroom practice. Furthermore, formative assessment and use of assessment results to improve learning, nurtures a culture of continuous improvement in the teaching profession (Heritage, 2010; Tuttle, 2009). The various classroom practices that teachers adopt in engaging with learners play an important role in student understanding of concepts and learning outcomes (Ottevanger et al., 2007).

Statement of the problem

The low learning outcomes at primary school grades in the remote and rural areas of Kenya is acknowledged as a challenge. This is mainly attributed to teacher quality as studies show low subject content knowledge and pedagogical content knowledge among primary school teachers in Kenya. In attempts to address this challenge, an intervention was implemented in Kwale County that aimed at improving teacher classroom practices, and student learning outcomes. A key component of this intervention was teacher mentoring to improve their classroom practices. Based on evidence from other contexts, it was assumed that this strategy would improve literacy outcomes for early grade learners. There is limited evidence in Kenya on the effectiveness of teacher mentoring as a strategy for improving teacher classroom practices. Specifically, there is no evidence on the effectiveness of teacher mentoring in improving classroom practices of primary school teachers in Kwale County of Kenya. Therefore, this study sought to determine the effects of teacher mentoring on the classroom practices of primary school teachers in Kwale County, Kenya.

Research objectives

The objectives are to:

(i) Determine whether teacher mentoring was an effective strategy for improving teacher classroom practices
(ii) Determine the duration of teacher mentoring that was more effective in improving teacher classroom practices
(iii) Establish the positive experiences from the teacher mentoring process
(iv) Establish challenges experienced from the teacher mentoring process

Objective 'a' was measured by assessing teacher classroom practices over a period of 20 months from May 2016 to October 2018. A classroom observation tool was used to assess the classroom practices of the same teacher over this period and the mean classroom practice scores for each year were analysed to determine whether there were significant changes in their practices. Objective 'b' was measured by comparing the mean classroom practice scores obtained in 2016 with that of 2017, and the mean score obtained in 2017 with that of 2018. Comparisons of the mean classroom practice score were done year by year to determine any significant differences. Objectives 'c' and 'd' were assessed by conducting teacher surveys each year during school monitoring visits by the study team to establish the positive experiences and challenges encountered by the teachers in the mentorship intervention.

Research hypotheses

The study was premised on the null hypotheses that:

i) **H_1:** teacher mentoring does not significantly affect teacher classroom practices
ii) **H_2:** duration of teacher mentoring is not a significant factor on teacher classroom practices.

Conceptual framework for the study

The study adopted the systems theory in education which depicts the teaching and learning process as having inputs that interact to produce outputs (Ayot and Patel, 1992). The elements of a teaching and learning system are illustrated in Figure 1. The conceptual framework for the study was adopted from Ayot and Patel (1992) who posits that all systems have common characteristics which includes; the set goals, elements that work

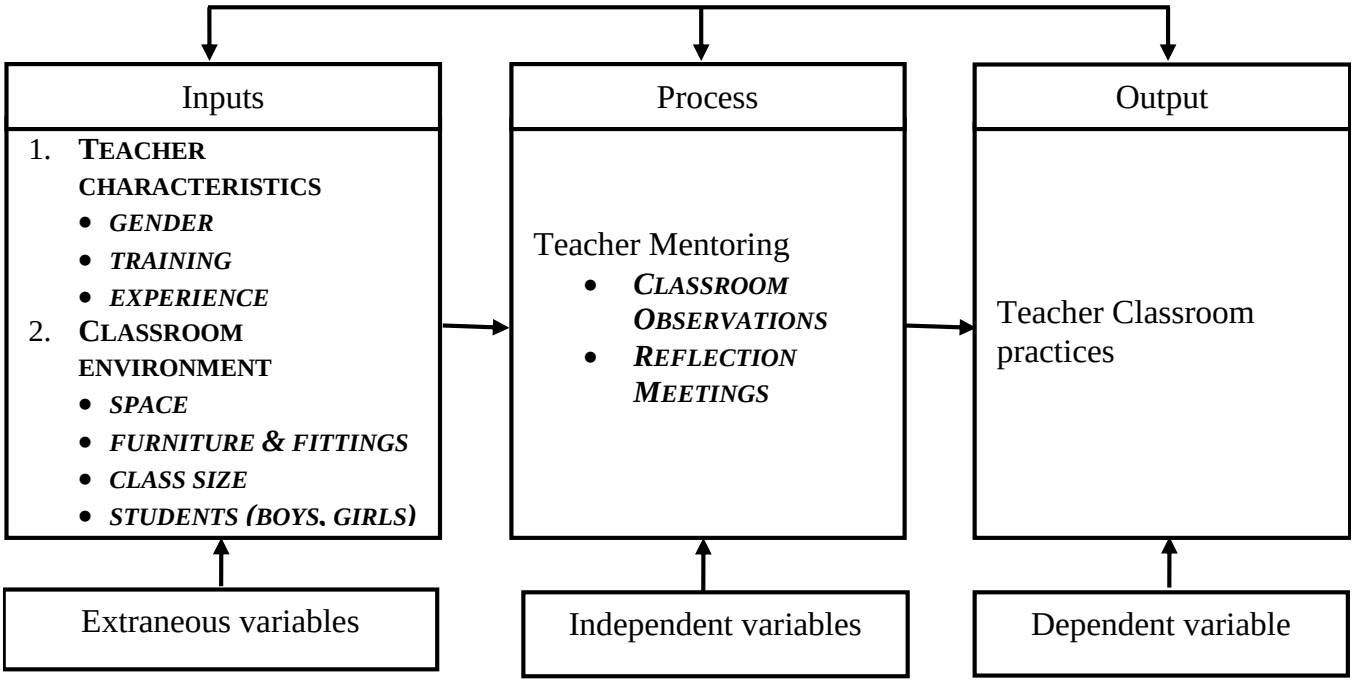

Figure 1. Conceptual framework for the study.

harmoniously, and feedback. Specific to teacher mentoring, the teacher is the input and through the mentoring process, teacher undergoes desirable changes in their pedagogical practices. The performance of the teacher in classroom practice is the output which provides feedback about quality of the teaching-learning process. Therefore, by manipulating the classroom practices through adopting the teacher mentoring intervention, it is possible to produce desirable outputs in the form of improved teacher classroom practices. The extraneous variables in this study were teacher characteristics and classroom environment. To control for the teacher characteristics, only trained teachers with more than two years of teaching experience in 22 public primary schools in Kwale County were involved in this study. This controlled for training and experience of the teacher. To control for classroom environment, the schools selected for the study were visited at the beginning of the project to ascertain that they had adequate classrooms and comparable student enrolment in terms of class sizes and gender.

METHODOLOGY

One group repeated measures design

The study was designed as an experiment aimed at determining the effects of teacher mentoring on their classroom practices. Teacher mentoring was the independent variable while the classroom practice score was the dependent variable (Best and Kahn, 2003; Wiersma, 2000; Robson, 2002). The study was conducted in a school context and it was not possible to establish experimental and control groups of teachers as the school management and education authorities in Kwale County could not allow randomization of teachers for the purpose of the study. Thus, the study adopted One Group Repeated Measures Design (Table 1) as quasi-experiment and followed one cohort of 40 teachers during the duration of 20 months of the study from May 2016 to October 2018 in 22 public primary schools. This design was found appropriate as it required fewer participants and resources. Furthermore, observing the same teachers, multiple times as they taught in their classrooms minimized variability. In Table 1, the symbol 'O' represents the classroom observations that were conducted using a classroom observation tool to assess the teacher classroom practices, which was the dependent variable. In 2016, each teacher engaged in the study was observed at least twice, in Term 2 (May to July) and Term 3 (September and October) and therefore, O_1 represents the average classroom practice observation score for all teachers that were observed in 2016. Likewise, O_2 and O_3 represent the average classroom observation score for classroom observations that were conducted in 2017 and 2018 respectively. The symbol 'X' represents the teacher mentoring sessions, which are the treatments or independent variable in this intervention that were conducted for each teacher immediately after each classroom observation. Therefore X_1, X_2 and X_3 represents teacher mentoring sessions that were conducted in 2016, 2017 and 2018 respectively.

Selection of schools and teachers

The target population in this study were 864 lower grades (Grades 1 to 3) public primary school teachers in 392 public primary schools in Kwale County Kenya. The accessible population was 121 lower grade teachers in 22 public primary schools in Kwale County, Kenya. The lower grade teachers were considered appropriate for

Table 1. One group repeated measures design.

Group	2016		2017		2018	
40 primary school teachers	O_1	X_1	O_2	X_2	O_3	X_3

this study because the overall goal of the intervention was to improve classroom practices of lower grades teachers as a strategy for improving literacy outcomes for lower grades learners. Purposive sampling was adopted in the selection of the 22 out of the 392 public primary schools in Kwale County. The criteria used in the selection of the schools were; a public school, willingness of the school management to participate in the project, geographical proximity to other project schools within a certain radius for engaging teachers in trainings and meetings in a cluster, number of students enrolled in the school, and approval by the local education authorities for participation of the school. A list of the public primary schools in Kwale County was obtained from the County Education Authorities and the 22 primary schools were selected using the criteria. The selected schools had comparable characteristics in terms of student enrolment, staffing, and school infrastructure. The average school enrolment was 720 students with an average class size of 51 students per class in lower grades. It was estimated that three lower grade teachers would be targeted for mentoring in each of the schools. All the 121 teachers who were selected to participate in the study were professionally qualified with a minimum of a primary school teacher training certificate. In addition, all the teachers had a minimum teaching experience of at least two years. In 2016, a total of 59 teachers were observed and mentored, while 68 and 71 teachers were observed and mentored in 2017 and 2018 respectively in the 22 schools. During the duration of the study, some of the teachers were not reached because they were; absent on the day of school visit, transferred to non-study schools, re-assigned to teach upper grade classes within the same school. These teacher dynamics reduced the sample size of teachers that was consistently observed and mentored across the three years from the expected 121 to 40 teachers. However, this final sample of 40 lower grade teachers was considered appropriate for statistical inferences.

In addition to the teachers, 15 mentors, comprising of five Curriculum Support Officers (CSOs) and 10 experienced teachers were selected to provide the mentoring support for the target teachers. The main criteria used for the selection of the 10 teachers as mentors was; teaching experience of at least 10 years, performance in teaching based on observations by the head teachers in their schools, participation in previous teacher professional development programmes, and approval by the local education authorities in Kwale County. Meanwhile, the five CSOs were government education officials with a mandate in teacher professional support in Kwale County. The inclusion of the 10 teachers as mentors in this intervention was informed by the few numbers of CSOs in Kwale County against the number of teachers that required to be mentored regularly.

Data collection instruments

A classroom observation tool and an open-ended interview guide were used for data collection. The classroom observation tool, self-developed by the researchers with 16 items was used in the classroom observations. The 16 items were specific classroom practices that were categorized into two domains; classroom environment (five items) and teaching and learning process (eleven items). Each of the classroom practice had five performance descriptor statements that were assigned a score of 1 to 5, with 1 indicating the lowest level of performance for the specific classroom practice, while 5 was the highest level of performance of the classroom practice. During the classroom observation, the teacher was scored on the 5-point rating scale from 1 to 5 for each classroom practice. Therefore, the total possible score was 80 scores which were expressed as a percentage. Table 2 illustrates a learner engagement item which was one of the classroom practices that was assessed in this study.

The classroom observation tool was evaluated by members of the study team and education specialist to ascertain its content validity. These experts are specialists in classroom instruction and teacher mentoring with wide experience in teaching of over 10 years. They ascertained that the items in the classroom observation tool were aligned with the desired teacher classroom practices and were based on sound teaching and learning theories (Gravells and Simpson, 2014). The reliability coefficient of the classroom observation tool was determined using the Cronbach's Alpha in SPSS Version 22 and achieved a reliability coefficient of 0.84, 0.81 and 0.79 in 2016, 2017 and 2018 respectively. An open-ended interview guide was used to gather qualitative information from the teachers, mentors, and head teachers on their experiences of the mentoring intervention. Using this guide, both positive experiences and challenges were gathered from these cadres of staff through surveys during eight school monitoring visits that were conducted by the study team in each of the 22 schools from 2016 to 2018.

Data collection procedures

The study was part of an intervention that was implemented in partnership with the education authorities in Kwale County of Kenya. Therefore, classroom observations were part of the intervention and informed the mentoring sessions that were conducted with each teacher after the classroom observation. Furthermore, the study team worked collaboratively with the education authorities in Kwale, but nevertheless, always sought for authorisation from the education authorities for the school visits.

As part of the intervention, each school was provided with 12 Clamshell Laptops that were pre-loaded with digital stories in English and Swahili languages for use in teaching of early grade literacy. The stories had earlier been developed by teachers and were aligned with the national curriculum in Kenya for the lower grade learners. A local technology company in Kenya was engaged for digitization and illustration of the stories. The target teachers were trained on how to integrate the digital stories in their teaching of early grade literacy. However, rather than conducting a one-off workshop, the teachers were trained in a series of workshops for six days, spread across six weeks from March to April 2016. This approach, which was dubbed the 'drip-feed approach', was meant to enhance understanding and uptake of the intervention, enabling teachers sufficient time to digest and reflect on what they were trained on before the next session. The training was followed up with school visits where the target teachers were visited, observed as they taught in their classrooms, and held discussion sessions thereafter.

Meanwhile, 15 mentors, comprising of five Curriculum Support Officers (CSOs) and 10 experienced teachers were selected and trained by the study team on the content and application of the

Table 2. Learner engagement.

Learner Engagement				
Are most children engaged in learning activities most of the time? Are children spending a lot of time waiting for instruction from the teacher? Does the teacher leave them unattended while s/he is busy with other tasks?				
1	**2**	**3**	**4**	**5**
Most learners are not engaged in any learning activities throughout the lesson	Most learners are engaged in learning activities for less than 25% of the time they are in the classroom	Most learners are engaged in learning activities for about 50% of the time they are in the classroom	Most of the learners are engaged in learning activities for about 75% of the time that they are in the classroom.	Almost all children are engaged in learning activities almost always – more than 75% of the time that they are in the classroom

classroom observation tool and the process of teacher mentoring. The teacher mentors had previous experience as teacher mentors. Under the guidance of the researchers in this intervention, the mentors prepared monthly schedules for school visits, conducted 20 monthly teachers mentoring school visits, and observed 238 classrooms. The mentors were assigned specific teachers in one to two schools within their vicinity for accessibility. On average, each of the 40 teachers was observed and mentored six times during the project duration. The mentors were supported by the study team with a daily rate for transport and meals as they were required to travel further away from their regular working stations. The study team conducted review and reflection meetings with the mentors every month after the school visits to share their observations, challenges and plan for the next round of classroom observations and mentorship sessions. These meetings were critical in enabling quality assurance by ensuring consistency and objectivity in classroom observation and teacher mentoring sessions thereby reducing variability. Furthermore, during these meetings, the mentors shared ideas based on their observations, discussed lessons learnt and best practices in the mentoring process, which enhanced their capabilities as teacher mentors.

During the school visits, the teacher mentors conducted classroom observations as the teacher taught a class in lower grade. The duration of classroom observation ranged from a single lesson to a series of lessons consecutively for one teacher depending on identified need and time availability. During the classroom observation, the mentor scripted their observations on notebooks. Soon after the observation, the teacher and mentor held a session where they discussed the observations. Importantly, the study team had decided that the classroom observation and teacher mentoring would not narrowly focus on the teacher integration of ICT in the lesson, but rather focus on the overall teacher classroom practice. The understanding was that ICT tools and ICT integration were meant to enhance overall teacher classroom practices and their integration was not an end in itself but part of the overall process of improving classroom practices. This decision had also informed the development of the classroom observation tool. However, as part of the classroom practices, there were specific items that addressed integration of ICT in teaching and learning.

During the mentoring sessions that were conducted soon after the classroom observation, the teacher and mentor first identified the good practices observed during the lesson and thereafter focused on the practices that needed to be improved. As part of the mentoring process, the mentors had opportunities to conduct demonstrations on how some of the practices that were challenging to the teacher could be better applied in the classroom. After the mentoring session, the mentor completed the classroom observation tool by rating the practices as observed. They shared the completed tool with the study team who entered the data on an excel template prepared for this purpose. Overall, each of the teachers were observed and mentored at least six times throughout the duration of the project. As part of the mentor training, emphasis was laid on the need for the mentors to nurture a professional relationship with the teacher based on trust and mutual respect.

Data analysis

Data that was collected using the classroom observation tool was consolidated into an excel template, cleaned and imported into SPSS version 22 for analysis by the study team. The classroom observation tool had 16 items that were statements of specific classroom practices. The teacher mentors were required to rate each practice on a scale of 1 to 5, with 1 being the lowest level of performance for the specific classroom practice, while 5 was the highest level of performance. The ratings for all the items were summed up to obtain a composite score with a total possible score of 80 which was expressed as a percentage. A high score indicated high classroom practice, while a low score indicated low classroom practice.

The study adopted the One Group Repeated Measures Design and followed one cohort of 40 teachers during the duration of 20 months of the study from May 2016 to October 2018 in 22 primary schools. An average classroom practice score was computed for 2016, 2017 and 2018 providing three data points for conducting the Repeated Measures ANOVA. However, before commencing on data analysis, the researchers tested the five assumptions of Repeated Measures ANOVA to ensure that the results obtained were valid. Meanwhile, the information gathered using the interview guide was subjected to content analysis and categorized into emerging themes in two main categories of positive experiences and challenges.

RESULTS

Testing assumptions of repeated measures ANOVA

The first assumption requires that the dependent variable is continuous, and this assumption was met as the classroom observation score was a continuous variable. The same group of 40 teachers in Kwale County were observed three times; in 2016, 2017, and 2018. Therefore, the second assumption of least two

Table 3. Classroom observation mean score and 5% trimmed mean score.

Year	Observed mean	5% trimmed mean
2016	57.79	57.82
2017	67.31	68.50
2018	69.54	70.32

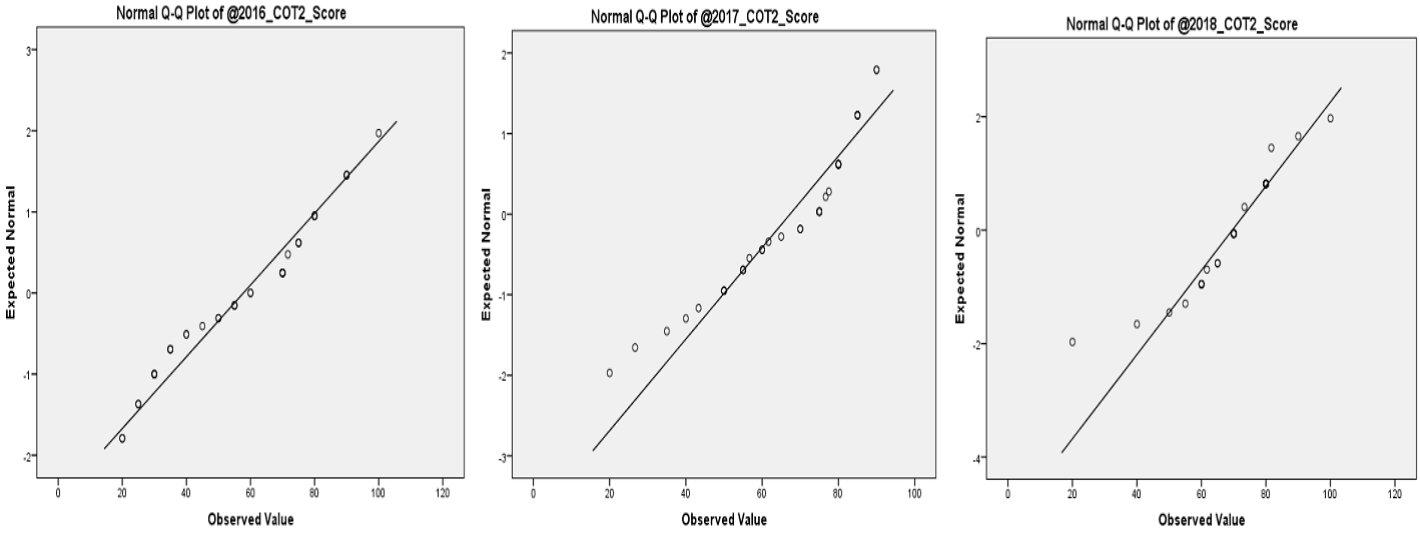

Figure 2. Test of normality.

categorical related groups for conducting Repeated Measures ANOVA was met. Table 3 shows that the observed mean scores and 5% trimmed mean scores for each year was comparable and therefore the third assumption of no significant outliers was met. The Normal Q-Q Plot was used in testing the assumption of Normality. The results are presented in Figure 2 which shows that the data for the three years (2016-2018) does not deviate significantly from the diagonal, and therefore the fourth assumption of normal distribution was met. The fifth assumption for Repeated Measures ANOVA tested the equality of variance differences between related groups using the Mauchly's test of sphericity. The results in Table 4 shows that there were no significant differences in the variances between groups and the Mauchly's test of sphericity was not violated at χ^2 (2) = 2.623, p=0.269 and the assumption was upheld.

Effect of teacher mentoring on classroom practices

The first null hypothesis (Ho_1) in this study tested the effect of teacher mentoring on classroom practice score. The mean classroom practice score was computed for each year from 2016 to 2018. The results are presented in Table 5 which shows that the mean classroom practice score improved across the three years from 2016 to 2018. To determine whether the observed classroom practice mean score differences across the three years were statistically significant, One Group Repeated Measures ANOVA was carried on the classroom practice scores for 2016, 2017 and 2018. The results are presented in Table 6 which shows that teacher mentoring had a statistically significant effect on classroom practice score at F=6.282, df=2, p=0.003 with a moderate effect size. Therefore, the null hypothesis is rejected and in conclusion, teacher mentoring was found to be an effective intervention in improving the classroom practices of the lower grade primary school teachers in Kwale County, Kenya.

Effect of duration of teacher mentoring on classroom practices

The second null hypothesis (Ho_2) in this study tested the effect of the duration of teacher mentoring on the classroom practice score. Therefore, LSD post hoc pairwise comparisons test was conducted on the mean classroom practice score for 2016, 2017 and 2018 to

Table 4. Mauchly's test of sphericity.

Within subjects effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Mentoring	0.933	2.623	2	0.269	0.937	0.983	0.500

Table 5. Mean classroom practice score 2016-2018.

Mentoring	Mean	Std. error	95% Confidence Interval	
			Lower bound	Upper bound
2016	57.792	3.575	50.560	65.023
2017	67.313	2.785	61.680	72.945
2018	69.542	2.131	65.232	73.852

Table 6. Tests of within-subjects effects for classroom practice score.

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Mentoring	Sphericity assumed	3115.706	2	1557.853	6.282	0.003	0.139
	Greenhouse-Geisser	3115.706	1.875	1661.749	6.282	0.004	0.139
	Huynh-Feldt	3115.706	1.966	1584.568	6.282	0.003	0.139
	Lower-bound	3115.706	1.000	3115.706	6.282	0.016	0.139

locate the significant differences across the three years. The results are presented in Table 7 which shows that there are significant differences in mean classroom practice score between the years 2016 and 2017 in favour of year 2017, and between years 2016 and 2018 in favour of year 2018. However, there was no significant difference between the years 2017 and 2018. While there were significant differences in the classroom practice score in the first year of teacher mentoring from 2016 to 2017, there were no significant differences in the second year of teacher mentoring from 2017 to 2018. Therefore, the null hypothesis is rejected. In conclusion, an additional year of teacher mentoring after the first year of teacher mentoring does improve their classroom practices. This could imply that a one-year teacher mentoring intervention is sufficient to improve their classroom practices. This finding could imply that an effective teacher mentoring programme should devote effort and resources in a one-year programme as subsequent additional year do not appear to produce significant results on the teacher classroom practice. Figure 3 illustrates the estimated marginal mean of classroom practice score across the three years which further shows that after a rapid improvement of the classroom practice between year 1 (2016) and year 2 (2017), the improvement slowed down between year 2 (2017) and year 3 (2018). This finding has implications on providers of teacher mentoring services as it could indicate that a one-year duration is a viable and effective teacher mentoring programme.

Positive experiences from the teacher mentoring process

Information was gathered through interviews on the emerging positive experiences from the teacher mentoring intervention. The following are some of the positive experiences that were observed:

(i) Increased collaboration: The mentoring process enhanced the practice of sharing of ideas between teachers, schools and school clusters. Teachers within supported schools became more open in sharing about their teaching and this improved teaching in the school. Meanwhile, the mentors picked up good practices observed during the mentoring sessions and shared them with teachers and mentors. For instance, one teacher started conducting library sessions for her learners using Laptops that were pre-loaded with digital stories and this idea increased learners' interest in reading. The idea was soon picked up and spread across other schools through

Table 7. Pairwise comparisons of mean classroom practice score 2016-2018.

(I) Mentoring	(J) Mentoring	(I-J) Mean difference	Std. error	Sig.[b]	95% Confidence interval for difference[b]	
					Lower bound	Upper bound
1	2	-9.521*	3.845	0.018	-17.298	-1.743
	3	-11.750*	3.614	0.002	-19.059	-4.441
2	1	9.521*	3.845	0.018	1.743	17.298
	3	-2.229	3.059	0.471	-8.416	3.958
3	1	11.750*	3.614	0.002	4.441	19.059
	2	2.229	3.059	0.471	-3.958	8.416

Based on estimated marginal means. *The mean difference is significant at the 0.05 level.

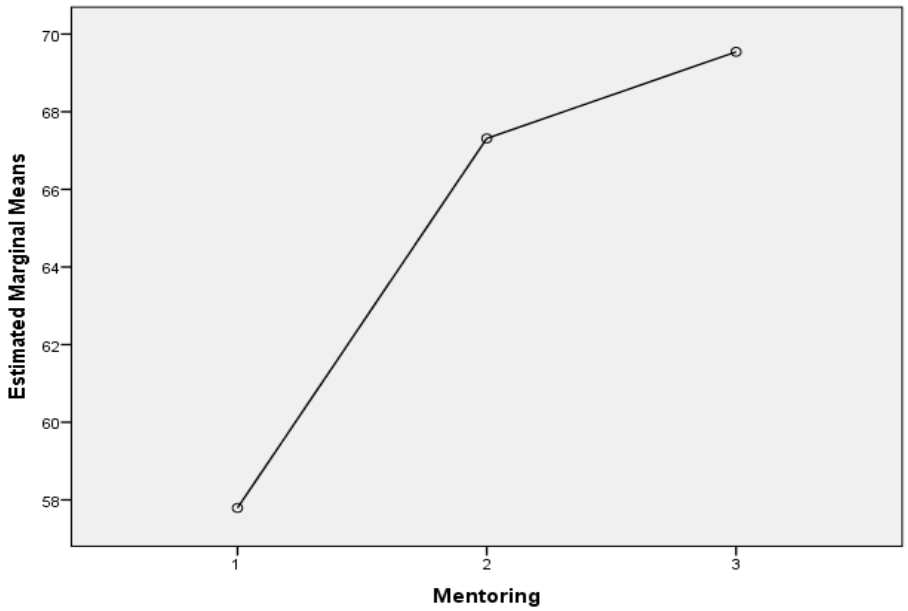

Figure 3. Estimated marginal means of classroom practice score.

the efforts of the mentors. In another case, a teacher was using self-developed and relevant stories and songs in enhancing student engagement and this practice was soon shared among the teachers.

(ii) Demand for mentorship: In most supported schools, changes were noted in the teachers who were being supported by the mentors. The word spread to other unsupported schools and they too started making requests for mentorship support for their teachers.

(iii) Improved capacity of mentors: The monthly review and reflection sessions for mentors emerged as important forums where mentors openly shared their challenges and solutions were proposed. The best practices experienced in the mentoring process were also shared and over time the mentors enhanced their capacity. Furthermore, it was observed that the mentors developed a sense of responsibility in their personal professional practices as pedagogical leaders.

(iv) Schools as learning hubs: Some schools came together and developed a learning programme where teachers could identify and visit a school that was doing well within their proximity to learn from other teachers. Such schools emerged as informal learning hubs largely driven by the initiatives of the teachers in such schools and this was attributed to the mentorship intervention.

(v) Support of education authorities: Education

officials including the quality assurance and standard officers and curriculum support officers supported the mentorship intervention including participation in the mentors' review and reflection meetings. They also led in coordinating the school visit schedules as well as the review and reflection meetings for mentors. This was critical; not only in the feedback they shared but also created a sense of legitimacy for the mentorship intervention among the mentors, schools and teachers.

(vi) Virtual communities of practice: Some teachers formed WhatsApp groups that brought them together for online sharing of soft copies of teaching and learning materials, ideas, and communication on emerging trends and developments in education including administrative matters.

(vii) Improved classroom practices: Supported teachers improved in their classroom practices over time. For instance, there were notable improvement in the classroom environment in terms of use of wall charts, manipulatives and other teaching and learning materials that enhanced learning. It was also noted that some teachers improved on their class management which led to improved student behaviour. Some teachers made phone calls to the coordinators of the intervention to express their satisfaction with the mentorship intervention as they had gained new ideas on how to address challenges they were facing in their teaching. The teachers also indicated that the mentoring intervention had motivated them to take personal responsibility for self-improvement in the teaching profession.

(viii) Trustful relationship: There was indication that teachers appreciated the friendly one on one interaction with the mentors, which was not judgemental but supportive.

(ix) Support by head teachers: Teachers reported that given the respect earned by the mentors, they shared their challenges with the mentors who would articulate them with the head teachers. The challenges were prioritised by the head teachers resulting in improved physical infrastructure, and provision of teaching and learning materials. This strategy also enhanced the head teacher's awareness of what was going on in the classes.

Challenges experienced from the teacher mentoring process

The following are some of the challenges experienced during the mentoring intervention;

(i) Coordination of school visits: initially, communications to schools about the school visits were not effective such that the head teachers or the target teachers were not aware about the visit or in some instances were not available in the school. However, this challenge was addressed over time.

(ii) Availability of mentors: In some cases, the mentors had to do a balancing act between their own teaching responsibilities and teacher mentoring. Consequently, some of the mentors initially missed out on mentorship sessions. However, through the support of the coordinators and education officials, the monthly school visit schedules were aligned with the availability of the mentors.

(iii) Transport to schools: Although mentors were assigned schools within their vicinity, some of the schools were geographically widely spread and it took more time to reach such schools, and little time was available for the teachers and mentors to engage productively.

DISCUSSION

The quality of education in Kenya at the primary school level is low and several strategies have been initiated to address this challenge with mixed results. Teacher quality and their classroom practices are key determinants of learning outcomes. This study sought to determine the effectiveness of teacher mentoring as a strategy for improving classroom practices and by extension teacher quality. Despite the existence of many teacher mentoring programmes, there is still no clarity on exactly what teacher mentoring is and how it is distinct from other teacher pedagogical support interventions such as induction, coaching, and supervision among others. The teacher mentoring intervention was focused on teacher classroom practices. Therefore, the observations of teacher classroom practices were conducted in the classroom, which was the main venue where teaching and learning are transacted in this intervention. Furthermore, the teacher mentoring was a collaborative process between the teacher and mentor that focused on; classroom observation, review and reflection session, identification of classroom practices that required to be improved, and developing strategies to improve the challenging classroom practices. Therefore, the mentoring intervention adopted a flexible approach in the structure, content, duration and intensity of engagement between the teacher and mentor (Collet, 2016; Ingersoll and Strong, 2011).

Several studies have documented the benefits of teacher mentoring interventions and the contexts under which they work. However, there are few quantitative studies that demonstrate the effectiveness of teacher mentoring to improve their classroom practices. This study has established that teacher mentoring was effective in improving the classroom practices of teachers. This finding is in tandem with previous studies

which associated teacher mentoring with improved teacher pedagogical skills (National Foundation for the Improvement of Education, 1999). Furthermore, the study established that a one-year programme of teacher mentoring is adequate to improve their classroom practices.

Aside from improving the classroom practices, teacher mentoring has other benefits that are important in improving teacher quality. In this study, it was found that participating teachers became motivated and took personal responsibility for self-improvement in the teaching profession. This finding support earlier studies that associated teacher mentoring with improved teacher commitment in their work (Ingersoll and Strong, 2011; Australian Council for Educational Research, 2016; Amin et al., 2018; Ochanji et al., 2017). The commitment to self-improvement was observed in collaborative activities that were initiated by participating teachers including forming of virtual communities of practice through WhatsApp groups and learning visits to neighbouring schools. Through these initiatives, teachers started sharing teaching and learning materials and ideas. Some participating teachers developed innovative solutions for teaching and learning and their schools emerged as resource hubs where teachers from neighbouring schools visited for learning.

Aside from the teachers, the mentors also benefited from the intervention. Through the monthly mentors' review and reflection sessions, the mentors over time enhanced their capacity as mentors and developed a sense of responsibility as pedagogical leaders. This finding is collaborated with other studies that found that mentors also benefit from the mentorship process in terms of self-satisfaction derived from helping others, earn respect, nurture collaboration, and gain new ideas (Holloway, 2001; Ochanji et al., 2017; Wasonga et al., 2015).

The key enablers for the successful implementation of the mentorship intervention were the support by education authorities in Kwale County, who not only coordinated the school visit schedules but also actively participated in the monthly review and reflection meetings, as well as termly school monitoring visits to assess progress of the intervention. At the school level, success of the mentoring intervention was attributed to the supportive role of the head teachers who were keen to improve quality of education in their schools. Finally, the trustful relationships were established between the mentors and teachers who respected and valued each other as learning partners, a finding that collaborated with previous studies (Irby et al., 2017). Meanwhile, the success of the mentorship intervention in the supported schools created demand and teachers from other unsupported schools made requests for support. There were challenges in coordinating the school visits as the mentoring strategy was not a formalized school programme in Kwale County at the time of the study. Furthermore, the absence of a formal mentorship programme in the schools meant that mentors had to individually balance between their teaching and mentorship roles which did not always work out perfectly.

RECOMMENDATIONS

The findings from this study will benefit key education stakeholders in Kenya and beyond in the design and implementation teacher mentorship programmes in schools. The following recommendations are made to the key actors in the education sector with a role in teacher professional development:

(i) Education policy makers: First, the findings will inform policy makers in the education sector in Kenya on planning for effective, efficient and sustainable teacher mentorship programmes as a strategy for teacher professional development for improvement of teacher quality. The mentorship programme should ensure that the teachers and mentors have sufficient time for engagements. Meanwhile, in order to ensure sustainability of the mentorship programmes, a formal structure should be established in teacher management for formal recognition of teacher mentors with commensurate compensation for this role. The programme should also include capacity building of the mentors to effectively deliver on their role.

(ii) Education practitioners and development partners: Secondly, education development partners and practitioners including teacher trainers and teacher training institutes will benefit on ideas for programming in the implementation of teacher professional development. Specifically, the findings will inform on implementation strategies particularly on the need to incorporate a comprehensive teacher mentorship component in every teacher professional development programme, and also the pre-requisite factors that need to be put in place as well as the challenges they are likely to encounter, and potential solutions in addressing them.

(iii) Education researchers: Evidence is limited on the effectiveness of teacher mentoring programmes in the developing countries and particularly on their potential for transforming teacher quality in rural and resource deficient settings. Therefore, the findings from this study will not only add into the existing body of evidence on this subject matter but will also form a basis for more discourse and work towards gathering of evidence on the effective models of teacher mentoring programmes in developing countries and their sustainability in the context of resource deficiencies.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

ACKNOWLEDGEMENTS

The authors are grateful to the teachers who actively engaged in the intervention to improve the quality of education, mentors who played critical roles as pedagogical champions in their areas, head teachers and management of the supported schools for their leadership and support, education authorities in Kwale County Kenya and respective education officials who collaborated and coordinated the intervention in the schools. They also appreciate Dubai Cares for funding the Project.

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Vol. 15(8), pp. 487-494, August, 2020
DOI: 10.5897/ERR2020.4005
Article Number: C5D518764503
ISSN: 1990-3839
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Full Length Research Paper

Students' transition from face to face learning to online learning at higher education: A case study in Trinidad and Tobago

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Received 22 May, 2020; Accepted 21 July, 2020

This action research highlights the experiences of undergraduate students as they transit from face to face learning to online learning at a higher education institution in Trinidad and Tobago. A review of the existing literature within the local context indicated that there exists a dearth of information about the experiences of these students. It is imperative that policy makers pay more attention and consideration to the voices of these students especially when they are formulating policies that pertain to online learning. Consequently, a case study was conducted to carefully ascertain students' experiences during this transition. Fifteen undergraduates participated in this study. Informal structured interviews and semi-structured questionnaires were employed. Data were analyzed with the use of three major thematic headings: Online learning (ONL) is a possible instructional option, Face to Face learning (F2F) is essential for Mathematics and Face to Face learning (F2F) is necessary for human interaction. Recommendations for the use of more ONL education were offered.

Key words: Online education, face to face education, case study.

INTRODUCTION

The transition from face to face learning (F2F) to online learning (ONL) at higher education could be considered a relatively new phenomenon in Trinidad and Tobago. For the purpose of this paper, the higher education institution at which this study was conducted will be referred to as Institution A. Over the years teaching/learning was conducted strictly via F2F although several attempts have been made to introduce ONL. ONL was never fully materialized and the conventional form of learning, F2F dominated. Several discussions, chiefly among policy makers, regarding the proper execution of ONL continued, and, in January 2020, a pilot programme was implemented. ONL was finally offered in several subject areas. Many were excited about this new teaching/learning strategy and gave it their full support and commitment.

Lecturers and students were strongly encouraged to utilize the new online platform for teaching and learning.

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Many lecturers and students with great enthusiasm continued to support this innovation. Initially there were problems such as: the lack of connectivity, the unavailability of laptops and computers for lecturers and students. In addition, some lecturers and students were unable to adequately manipulate the platform. As time progressed some of these issues were satisfactorily addressed. While ONL continued to stimulate great interest, no one took heed of the voices of students. They began to express their opinions concerning ONL. Students' voices about advantages and limitations of the use of ONL experiences remained unheard. Students began to scrutinize their realities about the shift from F2F to ONL. Listed below are some of their voices:

"Great! Don't have to come to school and spend money on printing assignments for courses. Everything is online."

"No assignments cost, no laptop cost, or internet cost because I pay for them every month. No added cost for me. For me online is cheaper."

"Oh well to be honest the class has more interaction compared with online. Lack of communication. There are barriers to communication."

These voices clearly express the experiences that some students encounter with the transition from Face to Face Learning (F2F) to Online Learning (ONL) at Institution A in Trinidad and Tobago. Their voices are extremely significant since there is a dearth of information about their experiences within the literature in the local context. It is also felt that their experiences must be taken into consideration by policy makers when creating guidelines that govern ONL.

Very often, policies in education, at this institution are implemented with little or no consultation of students. Thus, the principal objective of this study is to allow students to express their opinions freely and honestly. In this way, their experiences could influence and assist policy makers if more programmes are realized through ONL. Hence, this study could help to point a possible way forward especially if more ONL options are offered. Thus, this research carefully investigated the transition of fifteen undergraduates during the semester January to May 2020, at Institution A in Trinidad and Tobago. During this semester lecturers and students actively participated in ONL which was only offered via Google Classroom. Keeping this focus carefully in mind, which is the transition from F2F to ONL, this paper seeks to answer the research question: What are your experiences in the transition from F2F to ONL?

LITERATURE REVIEW

This literature review chiefly examines the criteria, associated with F2F and ONL. It begins with an overview of F2F then leads into ONL. It concludes with the purpose of the study.

Face to face learning (F2F)

Qureshi (2019) and Miles et al. (2018) contended that F2F is a teaching/learning method that enhances the teaching/learning process through interpersonal contact. These interactions can create a support network among students and teachers. Students may feel more comfortable and thus, learn easier in a familiar, traditional classroom setting. They may also access more information and acquire a better understanding of course content materials through these interactions. Kirkup and Jones (1996) offered a similar perspective and claimed that it was quite possible to have this bond of camaraderie between students and instructors in a F2F learning environment. Chen (1997) also supported this perspective and further stated that interactions not only allowed students to assess their own learning but also further assisted them to develop a genuine sense of community among themselves. Moreover, this community and fraternity can sometimes increase their level of confidence, intelligence as well as alleviate problems often associated with learning in isolation. Thus, F2F allows students to have greater scope of learning.

F2F is the more traditional type of learning instruction and it involves the transmission of information from the lecturer to the students (Bandara and Wijekularathna, 2017). It generally occurs in an enclosed physical classroom setting. Classes are conducted daily and may vary from early morning to afternoon and night. A whiteboard is normally placed to the front of the classroom, with furniture to accommodate both teachers and students.

Online learning (ONL)

One criterion associated with ONL is the delivery of study materials to students over a learning management system (Pozzi et al., 2019), which in most instances, is designed by an external source, for example, Google Classroom. Students are physically separated from instructors and the institution; they are also chiefly responsible for their own learning (Bagriacik, 2019). Depending on the nature of the study or subject area, the session maybe student centered. This depends largely on the content to be taught as well as students' familiarity with the complexity of the subject matter. However, one of the main objectives of ONL is to make the student-teacher interaction more convenient and flexible (Bandara and Wijekularathna, 2017). After careful consultations with lecturers and students, classes are meticulously organized and conducted synchronously at

a time that is convenient to both. They are also recorded and made available so that students could review it at a subsequent time if necessary (Fish and Snodgrass, 2019; Qureshi, 2019). As the foregoing reveals, F2F and ONL have similarities and differences. However, the goal of this study is to ascertain students' experiences as they relate to the transition from F2F to ONL.

METHODOLOGY

A qualitative approach which involved a case study, informal structured interviews and semi-structured questionnaires was utilized. This action research involves a cyclical process of data collection, reflection, and analysis. Meyer (2000) maintained that the strength of action research lies in its focus on generating solutions to practical problems. It also empowers practitioners, by getting them to actively engage with research. Reason and Bradbury (2008) described action research as an approach that is used in designing studies and it also seeks both to inform and influence practice.

The use of informal structured interviews and semi-structured questionnaires provided a clearer understanding of the experiences of these students. Interviews and questionnaires were carefully chosen because it was felt that they would allow students to speak without inhibition and thus, address the research question: What are your experiences in the transition from F2F to ONL? Four demographic items were used to collect data that answered the research question. These were recorded into categorical variables for further analysis. The selected criteria examined: age range, gender, enrolment status and duration of ONL experiences. Data collection was done through regular and consistent fieldwork. The days and the hours of contact were deliberately chosen to accommodate the students.

Case study

As noted in the introduction, the principal objective of this paper was to arrive at an accurate and thoughtful insight of the experiences of these fifteen students about their transition from F2F to ONL. Hence a case study was specially selected because it was felt that it could provide a more comprehensive picture, deep insights and would be better to investigate complex issues that were anchored in real-life situations. Case studies are holistic inquiries that seek to investigate a specific phenomenon within its natural setting. They are suitable for description, explanation and exploratory into arbitrary issues. According to Yin (2009), case studies explain, describe, illustrate, and enlighten. Yin (2009) also stated that they are empirical investigations and are chiefly based on knowledge and experience.

Creswell (2018) alluded to the fact that qualitative research is useful because researchers can explore and comprehend in greater detail what respondents convey. In a similar way, Smith (1978, cited in Merriam and Tisdell, 2016) supported that case studies are versatile and dynamic and provides a thorough and detailed examination of a phenomenon. It is also an intensive, holistic description and analysis of a single unit. Thus, Cohen et al. (2018) described it as an inquiry into precise scenarios within a real-life situation.

Interviews

Interviews are apt instruments for collecting data since they are flexible, and researchers can capture nuances and non-verbal cues. They can probe for better understanding, according to Cohen et al. (2018). Although interviews are powerful data collection tools, they are time consuming, open to interviewer bias, inconvenient for the interviewee and difficult to maintain anonymity. Bearing this in mind, the interview schedule covered two salient areas: Demographic and Students' Experiences which focused on the financial, educational, social, and psychological aspects of their lives.

Using WhatsApp and Google Classroom the interviewers requested permission from the interviewees to make copious notes of all their statements for the entire duration of the interview. Thus, immediately after interviews, data were transcribed verbatim and analyzed. Creswell´s (2018) qualitative thematic data analysis process was used, and the transcribed data was further coded and finalized into themes. This was done with the research question in mind: What are your experiences in the transition from F2F to ONL? Firstly, they were transformed in pen written form to type print transcripts into the Excel (Version 2014). Secondly, they were properly scrutinized, reviewed and thoroughly read to gain familiarity and a noticeably clear understanding of students' responses. Thirdly, they were coded and translated into three themes:

(i) Online Learning (ONL) is a possible instructional option
(ii) Face to Face learning (F2F) is essential for Mathematics
(iii) Face to Face learning (F2F) is necessary for human interaction

Questionnaires

Miles and Huberman (1994) stated that open-ended questionnaires give students an opportunity to freely express their voices in a dataset. Similarly, Creswell (2018) confirmed that this instrument also allows participants to state their views and opinions objectively and unconstrained by any biases of the researcher or past research findings. They are also cost effective and allow for structured responses. Therefore, open-ended questionnaires were chosen as an apt method of data collection and respondents were assured of anonymity. They comprised dichotomous, Yes/No and questions and some related to their experiences of F2F and ONL. Following the guidelines of Wilkinson and Birmingham (2003) eight questions with specific instructions which could be answered in approximately ten minutes were administered. This was done to minimize the time participants would spend to complete them and hence maximize the return rate.

Cohen et al. (2018) together with Leedy and Ormrod (2018) noted that researchers ought to be acutely mindful of the advantages and limitations of the use of questionnaires. In addition, Cohen et al. (2018) cautioned that this instrument does not afford participants the opportunity to explain their responses and the categories may not include all that they might want to say Thus, informal interviews addressed that deficiency and simultaneously served to triangulate data.

Validity

Creswell (2018) noted that credibility is evident when researchers validate their findings. According to Denzin (1978, cited in Danny (2014)) triangulation is the use of more than one method to gather data, such as informal interviews, and semi-structured questionnaires. Creswell (2012) offered that triangulation is also the process of corroborating evidence from different individuals in descriptions and themes in qualitative research. Similarly, Spaulding (2014) and Walsh (2013) observed that triangulation presents different aspects and a detailed analysis of the research outcome. Triangulation also allowed the researchers to collect and compare various perspectives of the phenomenon so that data presented were valid and free from bias. Triangulation also allowed

Table 1. Age Groups, gender, and status of participants.

Age groups (years)	% of population	Females (%)	Males (%)	Full-time (%)	Part-time (%)
Under 19	6.7	0	6.7	6.7	0
20-24	13.3	13.3	0	13.3	
25-29	33.3	13.3	20	0	33..3
30-34	20	20	0	0	20
40-44	13.3	6.7	6.7	0	13.3
45-49	6.7	6.7	0	0	6.7
Over 50	6.7	6.7	0	0	6.7

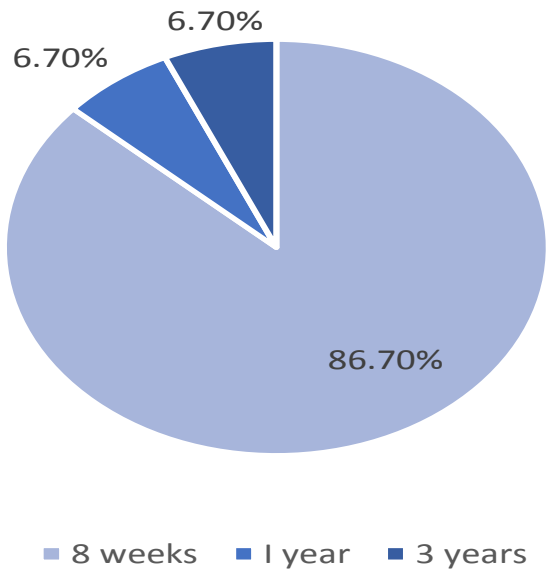

Figure 1. Duration of students´ online experiences.

researchers to optimize credibility. Data for this research were gathered through informal interviews and semi-structured questionnaires.

Reliability

Pilot and Beck (2014, cited in Connelly, 2016) hold the firm view that reliability in qualitative studies refers to the level of confidence in the data, interpretation, and methods used to support the quality. Additionally, Leung (2015) stated reliability in qualitative research refers to exact replicability of the processes and the results. Thus, to enhance consistency, intercoder reliability was established. A high level of intercoder reliability indicated that both reliability and replicability were present, and these strengthen evidence that the results of a qualitative study were scientifically valid (Kurasaki, 2000, cited in Mac Phail et al., 2016, p. 199). Thus, to ensure a high level of reliability, responses from informal interviews and semi-structured questionnaires were immediately recorded and clearly documented during telephone and Google Classroom conversations.

The students: Who are they?

According to Table 1, students' ages ranged from under 19 to over 50 years old. The majority of students were 25-29 years old. Most females were within the age group of 30-34 years, while the highest percentage of males was within the age group of 25-29 years. A seemingly unusual combination of both full-time and part-time students, studying within an exclusively part-time class contributed to the vast richness of the data. This enrollment included (80%) part-time and (20%) full-time students. All students had a positive response to ONL. However, they differed for the teaching of Mathematics.

The pie chart illustrates the variety of ONL experiences among students, before they began their programmes of study at this institution. Figure 1 shows that prior to this study, ten females and three male students, a total of 10 students used ONL for eight weeks, while one male studied with the online modality for one year, and another for three years. Males dominated females with years of experiences in ONL. This enhanced the judicious mix of rich experiences described by students in the data collected.

FINDINGS AND DISCUSSION

Data were collated, analyzed, triangulated, and documented in a narrative form using three thematic headings: Online learning (ONL) is as a possible

instructional option, Face to Face learning (F2F) is essential for Mathematics and Face to Face learning (F2F) is necessary for human interaction. Students also revealed that while they appreciated both forms of learning most of them noted that the teaching of Mathematics ought to be conducted F2F. Recommendations for the use of more ONL education were offered.

Students selected for this study were purposely chosen from one undergraduate class at a tertiary education institution in Trinidad and Tobago; they were readily available and accessible to participate in this study. While this complexity of student-demographic data presented some challenges to analyze and interpret, integrity was maintained. Sometimes the data collected and analyzed were intertwined and this also provided an excellent base for understanding the diverse experiences. The analysis was presented in a narrative form, which reflected its ever-developing nature, the various components of the students 'experiences.

ONL is a possible option

While ONL in higher education continues to be an option for students in Trinidad and Tobago there are limitations and advantages. Some limitations associated with this learning are the excessive length of time some students may take to learn in a digital space (Deming et al., 2015) and the inability to interact with peers. Some advantages include the increased access to educational programmes (Montelongo, 2019), the improved students´ outcomes and increased accessibility to information (Suresh et al., 2018). Students spontaneously describe some of their benefits:

"Students can study and work at their convenience. Some students even report better concentration in online classes due to the lack of classroom activity."

"Yes, I am - I am! My lecturers are very well informed, and I look forward to learning in a relaxed environment. It is a more relaxed learning experience for me."

Thus, the above-mentioned quotes emphatically illustrated that some students felt that ONL was extremely convenient and comfortable and they experienced minimum stress in completing exercises. This idea is supported by Croxton (2014, p. 1) who stated that: "Online learning holds great appeal to a large number of students because it offers flexibility in participation, ease of access, and convenience."

Other students mentioned that ONL was also economically viable because they did not have to spend money on transportation, meals, and printing assignments. In addition, they also claimed that since most of the classes were recorded, they listened to them at a subsequent time for further clarification. To underscore the importance of ONL a student carefully stated that it was: "Important that students can often revisit the recording to accentuate clarification. I check the recording and discuss with my peers after class or before the next class." Hence, ONL is valuable because students are better able to use to different platforms for communication, research, and networking. The following views expressed by these three students confirmed the foregoing:

"Yes, I would recommend ONL as it´s a valuable source of learning."

"Am I think it is a step in the right direction."

"I know people learn differently but for me ONL works and are preferred by me. I am comfortable with online education."

Davis (2017) compared students' satisfaction with ONL and traditional education. She posits that students preferred the online environment, and that it provided them with more satisfaction. The view expressed by Davis (2017) concurred with findings of this study since students also gave reasons for their preference of ONL over F2F. They stated that studying via ONL was convenient and it helped to reduce expenditure. In addition, the flexibility to subsequently source recordings of classes and revise content also proved to be extremely valuable. Moreover, studying via ONL gave them the opportunity to learn more about technology. They generally preferred ONL and the following statement confirmed the perspective gleaned from a student:

"Convenience and flexibility: Online courses give students the opportunity to plan study time around the rest of their day, instead of the other way around."

At least three students reported that they had no previous orientations to ONL, and this may have caused hindrances to their learning. Burge (2000) stated that persons enter the online learning environment with different skill levels; hence it is recommended that before a student takes an online course, information must be gathered and acted upon before the student is assigned to the Learning Management System. Possessing the necessary computer skills is essential for success in an online learning environment. Therefore, students must have orientation sessions to build their confidence in the use of Learning Management Systems such as Google Classroom before they are assigned ONL. These two students provide this summary:

"I will focus more in class. We need small classes. People have no opportunity to interact like in IR class. Does not allow us to connect. It is boring. I am not learning anything in this class."

"there is no personal teaching interaction between pupil and teacher…if the pupil needs that special attention."

F2F is essential for Mathematics

Kee (2020) maintained the strong view that interaction is part of the learning experience of adult learners. Further, Mouw et al. (2019) also confirmed this theory in 2019, when they investigated the quality of teacher - students' interaction and Mathematical learning gains. They found that there was a positive correlation between teachers' interactions with students and performances in Mathematics. This constant interaction and engagement of both teachers and students were undoubtedly expressed by these students:

"Limited. I mean I find online not too interactive. I need the interaction. I need a classroom to ask questions for Maths. The online can work for the courses not for Maths."

"I want to actually see you write the Maths, so it is not the same."

"Maths is not a subject to do online."

The experiences of the students expressed above notably indicated that there is great merit when Mathematics is taught in a F2F environment. Moreover, cognition is stimulated, the teaching/learning process is enhanced and ultimately the students benefit. Students specifically mentioned that because Mathematics classes were dynamic, stimulating and actively involved them, cognition was evident:

"Able to understand Maths F2F, it more hands on, and can interact with peers."

"Ah could talk in class more about it. With Online is very restrictive and does not adequately facilitate the teaching of Maths."

Classroom interactions extend beyond mere discussion of course content. They include affirmation and motivation by both lecturers and peers. These criteria are absolutely essential since they give students a deep sense of worth and dignity. Moreover, students are encouraged to do their best. The opposite is also true since the absence of these attributes serves as a disincentive. Merton (1948) affirmed this position. He first postulated the theory of self-fulfilling prophecy: forecast an action and it becomes a reality.

Students acutely aware of this theory vividly recalled a particular experience that they encountered during a Mathematics class. They stated that the teacher presented some Mathematical problems to solve. They were allowed to communicate freely in groups and then write their possible responses on the white board. They also remembered that during the same session the teacher regularly affirmed them and was non-judgmental. As a consequence of this remarkable gesture they were able to maximize their potential. Hence, it was not unusual that these students appreciated this approach to the teaching of Mathematics above all other types of experiences in other courses. Therefore, they unanimously exclaimed that they preferred to study Mathematics through F2F as mentioned by this particular student:

"Decided to discontinue Maths because it is not as engaging as F2F. Maths is too difficult and I really need interaction from the teachers and other students. Moreover, the teacher is better able to motivate and encourage students."

Krishnan (2014) investigated students' perceptions of the F2F and the online component in a hybrid Mathematics course. His analysis revealed that students preferred the F2F mode and that they understood mathematics concepts better with the F2F instructions" (p. 36). A unique revelation of this study lies in the fact that more than 75% of the participants categorically stated that Mathematics ought to be taught using F2F:

"Maths is not a subject to do online. The only subject I do not like in F2F is Maths. I think I will understand Maths via F2F, it more hands on, I could talk in class more about it with my peers and that makes it easy. The online is less peer talk so I do not understand it as good as in class."

F2F is necessary for human interaction

"You'll be able to concentrate harder on your learning because there'll be less distraction than if you were at home. You may feel more comfortable and learn more easily in a familiar, traditional classroom situation."

"Face to face was more fun and interactive. It allowed me to be more participative."

You and Kang (2014) purported that students who are self-disciplined may favour ONL. In addition, Chaney (2001) stated that ONL is rapidly expanding environment which permits users the flexibility of studying. Croxton (2014, p. 2) further added that: "When students have insufficient formal or informal interaction experiences in online courses, both learning and satisfaction may be compromised." Bandura (2001) is of the strong view that from a social cognitive perspective, knowledge is constructed and further developed while individuals are engaged in activities. This entails receiving feedback, as

well as participating in other forms of human interaction in public, social contexts. Bandura (2001) further added that since cognition is not considered an individual process, learning and knowledge are shaped by the kinds of interactions a student has with others and the context within which these interactions occur.

On one hand, online education is flexible, engaging and cost effective. On the other hand, there is a serious lack of personal interaction and intimacy with peers and lecturers. Moreover, there is the inability to converse freely. It is also intimidating for those who are shy and innocuous. Thus, F2F is better because it challenges and motivates students to maximize their potential. One student claimed that:

"Since I must literally face the teacher, I was motivated to do the home-work and write the work on the white board. With ONL it is difficult to supervise students but with F2F there is the text, and all can follow the lessons."

Students also hold the opinion that the physical presence of the lecturers and peers can positively impact others socially, mentally, and educationally. This becomes even more apparent because: "Peers are sometimes reluctant to admit that they do not understand the lecturer, and they are afraid of appearing somewhat inferior." Moreover, lecturers can often supplement the lack of personal teaching interaction between pupil and teacher especially if the student needs that special attention. A student remarked: "It is bad because I am not motivated because I am home, and I do not have good time management." Yet another added: "Yes, I am missing group work. Online I am limited and cannot network and get other opinions." This same student concluded that:

"Everyone logs on to class, then go their own way after class. Does not allow for networking and working with peers which I miss."

Recommendations

From all that was stated the following recommendations are suggested:

(i) Students ought to be given more opportunities to study ONL.
(ii) Students should be provided with social opportunities during ONL.
(iii) A blended form of instruction should be given for Mathematics courses.

Conclusion

The researchers tried as far as possible to keep the focus and thus answered the research question: What are your experiences in the transition from F2F to ONL? By adequately addressing the research question they presented the experiences of students. Action research afforded them the flexibility to interact informally with these students in their natural environment and it also allowed them to speak freely about their own experiences. The use of a combination of informal structured interviews and semi-structured questionnaires permitted the researchers to maintain validity and readability. Data were collected, collated, triangulated and documented in a narrative form using three major thematic headings: Online learning (ONL) is a possible instructional option, Face to Face learning (F2F) is essential for Mathematics and Face to Face learning (F2F) is necessary for human interaction. Students also revealed that while they appreciated both forms of learning most of them persistently noted that the teaching of Mathematics ought to be conducted F2F. Recommendations for the use of more ONL education were offered.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Vol. 15(8), pp. 495-503, August, 2020
DOI: 10.5897/ERR2020.3983
Article Number: 36A2B8864551
ISSN: 1990-3839
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Influence of classroom environment on senior secondary school students' academic achievement in mathematics in Calabar Nigeria

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Received 1 May, 2020; Accepted 16 July, 2020

This study examined classroom environment and mathematics achievement of senior secondary school (SS2) students' in the Calabar Cross River State, Nigeria. Ex-post facto quasi-experimental research design was used to test two hypotheses on the influence of two classroom variables, class size and instructional materials on students' academic achievement in mathematics. A sample of 700 students was selected from public secondary schools for the study using stratified and simple random sampling procedures. Two instruments used for data collection were a questionnaire on classroom environment and test items on mathematics achievement. The reliability estimate of the instrument was established through Cronbach Alpha reliability estimate and Kuder – Richardson K-R-20 formula which gave the reliability indices to range from 0.75 to 0.78. Independent t- test was the statistical technique adopted to test the hypotheses at 0.05 level of significance. The result of the analysis revealed that class size and availability of instructional facilities significantly influenced students' academic performance in mathematics among SS 2 students in Calabar Nigeria. Based on this finding, increased government funding for provision of conducive classroom environment, with optimum class sizes is recommended. Instructional materials for teaching mathematics should be made available in public schools.

Key words: Class size, instructional facilities, mathematics, achievement.

INTRODUCTION

Across the nations of the world, the teaching and learning of mathematics is accorded the utmost importance because mathematics is believed to play a key role in accelerating social, economic and technological development. In Nigeria, the educational policy accords high priority to the teaching of mathematics, and has made the subject mandatory for all Primary and Secondary School students, and a compulsory entry requirement into all science and technology courses in tertiary institutions (Federal Republic of Nigeria, 2014). To celebrate the beauty and importance of mathematics and its essential role in everyone's life, the 40th General

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Conference of UNESCO held on November 26th 2019, approved the Proclamation of March 14 (Pi Day) as the International Day of Mathematics (International Mathematics Union, 2019). Mathematics is indeed beautiful and worthy of celebration but unfortunately a significant proportion of students dislike or are afraid of mathematics rather than celebrate it. Poor attitude towards mathematics and fear of the subject are known to adversely influence learning and result in poor students' performance in the subject (Karjanto, 2017; Sule et al. 2016). A survey of 784 higher secondary school students in southern district of West Bengal to assess the attitudes students of different streams (Science, Arts and Commerce) towards mathematics showed strong association between the students' attitude towards mathematics and their achievement in mathematics (Kundu and Ghose, 2016)

Despite the priority attention given to the subject, high failure rates in mathematics among high school students in internal and national examinations remains a major concern to educational authorities and parents. For instance, the West African Senior School Certificate Examination (WASSCE) Chief Examiner's report for the years 2006-2016 specifically noted that the performance of students in mathematics was generally poor. The report showed that more than 50% of the students who sat for the examinations performed below credit level in mathematics (WAEC, 2016).

Factors that influence students' performance in mathematics have been well studied but this subject area remains a research priority especially in countries like Nigeria where students' failure rates in the subject remain high. Recent Nigerian studies have identified non-conducive learning environment, poor teacher-student relation and non-application of instructional materials in teaching mathematics as factors that may be causally related to mathematics phobia and poor students' performance in mathematics (Olaniyan and Salman, 2015; Nwoke and Ugwuegbulam, 2016). Another study in the country found shortage of well-trained mathematics teachers, inadequate teaching facilities, large classes, mathematics phobia, lack of laboratories and libraries to be associated with poor students' performance in mathematics (Sa'ad et al., 2014). elsewhere in Africa, a study of public secondary schools in Kenya that assessed the influence of students' attitude on performance in mathematics showed that students that perceived mathematics as a difficult subject were less motivated to learn mathematics and more likely to do poorly in the subject (Karigi and Tumuti, 2015). Another study that assessed the effects of human and material resources on mathematical literacy which involved economic, social and cultural status, and the cumulative expenditure on education (Aztekin and Yilmaz, 2014),

Among these myriads of factors that are known to influence students' performance in mathematics, classroom environment has commonly implicated in studies. Lizzio et al. (2002) in a study of university students found that students' perceptions of the learning environment influenced wide spectrum of learning outcomes including academic achievement, development of key skills and satisfaction with learning. The study also concluded that students' perceptions of their current learning environment were a stronger predictor of learning outcomes at university than prior achievement at school. Another survey in Cross River State that involved 1200 Junior Secondary 2 (JS2) students from 48 secondary schools showed that the following classroom environment variables (viz. time utilized by teacher; physical layout of classroom; classroom climate; teacher's motivation of students; instructional material utilization; classroom management skills; teacher-student classroom interaction and student-student classroom interaction) were individually and collectively predictive of students' mathematics achievement (Igiri et al., 2014).

Class size and the availability of suitable instructional materials are two components of the classroom which stand out as key modifiable factors (Spinner and Fraser, 2005). Effective teaching and learning cannot take place in poorly managed classrooms. Poor classroom environment is characterized by crowded population, poor learning facilities, lack of sitting accommodation and lack of instructional materials. It is common knowledge that lack of instructional facilities or inadequate use of instructional facilities and large class size characterize the classroom environment of many public schools in Nigeria. The persistence of these inadequacies of the classroom in Nigerian public schools contribute remarkably to poor learning outcomes reflected by high failure rates in mathematics as reported by the West African Senior School Certificate Examination (WAEC, 2016).

Our review of literature in this subject area shows that class large class size adversely influenced learning outcome. A study of 337 randomly selected Senior Secondary School students in Yobe State Nigeria showed that the students taught in an ideal learning environment performed significantly better in mathematics achievement tests than the students taught in a dull learning environment (Shamaki, 2015). Another recent study of senior secondary school students in Nigeria found that large class size was associated negative effect on students' academic performance in biology (Adimonyemma et al., 2018). The study also observed that large class size had adverse psychological and social effect on students which may have indirectly affected their academic performance. Also, a cross-sectional survey involving 30 lecturers and 520 final year students of tertiary institution in Nigeria revealed that large class size adversely affected the teaching and learning of Business Education (Ayeni and Olowe, 2016). In Uganda, another African country, a study of high

school students identified students' perception of good classroom as a significant predictor of students' achievement in mathematics along with parental support, peer influence, prior Mathematics achievement and attitude toward mathematics (Kiwanuka et al., 2015). Meta-analysis of studies that assessed the effect of class size on student achievement concluded that classroom size reduction (CSR) generally had positive effects on students' performance in all subject areas (Shin and Chung, 2009). A longitudinal study of kindergarten students and teachers randomly assigned to small and large classes within participating schools concluded that students in small classes outperformed their counterparts in classes of regular size (Finn and Achilles, 1990).

The assertion that learning is enhanced by appropriate use of instructional materials is widely studied and accepted to be true yet contextual variations and the complex nature of mathematics and related science subjects make it imperative to continue to research this subject area in a bid to explore intervention options that may offer novel opportunities to enhance learning outcomes. Abdi (2017) in a study of institutional factors that influenced students' performance in public secondary schools in Somaliland, observed that instructional materials and school facilities significantly influenced students' academic performance more than teacher characteristics did. In Nigeria, Adimonyemma et al. (2018) and Olayinka (2016), in two separate studies reported that adequacy of instructional facilities in the classroom environment significantly influenced students' performance in biology and social studies respectively.

Results of studies cited in the foregoing review of literature on effects of class size and instructional materials suggest that improvement in these classroom variables, namely, provision of adequate instructional materials and reduction of class sizes could contribute to efforts to improve learning outcomes in mathematics in settings where these conditions are currently suboptimal.

Purpose of study

The study aimed to assess the influence of two elements of classroom environment namely instructional facilities and class size on the performance senior secondary school students in mathematics. This study is premised on a national context characterized by sub-optimal classroom resources and preponderance of poor students' attitude to mathematics.

Statement of hypotheses

The following null hypotheses were formulated to guide the study:

(i) Class size does not have a significant influence on students' academic performance in Mathematics.
(ii) Instructional facilities do not have a significant influence on students' academic performance in Mathematics.

Conceptual and theoretical framework

The foregoing review of literature show that the environment within which teaching and learning occurs can influence the effectiveness of teaching, attitude and performance students in mathematics. The conceptual framework for this study seeks to provide a construct for understanding interaction between student's attitude or perceived self-efficacy and two elements of classroom environment namely, class size and instructional materials, and how these may influence student's achievement in mathematics. The framework derives from three related concepts. The first that is the widely held believe that the classroom environment influences the process of teaching and learning, and is a determinant of students' performance (Ogbuehi and Fraser, 2007). The second concept is that a child's attitude and self-efficacy belief can be influenced by the classroom environment (Dorman, 2001; Zedan and Bitar, 2014; Daemi et al., 2017). This is rooted in the self-efficacy component of Bandura's social cognitive theory. This theory provides a construct to explain people's beliefs about their own capacities to perform an activity or achieve an objective (Bandura, 1997). Pajares (1996) elaborating on the application of Bandura's self-efficacy theory to academic tasks, stated that students who have high academic self-efficacy tend to perform demanding tasks more often, and in the process gain higher knowledge and proficiency than students with low self-efficacy.

McMahon et al. (2009) in a study of fifth and sixth grade students from California showed that classroom environment influenced the student's academic self-efficacy. Another study involving 1309 seventh and eighth grade mathematics students in Hong Kong and USA found significant positive relationships between classroom learning environment and the students' academic self-efficacy (Hanke, 2013).

The third concept derives from the evidence that students' preference for mathematics and their achievement in mathematics is influenced by factors that influence self-efficacy belief in the subject. Researchers have shown that students' interest in mathematics and their choice of math-related courses is influenced by their academic self-efficacy belief (Hackett and Betz, 1989; Pajares and Miller, 1995). A study by Collins (1982) cited by Schunk (1989), which involved children with low, middle and high mathematics ability who had either high or low self-efficacy showed that although ability influenced students' performance, high self-efficacy was associated with higher performance regardless of ability.

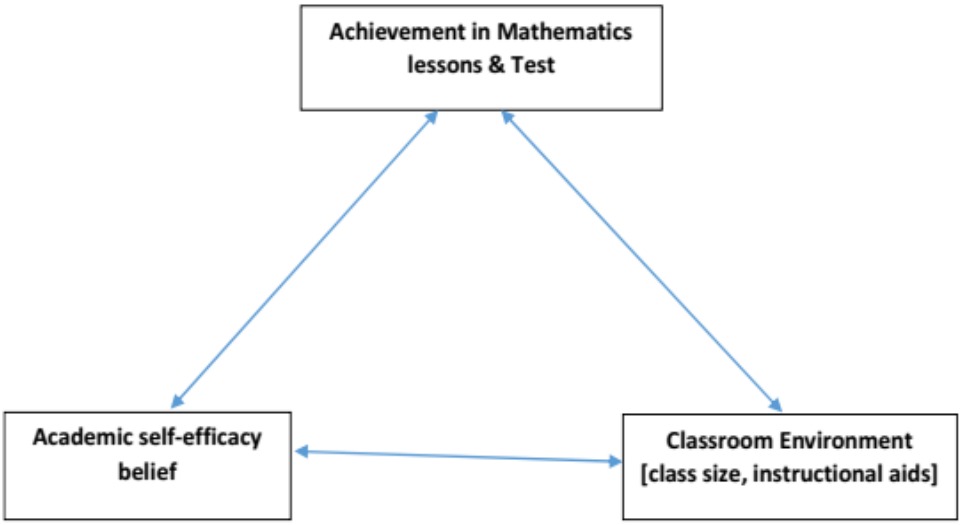

Figure 1. Conceptual framework on relationship of classroom environment, mathematics self-efficacy and achievement.
Source: Adapted from Tosto et al. (2016).

Children with high self-efficacy completed more problems correctly and reworked more of the ones they missed. The triangular conceptual model expressed in Figure 1 shows the direct relationship between mathematics achievement on one hand, and self-efficacy belief or classroom environment on the other. It also shows that changes in classroom environment indirectly impacts on mathematics achievement by its influence on the student's self-efficacy belief.

The theoretical basis for using instructional materials to aid the teaching of mathematics derives from the Dale-Brunner learning theory of "Cone experience" (Bruner, 1966; Dale, 1969) (Figure 2). The theory postulates that learners profit more from abstract instructions when they have had related concrete experiences that give meaning to abstract representations of reality. In the context of this study, the abstract instructions refer to mathematical problems (including mathematical symbols) while the use of instructional materials represent the concrete experiences that would give meaning to the abstract representations of reality expressed in the mathematical problems. The theory suggests that for learning to take place easily and smoothly at a foundational level, the use of practical instructional aids is essential. Foundational level may refer to primary education or, when applied at higher levels of education (secondary or tertiary) refers to use of instructional materials (for example audio-visual, media material) to aid learners to better appreciate newly introduced abstract mathematical concepts. Learners at the base of the cone who are at the earliest (enactive) phase of development or high school students who are being introduced to a new abstract topic area therefore need concrete manipulative instructional aids or visual models for better understanding of the concept. Learners at near the top of the cone should have increasing ability to understand abstract concepts and symbols with less need for concrete instructional aids.

The current study, sought to examine the influence of classroom environment on mathematics achievement of Nigerian secondary students. In conceiving the study, it was assumed that positive modification of the class room environment by improving on availability and use of instructional materials and implementing optimum class size would impact positively on the effectiveness of teaching and the students' academic self-efficacy with overall improvement in their performance in mathematics achievement tests.

METHODOLOGY

The study area was Calabar Education Zone of Cross River State in Southern Nigeria. The research design used for this study was the ex-post facto design with class size and instructional facilities as the independent variables. The sample of 700 students was draw from the population of all Senior Secondary level two classes (SS2) in Public Secondary Schools in Calabar Education Zone which make up a total of 6,996 students 84 public secondary schools. A multi-stage sampling technique involving stratified and simple random technique were adopted in selecting approximately 10% of the total number of students using proportional sampling technique giving a total sample of 700 students.

Two instrument were used; a questionnaire on classroom environment and Mathematics achievement test items. The questionnaire title "classroom environment" consisted of two sections, A and B. Section A described the bio data of the respondent and class size while section B was developed on the main variable namely instructional facilities which consisted of 6 items to elicit respondents' opinion on instructional facilities. The

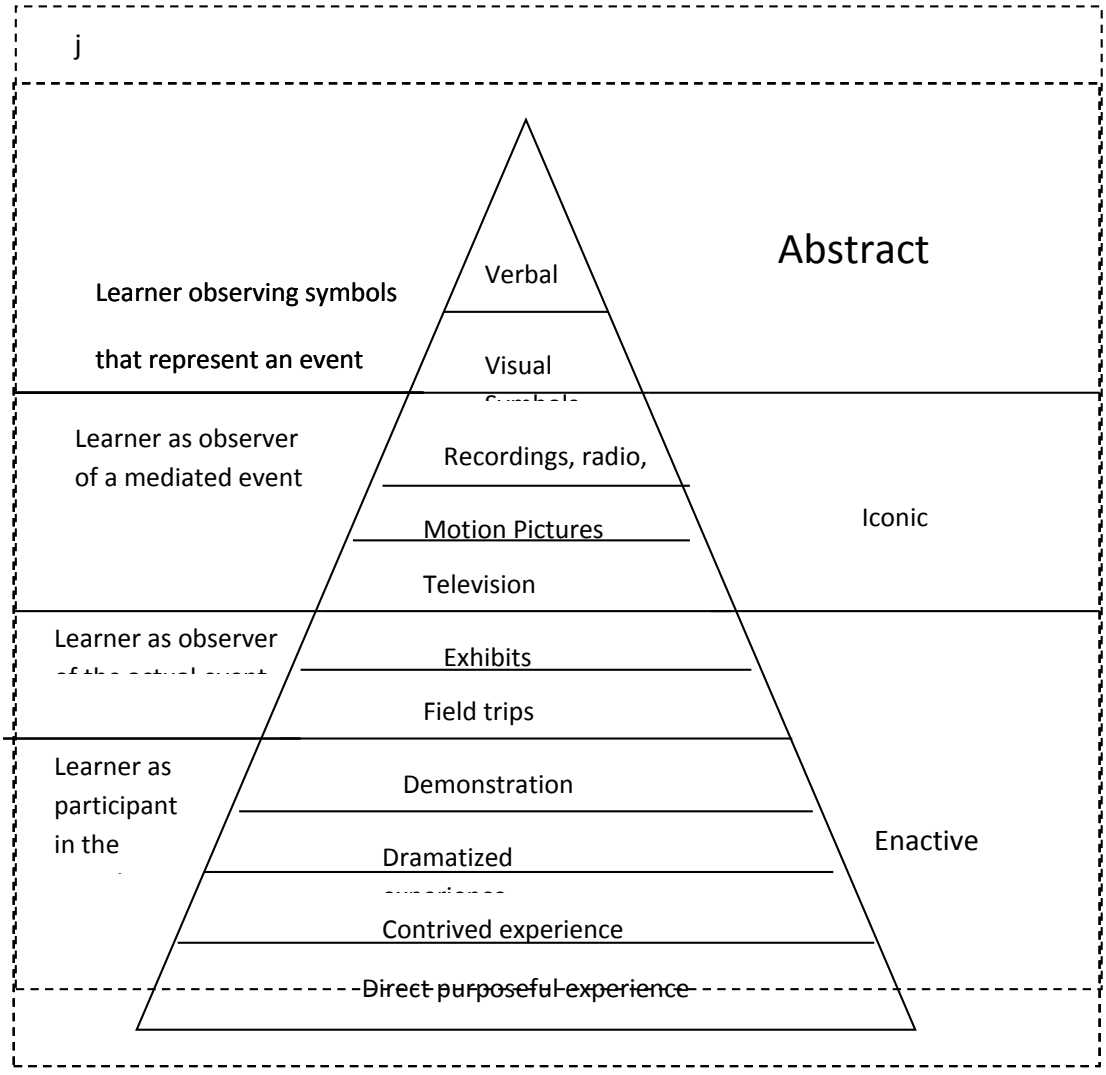

Figure 2. Dale-Bruner theory of cone experience.
Source: Heinich et al. (1982).

questionnaire was based on four-point scale used in measuring responding opinion level of agreement or disagreement such as strongly agree, agree, disagree and strongly disagree. Mathematics achievement test consisted of 40 items constructed by the researchers was used to test pupils' ability in Mathematics tasks. The instrument was face-validated by two experts in measurement and evaluation from the University of Calabar. Corrections and adjustments were made on the instruments based on the advice of the expert to enhance the validity. The reliability estimate of the questionnaire was established through Cronbach Alpha reliability estimate which give 0.75 and 0.78 while students' achievement test was established through Kuder Richardson formula K-R20 which give 0.77. The Statistical Package for Social Sciences (SPSS) computer programme was used to analyze the data collected. Independent t-test was applied as inferential statistics in testing the two hypotheses, with significance level set at 0.05.

We defined a class of < 40 students as small and class of ≥ 40 students as large based on the stipulation of the National Policy on Education (Federal Republic of Nigeria, 1981).

RESULTS

The results of the analysis are presented in the Tables 1 and 2.

Hypothesis one

Class size does not have a significant influence on students' academic performance in Mathematics.

The independent variable in this hypothesis is class size while the dependent variable is students' academic performance in mathematics. To test this hypothesis, class size was classified into two groups (Large and small). Based on the classification, the means scores of study participants were compared using independent t-test and the result presented in Table 1.

Table 1. Independent t-test analysis of influence of class size on students' academic performance in Mathematics.

Variable	N	X	SD	t	p-value
Large	395	14.12	6.52		
Small	305	16.23	5.92	4.473	0.00
Total	700	15.04	5.88		

*Significant at 0.05 level of significance.

Table 2. Independent t-test analysis of influence of instructional facilities on students' academic performance in mathematics.

Variable	N	X	SD	t	p-value
Adequate	326	17.68	6.75		
Adequate	374	13.21	6.92	8.638	0.00
Total	700	15.28	6.28		

*Significant at 0.05 level of significance.

The result of the analysis (t=4.473; p=.000) as presented in Table 1 indicates that there is a significant relationship between class size and students' performance in mathematics. The mean performance score of students in small classroom (16.23) is significantly higher than the mean of those in large classroom (14.12), and the null hypothesis was rejected at 0.05 level of significance. and alternative hypothesis was accepted. This means that higher number of students in a class was associated with lower students' performance scores in Mathematics.

Hypothesis two

Instructional facilities do not have a significant influence on students' academic performance in mathematics.

The independent variable in this hypothesis is instructional facilities while the dependent variable is students' academic performance in mathematics. To test this hypothesis, instructional facilities were classified into two groups (adequate and inadequate). Based on the classification, their means were compared using the independent t-test analysis and the result presented in Table 2.

The result of the analysis (t=8.638; p=0.000) as presented in Table 2 indicates that instructional facilities significantly influenced students' academic performance in mathematics. With this result, the null hypothesis was rejected at 0.05 level of significance and alternative hypothesis was accepted. The mean score of students taught with adequate use of instructional materials (17.68) is higher than the mean score of those taught with inadequate use of instructional materials (13.21). This implies that appropriate use of instructional materials would enhance students' academic achievement in Mathematics.

DISCUSSION

The result of the first hypothesis revealed that smaller class size is significantly associated with better students' performance in mathematics achievement tests. This finding is in agreement with the result of several other studies that addressed similar research question. The results of this study are similar to the result of a comparative study involving senior secondary school student in Northern Nigeria which assessed influence of components of learning environment on students' mathematics achievement. This showed that the mean score of students taught in an ideal learning environment was significantly higher than mean score of those taught and the students taught in less optimal learning environment (Shamaki, 2015). The classroom environment variables assessed in that study were classroom painting and lighting, climate and ventilation, seats and sitting arrangement, chalkboard and number of students per class. The variables assessed in this study which were also assessed by our study were the number of students per class, and chalkboard as an instructional material.

Also, a recent Nigerian study of the effect of class size on students' academic performance found that large class size was associated with negative effect on students' academic performance in biology. The study also observed that large class size had psychological and social effect on students, and that this was likely to have

affected their academic performance (Adimonyemma et al., 2018).

Another study involving 1763 students of a US public university which examined how classroom environment and student personality influences student satisfaction and performance found that personality characteristics (namely agreeableness and conscientiousness) and the structural dimension of classroom environment structure were all positively related to both satisfaction and academic performance (Pawlowska et al., 2014). This study further showed that interpersonal factors within the classroom environment influence the outcome of learning.

While our study and the study by Shamaki (2015) assessed the effects of physical elements of the classroom environment, they failed to assess interpersonal factors as did the study by Adimonyemma et al. (2018) and Pawlowska et al. (2014). As shown by these two studies, large class sizes have been shown to have negative effect of interpersonal relationships among students and teachers. It is likely that better interpersonal relationships among students in smaller class sizes contributed to the better performance observed among these students, compared to their counterparts in larger classes.

Contradicting this finding, another Nigerian study by Owoeye and Yara (2011) which analyzed the results of 50 schools in the West African School Certificate Examination (WASCE) found no statistically significant difference between the performance of students in large classes and small classes. The result of that study may have been influenced by confounding and methodological issues inherent on using aggregated data from administrative records retrospectively. The analytical process in this study differs from theirs in that our study used individual participants' data obtained prospectively while the study by Owoeye and Yara (2011) used aggregate data from published WASCE results.

Report of meta-analysis of research on class size and educational achievement concluded that there was a clear and strong relationship between class size and achievement with students in smaller classes doing better (Glass and Smith, 1979). This relationship was reported to have been more pronounced in well-controlled studies where pupils were randomly assigned to classes of different sizes. The participants in our study were randomly assigned to study arms thus minimizing selection bias, and this could partly the differences in the conclusions reached by our study and theirs. The results of that meta-analysis also suggested that the relationship between class size and academic achievement appeared to be stronger in secondary than primary schools. It is unclear if the fact that we studied secondary school students has in any way contributed to the study results as suggested by Glass and Smith (1979) in their meta-analysis.

The result of the second hypothesis revealed that teaching with adequate instructional facilities was associated with significantly higher students' performance in mathematics achievement tests. Our results are in consonance with the findings of Bassey et al. (2010) and those of Olayinka (2016) who in separate studies reported that adequacy of instructional facilities in the classroom environment significantly influenced students' performance in mathematics and social studies respectively. Bassey et al. (2010) in a study conducted among senior secondary school students in Cross River State Nigeria showed that non-availability and non-use of instructional materials by schools were independently associated with poorer performance of their students in mathematics achievement tests. It is important to note that the control arms in our study as in the other two Nigerian studies were made up children in the usual classroom situation of the public schools in the country, mostly characterized by deficiencies in instructional facilities.

Also, study by Oladejo et al. (2011) which compared teaching of physics with improvised and standard instructional materials showed that the students taught with improvised instructional materials obtained the highest achievement score at post-test, followed by those with standard instructional materials, while the control group scored the lowest. The result of this study shows that improvised instructional materials could be as effective as or better than standard instructional materials if appropriately applied. Again, given that the control arm of this study and ours represents children in the usual situation of public school classrooms in Nigeria, these results highlight the deficiencies in provision of instructional facilities in the nation's public schools. These studies and ours show how the persisting lack of essential learning resources could adversely impact on learning outcomes in Nigerian public schools in general, and particularly mathematics classroom.

A key limitation of our study being of quasi-experimental design is the failure to apply statistical adjustment for confounding effects and risk of bias inherent non-randomised and observational studies. Another limitation of our study its focus on the structural dimension of classroom environment while failing to assess interpersonal factors which are known to also influence the outcome of learning within the classroom environment. For instance, Pawlowska et al. (2014) showed that classroom environment as well as student personality influenced student satisfaction and academic performance.

CONCLUSION AND RECOMMENDATION

This study has shown that small class size and use of instructional materials positively influence learning

outcomes in mathematics. The students in the control arms of our study and others performed poorly because they were in their usual classroom situation characterized by large-sized classes and deficiency of instructional materials. The findings highlight resource gap in educational system which adversely impact on the teaching and learning of mathematics in particular. Provision of instructional materials will require increase in funding of public schools which is bound to pose a major challenge with worsening economic situation in many countries. Parents, teachers and students should be encouraged to make improvised instructional materials. This has the potential to mitigate the effect of declining resources due to the effects of COVID-19 on the economies of many low and middle income countries.

This study has highlighted poor compliance with the National Educational Policy which stipulates maximum class sizes of 20, 30 and 40 for pre-primary, primary and secondary schools respectively (Federal Republic of Nigeria (1981). Programme to reduce class sizes would entail cost-intensive interventions like construction or reconstruction of classrooms and procurement of equipment. Innovative, cost-efficient approach to mitigate the effects of large class size in public schools could include rotation of students to teach them in small groups, and provision of virtual electronic learning platforms and materials by radio, television and the internet.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

ACKNOWLEDGEMENT

The authors appreciate the University of Calabar, for the intramural support for the academic and research activities.

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Vol. 15(8), pp. 504-510, August, 2020
DOI: 10.5897/ERR2020.4023
Article Number: 8545AA364553
ISSN: 1990-3839
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Use of online collaborative learning strategy in enhancing postgraduates' learning outcomes in science education

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Received 23 June, 2020; Accepted 14 July, 2020

Most postgraduates in Nigeria Universities are family and working-class students. They rarely have time to stay and study in the classroom due to pressures at home and work-place. To enhance their outcomes in the program despite their tight schedule, the use of online collaborative learning strategy was employed. Pretest-posttest, control quasi-experimental research design was used on 38 postgraduates in Science Education. The sample was selected from two Universities in south west Nigeria. Two instruments: Questionnaire on Postgraduates' Studying Challenges (QPSC) and Science Education Performance Test (SEPT) were administered on the sample. Data generated were analyzed using descriptive and inferential statistics. The result revealed that the use of Online Collaborative Learning Strategy enhances undergraduates' learning outcomes and retention in Science Education.

Key words: Postgraduates, online collaborative learning strategy, science education, learning outcomes, universities, students.

INTRODUCTION

Postgraduate programs at Masters level in Nigeria Universities are combination of course works and research activities. These require students' presence both in the classroom and on the field most of the time. They are expected to spend more time on research field than in the classroom. At the same time, they must visit their research supervisors to showcase their progress reports and take some instructions from them. Most of the class works and research activities cannot be done in isolation. There is need for collaboration and consultation. Coupled with the family life and workplace demands, most postgraduates are faced with a number of challenges in their studies (Chigona and Chetty, 2017). The three facets of their pursuits compete with the limited time available to undergraduates (Ataca and Berry, 2010). As a result of the numerous challenges faced by married students, there is need for an avenue where such students could interact with their colleagues and instructors without jeopardizing the family and work-place demands. One of the current ways of getting these activities done is through online collaboration.

Online Collaborative Learning Strategy (OCLS) in the context of this work entails grouping the students together in a sizable number suitable for group work.

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Unlike the conventional Collaborative Learning Strategy (CLS), in OCLS, there might be no need for physical convergence of the group members at all times. It is a distance learning carried out collaboratively.

Online activities include the use of social media platforms. Students across the world are embracing learning through social media. From the study of Ansari and Khan (2020) revealed that 67% of India students accepted that mobile devices and social medial play a vital role in their academic performance and career enhancement. This was in support of Gikas and Grant (2013) who earlier opined that mobile devices and social media provide excellent educational e-learning opportunities to the students for academic collaboration, accessing course contents and tutors despite the physical boundary Ansari and Khan further stressed that some of the benefits of collaborative learning through social media networks include accessing course contents, video clip, transfer of instructional notes. In an interview study carried out among students of three Universities in the United States showed that social medial created resourceful collaborative learning opportunities to students (GIkas and Grant, 2013). This was buttressed by a study carried out by Dahlstrom (2011) cited in Elkaseh et al. (2016) on 3000 college students in United States which revealed that 90% of the students uses Facebook, while 37% uses Twitter to share information. Studies in western countries have stressed that online social media used for collaborative learning has a significant contribution to students' academic performance and satisfaction (Ansari and Khan, 2020). Study of Eid and Al-Jabri (2016) carried out on 308 graduates and postgraduates in Saudi Arabia University revealed that students embarked on collaborative learning, sharing files and knowledge through the use of social media. In Nigeria, over 60% of students use social media as their primary source of information (Kamau, 2017). These studies carried out across the world justified the inclusion of online media in the Collaborative Learning Strategy as adopted in this work. The choice of social media for the study was based on the findings of previous researches that claimed popularity of Facebook and other social media among students in various levels of educational institutions. Derived from literature, it implies that all collaborative activities might be perfectly done online. This would spare the students time to attend to family and work-place issues. Distance coverage in journeys to attend lectures and deliberations on field work and the risks involved in such journeys could be avoided, yet the postgraduates' activities could still be carried out appropriately.

OCLS is part of Group Learning Strategies where students work together as a team (Chandra, 2015; Ha et al., 2018). In OCLS, students are grouped into five memberships at most. Each group is given a task to perform and in performing the task, each member studies, thinks and shares ideas among colleagues. In online collaborative learning, everyone is an active member of the group (Yamarik, 2007). Online collaborative learning enhances active interaction with other members of the group, each member is accountable and responsible to the group, and there is positive interdependency. In small groups students are more active and perform better (Yamarik, 2007). Collaborative learning has been proved to have the potentials of enhancing students' learning (ai, 2011, 2013).

The slight difference between the CLS and the OCLS is in the introduction of virtual classroom. In CLS, sharing of information, class or group interaction is not possible unless there is physical class or group gathering. Each member of the class would have to travel from their various locations for the purpose of sharing or receiving information or materials. Much time is spent by the students in order to receive instructions or deliberate on the study tasks. But in OCLS, all activities are online based. Students might not need to leave their duty posts for study centers. Yet all learning activities are done through online platforms. OCLS allows constant and consistent discussions among the learning group members, it doesn't require physical gathering of the learners before performing any necessary learning activity. It makes sharing of information and materials easier. It also allows prompt and instant reports from the fieldwork. The idea of waiting till the meeting days before reporting is defeated under OCLS. The stages involved the use of OCLS includes the following.

Permutation of the learning groups

The teacher at the beginning of the class will, through the use of an unbiased technique, group the students into sizable numbers ranging between 3 and 5. The group head/coordinator will thereafter be appointed for each group. The group head is saddled with the responsibility of coordinating the activities in the group and keep records of what is done.

Preparation and presentation of the day's activities

The teacher who stands as the facilitator under this strategy prepares the students for the day's work and gives them the study contents and the learning objectives. All necessary learning materials are also provided and presented to the groups. The group members thereafter determine the procedures for the tasks before them.

Participation and online collaboration

Members of the groups are made to register online with

one of the two social media platforms dedicated for this study. Facebook Group Class (FGC) and WhatsApp Group Class (WGC) were chosen to be the group learning platforms because of their popularity among Nigeria students. The two social media platforms are mostly used by many Nigerian students. They are already used to the operations of the platforms. Network providers in Nigeria also make their services on the two platforms affordable to students. By implication, every student in Nigeria is a perpetual user of Facebook and WhatsApp (Mageto, 2017; Kamau, 2017; Ngonso, 2019). For the purpose of this study, whichever platform chosen by a group becomes the virtual classroom for the group members to interact. ZOOM was dedicated for general classroom interaction. ZOOM was preferred as the overall virtual classroom because of its features and provision for large participants. The collaborative activities are done online. Group members chat and present ideas through the platform. The duty of the course lecturer is to monitor the online collaboration but not to intervene in their learning processes. At the end of a section, the lecturer converge all the groups through ZOOM which was created for the purpose of online general class teaching in this study. The use of online platform for collaboration was to allow the postgraduates have time for home and office commitments and at the same time, progressing in their studies. They begin the activities by discussing, observing, deliberating and manipulating the materials online one after the other. At this stage every member of the group must present his ideas and findings to the group. Every individual's findings are considered by the entire group members and discussions are allowed on such findings. This will be done in turns among the group members until everyone in the group have participated. To conclude the group activities for the section, a consensus would be reached and documented for presentation to the whole class.

Progress report and posting

At the end of the activities, every group would be made to present their findings through the ZOOM platform and the entire class members will consider and conclude on the best findings out of all that were presented by the groups. The learning for the section then ends.

Statement of the problem

Most postgraduates in Science Education are family and work-class people. They rarely have time to spend in the classroom yet interested in the postgraduate program. A good number of them are faced with the challenges of managing work and family alongside their studies. There are little or no time left out of their tight schedules for the rigorous and "in-the-class" study in higher education. As a result of physical convergence barrier among them, sharing of study materials, knowledge and ideas are almost impossible. There was no opportunity of team work which postgraduate studies required most of the time. To encourage such married students and encourage team work as well as sharing of information and ideas, there is need to provide a learning platform that would allow them study as teams, share information and at the same time manage their homes and work schedules. Since the lecturer-in-charge cannot give all his time to students' consultations only, and the students are faced with the challenges of converging in the classroom for lectures, there is need for online collaboration. Therefore, this study introduced Online Collaborative Learning Strategy (OCLS) to determine its effects on postgraduates' learning outcomes in Science Education.

Research questions

The following research questions were raised to guide the study:

1. What is the distribution of the postgraduates in Science Education across marital and employment statuses?
2.What are the challenges faced by the postgraduates in their studies?

Research hypotheses

The following research hypotheses were formulated and analyzed:

1). There is no significant difference between the pretest mean scores of experimental and control groups
2). There is no significant difference between the posttest mean scores of experimental and control groups.
3). There is no significant difference between the retention mean scores of experimental and control groups.

METHODOLOGY

The design used for the study was a pretest-posttest- control quasi-experimental research. The sample used was 38 postgraduates studying Science Education at Masters level selected from two Universities in South-West, Nigeria. Simple random sampling technique was used in selecting two states out of the six states in South-West, Nigeria as well as in the selection of the two Universities used in this study. Simple random sampling technique was also used to select the University designated as 'Experimental Group' while the other University became the 'Control Group'. Purposive sampling technique was used in the selection of the 20 Science Education students for experimental group as well as the 18 Science Education students for the control group. All second-year postgraduates studying Science Education at Masters level from the two Universities selected were used for the study. Two instruments were used for the study. The first instrument was a self-constructed 10-item questionnaire titled 'Questionnaire on Postgraduate' Studying Challenges' (QPSC) and a 10-item short

Table 1. Percentage analysis of the marital and employment statuses of the postgraduates in Science Education.

Postgraduate status	N	Percentage
Married and employed	30	78.95
Not married but employed	3	7.89
Married but not employment yet	4	10.53
Not married and not employment yet	1	2.63
Total	**38**	**100**

answer easy type 'Science Education Performance Test' (SEPT). Each item in QPSC was rated 1mark while each item in SEPT was scored 2 marks. Face and content validity of the two instruments were ensured and reliability was also carried out on the two instruments by administering them to 5 postgraduates in Science Education outside the sampled Universities for this study. The data collected form the 5 students were analyzed using Kudar-Rechardson formula 21 (Kr_{21}) for QPSC and Kudar-Rechardson formula 20 (Kr_{20}) for SEPT. The reliability coefficients obtained were 0.86 and 0.89 for QPSC and SEPT respectively at 0.5 level of significance. The two instruments were administered on the experimental and control groups prior the treatment to obtain their pretest scores. Experimental group was thereafter grouped into four learning groups. Each group had five memberships. The four groups were made to register on any of the two Social Media Platforms dedicated for the group online collaboration. The two Social Media Platforms for group online interactions were Facebook Group Class (FGC) and WhatsApp Group Class (WGC). 'ZOOM' was chosen to be the general online classroom platform for experimental group only. This was where general class interactions and findings of all groups were collated and judged. All activities done throughout the study were online and virtual classroom based.

Activities within experimental group

The treatment was given to the experimental groups for a period of ten weeks out of the thirteen weeks designated for the study. At the end of the formation and online registration of the collaborative learning groups, study contents and learning objectives were presented to both experimental and control groups. The researcher played the role of an online facilitator to the experimental group. The frequency of the online meetings was determined by the OCLS learning groups. None of the groups met less than five times of appreciable hours per week. They took advantage of online platforms that allow studying while at work or home

Activities within the control group

The regular course lecturer for the control group was made to engage his students using his conventional teaching strategies for the period of the study. By implication, the learning process existing at the control group class before the commencement of this study was upheld throughout the study period. There was no interference or adjustment to the learning conditions of the control group. The control group had meetings twice a week for a period of 2 h per day as stipulated in the University lecture time table. It was ensured that there was no interference between the two groups throughout the ten weeks of study. The same Science Education curriculum was given to the two groups for the period. Contents of the curriculum covered were as prescribed in the University course-work schedule for the semester that coincides with this study time. These include: Instructional Materials and Techniques in Science Teaching, and Evaluation in Science Education

At the end of the tenth week, SEPT was administered on the two groups to determine their posttest mean scores. Three weeks break was given to the students thereafter and SEPT was re-administered on the two groups to obtain the retention mean scores. The study lasted 13 weeks. The data collected were subjected to statistical analysis to determine the students' performance and retention in Science Education.

RESULTS

Descriptive analysis

Question 1: What is the distribution of the postgraduates in Science Education across marital and employment statuses?

Table 1 shows that 78.95% were married and employed, 7.89% were not married but employed, while 10.53% were married but not employed yet and 2.63% were not married and not employed yet. This showed that 89.5% of the students sampled were married and at the same time studying, while 86.8% were students and also working at the same time.

Question 2: What are the challenges faced by the postgraduates in their studies?

Table 2 showed that 78.9% of the postgraduates sampled were fully engaged at the work-place, 76.3% found it difficult to study at home due to huge domestic activities, 68.4% also found it difficult to attend classes and 84.2% could not embark on field work alone, while 60.5% missed lectures as a result of domestic challenges. The table revealed further that 68.4% of the postgraduates were not gaining the support of their employer to proceed on the study, 57.9% were not visiting their project supervisors as expected, 97.4% confirmed that it was difficult for the entire students to physically converge at the study center due to variations in terms of office and family schedules, 100.0% of the students claimed that lectures and field works are time demanding, while 97.4% of the students observed that postgraduate programs require collaboration among the students.

Hypotheses testing

$H_0$1: There is no significant difference between the

Table 2. Percentage analysis of the challenges faced by the postgraduates in their studies.

Challenges	N	Percentage
My duties at work-place do take much of my time	30	78.9
Domestic activities always hinder my personal study at home	29	76.3
Coming to class possess great challenge to my life	26	68.4
It's difficult to do field work alone	32	84.2
I always miss class lectures due to domestic challenges	23	60.5
My place of work did not support my study	26	68.4
I rarely meet with my supervisor as a result of time constraints	22	57.9
It is difficult to physically converge in the class due to variations in office work schedules of working-class students among us	37	97.4
Lectures and field works demand much time	38	100
Postgraduate program requires collaboration with colleagues	37	97.4

Table 3. t-test analysis of the difference between the pretest mean scores of experimental and control groups.

Group	N	Mean	SD	df	t	Sig
Experimental	20	6.40	1.47	36	0.27	0.789*
Control	18	6.28	1.32			

*p<0.05.

pretest mean scores of experimental and control groups.

Table 3 revealed that the p value (0.789) was greater than the α-value (0.05). Therefore, the hypothesis was not rejected. There was no significant difference in the pretest mean scores of experimental and control groups. Both experimental control groups were at the same performance level before the treatment. It implies that the two groups were homogeneous.

$H_0$1: There is no significant difference between the posttest mean scores of experimental and control groups.

Table 4 revealed that the p value (0.000) was less than the α-value (0.05). Therefore, the hypothesis was rejected. There was a significant difference in the posttest mean scores of experimental and control groups. Experimental group performed better than the control group as a result of the treatment.

$H_0$2: There is no significant difference between the retention mean scores of experimental and control groups.

Table 5 revealed that the p-value (0.000) was less than the α-value (0.05). Therefore, the hypothesis was rejected. There was a significant difference in the retention mean scores of experimental and control. Experimental group has better retention ability than the control group.

DISCUSSION

The findings of the study showed that statuses of the postgraduates were very busy ones. Most of them were married and employed. This indicates that they were to manage home and office tasks together as well as attending to their studies at the same time. This posed a lot of challenges to the students. There were conflicts between the three obligations. It was found out that the students were fully engaged at the work-place at the same time find it difficult to study at home due to huge domestic activities. The students also found it difficult to attend lectures. They could not embark on field work alone and could not visit their project supervisors as expected. One of the reasons was the inability to gain the support of their employer towards the study. This finding was in agreement with Chigona and Chetty (2007) as well as Ataca and Berry (2010) who both observed that most postgraduates are faced with challenges of managing their studies with office work and home activities. Since none of the trio can be sacrificed for the other, there is bound to be conflicts in time demand and allocation to each of the pursuits.

The findings from the study showed that there was no significant difference in the pretest mean scores of experimental and control groups. Both experimental control groups were at the same performance level before the treatment. It implies that the two groups were homogeneous. The findings of the study further revealed that there was a significant difference in the posttest mean scores of experimental and control groups. Experimental group performed better than the control group as a result of the treatment. Online collaboration

Table 4. t-test analysis of the difference between the posttest mean scores of experimental and control groups.

Group	N	Mean	SD	df	t	Sig
Experimental	20	16.05	2.87	36	7.71	0.000*
Control	18	9.94	1.83			

*p<0.05.

Table 5. t-test analysis of the difference between the retention mean scores of experimental and control groups.

Group	N	Mean	SD	df	t	Sig
Experimental	20	14.5	2.69	36	9.13	0.000*
control	18	8.06	1.39			

*p<0.05.

among the postgraduates allowed them to have constant and consistent interactions with their group members, the entire class and the lecturer-in-charge without necessarily jeopardizing the assignments at work-place and home. Unlike in the control group where learners were to leave their place of works and homes to meet for lectures or meetings. The OCLS learning groups were more active, meeting regularly, frequently and consistently for discussions and sharing of information. Consequently, their performances in the study and at the research activities were enhanced. This was in line with the findings of Yamarik (2007), Al-Saai et al. (2011) and Kyndt et al. (2013) carried out in different parts of the continent. They all found out the collaborative learning enhances the performance of higher education students. Eid and Al-Jabri, (2016) as well as Ansari and Khan (2020) in the recent year also buttressed the fact that online collaboration enhances performance and satisfaction among University students.

The findings of the study also revealed that there was a significant difference in the retention means scores of experimental and control. Experimental group has better retention ability than the control group. This was as a result of the treatment given to the experimental groups. Students exposed to Online Collaboration Learning Strategy could retain what they learnt for a period of time. This was in line with the findings of Hasan and Fook (2012), Puzio and Colby (2013) as well as Ha et al. (2018). They all agreed that students exposed to Online Collaborative Learning Strategy could perform better and retain what they have learnt for a period of time than their counterparts who were not exposed to Online Collaborative Learning Strategy. This could be so because of the fact that the online classroom afforded them the opportunity of interacting regularly with their counterparts without conflicts of time and schedules.

Therefore, they can retain what they have learnt for a period of time.

CONCLUSION AND RECOMMENDATION

The study was able to present Online Collaborative Learning Strategy as one of the most effective learning strategies for postgraduates in Science Education. It was concluded from the study that the use of OCLS has the potentials to enhance students' sharing of information, resource materials, ideas and performance. It also improved their retention abilities. The use of OCLS gave the students an opportunity of coordinating their study activities alongside the office work and home obligations. It provided the avenue for consistent collaboration with other students and the lecturer-in-charge overcoming the barrier of physical distances. Based on the findings, it was recommended that Online Collaborative Learning Strategy should be used for postgraduates in Science Education to enable them cope with the trio commitments of study, work-place and home and at the same time, to enhance sharing of information and ideas among them which in turn would also enhance their performance and retention in the course.

Implication

The study revealed that postgraduate studies could be done successfully through virtual classroom. All students could interact, learn and collaborate online. If this strategy could be embraced globally, several qualified people would enroll for advanced studies in a University of their choice in any part of the World. This would enhance international relationships and value sharing. It would be of great opportunity for people from low and medium economic nations who are interested in obtaining

higher educational certificates but might not have the wherewithal to travel across countries for such studies. As the opportunities of studying and working alongside increase globally, it would encourage entrepreneurship and national economic growth because people may not need to leave their jobs or businesses in the name of going abroad to study.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Vol. 15(8), pp. 511-522, August, 2020
DOI: 10.5897/ERR2020.4024
Article Number: 62DB3D564567
ISSN: 1990-3839
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Development model of competencies for teachers of Early Childhood Development Center under the local administrative organization with application of empowerment evaluation

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Received 23 June, 2020; Accepted 28 July, 2020

This research focuses on synthesizing concepts and needs for the development of teachers' competencies and studying the performance in accordance with the development model of competencies for teachers of the Early Childhood Development Center with application of empowerment evaluation. The research was divided into 3 stages. In the first stage, the needs for the developments of teachers' competencies were investigated. The informants were 274 teachers and 10 educators and directors of Division of Education Religious and Culture. The research instruments were questionnaire and interview form. In the second stage, the development model which was verified by 5 experts. In the third stage, the evaluation of performance in accordance with the development model of 30 teachers and 5 supporters and researchers was conducted. The research instruments were test, observation form, questionnaire, and interview form. The quantitative research used statistics to analyze for mean, standard deviation, t-test, and Modified Priority Need Index while the qualitative research used content analysis approach. The research findings revealed that teachers' needs for functional competency development showing its priority need index from 0.336 to 0.416. In addition, the educators and the directors of Division of Education Religious and Culture showed their needs to develop teachers' functional competencies. Moreover, the development model of competencies for teachers consisted of 6 components: Basic concepts and principles, objectives, expected outcomes, training activity content, training activity process, and evaluation. The teachers' mean scores of post-training were higher than pre-training at statistical significance level of 0.01.

Key words: Early Childhood Development Center, local administrative organization, competencies, empowerment.

INTRODUCTION

Early Childhood Development Center is an educational institution according to the Section 4 of National Education Act B.E. 2542 (1999) and Amendments (Second National Education Act B.E. 2545 (2002) and

Third National Education Act B.E. 2553 (2010) section 18 (1) prescribing that early childhood education should be provided in child care center, child development center, Early Childhood Development Center, or other names. The local administrative organization has to be in charge in performing educational mission as the first standard and qualified educational institution responding thoroughly to community in terms of childhood education administration of 2 to 5-year-old children according to the authority and intention of the government (Department of Local Administration, 2017). In developing quality, efficiency, and effectiveness of educational management, teacher is very important as an administrative resource in achieving the success of organizational activity operation. Therefore, a successful organization has to rely on personnel with competencies according to vision, mission, and goal of the organization. In other words, personnel have to possess knowledge, skills, abilities, and characteristics that are important to their operation, and they have to have cooperation and teamwork to get efficiency of work (Smithikrai, 2015).

Empowerment evaluation is a concept proposed by Fetterman (1998), and it is initially from action research. The empowerment evaluation applies concepts, techniques, and findings of evaluation to stimulation of development and improvement of self-regulation using both quantitative and qualitative approaches. It is also considered as a process supporting people in self-development employing self-evaluation and reflection. The stakeholders normally consist of internal personnel taking responsibility for self-evaluation and external personnel taking responsibility for being counselor and facilitator; however, it depends on the potential of internal personnel in what level of support they need (Wongwanich, 2015). Empowerment evaluation relies on teamwork; in other words, one cannot empower others, but one has to empower oneself. Thus, this evaluation is not ended up with perceiving the value of evaluation compared to the traditional one, but it is a process carried out continuously for development, improvement, and lifelong learning. The product obtained from empowerment evaluation is learning organization, so external personnel play a role in developing personnel in the context of empowerment evaluation in many activities (Fetterman, 1996; Wongwanich, 2015). (1) Training is a development process for internal personnel to be able to conduct self-evaluation with the provided knowledge about evaluation method. The training can enhance the internal personnel to get insight in all steps of work and have more understanding of the method compared to passing on knowledge directly. (2) Facilitation is provided by evaluators who are responsible for introducing a guideline on how to evaluate, operational management, handling with problems, and giving advice to increase reliability in the success of evaluation process. (3) Advocacy is a process of implementing evaluation results. The results are proposed to the stakeholders especially administrators to ask for supportive operational resources. (4) Illumination is motivated by the results of empowerment evaluation that can provide experiences through self-learning community and become a learning community. (5) Liberation is provided for individuals to be able to develop and learn by themselves to be in accordance with their predicted future. This can promote individuals to think independently based on the prior conceptual frameworks in order to build and specify their own guidelines.

According to a survey on teachers' competency concept, most of them have understanding of competencies at moderate level. As a result, teachers have confusion and misunderstanding in processes or methods of performance evaluation based on their own competencies that lead to the lack of integration. Therefore, empowerment for teachers is required particularly in competency evaluation. Performance appraisal training is important to teachers because they play a great role in developing educational management to achieve higher efficiency and quality. The process in considering self-esteem consists of competency evaluation to examine ability and performance towards operation and responsibilities so that teachers can be enhanced in learning management for students. Teachers' competencies can indicate their knowledge, skills, and essential characteristics that facilitate them to achieve the goals at work that influence the quality and success of school. According to the study of Nonhuaro (2014), an empowerment evaluation model was developed to enhance the educational assessment competency of in-service teachers in Prachinburi Primary Educational Service Area Office 2. Investigating the current situation, teachers possessed the concept of learning measurement and assessment at moderate level. Chariyamakarn (2014) carried out a case study on building evaluation capacity for teachers using empowerment evaluation and assessment-based instruction approaches to develop Thai language communication skills of students. Teachers in 2 schools were asked to complete the concept test of measurement and assessment. The result demonstrated that teachers in School A scored 12 points (or got moderate level of measurement and assessment concept) while teachers in School B scored 9 points (or got poor level of measurement and assessment concept). Consistent with interviewing teachers about the concept in assessment, teachers in School A showed their misunderstanding about measurement and assessment, but they could use

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various types of assessment tools. On the other hand, teachers in School B showed their misunderstanding about measurement and assessment, and some of them still lacked knowledge of assessment.

According to the concept of empowerment evaluation, it supports continual and sustainable development and provides opportunities for stakeholders in the organization to get involved in conducting self-evaluation and reflection for self-determination. Investigating the concept of functional competencies, teachers of Early Childhood Development Center showed their moderate level of understanding in the competencies. From this result, teachers still misunderstand the process or method of performance evaluation according to their own competency, and they also lack integration and cannot apply the concepts for empowerment evaluation to functional competencies. For this reason, the researcher highlights creating the development model of competencies for teachers of the Early Childhood Development Center under the local administrative organization with application of empowerment evaluation so that it can be used as a guideline for competency development which is appropriate with organizational vision, mission, and goal for developing the quality of learners.

Research questions

(1) What are the needs for the development of teachers' competencies of the Early Childhood Development Center under the local administrative organization?
(2) How should the development model of competencies for teachers of the Early Childhood Development Center under the local administrative organization with application of empowerment evaluation be?
(3) How is the quality of development model of competencies for teachers of the Early Childhood Development Center under the local administrative organization with application of created empowerment evaluation?

Objectives

(1) To synthesize concepts and needs for the development of teachers' competencies of the Early Childhood Development Center under the local administrative organization.
(2) To create the development model of competencies for teachers of the Early Childhood Development Center under the local administrative organization with application of empowerment evaluation.
(3) To study the performance in accordance with the development model of competencies for teachers of the Early Childhood Development Center under the local administrative organization with application of empowerment evaluation.

METHODOLOGY

Stage 1: Synthesizing concepts and needs for development of teachers' competencies of the Early Childhood Development Center under the local administrative organization

(1) Related concepts and theories were reviewed: (a) theory on empowerment of Block (1987), (b) empowerment mode of Fetterman (2001), and (c) functional competencies e.g. learning design, learner development, and classroom management.
(2) Current situation and needs for self-development were investigated in terms of functional competencies for teachers of the Early Childhood Development Center, educators, and directors of Division of Education Religious and Culture under the local administrative organization.
(a) Creating and developing questionnaire and interview questions based on related concepts, theories, and studies.
(b) Investigating current situation and needs for self-development in terms of functional competencies for teachers of the Early Childhood Development Center by using questionnaire.

Population and sample

Population and sample were divided into 2 groups. (1) The population consisted of 874 teachers of the Early Childhood Development Center under the local administrative organization. The sample consisted of 274 teachers of the Early Childhood Development Center under the local administrative organization determined by using the Yamane's formula (Yamane, 1967). (2) The population was 425 people comprising educators, and directors of Division of Education Religious and Culture, Khon Kaen Province. The sample consisted of 6 directors of Division of Education Religious and Culture, Khon Kaen Province and 4 educators, Khon Kaen Province. Purposive sampling was used for selecting the sample.

Research instruments

(1) Questionnaire,
(2) Structured interview

Data analysis

(1) Mean, standard deviation, t-test, standard error of mean, degree of freedom, statistical significance, and modified priority need index.
(2) Content analysis.
(3) The quality of questionnaire was analyzed for its validity and reliability, and it was tried out with 30 teachers of the Early Childhood Development Center under the local administrative organization who were not the sample of the study. The result of try-out using Cronbach's alpha coefficient (Tayraukham, 2018) showed the reliability of 0.874 for the whole questionnaire.

Stage 2: Creating the development model of competencies for teachers of the Early Childhood Development Center under the local administrative organization with application of empowerment evaluation

(1) Drawing up the development model of competencies, 6 components were found: (a) basic concepts and principles, (b) objectives, (c) expected outcomes, (d) training activity content, (e) training activity process, and (f) evaluation.
(2) Then the development model of competencies were evaluated by experts and brought to create a manual for training on

empowerment evaluation according to teachers' functional competencies.

Research instruments

(1) Training manual,
(2) Test of functional competencies,
(3) Empowerment evaluation, and
(4) Survey form of satisfaction with the model

The training manual was divided into 3 main parts. (1) Introduction was composed of background and significance, related concepts and theories, principles of activity management, empowerment evaluation, and steps of activity management. (2) Method was composed of training guidelines, training methods, and training topics. (3) Training plan was composed of 4 units; unit 1: self-esteem, unit 2: self-empowerment in working, unit 3: development of functional competencies, and unit 4: evaluation of functional competencies.

Data analysis

Data were examined for suitability. The result of evaluation was calculated for mean and standard deviation and then interpreted based on the five-scale criteria (Srisa-ard, 2015). The result of evaluation was at between high and highest level of suitability; mean of 3.51 and over, so it did not have to be improved or rectified. However, if it was between moderate and lowest level of suitability; mean of below 3.51, it should be improved or rectified according to the experts' suggestions.

The development model of competencies for teachers of the Early Childhood Development Center under the local administrative organization with application of empowerment evaluation was obtained.

Stage 3: Studying the performance in accordance with the development model of competencies for teachers of the Early Childhood Development Center under the local administrative organization with application of empowerment evaluation

Population and sample

The population consisted of 874 teachers of the Early Childhood Development Center under the local administrative organization, Khon Kaen Province. The sample consisted of 30 teachers of the Early Childhood Development Center under the local administrative organization, Phon District, Khon Kaen Province. The selection was conducted based on inclusion and exclusion criteria as follows:

(1) Inclusion criteria (All teachers of the Early Childhood Development Center, and evaluators and supervisors participated as a group of supporters).
(2) Exclusion criteria (There were no evaluators and supervisors as a group of supporters).

A group of supporters consisted of 4 persons that were the directors of Division of Education Religious and Culture and the educators and 1 person that was researcher. In purposive sampling, the selection was based on 2 characteristics: (1) those who were evaluator of the sample that was teachers of the Early Childhood Development Center who were, and (2) those who were supervisor of that sample that was teachers of the Early Childhood Development Center.

Research instruments

(1) Evaluation form of teachers' functional competencies, (2) forms of self-evaluation and empowerment, and (3) questionnaire

Data analysis

(1) Scores of empowerment were compared. Satisfaction with evaluation model of empowerment was examined. Quality of model was evaluated according to evaluation standards.
(2) Teachers were asked while evaluation model of empowerment was being used, and behaviors during the training were observed.

RESULTS

Stage 1

(1) The first stage shows the result of concept and theory synthesis from documents, texts, and studies related to empowerment in working and empowerment evaluation in order to gain background information for creating an initial development model of competencies with application of empowerment evaluation. The result can be concluded as follows:

(a) Self-empowerment refers to a process of change, development, and involvement in promoting individuals to discover their own performance through different methods that can be useful for self-development such as ability improvement in working with creativity and raising awareness of self-esteem. These increase potential of individuals and support them to get successful in working by themselves without being controlled by others. The self-empowerment consists of 3 main principles. (i) 'Sharing' is learning information, ideas, and knowledge from each other to get more clearly understandable on objectives and goals at work as well as criteria for performance evaluation in order to build a sense of success ownership together. (ii) 'Collaboration' is working together in a team. (iii) 'Mutuality' is building trust and respecting to each other. The process of self-empowerment comprises 8 steps: formulation of work standards and strategies, assignment, development and training by educating or passing on knowledge, feedback, appreciation or acceptance of mistakes, evaluation, improvement, and conclusion.
(b) Empowerment evaluation refers to the use of concepts, techniques, and findings obtained from evaluation to improve operation and self-determination. The stakeholders' abilities and skills are increased in terms of planning, operation, and self-evaluation for better improvement with 5 principles. (i) 'Training' can lead to scope definition, creation of related activities, and evaluation of organizational general circumstances. Also, the training can create needs in setting goals and strategies to become successful as well as documentation to demonstrate the progress of any project. (ii) 'Facilitation' gives empowerment evaluators

opportunities to act as facilitators at work. The facilitators are responsible for dealing with problem as well as clarifying misunderstandings with discussion and giving advice so that success can be guaranteed. (iii) 'Advocacy' can give administrators or financial supporters opportunities to set goals and strategies and design how to get successful in evaluation. It can also link performers' self-evaluation to the performance at group or project level in the future. (iv) 'Illumination' can be used in developing valuation and improving projects. It additionally plays a role in connecting the prior experiences to the new ones or making understating clearer. (v) 'Liberation' is an activity allowing one can understand restrictions, and it is related to transferring a concept from one place to another one. The empowerment evaluation consists of 3 steps. (i) 'Mission determination' is a process reinforcing personnel under a project to get involved in. The empowerment evaluators have to facilitate in introducing topics to the project participants as many as possible. In the meantime, the participants have to be reinforced with questions that give all of them opportunities to present about mission of the project. (ii) 'Taking stock' provides opportunities to have a conversation that leads to a wider discussion. This is a way to consider and receive accurate data relying on 2 processes. First, activity definition is facilitated by empowerment evaluators introducing the topics for project members and participants to express their ideas about the most important activities or activities that are associated with the project. Second, definition of activity significance provides everyone opportunities to get involved in prioritizing the activities selected from the previous process. (iii) 'Planning for the future' allows members and participants under the project to work together in setting goals corresponding to mission and standpoint depending on cooperative brainstorming, analysis, and conclusion.

(c) Competency evaluation means a systematic process of interpreting, recording, and gathering information based on a defined goal. Then things' value judgment is conducted based on 4 principles of standardized criteria. (i) 'Measurement' has to be done according to the objectives. Competency evaluation is performed to examine how much success of the performance based on the objectives. Therefore, when conducting a competency evaluation, goal and agreement have to be fixed certainly. (ii) 'Tools with high quality' have to be used. Although the objectives of measurement are clear and the tools are selected according to the objectives, the measurement probably lacks the quality when using tools with low quality. In other words, when low-quality measurement results were implemented, errors can possibly happen. Thus, to receive reliable results of measurement, tools with high quality should be used. (iii) 'Justice' has to be taken into consideration. The justice is an important moral principle that has to be held by evaluators at all time of evaluation. In other words, measurement and evaluation have to be performed without bias. (iv) 'Interpretation' has to be done correctly. Evaluation aims at implementing the results to describe and compare them in each characteristic. Therefore, interpretation has to be done carefully according to principle and methodology of interpretation as well as logic, reasonability, and consistency with evaluation principles. The competency evaluation is performed under 7 steps: setting goals of evaluation, analysis of evaluation results, developing evaluation tools, data collection, data analysis, value judgment of evaluation results, and reporting and implementing for development.

(d) Performance evaluation is defined as a process of collecting, analyzing, interpreting, and recording data from both formal and informal evaluation. These can be conducted all the time of the evaluation using various tools that are suitable and consistent with behaviors to be measured. The obtained results are then interpreted and compared with 4 principles of criteria. (i) 'Placement assessment' is carried on before the beginning in order to search for data showing readiness, interest, level of knowledge, and essential skills. (ii) 'Diagnostic assessment' is a way to find out what kinds of development the teachers achieve and how much accuracy for what they have previously known to inquire into the problems of individual development. (iii) 'Formative assessment' is continuously used for learning development so that learning can be progressive. (iv) 'Summative assessment' is performed to examine learning achievement, and it is used as data to compare with pre-learning assessment using diverse method and tools in order to perceive teacher's development. The performance evaluation consists of 6 steps. (i) Teachers are informed about goal that they have to achieve. (ii) Brainstorming is cooperatively conducted to define the criteria to indicate goal achievement publicly. (iii) Examples of prioritized duties are provided for teachers to understand their difference, and they can be used by teachers for comparing their duties and knowing how to develop them. (iv) Learners are given feedbacks by stakeholders based on criteria through reinforcing words for self-development. (v) Teachers are allowed to assess themselves for getting improved. (vi) Teachers do their own self-evaluation and reflection, and stakeholders evaluate teachers.

(2) According to teachers' opinion survey, they need functional competency development; Modified Priority Needs Index from 0.336 to 0.416. Asking opinions of educators and directors of Division of Education Religious and Culture, teachers are required to have some techniques for developing and promoting learners on physical, emotional, mental, social, and intellectual aspects to achieve desirable characteristics. In addition, teachers should perform according to the organization's policies on child development, self-development, and organization development and evaluate these

Table 1. Experts' opinions on components of development model of competencies for teachers with application of empowerment evaluation.

Components	Suitability		Result	Possibility		Result
	$\bar{x}$	S.D.		$\bar{x}$	S.D.	
Basic concepts and principles	4.80	0.44	Highest	4.80	0.44	Highest
Objectives	4.60	0.54	Highest	5.00	0.00	Highest
Expected outcomes	5.00	0.00	Highest	4.80	0.44	Highest
Training activity content	5.00	0.00	Highest	5.00	0.00	Highest
Training activity process	4.80	0.44	Highest	5.00	0.00	Highest
Evaluation	4.60	0.54	Highest	4.80	0.44	Highest
Average	4.80	0.33	Highest	4.90	0.22	Highest

quantitatively, qualitatively, and advantageously. Both evaluators and evaluatees make an agreement in advance. For activities or projects that are successful according to the agreement, their results have to be publicized. Importantly, teaching is a behavior that can be learned, and learning is improvement of behaviors. Supervisors can help teachers change their behaviors to improve their experience provision; in other words, teachers are supervised and monitored about learning management in order to improve some parts according to the supervisors' suggestions. The following examples are the words from interviewing educators and directors of Division of Education Religious and Culture.

"Teachers have techniques for developing and promoting childhood on physical, emotional, mental, social, and intellectual aspects to achieve desirable characteristics."
(A Directors of Division of Education Religious and Culture)

"Teachers' performance should accord with organizational policy on childhood and organization development, and it is then evaluated quantitatively, qualitatively, and advantageously."
(A Directors of Division of Education Religious and Culture)

"Evaluators and evaluatees make a pre-arrangement, and activities or projects that get successful according to the arrangement will be exhibited to the public."
(A Directors of Division of Education Religious and Culture)

"Teaching is a behavior that can be learned while learning can change behaviors into a better way."
(An educator)

"Supervisors can change teachers' behavior of experience management so that it can be improved and developed."
(An educator)

"Teachers are supervised and monitored about learning management in order to develop in what the supervisors suggest."
(An educator)

Stage 2

(1) The development model of competencies for teachers of the Early Childhood Development Center with application of empowerment evaluation consists of 6 components: basic concepts and principles, objectives, expected outcomes, training activity content, training activity process, and evaluation.
(2) The result of examining the development model of competencies with application of empowerment evaluation is presented in Table 1.

The suitability of the development model of competencies for teachers with application of empowerment evaluation is at the highest level ($\bar{x}$ = 4.80, S.D. = 0.33) and the possibility of it is also at the highest level ($\bar{x}$ = 4.90, S.D. = 0.22).

Stage 3

(1) Teachers' scores of self-evaluation are calculated for mean ($\bar{x}$) and standard deviation (S.D.). Then they are compared using t-test. The result is shown in Table 2. Teachers' mean of competency scores of post-training is higher than pre-training with statistical significance level of 0.01.
(2) Competency scores of self-empowerment in working as perceived by the teachers before and after training are compared. The result is shown in Table 3. Teachers' mean of competency scores of self-empowerment in working of post-training is higher than pre-training with statistical significance level of 0.01. The result is shown in Table 4. Teachers' satisfaction with the training of functional competency development is at the highest level in both suitability ($\bar{x}$ = 4.77, S.D. = 0.42) and

Table 2. Mean of competency scores compared between cognition, skill, and satisfaction aspects of teachers participating in training (N = 30).

Functional competency	$\bar{x}$	S.D.	t	p
Cognition				
Pre-training	5.23	0.68	15.52**	0.00
Post-training	8.33	0.84		
Skills				
Pre-training	5.13	0.81	15.52**	0.00
Post-training	8.23	0.72		
Satisfaction				
Pre-training	5.50	0.90	16.20**	0.00
Post-training	8.13	0.68		

**Statistical significance level of 0.01.

Table 3. Competency scores of self-empowerment in working as perceived by teachers compared between pre and post training (N = 30).

Self-empowerment in working	$\bar{x}$	S.D.	t	p
Pre-training	13.67	2.38	13.86**	0.00
Post-training	18.57	0.77		

**Statistical significance level of 0.01.

Table 4. Mean and standard deviation of model evaluation scores of teachers participating in training towards development model of competencies (N = 30).

List	$\bar{x}$	S.D.	Level
Possibility			
The training gives clear objectives and goal.	4.73	0.44	Highest
The training is flexible in using diverse techniques of data collection for obtaining the right evaluation result	4.73	0.44	Highest
The training provides systematic process of evaluation for obtaining the right evaluation result	4.70	0.46	Highest
Information obtained from training is enough for summary process	4.70	0.46	Highest
The training is consistent with the context of Early Childhood Development Center	4.73	0.44	Highest
Average	4.72	0.45	Highest
Suitability			
The training is suitable for competency evaluation of teachers	4.70	0.46	Highest
Steps of the training are suitable	4.80	0.40	Highest
The training is consistent and responds to performance evaluation of teachers	4.80	0.40	Highest
The training identifies what should be evaluated clearly	4.80	0.40	Highest
The training based on evaluation model can be integrated with experience provision	4.73	0.44	Highest
Average	4.77	0.42	Highest

possibility ($\bar{x}$ = 4.72, S.D. = 0.45). Teachers' satisfaction with empowerment evaluation, their roles, and researcher's role is at the highest level.

(3) From interviewing teachers who are trained about empowerment evaluation as well as educators and directors of Division of Education Religious and Culture as supporters and facilitators, they are satisfied with the model and believed that the model is useful for

experience provision, and it can be applied to activity management for the Early Childhood Development Center.

(a) Cognition aspect of empowerment evaluation training can lead to understanding of developing tools used for evaluation and how to create the tools with various ways as the following some examples of words from the interview:

"Being a part of the training, I have got knowledge about guidelines for applying various ways of competency evaluation."
(Teacher Samai)

"The training teaches us about the process of planning and doing. This is a very useful activity."
(Teacher Chanida)

"This is a great training because it allows all teachers to know how to perform the same way, so they can have knowledge about competency evaluation and have continuous process of monitoring."
(Tiemchan, an educator)

(b) Benefits and application aspect can lead to useful experience provision. The training should be additionally extended for all Early Childhood Development Centers so that teachers can have a proper guideline for competency evaluation as the following some examples of words from the interview:

"The training is very helpful for competency development in terms of implementation."
(Teacher Orathai)

"This is a great training because everyone joins together in group working, and the obtained concepts can be used for experience provision."
(Teacher Jurisa)

"The training gives us additional knowledge. I feel impressed with friendliness of the guest speaker and all participants that can encourage all of us to be with all parts of the training activities."
(Teacher Yenruedee)

DISCUSSION

Concept and need synthesis for development of teachers' competencies of the Early Childhood Development Center under the local administrative organization

(1) Synthesis of related studies and documents to gain background information for empowerment evaluation is a major concept that can help develop teachers' knowledge and understanding of functional competencies in providing experiences for childhood with high quality. The empowerment evaluation is conducted to expand opportunity and possibility for the project to achieve goal. The stakeholders are empowered in making operational plans and self-evaluation in any project. Said by Fetterman and Wandersman (2005), empowerment evaluation does not have ambiguity in terms of evaluation value. In other words, the empowerment evaluation can give clear value, or it is evidently designed with the purpose of helping individuals carry out self-evaluation so that their performance can be continuously improved. Based on Ampansirirat (2017), empowerment evaluation aims to provide possibility for project and plan or program to get successful by developing the stakeholders' potential to be able to plan and evaluate the project themselves to improve their quality of performance. Previously, the empowerment evaluation concept has not been applied to functional competency development for teachers of the Early Childhood Development Center. To have a guideline for developing teachers' behavior, knowledge, and skill to get efficient performance, the empowerment evaluation concept should be used in order that teachers can conduct self-evaluation correctly.

(2) In terms of teachers' needs of functional competency development, educators and directors of Division of Education Religious and Culture support that teachers should develop their functional competencies. The Priority Needs Index of each order is not much different arranged the following in descending order. (a) Early childhood curriculum should be developed in accordance with core and local curriculum. (b) Learning activities should be designed to meet ages and requirements of learners and community. (c) Learning management should be developed through ICT. (d) Teachers should study research related to their own context so that experience provision can be efficiently developed. (e) Teachers should have proficiency in providing learning experience for different types of learners e.g. gifted learners, learners with moderate level of learning ability, and learners with special needs. (f) The use of curriculum should be evaluated, and the evaluation results should be implemented for curriculum development. (g) Teachers should be able to pass on knowledge based on the curriculum and integrate knowledge systematically. (h) Methods of measurement and evaluation should be variously designed appropriate with content, learning activities, and learners. (i) Learners should be developed in terms of physical and emotional condition as well as social co-existence with happiness. (j) Classroom management should be evaluated and the evaluation results should be implemented for better improvement. (k) Learners' guardians should be given opportunities to get involved in designing learning activities and evaluations. (l) Experience provision design should be evaluated for better development and improvement. (m) Teachers should provide various techniques of experience provision in order that learners can extremely develop their own potential. (n) Moral and ethics should

be simultaneously added during experience provision for learners in the class. (o) Information should be applied to learner development as much as possible. (p) Appropriate environment of both inside and outside of the classroom should be provided. (q) Learners' information should be individually created, and classroom documents should be correctly made and updated. (r) Connection between evaluation objective and result from experience provision plan should be understood.

The Priority Needs Index of teachers' functional competencies is related to some issues of the research result e.g. creating and developing early childhood curriculum that is consistent with the core and local curriculum, evaluating the use of curriculum and implementing the result to improve the curriculum, and learning as well as developing the experience through ICT. As seen in the study of Luenam (2018), model development is regarded as creation of new knowledge. Investigating problems and needs is very important in terms of connecting with prior concepts and theories in order that the model becomes accurate and reliable. In case of designing a diversity of learning activities that can respond learner and community needs, development of teachers' functional competencies can help for this. As mentioned in the study of Smithikrai (2015), teachers play important role in improving and standardizing educational quality. In other words, teachers have to perform the organizational activities to become successful, and they also have to possess knowledge, abilities, and skills which are required in their performance. Moreover, they have to rely on great cooperation and teamwork.

Development model of competencies for teachers of the Early Childhood Development Center under the local administrative organization with application of empowerment evaluation

The development model of competencies comprises 6 components: basic concepts and principles, objectives, expected outcomes, training activity content, training activity process, and evaluation. Similarly, the previous studies of Nonhuaro (2014) and Nopphakhun et al. (2018) indicate that the development model of competencies for teachers in schools under the Nakhonratchasima Primary Educational Service Area Office consists of 6 components: principles, objectives, curriculum structure, curriculum content, training process, and measurement and evaluation. According to Khammani (2016), a model is objectivity of an abstract thought expressed by individuals in different forms such as diagram and chart for helping oneself and others have more understanding. Nevertheless, the model components, proposed by Asawapoom (2016), depend mostly on the phenomenal characteristics that those interested create a model without fixed rules. Generally, it begins with knowledge acquisition. Then hypothesis and principles of the model are investigated. Next, the model is developed according the principles, and the developed model is checked or its quality. The development model, said by Wiboonsri (2016), is a way that individuals show ideas, understanding, and imagination towards phenomena or situations through different ways of communication to become easier to understand. Also, stories or issues can be concisely and systematically presented under the principles.

Both suitability and possibility are at the highest level. This is because the developed model provides an operational guideline with descriptions and charts that can help others clearly understand the guideline. Thus, this research has used the model as a cognitive tool for teachers of the Early Childhood Development Center in developing competencies for evaluating their functional competencies with correctness and efficiency. As found in the study of Luenam (2018), an evaluation model for learning using empowerment evaluation for teachers shows its accuracy, suitability, and consensus. In the study of Thammathikul (2015), a model of elderly empowerment for community development has been developed. Examined and verified by the experts, evaluation and improvement of the model of elderly empowerment show highest level for suitability and possibility of application.

Performance in accordance with the development model of competencies for teachers of the Early Childhood Development Center under the local administrative organization with application of empowerment evaluation

(1) The teachers' competency score in cognition, skill, and satisfaction aspects of post-training is higher than pre-training with statistical significance level of 0.01. This result reflects that evaluation model of empowerment is efficient for functional competency development of the trained teachers because the training provides activities for them to learn how to solve problems at work. The problems encountered while working will become an indicator helping decide which process should be learned while workplace will be a learning simulation. Moreover, the content used in training has been developed according to the needs of the trained teachers. The needs of self-development have been measured by the researcher to obtain data for training preparation. Based on Iriarte (2009), to provide efficient adult education, need analysis is very important. Learning is a major activity for efficient management of knowledge. Organizational education is different from formal education because it is learning from workplace environment. The study of Nonhuaro (2014) indicates that teachers' competency scores in educational measurement and assessment of post-training are greater than pre-training with statistical significance level of 0.01. In addition, a program for developing techniques

of self-esteem and self-empowerment for social development officers developed by Kongwijit (2017) can lead to better understanding of self-esteem and self-empowerment with statistical significance level of 0.05.
(2) The competency score of self-empowerment in working as perceived by the teachers of post-training is higher than pre-training with statistical significance level of 0.01. This result reflects that evaluation model of competency is efficient for ability to empower teachers who participated in the training. Because the provided training activities raise self-esteem within teachers, they get self-confident in their ability. Self-confidence can lead to efficient performance. Likewise, the study of Nonhuaro (2014) indicates that the competency score of self-empowerment in working as perceived by the teachers of post-training is higher than pre-training with statistical significance level of 0.01. The study of Kongwijit (2017) developing a program for developing techniques of self-esteem and self-empowerment for social development officers presents that the social development officers are promoted in terms of applying knowledge to a target group who receives services. The result reveals that the level of empowerment and self-esteem of the target group after receiving services is higher than before receiving services. Referring to the study of Yaemsang et al. (2015), an effect of empowerment program on exercise and eating behavior modification of students with obesity is studied. The result demonstrates that the mean score of exercise and eating behavior of the students with obesity after participating in the program is higher than before participating in the program with statistical significance level of 0.01.
(3) Teachers participating in the training are satisfied with operation according to the development model of competencies for teachers applying empowerment evaluation in terms of suitability and possibility at highest level. This result reflects that the development model is efficient and standardized in both suitability and possibility. The teachers are satisfied with the suitability due to its clear objectives and goals. The training has been integrated between empowerment evaluation and self-empowerment in working to create learning organization. The learning organization comes with the purposes of creating knowledge about relationships between action and outcome and putting it into routine duties or implanting it into the organization. Apart from this, the learning organization tries to adjust behaviors of learners and performers in the organization to achieve the sustainability. The trained teachers are given opportunities for self-determination, self-determination of learning goals, self-evaluation, and evaluating others with willingness or without being forced or controlled by others. In addition, a group of mentors or supporters, e.g. educators, directors of Division of Education Religious and Culture, researcher, and guest speaker, facilitate teachers in terms of providing knowledge with friendliness as a following example of positive feedback given by a trained teacher:

"The training gives us additional knowledge. I feel impressed with friendliness of the guest speaker and all participants that can encourage all of us to be with all parts of the training activities."
(Teacher Yenruedee)

This indicates that the developed evaluation model of empowerment becomes valuable for organizing the training in order that teachers can have fun and cannot get bored with it. Teachers have been provided with learning activities step by step, and they perform as facilitators, counselors, and leaders to make changes. Additionally, the learning organization can promote efficient and effective procedure within organization and members by connecting teamwork methods to create learning process and understanding so that any changes can be handled. Furthermore, the team is given chances to work and use power for making decision in order to build the atmosphere of creativity as well as innovation that can bring about to stronger organization. This is consistent with the study of Nachit (2015) finding that the model has suitability and possibility that can be implemented in a school at highest level.
(4) The result is shown in Table 5, Teachers participating in the training are satisfied with empowerment evaluation, their roles, and the researcher's role at highest level. This result reflects that evaluation model of empowerment is efficient towards the role of teachers whose empowerment is evaluated. For the role of researcher, educators, and directors of Division of Education Religious and Culture, a group of supporters and facilitators in empowering teachers, the teachers are most satisfied with the supportive reinforcement from the mentioned supporters because the training activities have been designed to give all parties opportunities to get involved in empowering to each other. Also, teachers have received supportive and positive words that motivate and encourage them to express opinions, give advice about training management, and share ideas with other teachers in order that they can be completely successful in self-evaluation of functional competencies. According to the study of Nonhuaro (2014) on trained teachers' satisfaction with empowerment evaluation for their role and researcher's role, the result demonstrates that the teachers are satisfied with the model at high level e.g. advocacy ($\bar{x}$ = 4.10, S.D. = 0.44), freedom of thought ($\bar{x}$ = 4.07, S.D. = 0.65), and illumination ($\bar{x}$ = 4.03, S.D. = 0.43), by descending order.

In consequence, the trained teachers as well as educators and directors of Division of Education Religious and Culture are satisfied with the model because they believe that it can be useful for experience provision and integration in the Early Childhood Development Center. Also, it can help reflect the concept

Table 5. Mean and standard deviation of teachers' scores of satisfaction with development model of competencies for teachers of Early Childhood Development Center under local administrative organization with application of empowerment evaluation (N = 30).

List	$\bar{x}$	S.D.	Level
Facilitation			
You are introduced about how to do competency evaluation.	4.70	0.46	Highest
You are facilitated in solving problems and provided with advice in competency evaluation.	4.60	0.49	Highest
Average	4.65	0.48	Highest
Advocacy			
You are reinforced by administrators in terms of operation.	4.96	0.18	Highest
You are supported in terms of resources for competency evaluation.	4.63	0.49	Highest
Average	4.80	0.34	Highest
Illumination			
You are clarified about corresponding evaluation.	4.50	0.50	High
You have learned about competency evaluation through self-directed learning.	4.60	0.49	Highest
Average	4.55	0.50	Highest
Liberation			
You feel confident in competency evaluation.	4.46	0.50	High
You can design the competency evaluation.	4.53	0.50	Highest
You can do by yourself without any help from others.	4.70	0.46	Highest
Being criticized by colleagues can improve your self-development.	4.43	0.50	High
You dare express your true feeling although you know you might be unsatisfied with the outcome.	4.73	0.44	Highest
You do not mind participating in discussing about serious issues with your collogue.	4.66	0.47	Highest
You introduce others to know your status and theirs.	4.56	0.50	Highest
The center of the most important power is within you.	4.40	0.49	High
You believe in your own perception and sense although they are different from others'.	4.36	0.49	High
Average	4.54	0.48	Highest
Overall Average	4.64	0.45	Highest

and self-evaluation that leads to quality development of learners.

Conclusion

(1) Teachers needs all particulars for development of functional competencies; the Priority Needs Index from 0.336 to 0.416. Educators and directors of Division of Education Religious and Culture want teachers to develop themselves in terms of functional competencies.
(2) The development model of competencies for teachers of the Early Childhood Development Center under the local administrative organization with application of empowerment evaluation is composed of 6 components, that is, basic concepts and principles, objectives, expected outcomes, training activity content, training activity process, and evaluation.
(3) Mean of teachers' functional competency scores of post-training is higher than pre-training with statistical significance level of 0.01. Mean of competency scores of self-empowerment in working as perceived by the teachers of post-training is higher than pre-training with statistical significance level of .01. The development model of competencies shows its suitability and possibility. Teachers, educators, and directors of Division of Education Religious and Culture are satisfied with the model at highest level.

Suggestıons

(1) This field of study should be conducted with teachers in private schools and teachers under the Educational Service Area Offices in order to gain broader image of the result.
(2) Qualitative data should be studied to monitor and evaluate the behavioral continuance of teachers who were trained about empowerment in working.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Vol. 15(8), pp. 523-529, August, 2020
DOI: 10.5897/ERR2020.4015
Article Number: AC4A0F964569
ISSN: 1990-3839
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Effect of art education program given to gypsy children on children's creativity

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Received 1 June, 2020; Accepted 21 July, 2020

In the study, the effect of art education program given to gypsy children on children's creativity was examined. The study group of the study consisted of 51 gypsy children in the 5 to 6 years age group who show normal development and who attend private, official, independent kindergartens and kindergartens in primary schools under the Ministry of National Education in the Doğanlar district of Karatay county of Konya province. Art education program was applied to gypsy children for twelve weeks. When the creative skills scale pretest-posttest mean scores were examined, a significant difference was obtained in each of the drawing and categories sub-dimensions and home and school evaluation scales. There was no significant relationship between the creativity levels of the gypsy children and their post-test scores. A significant difference was found between the ages of the children and the creativity post-test scores. In line with this result, it was observed that the art education program applied to gypsy children has a positive effect on children's creativity.

Key words: Creativity, art education, gypsy, children, preschool education.

INTRODUCTION

Creativity is a feature that leads to its most prominent innovations in human history (Johnson, 2000). Yuvacı and Dağlıoğlu (2016) explained creativity as the ability to look at the situations that a person encounters throughout her/his life from different perspectives. According to Zembat et al. (2018), creativity is expressed as designing a different product and presenting a new idea or work.

In order for children, that is, the individuals of the future to adapt to the changes occurring today, an education system with a creative and innovative understanding must be established (Gözün Kahraman and Demirbaş, 2018). In order to bring different solutions to different events which individuals will encounter in their lives, creative thinking skills should be provided to children from a very early age. Acquisition of creative thinking skills for children at an early age can be realized by

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[1] This study was conducted with the data obtained from the project titled "Providing Employment for Leading Mothers and Raising Awareness in Preschool Education through the Model of Mother Producing in the Neighborhood Not Visible", which was approved within the scope of "Grant Scheme for Improving Employability of Disadvantaged People through Social Integration

[2] The study was presented as an oral presentation at the International Congress of Science, Culture and Education, held between 29 October 2019 and 2 November 2019

creative preschool teachers, which will be prepared and implemented in accordance with the development levels of children. According to Koyuncu Şahin and Akman (2018), it is stated that children's creative thinking will continue actively as long as children are provided with a free environment and no attitudes preventing them from thinking creatively by adults. Creative thinking process should be included in this education system. Thus, it will be made sure that the creative attitude in children (Płóciennik, 2018) which includes the skills of curiosity, exploring, critical thinking, comparing situations and being able to make decisions as a result, is improved. In order for individuals to find effective solutions for the problems they will encounter throughout their lives, they must have creative thoughts and produce creative ideas (Savcı, 2018). Scibinetti et al. (2011) stated that there is a close relationship between creativity and thinking.

Creativity is a process that takes place over time (Johnson, 2000) and especially children's imaginations are very rich in preschool period (Çelebi Öncü, 2018). It is a known fact that the language, cognitive, motor and social-emotional development areas of preschool children develop quite rapidly compared to other times. Supporting all the development of children in this period is important in revealing the talents of children (Ceylan and Cevher Kalburan, 2018). The feeling of curiosity, which forms the basis of creativity, is a situation observed in all children and observed when children start to explore their environment (Çakmak and Akıncı Demirbaş, 2018). The fact that children think that they can succeed in this process during a confronted situation and have the potential competence to overcome this situation will enable them to successfully complete this situation with a high motivation (Haase et al., 2018). According to Lee and Kemple (2014), providing children's flexible thinking in developing their creativity, supporting them with cooperative teaching, ensuring that children can evaluate themselves, that is, creating awareness in self-assessment, supporting their independent thinking, and providing their experiences with different stimuli in different learning environments and these experiences of children will enable them to act boldly and eagerly.

Children who come into the world have to act dependent on their parents as a result of not being able to determine the environment in which they will live their lives (Arslan Karaküçük, 2008). In our country, gypsy children are exposed to differentiation in the education process compared to other children. As gypsies usually live on the outskirts of cities, gypsy children continue their education in their neighborhoods. This situation restricts gypsy children's receiving education together with other children and causes them to be excluded (Genç et al., 2015). It was determined that there are patterns in children's perceptions of space in the learning environment (Jankowska et al., 2019).

As in other developmental areas of children, many factors affect the development of their creativity as well. Among these factors, the environment which the child stays in is very important. The development of children in early childhood will be positively affected by equipping their environment with appropriate stimulating materials. In contrast, the development of children raised in adverse environmental conditions will also be negatively affected. Through this study, in order for gypsy children living in Konya province to improve their creativity levels, a twelve-week creativity training was given by providing training environments with rich stimulants, and it was aimed to increase the creativity levels of the children.

METHODOLOGY

Participants

The aim of the study is to investigate the effect of arts education program given to gypsy children on children's creativity levels. In the study, a single group pretest-posttest model from pre-trial models was used in order to reveal the effects of the education program for gypsy children on the creativity of children. In the single group pretest-posttest model, by applying an independent variable to a randomly selected group, measurements have been made both before and after the experiment (Karasar, 2020). "Profile of Creative Abilities-PCA" was applied as a pretest to be able to determine the effect of "Preschool Art Education Program" given to gypsy children on the levels of creativity of the children within the scope of the research. After the pretest applications, “Preschool Art Education Program” was applied to gypsy children within the scope of the research. At the end of the training, the same scale was applied to the group as a post-test. While the independent variables of the research are the creativity levels of the children, the dependent variables are the “Preschool Art Education Program” for gypsy children. The study group of the research consisted of 51 gypsy children in the 5-6 age group who were selected based on the simple random sampling method, who show normal development, and who attend private, official, independent kindergartens and kindergartens in primary schools under the Ministry of National Education in the Doğanlar district of Karatay county of Konya province (Büyüköztürk et al., 2011; Balcı, 2007). Simple random sampling method is a method that allows the individuals who will be selected for the sample group to be determined according to the chance element (Böke, 2017). 19 (37.25%) of the children in the study group are girls and 32 (62.75%) are boys. 31 (60.8%) of gypsy children are in the age of five, and 20 (39.2%) are in the age group of six.

Instruments and data collection

In the research, the general information form was developed by the researchers to obtain demographic information about children and their families, and the PCA was developed by Ryser (2007) in order to evaluate the creativity levels of children.

General information form

The general information form was created by the researchers in order to determine the demographic information of the children included in the research. In the general information form, questions about the date of birth, gender, and the order of birth of the children taking part in the study are included.

Profile of creative abilities-PCA

The PCA, which was developed by Ryser (2007) and whose validity and reliability study was conducted by Yıldız Çiçekler and Aral (2016), was used in the research in order to evaluate the creativity levels of children. The scale consists of drawing, categories, home rating scale and school rating sub-dimensions. The drawing subscale consists of eight different shapes that are left unfinished. In the drawing subscale, children are asked to complete eight different shapes, which are left unfinished, using their imagination. Although there is no time limitation on the drawing subscale, children are encouraged to complete this subscale within thirty minutes. The drawing subscale is scored according to four creative ability sub-dimensions. The four sub-dimensions in the drawing subscale are scored as 0, 1 and 2. The categories subscale consists of two matrices. Including 4 transverse and 5 longitudinal, there are 20 animal pictures and 20 geometric figures in these matrices. The children are asked to form groups of at least three pictures and figures, and the person performing the test is asked to explain how they formed these groups. The child is given three minutes to produce as many categories as possible for each form. The person who applies the scale records the child's answers. The home assessment scale is a likert-type scale consisting of thirty-five questions that can be answered by the child's parents or an adult who cares for the child. The school evaluation scale is also a likert-type scale with thirty-five questions answered by the child's teacher. Within the scope of the validity study of the scale, as part of reliability, methods of test-retest reliability, inter-rater consistency, and the calculation of the Cronbach Alpha coefficient were used for the validity of scope, structure and criterion. It was found that the internal consistency of the drawing subscale of the PCA is 0.80, the internal consistency of the categories subscale is 0.90, the reliability of the home rating subscale within the scope of internal consistency is 0.97, the reliability of the school rating subscale in terms of internal consistency is 0.97, and the overall Cronbach Alpha value of the scale is 0.95.

Data collection and analysis

In the study, “Preschool Art Education Program” was given to the children in Akif Paşa Primary School in Doğanlar district for twelve weeks. Arts education was given to 51 gypsy pre-schoolers who are at the age of 5-6. The given education includes artistic activities such as dough activities, paper activities, residual material studies and paint activities are told and performed, which are also known as dye and desk activities to support their language, cognitive, social, affective and psycho-motor development. In the study, firstly, necessary permissions were obtained from Konya Directorate of National Education and correspondences were made regarding cooperation. Prior to the study, parents on whose children the training program was planned to be implemented were given information about the training and the content of the scale to be implemented, and their informed consent was obtained. Special care was given to ensure voluntary participation. Before and after the training activities, the “PCA” was applied to the children and the data collected were analyzed in the computer environment. The data obtained were evaluated with the ‘T-test for related samples’ and ‘Mann Whitney U-Test’ (Büyüköztürk, 2012) used in experimental studies where frequency, percentage and two related measurements or scores were obtained.

RESULTS

Findings regarding the effectiveness of educational programs for gypsy children are handled. When the Profile of Creative Abilities-PCA pretest-posttest mean scores were examined, a significant difference was obtained in each of the drawing and categories sub-dimensions and home and school rating scales (Table 1). In line with this result, it shows that the art education program applied to gypsy children has a positive effect on children's creativity.

When the results of the education given according to the gender of gypsy children are analyzed, it is seen that there is a significant difference in favor of girls only in the total score of drawing sub-dimension (Table 2).

It is seen that there is a significant difference between the creativity levels of gypsy children and their age in favor of children in the age group of six (Table 3).

DISCUSSION

In the study, the effects of the educational program intended for gypsy children on the creativity levels of children were examined. At the end of the study, as a result of the pretest-posttest mean scores of the PCA applied to gypsy children, a significant difference was obtained in each of the drawing and categories sub-dimensions and home and school rating scales. With this result, it was determined that the art education program applied to gypsy children has a positive effect on children's creativity. It is very important for children to observe the environment and examine the existing objects in order to create different ideas or products in art activities. For this reason, gypsy children were trained with art education in the study. In the study, children were trained with art education and gypsy children, who is a disadvantaged group, was provided with the opportunity to meet materials that children have not experienced before. The children were introduced to these materials and directed to design different products from the materials. Thus, children were provided to reveal their creativity, which is actually present. Children who are in a disadvantaged group and do not live in an environment that is sufficiently stimulating cannot demonstrate and develop their creativity due to adverse conditions. With this result obtained from the study, it can be seen that effective results may occur in children when sufficient environment and opportunities are provided for disadvantaged children.

In many societies, it is known that children as well as adults do not use their creative abilities (Runco, 2010). When the studies on this subject are analyzed, creativity education program was applied to the children and it was determined that the creativity trainings applied had a strong and positive effect on the children in the study conducted by Aral et al. (2006), Can Yaşar (2009), Can-Yaşar and Aral (2011), Garaigordobil and Berrueco (2011), Dere and Ömeroğlu (2018), Yüksel (2018), and Zahra et al. (2013).

In order to support the development of children in many areas such as creativity, it is necessary to attend the

Table 1. Pre-test and post-test average scores of the Profile of Creative Abilities and t-test results.

Variable	N	$\overline{X}$	S	sd	t	p
Drawing new element pre-test	51	1.19	1.26	50	5.25	0.000
Drawing new element post-test	51	2.03	2.77			
Drawing originality pre-test	51	9.07	2.50	50	19.17	0.000
Drawing originality post-test	51	14.13	5.26			
Drawing adaptation pre-test	51	0.078	0.271	50	2.82	0.044
Drawing adaptation post-test	51	0.137	0.347			
Drawing perspective pre-test	51	0.156	0.418	50	2.36	0.010
Drawing perspective post-test	51	0.235	0.709			
Drawing final total pre-test	51	10.45	3.17	50	16.93	0.000
Drawing final total post-test	51	16.43	6.92			
Categories agility pre-test	51	3.43	0.755	50	18.34	0.000
Categories agility post-test	51	5.84	2.27			
Categories flexibility pre-test	51	3.45	0.986	50	17.03	0.000
Categories flexibility post-test	51	5.52	2.31			
Categories final total pre-test	51	6.88	1.39	50	17.87	0.000
Categories final total post-test	51	11.37	4.54			
Home rating scale pre-test	51	83.80	14.17	50	36.99	0.000
Home rating scale post-test	51	108.68	20.97			
School rating scale pre-test	51	100.21	14.25	50	42.62	0.000
School rating scale post-test	51	105.88	17.73			

school regularly and to provide the necessary training by determining the needs according to the development status of the children. When the school attendance processes of Gypsy children are examined, it is seen that they could not attend schools for reasons such familial, economic, etc. (Mercan Uzun and Bütün, 2015). According to Mercan Uzun and Bütün (2015), it is emphasized that education is an important opportunity in shaping the lives of individuals, but individuals should be eager for education in order to be beneficial for this opportunity.

Due to the social exclusions experienced by gypsy children, approaching to gypsy as individuals prone to crime in society causes them to be exposed to derogatory discourses and to experience discrimination in the school environment. As a result of this situation, the biggest problem experienced during the education process of gypsy children is that school absenteeism is very common. Due to economic factors, family structures and social exclusion experienced in the society, there are difficulties in educational conditions of gypsy children (Daşdemir et al., 2015). Based on this information, it has been observed that there will be advances in children's creativity levels when education is provided by providing environments with sufficient stimulating materials for gypsy children. It is thought that this positive process can be maintained by providing these children to receive education in schools with a better educational environment instead of training gypsy children in suburbs. When the education given according to the gender of gypsy children are analyzed, it was seen that there was a significant difference in favor of girls only in the total score of drawing sub-dimension. In the study, different activities were carried out to gypsy children during twelve weeks, which they had not experienced before. The fact that there is no difference in the other sub-dimensions apart from drawing sub-dimension between girls and boys can be explained by applying the same activities within the same periods and never exposing children to these activities before. Participation of children with interest in educational programs applied to children is an important factor in the effectiveness of the education

Table 2. Mann Whitney U-Test results of pre-test and post-test average scores of the Profile of Creative Abilities regarding gender of gypsy children.

Variable	Gender	n	$\overline{X}$	Standard deviation	Mean rank	Sum of ranks	U	p
Drawing final total post-test	Female	19	20.00	6.64	33.95	645.00	153.00	0.003
	Male	32	14.31	6.27	21.28	681.00		
Categories final total post-test	Female	19	10.89	4.39	24.42	464.00	274.00	0.556
	Male	32	11.65	4.67	26.94	862.00		
Sum of standard scores post-test	Female	19	30.89	9.12	31.03	589.50	208.50	0.062
	Male	32	25.96	9.60	23.02	736.50		
Creativity Index	Female	19	107.89	13.27	30.13	572.50	225.50	0.125
	Male	32	100.40	17.58	23.55	753.50		
School rating scale post-test	Female	19	106.63	15.26	26.82	509.50	288.50	0.762
	Male	32	104.25	21.02	25.52	816.50		
Home rating scale post-test	Female	19	112.36	10.04	28.58	543.00	255.00	0.339
	Male	32	109.03	10.62	24.47	783.00		

Table 3. Mann Whitney U-Test results of pre-test and post-test average scores of the Profile of Creative Abilities regarding age of gypsy children.

Variable	Age	n	$\overline{X}$	Standard deviation	Mean rank	Sum of ranks	U	p
Drawing final total post-test	5	31	12.06	3.51	16.35	507.00	11.00	0.000
	6	20	23.20	5.24	40.95	819.00		
Categories final total post-test	5	31	9.16	3.94	18.69	579.50	83.50	0.000
	6	20	14.80	3.07	37.33	746.50		
Sum of standard scores post-test	5	31	21.22	4.63	16.00	496.00	0.000	0.000
	6	20	38.00	5.52	41.50	830.00		
Creativity Index	5	31	91.96	9.47	16.00	496.00	0.000	0.000
	6	20	120.60	6.36	41.50	830.00		
School rating scale post-test	5	31	103.64	20.79	20.68	641.00	145.00	0.001
	6	20	107.45	15.92	34.25	685.00		
Home rating scale post-test	5	31	108.87	11.08	20.58	638.00	142.00	0.001
	6	20	112.45	9.19	34.40	688.00		

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provided. The gender of children has not been an important variable in their interest in participating in the activities implemented in educational programs and in the creativity of children. The significant difference in the sub-dimension of drawing pictures between girls and boys can be explained by the fact that girls tend to draw more than boys and that they perform this activity with interest. There are many studies with similar results with the results obtained in the study. While significant differences were found between the creativity levels of children and gender in favor of girls in the studies carried out by Çağatay Aral (1990), Eratay (1993), Aral (1996), Gralewski (2019), and Hemdan and Kazim (2019), the effect of gender on creativity was examined and as a

result of the researches, there was no significant difference between the genders in the studies carried out by (Sonmaz, 2002; Lee, 2005).

According to another result obtained from the study, when the creativity levels and age of gypsy children were examined, a significant difference was obtained in favor of the children in the age group of six. In the studies carried out by Jastrzębska and Limont (2017), Gralewski et al. (2016), Karadayı (2018), Mottweiler and Taylor (2014), Yeh and Li (2008), and Yıldız Çiçekler (2016), it was observed that there was a relationship between children's creativity levels and their ages and creativity increased with age. Creativity is not at the same level among individuals (Karwowski and Jankowska, 2016). Therefore, it is important for parents and educators to know the creative thinking characteristics according to the age levels and individual differences of the children, since the development of creativity is quite different from the other development areas of the person (Aral and Yıldız Çiçekler, 2018). It is necessary that children are provided with sufficient stimulating environments until the age of thirteen (Gönen et al., 2006) known as the age at which creativity reaches the highest level and that children are guided as a conscious teacher and parent. The reason for the improvement in creativity levels as the ages of the children increase is explained by the fact that the children benefit from adequate and rich stimulating environmental settings. However, gypsy children are deprived of these adequate and rich stimulating environmental settings. According to the results of the study, if the gypsy children are given sufficient material and supportive education opportunities, it is thought that positive results can be obtained in the creativity levels of these children.

Conclusion

In the study, the effects of the educational program intended for gypsy children on the creativity levels of children were examined. At the end of the study, as a result of the pretest-posttest mean scores of the PCA applied to gypsy children, a significant difference was obtained in each of the drawing and categories sub-dimensions and home and school rating scales. When the education given according to the gender of gypsy children are analyzed, it was seen that there was a significant difference in favor of girls only in the total score of drawing sub-dimension. According to another result obtained from the study, when the creativity levels and age of gypsy children were examined, a significant difference was obtained in favor of the children in the age group of six.

RECOMMENDATIONS

As a result of this information, it would be useful to give different training to gypsy children in their creative fields in order to ensure, through art activities, that preschool children develop positive attitudes towards school and studying and to make their school attendance permanent. Contributions will be made to the mental, physical and social developments and creativity of children by making sure that the communication, self-expression and imaginative thoughts of children are developed by means of art education. Thus, through art activities performed with children, the increase in the enrolment rates of the number of children attending pre-school education and sustainability of the attendance of children to school will be ensured by emphasizing that the school environment is both an educational and entertaining place.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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