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PROFESSIONAL COMPETENCES REQUIRED BY TEACHES FOR EFFECTIVE TEACHING OF MATHEMATICS IN EBONYI STATE

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ABSTRACT

The study focused on professional competences required by teachers for effective teaching of mathematics in Ebonyi State. Two research questions were developed to guide the study. The study adopted description survey design. The population of the study was 575 teachers of mathematics which was taken as sample because of the manageable size. Therefore the sampling was purposive. A fourteen (14) item structured questionnaire (nine on technical competencies and five on opportunity for improving the effectiveness of teaching) was developed and used for data collection. Three curriculum experts validated the instrument. Four hundred and five (405) respondents returned the completed questionnaire. Cronbach alpha coefficient method was used to determine the internal consistency of the instrument which yielded a coefficient of 0.85. Three research assistances helped to administer the questionnaire. Weighted mean and standard deviation were used to answer the research questions, while the t-test statistic was utilized to test the hypothesis at 0.05 level of significance. The findings of the study revealed among others, that all the nine items are technical competencies required by teachers for effective teaching of mathematics in secondary schools and that Workshop, conference, seminar, short duration courses, and work and study programs are opportunities for capacity building of mathematic teachers. Also there is no significant difference in the mean responses of teachers in urban and rural areas on the competencies and opportunities required by teachers for effective teaching of mathematics. It was recommended that teachers of mathematics shall avail themselves of opportunity for capacity building to acquire new knowledge and skills for effective teaching. That mathematics teacher shall endevour to inculcate all the competencies during lesson delivery to enhance learning.

Keywords: Professional, Competences, Teacher effectiveness, Teaching mathematics in Ebonyi State

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Introduction

A teacher is a person who through proper training has acquired the methodology, technical knowledge, skills and attitude in a particular field of study to guide and teach students in a formal school setting. A teacher is an essential component in teaching-learning process, which brings the learner face to face with all learning activities (Karakus and Turhan, 2013). Nbina (2012) stated that a teacher is someone who is in an official capacity for the purpose of directing and guiding the students. The author further stated that a teacher must be technically and professionally equipped through the acquisition of technical knowledge and methodology of teaching.

Teaching means to make learning possible or easier to the learners by giving them the information or exposure they need. It involves the impartation of the right attitude, knowledge and skill to the leaner. It equally means to prepare students for future where they will come across more difficult situations that will force them to think in some diverse ways to stay with the change (Karakus and Turhan, 2013). Effective teaching is the only way that can prepare students to meet the challenges of such situation.

Effective teaching means, giving the right training through which the desired objectives may be achieved and students may learn with full understanding (Khan, 2017). It helps the students to connect previous knowledge with new knowledge. It also aids the students to work in the changing environment as a result of knowledge acquired. Teaching of any school subject needs to be effective for learning to occur. This includes the teaching of mathematics.

A teacher of mathematics can be described as someone who is trained; who has acquired the right knowledge, ideas, skills, attitudes and concepts in mathematics as well as methodology of teaching the subject matter to the students. Teachers of mathematics in senior secondary schools are expected to posses the professional standard required for teaching in Nigeria. Professional Standard is the minimum set of knowledge, skills, values, attitude, conduct, rights, privileges and obligations expected of a professional teacher in Nigeria (T.R.C.N., 2010).

The Professional Standards for Nigerian Teachers consists of four Themes to be used to appraise the professional standing of a teacher in Nigeria. These are: Professional Knowledge, professional skills, professional Values, attitude and Conduct, and professional membership Obligations (TRCN, 2010). In the concept of this study, a teacher of mathematics is an individual who has acquired the knowledge, skills, concepts and methodology of teaching mathematics to students in Ebonyi state senior secondary schools.

A senior secondary school is the last three years in a six year secondary school system. At the secondary school level a distinction is made between junior Secondary School (JSS) and Senior Secondary School (SSS) curricula. Teacher competencies for each level and in the subjects are needed. Their competencies must thus relate to academic and professional preparation, professional growth, classroom interaction and evaluation (Nbina, 2012).

Competence is referred to as the capacity or potentiality to perform (Karakus and Turhan, 2013). It is equally described as a habitual and judicious use of knowledge, communication, technical skills, reasoning, values and reflection in daily practice for the benefit of the learners and the nation at large (Erdogdu and Kurt, 2012). They further stated that for meaningful teaching to take place, Teacher competence needs to be very high. The higher the competency of the teacher, the higher will be the students' learning and the retention of what was learned. Vorhaus, Desforges, Entwistle, and Hodkinson, (2017) are of the view that learning occurs as a result of the activities of gene and environmental factor. The teacher belongs to the category of environmental factor in influencing learning and they need to be competent. When a teacher exhibits competence in his or her duties students' performance will be affected positively (Nbina, 2012).

The researcher observed that students' performance in mathematics in external examinations such as WAEC, NECO, or UTME have not been encouraging probably due to the teacher's incompetence which could result from the use of poor teaching method. Nimbra, (2015) stated that the way teacher handle classroom instructions has led to poor performance of students in senior certificate Examinations. This indicates that learning is not going on effectively in schools. The mathematics teacher is expected to posses certain competencies both professional and technical. Professional competencies includes, technical, pedagogical and ethical. Technical competencies are the teachers' knowledge of his subject. Pedagogical competency is the knowledge of methodologies of teaching mathematics and observing such principles as teaching from known to unknown, concrete to abstract and from simple to complex while ethical competence is having the right attitude to teaching (Roxas, 2015). The mathematics teacher's success in the classroom depends very much on his or her preparedness for the instructional process. Qualified mathematics teachers are in the best position to give quality education to the student. Maintaining effective and good working relationship with learners is a focal point of teacher competence. Buket and Turhan (2018) also pointed out that as professionals; teachers are responsible for keeping themselves updated with educational trends and improving their competencies throughout their career.

Teachers need to improve skills and knowledge to enhance, improve and explore their teaching practices. The policy of education changes very quickly depending on the needs of the society thus, requiring more capability. These demands directly affect educational system. Teachers also need to have knowledge and skills necessary to create a positive classroom environment and work collectively with other stakeholders within and outside the school in order to provide timely support to learners. Teachers' competencies must be reviewed in consonance with emerging issues in teacher education. Teachers are responsible for operating educational system and they need strong and efficient professional competencies. Lack of teaching competencies queries the attainment of optimal teachers' performance in mathematics. Assessing teaching

competencies of mathematics teachers is very important in ensuring quality learning and education of our students, to give them the needed knowledge and skills for life or further education. Therefore there is the need to determine professional competencies required by teachers for effective teaching of mathematics in senior secondary schools in Ebonyi State.

Statement of Problem

Mathematics is one of the most important subjects taught in senior secondary schools in Nigeria including Ebonyi State. The importance of mathematics is informed by its relevance in almost every aspect of human endeavour like commerce and work environment. In addition, pursuit of higher studies also demands good knowledge and understanding of basic mathematics as it is relevant in research and statistics. Consequent upon its relevance, only professionally qualified teachers knowledgeable in pedagogy and technical know-how of the students are usually employed by government to teach the subject to student at the junior and senior secondary school levels. Effective teaching of mathematics can enable students perform creditably in both internal and external examinations such as National Examination Commission (NECO), West African School Certificate Examination(WASCE) and Joint Admission And Matriculation Board(JAMB).

At present the level of performance of students in mathematics at the senior secondary school level in the past few years in Ebonyi State is very poor and demands urgent attention to remedy the situation. As a result of this poor performance, students fail to secure admission into higher institutions requiring credit passes in mathematics in WASCE or NECO. In addition, most of them cannot survive in businesses outside school which requires mere addition, subtraction or the like. Many of these students got frustrated for not meeting up with their proposed life careers due to poor performance in mathematics. Consequent upon this sad situation, some of them got involved in unethical jobs such as stealing, sex work, cybercrime, kidnapping and other forms of restiveness.

Government at the state and federal levels fail to encourage mathematics teachers to embark on capacity improvement training through workshops, conferences and seminars to encourage teachers to acquire the requisite professional and technical competencies in teaching mathematics effectively to students. Failure of students to pass mathematics at credit levels in NECO or WASCE could be associated with inability of teachers to effectively teach students. In order to exonerate teachers from the blame there is the need to determine the competencies required by teacher for effective service delivery of mathematics in secondary schools, hence this study.

Purpose of the Study

The purpose of this study is to determine professional competences required by teachers for effective teaching of mathematics in secondary schools. Specifically the study sought to determine the:

1. Technical competencies required by teachers for effective teaching of mathematics in senior secondary schools.

2. Opportunities for capacity building of teachers for effective teaching of mathematics in secondary school

Research Questions

The following research questions were answered by the study:

1) What are the technical competencies required by teachers for effective teaching of mathematics in senior secondary schools
2) What are the opportunities for capacity building of teachers for effective teaching of mathematics in secondary schools?

Scope of the Study

The study was restricted to competencies required of mathematics teachers for effective teaching of mathematics in Ebonyi State. Content scope covered: knowledge of content, pedagogical skill and attitude to teaching. The respondents were restricted to teachers of mathematics in SSI, SSII and SSIII in urban and rural areas of Ebonyi State. Data collection method was restricted to the use of structured questionnaire developed from literature reviewed for the study.

Review of Related Literature

Concept of a professional teacher

Profession simply means a type of job that needs special training or skill, especially one that needs a high level of education such as in medical, legal or teaching professions (Hornby, 2016). A professional, means someone that is well trained and extremely skill. It can also be seen as a person who has a lot of skill and experience. Depending on the circumstance, these concepts may stir up many images and have multiple definitions. In the world of sports, professionals are distinguished by the level of skill that competitively sets them apart from amateurs. In the business world, "professional" is often synonymous with "successful". Doctors, pharmacists, physical therapists, nurses, and others are health care professionals with clearly defined roles, tasks, and limits on their occupational behaviors. In the field of education, however, Palacios (2014) stated that a Professional teacher is the "licensed professional who possesses dignity and reputation with high moral values as well as technical and professional competencies. He/she adheres to observe and practice a set ethical and moral values principles and, standards. Tichenor and Tichenor (2005) stated that the quality of one's practice or teaching portray him/her as professional. They further Describes a professional teacher as those who have a strong grasp of the subjects they teach and are committed to the intellectual demands of their discipline. They are able to examine the needs of the students for whom they are responsible. They know the standards of practice of their profession. They know that they are accountable for meeting the needs of their students. In the context of this study a professional teacher is a paid employee who is trained to impart knowledge, virtue and skill. Teaching should be regarded as a profession: It is a form of public service which requires expert knowledge and specialized skills, acquired and maintained through rigorous and continuing study; it calls also for a sense of personal and corporate responsibility for the education and welfare of the pupils in their charge (Ufonabasi and Friday, 2014). To be a qualified professional teacher in Nigeria the person must possess a minimum of Nigeria Certificate in Education (NCE). It is

•therefore sufficient to state that teachers undergo all these necessary intellectual, professional, social, moral and even psychological rigors characteristic of the other noble professions which have set them far apart from quacks and lay people. This study tends to find out the competencies required of a professional teacher of mathematics for effective teaching of mathematics in secondary schools in Ebonyi State.

Vision of teacher education in Nigeria

T.R.C.N in 2010 stated that the Vision of Teacher Education in Nigeria is to: Produce quality, highly skilled, knowledgeable and creative teachers based on explicit performance standards through pre-service and in-service programmes, who are able to raise a generation of students who can compete globally. TRCN (2010) made a list of scope of Professional Standards for Nigerian Teachers to include:

(a) Professional Knowledge: Three kinds of knowledge are crucial for teaching school mathematics which are; knowledge of mathematics, knowledge of students, and knowledge of instructional practices. Teachers need to make connections within and among their knowledge of mathematics, students, and pedagogy (Pantic, 2014). They equally need proper knowledge of curriculum, computer system and communication technology to teach mathematics effectively in this era.

(b) Professional Skills: skills required for successful classroom practice according to Kyriacov (2017) includes skills for; lesson planning and preparation, lesson presentation, lesson management, classroom management, discipline, assessing pupils progress, reflection and evaluation.

(c) Professional Values, Attitude and Conduct: this according to TRCN (2010) includes; sense of responsibility in carrying out education programs, honour learners right and dignity, empathy for learners, confidentiality for learners personal information, shun sexual and related abuse of office, seek fair remuneration, vanguard against examination malpractice, abhor illegal learners group, serve as role model, corrupt-free, avoid corporal punishment, inspire discipline among learners, zero tolerance for interference of ideology, high integrity, mutual respect for colleague, good relationship with student, parents and guardian, employers, and society at large,

(d) Professional Membership Obligations: Intending teachers is to be inaugurated by TRCN at the point of graduation , register with TRCN, pay their annual TRCN subscription and possess up-to-date teaching license, participate in continuous professional development, exhibit professional excellence, teachers are efficient, dedicated to work, loyal to professional regulatory authority, community builders and obey education laws. These Standards are essentially performance benchmarks expected of Professional Teachers in Nigeria, depending on the Category of the teachers. The issue now is to find out the teachers view of the professional competencies required for effective teaching of mathematics.

Concept of mathematics and effective teaching

Mathematics is the study of numbers and shapes. Its dictionary meaning states that, 'Mathematics is the science of measurement, quantity and magnitude' (Hornby, 2016). It is exact, precise,

systematic and a logical subject. Mathematics reveals hidden patterns that help us to understand the world around us. Mathematics today is a diverse discipline that deals with data, measurements and observations from science, with inference, deduction, and proof; and with mathematical models of natural phenomena, of human behavior, and of social systems (Roohi, 2017). School administration and teacher training institutes consider mathematics an important subject and treat it differently. It is a subject in which students can make their marks sheet attractive by getting up to 100 % marks in exams. But in reality, students do not rank it at top among their favorite subjects. Results show that this is the subject in which students face many problems and majority of the students drop it as they get option for selection.

The new education curricula lay more emphasis on student centered learning and students' independent investigations of mathematical ideas. Inherent in the design of these programs is the view taken of the teacher as the facilitator of learning within the classroom. As students engage in investigations, the teacher is expected to create an environment in which mathematical discourse takes place. Teachers are the key to improving mathematics education. What teachers know how to do, and what they choose to do, when delivering instruction in their classrooms determine what content students learn and which students learn that content? (Alnoor, yuanxiang&Abudhuim, 2015). To teach mathematics effectively, teachers need to make connections within and among their knowledge of mathematics, students, and pedagogy; an elaborated, integrated knowledge of mathematics, a knowledge of how students' mathematical understanding develops, and are able to use pedagogical practices that take into account the mathematics being taught and how students learn it, propelled effective teaching of mathematics. As the rapid developments in technology infuse into our lives, they affect the way students learn and the way teachers teach.

Stronge (2002) summarizes the characteristics of effective teachers into three statements: the effective teacher recognizes complexity, communicates clearly, and serves conscientiously. According to Stronge and Hindman (2003) teacher effectiveness is defined by some researchers in terms of student achievement; others focus on high performance ratings from supervisors; and still others rely on comments from students, administrators, and interested stakeholders". Khan and Jumani (2008) in their study observed that the existing syllabus of mathematics is tough and teachers do not have command over the subject due to lack of proper training. National Education Policy (2009) proposed that in service teachers training in mathematics shall be provided, with due attention to developing conceptual understanding, procedural knowledge, problem solving and practical reasoning skills. This calls for concern, to review teacher's competencies in other to help educational programmes to achieve the desired result, since teachers are an important factor in teaching learning process. The issue at hand is not to come up with a single, all-encompassing definition of effective teacher but to establish parameters of behaviour and characteristics

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that can be fostered among teachers, if they are to teach mathematics effectively, stay motivated and remain relevant in a rapidly changing world.

Teaching competencies

Competencies can be seen as, a measure of one's performance and a description of one's ability (Bricca, Canvalno& Anna, 2016). A person's competencies may be defined in terms of one's knowledge, skills and behavior. Jones (2018) defined competence as the capacity to mobilize various psychosocial (cognitive, functional, personal and ethical) resources to meet complex demands in a given circumstance. In this sense competence is dynamic and process-oriented, and includes the capacity to use and to adapt knowledge. Selvi (2010) view the role of competent teacher to included: nurturing the whole child, providing quality learning, working with others, and developing a strong set of personal values. A competent teacher must possess:

- Subject Matter Knowledge Competencies: Mathematics teacher's knowledge of mathematics content is the main competency for teachers who will teach mathematics in the classroom.
- Information and Communication Technologies (ICT) Competencies: ICT competencies are based on using tools and technical equipments for the distributing, reaching and transferring knowledge.
- Professionalism Competencies: The effective teacher understands his or her legal and moral responsibilities, Learns from experience and supervision and understands the impact he/she is expected to make in the life of the learners. Erduga and Kurt (2012) outlined professional teaching competencies teachers need to consider for an effective teaching to include;

1. Engaging and supporting all students. Teachers needs to connect students with prior knowledge, life experience and their interest with learning goals
2. Creating and maintaining an effective environment for student learning: Teachers need to create an environment that engages students.
3. Understanding and organizing subject matter for student learning: Teachers need to demonstrate knowledge of subject matter, organize curriculum to support students understanding of the subject matter.
4. Planning instruction and designing learning experiences for all students: Teachers needs to establish and articulate goal for teaching student
5, Evaluating student learning: Teachers establish and communicate learning goals to all students. They collect and use multiple sources of evaluation to assess students.
6. Developing as a professional instructor: Teachers need to establish professional goals and pursue opportunity to grow professionally.

Theoretical Framework

The theoretical framework is presented under theory of teaching and training and need assessment theory

Theory of teaching and training

A theory, according to Okenwa and ugbo (2003) is a statement of the principles upon which a subject is based. This implied that a theory provides needed information about a giving subject matter. Stacy (2020) viewed teaching theory as a theory that

predicts, clarifies and controls the way teachers' behaviour affects students learning. The author further affirmed that learning occurs as a result of the role teaching plays in education process. Bruner in Vinney (2020) also defined teaching theory as the clarification of the general methodology of instruction.

Training according to Mcnamara(2007) involves an expert working with learners to transfer to them certain area of knowledge and skill to enable them learn and improve in their current skills, The author stated further that training is the organizational effort aimed at helping an employee to acquire basic skills required for efficient execution of the function for which he/she was hired. Training theory therefore, is a statement of the principles of training as it is giving to employees on the job. In this study, the theory of training are the principles or guidelines for equipping teachers of mathematics with knowledge, skills and attitudes and the methodology of imparting them by an expert teachers of mathematics in senior secondary schools,

Theory of Needs Assessment

Needs assessment study is directed towards determining or assessing the needs of an organization through training or retraining. Elom (2016) stated that needs assessment is the process of collecting information about an expressed or implied organizational need that could be met by conducting training. This is done in order to correct deficiency for the purpose of improvement or efficiency of the organization or system. In this study, need assessment theory can be explained to be the principles that determine the process of collecting information about the in-service training requirements of teachers of mathematics necessitated by technological advancement that hinges upon pedagogy and know-how of the subject matter and classroom communication technologies.

Research Method

The study adopted a survey research design. A survey design in the opinion of Orodho and Kombo (2006) described the existing research concern by asking individuals about their perception, attitudes or value or through observation. This study embarked on finding out practicing teachers' perspectives on the competences required by teachers for effective teaching of mathematics in senior secondary schools. Research problem under investigation was descriptive as such survey research design was considered appropriate for collection, analysis and presenting the data using a sample of individual representative of the population. The study was conducted in Ebonyi state which consists of three education zones of Ebonyi South, Ebonyi North and Ebonyi Central. The choice of the area was made because Ebonyi state was regarded as one of educationally disadvantaged states in the country. The population of study was 575 Teachers of mathematics in senior secondary schools in Ebonyi state. The information on the number of mathematics teachers was obtained from Ebonyi State Secondary Education Board (EBSEB) headquarters Abakaliki. The population of teachers was considered relatively small. Hence the entire population was used as sample. Instrument for data collection: 575 mathematics competencies requirement (MCR) structured questionnaire items for teachers of mathematics was developed from reviewed literature and used for data collection and only 405 teachers

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participated in the study. Each item was assigned 4 response option scale with corresponding numerical Values as follows highly required (HR) =4; moderately required (MR)=3; low required (LR)=2; and not required (NR)=I. The face and content validity of the instrument was ascertained by 3curriculum experts: two from the department of Education foundation and one from science education Ebonyi state university, Abakaliki. Each validator was given a copy of the questionnaire to determine the relevance and content coverage of the items. Based on their suggestions, the final questionnaire for collecting data for the study was developed. Cronbach Alpha Coefficient method was used. A pilot study of 10 teachers (5from urban and 5 Rural) senior secondary school in the study area was used to establish the reliability of the questionnaire item. These respondent used in the pilot study were, however, not part of sample for the study. The data obtained from the administration of the questionnaire was analyzed by finding the variance of each item in the questionnaire and the variance of the total number of items in each section of the questionnaire which gave a coefficient of 0.85. This value represented the reliability coefficient of the questionnaire. Four hundred and five (405) copies of questionnaire were delivered to the teachers of mathematics with the help of three (3) research assistance from each of the three educational zones of the state. The researcher also explains the purpose of the data collection to the research assistance so that if someone asks them about the purpose of questionnaire, they must be able to explain the purpose of the study. The researcher retrieved the copies of questionnaire from research assistance after one week at a designated place. Mean, standard deviation and t-test statistics were employed to analyze the data obtained from the respondents. The mean and standard deviation were used to answer the research question. The internal scale of 0.05 was used to determine the upper and lower limits of the mean value. The upper limit was 2. 50 +0.05= 2.55. The lower limit was also 2.50-0.05 =2.45. As a result of this, upper limit of 2.55 was used to make a decision on the mean of each competencies required for effective teaching. The upper limit of 2.55 was used because it disseminate better. As such, any competencies item with a mean of 2. 55 and above was regarded as required while any item with a mean of response less than 2.55 was regarded as not required.

Presentation of Results

Research question one: what are the technical competencies required by teachers for effective teaching of mathematics in secondary schools? The data for answering research question one is presented in table 1

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Table 1: Mean rating of the responses of teachers of mathematics on competencies required for effective teaching of mathematics N=405.

S/N	ITEM STATEMENT	X	SD	Remarks
1	Acknowledge the level and background of the students in the class	3.45	0.11	Required
2	Introduce the lesson using local examples to capture students interest and enthusiasm	2.60	0.51	Required
3	Have proper knowledge and understanding of the subject matter.	4.32	0.44	Required
4	Solve a particular problem in many ways.	3.66	0.12	Required
5	Show full working that is, application in teaching a particular topic	3.11	0.44	Required
6	Give students opportunity to communicate their reasoning or ask questions	2.89	0.56	Required
7	End the lesson with a summary	4.77	0.66	Required
8	Evaluate students orally or in writing based on the day lesson	3.42	0.71	Required
9	Possess ICT skills needed in teaching mathematics	4.44	0.92	Required
10	**Grand Mean**			**Required**

The data in the table 1 showed that all the items presented had a mean value above the cutoff point of 2.55. This indicated that all the respondents agreed that the items are required for effective teaching of mathematics in senior secondary schools.

Research Question Two: What are the opportunities for capacity building of teachers in senior secondary schools?Data for answering research question two are presented in table 2:

Table 2: Mean rating of the responses of teachers of mathematics on opportunities available for improving the effectiveness of teaching N=405

S/N	ITEM STATEMENT			Remarks
11	Workshops	4.31	0.11	Agreed
12	Conferences	3.56	0.05	Agreed
13	Seminars	3.22	0.27	Agreed
	short duration courses	4.85	0.31	Agreed
14				
15	work and study programs	2.69	0.03	Agreed
	Grand mean			**Agreed**

The data in the table 2 shows that all the 5 items had a mean above the cutoff point of 2.55. This indicated that the respondents agreed that all the items are opportunities available for improving the effectiveness of teachers. The data in table 2 above shows that the mean rating of teachers' ranges from 2.69 to 4.85 which indicated that all the items had a mean above the cutoff point of 2.55. This also indicated that the teachers agreed that all the items are opportunities for capacity building of teachers.

Hypotheses

$H0_1$: There is no significant difference in the mean ratings of urban and rural mathematics teachers on the technical competencies required by teachers for effective teaching of mathematics in secondary schools.

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Table 3: t-test of difference in the mean responses of urban and rural on the technical competencies required by teachers for effective teaching of mathematics in secondary schools.

Items	Category of respondents	N	Mean	SD	Df	t-cal	t-crt	Decision
1.	Urban	205	3.58	0.55	203	0.80	1.96	Not Significant
	Rural	200	3.50	0.59				
2.	Urban	205	3.22	0.86	203	0.99	1.96	Not Significant
	Rural	200	3.33	0.64				
3.	Urban	205	3.02	0.69	203	1.25	1.96	Not Significant
	Rural	200	3.17	0.64				
4.	Urban	205	2.55	0.93	203	1.12	1.96	Not Significant
	Rural	200	2.70	0.75				
5.	Urban	205	3.47	0.84	203	0.53	1.96	Not Significant
	Rural	200	3.40	0.74				
6.	Urban	205	3.44	0.55	203	0.38	1.96	Not Significant
	Rural	200	3.40	0.65				
7.	Urban	205	3.22	0.72	203	0.93	1.96	Not Significant
	Rural	200	3.32	0.63				
8.	Urban	205	3.05	1.09	203	1.95	1.96	Not Significant
	Rural	200	3.34	0.82				
9	Urban	205	3.00	0.62	203	1.14	1.96	Not Significant
10	Rural	200	3.11	0.77				
	Urban	205	2.57	0.66	203	1.22	1.96	Not Significant
	Average					**0.99**	**1.96**	**Not Significant**

Result on Table 3 revealed that the mean rating of urban and rural mathematics teachers on the technical competencies required by teachers for effective teaching of mathematics in secondary schools was not significant, as the t-cal of 0.99 was less than the Alpha value of 1.96. This means that the urban and rural mathematic teachers were of the same opinion on the technical competencies required by teachers for effective teaching of mathematics in secondary schools

H0$_2$: There is no significant difference between the mean ratings of urban and rural mathematics teachers on the opportunities for capacity building of teachers in senior secondary schools

Table 4: t-test of difference in the mean responses of Urban and rural mathematics teachers on the opportunities for capacity building of teachers in senior secondary schools

Items	Category of Respondents	N	Mean	SD	Df	t-cal	t-crt	Decision
11	Urban	205	3.52	0.60	203	0.41	1.96	Not Significant
	Rural	200	3.48	0.56				
12	Urban	205	3.30	0.62	203	1.35	1.96	Not Significant
	Rural	200	3.43	0.53				
13	Urban	205	3.52	0.60	203	1.18	1.96	Not Significant
	Rural	200	3.40	0.59				
14	Urban	205	2.69	1.00	203	1.8	1.96	Not Significant
	Rural	200	3.10	0.82				
15	Urban	205	3.05	0.62	203	0.38	1.96	Not Significant
	Rural	200	3.09	0.55				
	Average					**1.02**	**1.96**	**Not Significant**

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Result on Table 4 revealed that the mean ratings of urban and rural mathematics teachers on the opportunities for capacity building of teachers in senior secondary schools was not significant, as the t-cal of 0.41,1.35,1.18,1.8,0.38, and 1.02 was less than t-critical of 1.96. This means that both teachers of rural and urban areas were of the same
opinion on the opportunities for capacity building of teachers in senior secondary schools.

Discussion of Findings

The result of table 1 showed that all the 10 items were technical competencies required by the teachers for effective teaching of mathematics in senior secondary school. The finding is in consonant with the opinion of Alnoor etal(2015) who identify preparation competencies and planning the lesson, competence in carrying out the lesson, assessment competences, education means and equipment and personal competencies as necessary competencies for mathematics teaching. Table 2, the result of the finding revealed that all the 5 items were required by teacher for capacity building in mathematics teaching. The finding however, is in consonant with Ibrahim (2015) who stated that workshops, seminars, conferences and so on should be made available to teachers to enable them keep abreast of changes in the curriculum and be effective in teaching.

Conclusion

The respondents agreed that items in Technical competencies are required by mathematics teachers and that the opportunities for capacity building are also required for mathematics teachers to enhance their teaching capacity. Also teachers of mathematics operating in both urban area of the state and their counterpart in rural areas did not differ in their opinion on the technical competencies required by teachers for effective teaching of mathematics in secondary schools and opportunity required for improving effectiveness of teaching in Ebonyi state. The result of this study if utilized by stakeholders in education could help ensure effectiveness in teaching of mathematic in Ebonyi Senior Secondary Schools.

Recommendations

The study recommended the following:

1. Ebonyi State government officials and NGOs should allocate enough funds on a quarterly basis for the retraining of teachers of mathematics to ensure effectiveness in teaching.
2. Teachers of mathematics shall avail themselves of opportunity for capacity building to acquire new knowledge and skills effective in teaching.
3. Teachers of mathematics should try to utilize the technical competencies during lesson delivery to engender effective teaching which could lead to better performance of students.

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