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Original Research Article

Teacher Competence as a Determinant of Students' Interest in Science Education

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Abstract

Science education is a fundamental requirement in the development aspirations of any country. Education at secondary school level often provides a foundation for acquisition of further knowledge and skills in tertiary institutions of learning. It is a bed-rock where future productive human capital is nurtured to serve the dynamic needs of a nation's labour market and the economy in general. This is particularly emphasized by law N^0 98/004 of April 14, 1998 to law down the guidelines for education in Cameroon; stating that secondary education shall prepare learners for the job market. Those charged with the transmission of such knowledge must be competent in discharging their duties on the one hand and students must be adequately interested on the other. This study therefore sought to investigate the influence of teacher's competence on students' interest in science in secondary schools in Fako division. The objectives of the study were to find out how; teachers' mastery of subject matter to be taught affects students' interest in science and the relationship between teacher's training and teacher competence in relation to learners' interest in science. The study targeted all form 6 students and their teachers in public, confessional and lay private schools. A structured questionnaire was used for data collection. The sample consisted of 341 respondents selected using simple random and purposive sampling techniques. Data collected was analyzed using the Pearson Product Moment Correlation analysis with the help of the Statistical Package for Social Sciences (SPSS). Findings suggest that teachers' mastery of subject matter significantly affects students' interest in science (Γ_{xy}=0.224), there is a significant relationship between teacher's training and teacher's competence (Γ_{xy}=0.214) strongly correlated to students' interest. Based on these findings, it is recommended that teacher education programmes should lay emphasis on the mastery of content to be taught; teacher education should focus attention on learner interest as an important aspect of teacher competence; people with academic qualifications should mandatorily go through teacher education courses that will equip them with pedagogical skills.

Keywords: Teacher Competence, Determinant, Students' interest, Science Education

INTRODUCTION

The provisions of the National policy on Education for teacher education includes the purpose of teacher education, institutions of training professional teachers and their entry qualifications, curriculum of Teachers' colleges and professionalization of teacher. Effective learning in schools would require effective teaching to

accompany the efforts of the learners. Teacher competence needs to be very high in order for meaningful teaching learning to take place (Segun, 1986). At the secondary school level curricula, teacher competencies for each level and appropriate subjects would vary as well. In order to ascertain what these competencies are, secondary school programmes need to be examined in the context of the preparation of the teachers that would implement these programmes. Their competencies must therefore relate to academic and professional preparation, professional growth, classroom interaction and evaluation (Macaulay, 1986).

Conceptualizing Teacher Competence and Students' Interest in Science Education

The professional science teacher is expected to possess certain competence both professional and personal. Professional competences are both academic and pedagogical. Academic competencies are the teachers' knowledge of his subject. Pedagogical competency is the art of teaching the subject, observing such principles as teaching from known to unknown, concrete to abstract and from simple to complex (Akpan, 2002). The chemistry teacher's success in the classroom for example depends very much on his preparedness for the instruction process.

What is then needed to be a competent Science Education teacher? A competent Science Education teacher is a person who is professionally qualified and trained to teach Science related subjects, having the necessary qualities or skills and showing adequate skills in the teaching process, (Osaat, 2004). Other competencies required of teachers include knowledge of subject-matter, pedagogy, skill processes, resourcefulness, behaviour motivation and evaluation (Ivowi, 1986a). A competent Science Education teacher attends conferences, workshops and seminars, has a good classroom control, effective communicative skills, adequate knowledge of the subject, utilize a variety of teaching methods, or strategies and show enthusiasm for teaching (Akinbobola, 2004).

There is an implicit assumption that the ability to engage and motivate students is a characteristic of good practice in the teaching profession. Undoubtedly, students' engagement and interest in science has been a concern for researchers in the field of science education, and many seem to agree that there is a critical link between the role of the science teacher and students' levels of engagement and interest in science (Barmby et al., 2008; Freeman et al., 2007; Osborne and Dillon, 2008). While much is known about students' attitudes to science (Maharaj-Sharma, 2007; Nasr and Soltani, 2011), only very little is known about students' expectations of their science teachers and their science lessons. According to Kajuru et al. (2015), secondary education is a very important instrument for national development that fosters the worth and development of the individual for further education and development as well as the general development of the society. To them, education is regarded as an instrument that can be used to achieve more rapid economic, social, political, technological, scientific and cultural development in a country.

Over the recent years, students' performance in the Sciences has attracted attention from various stakeholders and further raised interest in teachers' competence in delivering the subject matter. Some scholars opine that student performance in Science is a function of student effort, attitudes, interest in the subject and intellectual capabilities as well as competence of the teacher. As regards teachers' roles in student achievement in science subjects in particular, there are various competency standards required in the teaching profession. These standards relate to teacher competence requirements such as the level of educational qualification, mastery of content to be taught and training amongst others (Trinder, 2008). Competent teachers who meet the profession's requirements are perceived to be "good" or "effective" teachers who bring about learning and exhibit desirable traits by upholding the standards and norms of the profession (Zuzovsky, 2003). An effective teacher is one who is capable of bringing about intended learning outcomes (Tambo, 2012). It is however argued that, the professionally competent teacher must be innovative, creative and dynamic in producing and using improvised motivation and teaching techniques especially in the sciences where student interest seems to be less.

Tambo (2012), Tchombe and Nsamenang (2014) opine that interest is one of the most important influences on learning. They maintain that a learner would learn whatever they are interested in especially if the knowledge being learned is contextually relevant. High interest generally translates to better academic achievement and in this light, it may be argued that students in our secondary schools lack the necessary interest; but whether or not teachers' competence is responsible is yet to be determined. The fact is that the teacher is supposed to arouse and maintain student interest in the content area they teach.

A study done by Odumbe et al. (2015) indicates that science performance depends on the success of the teaching process which is a multidimensional construct measured through evaluation of the overall achievement by students. It also depends on motivation of the students as well as the evaluation of the teacher's role. In addition, science performance varies from school to school, set-up of the learning environment, availability of resources and infrastructure that support learning and the type of school-whether private, public, or faith based.

According to Odhiambo and Toili (2013) other factors inhibiting science performance in general and in

examinations include; lack of proper lesson planning, poor teaching methodology/methods, poor pace of work coverage, poor topic sequencing and use of unsuitable learning resources. This is compounded by the fact that teaching in our schools examinations oriented.

Trinder (2008) defines competence as the ability of a professional to apply knowledge, skills and experiences in performing activities within a given occupation in order to produce a required outcome. From the teaching point of view, teacher competence involves an individual teacher's ability to function as expected in employment and do a particular job or perform a set of tasks under various conditions including the ability to cope with contingencies.

According to Passos (2009), teacher competence is highly associated with professional performance and can be defined from both cognitive and operational perspectives. From the theoretical point of view, teacher competence refers to a cognitive structure that facilitates specified behaviours. From the operational perspective, it entails a myriad of higher-order knowledge, skills, attitudes, strategic thinking, metacognition and behaviours that represent the teacher's ability to deal with complex situations that cannot be predicted with precision Passos (2009).

Wilson and Mant (2011), based on students' responses, have described exemplary teachers as those teachers who are clear explainers and whose lessons are characterized by high levels of thinking, problem solving, and discussion. Less teacher-led demonstrations and more practical work, as well as the delivery of contextualized science, are other qualities students agreed exemplary science teachers should possess (Thompson et al., 2008).

Tobin and Fraser (1990) found that in their view of science students, exemplary science teachers are those who manage and facilitate student engagement, those who increase students' understanding of science, those who encourage students to participate in learning activities, and those who maintain a favourable learning environment in their classrooms. Subsequent to Tobin and Fraser (1990),

Also, Bencze and Pedretti (2005) explored exemplary science teaching through the eyes of science students, and found that students appreciate and respond positively to teachers who are truly knowledgeable about the science they are teaching and who use creative delivery methods to teach science content. In addition to making the subject matter appealing and the learning environment a positive one, students have also said that a good science teacher ought to make students feel important and valued, and through meaningful interactions good teachers should be caring, compassionate, understanding, and loving (Barmby et al., 2008; Parkinson, 2004).

Competence has mental component involving thought and a behavioural component involving competent professional performance. To influence the desired student performance in the sciences, teacher competence goes beyond mere possession of the requisite knowledge, skills and attitudes (Kajuru et al., 2015).

This is because the success of any pedagogical process also relies on other factors such as the mode of delivery of content, teacher preparedness, learner engagement in the learning process, the learning environment among others. According to Passos (2009), competence is developed through teacher education, work experience and on-the-job training based on an exposure to a variety of activities that test an individual's ability to cope with different situations. Teaching experience gained also improves the teachers' ability to cope with unusual circumstances while education provides the teacher with solid understanding of the subject matter. Education and work-related experience also enhance the teacher's understanding of the principles and concepts underlying efficient and effective delivery of science content.

Akpan et al. (2008) asserted that one of the most important teacher variables that enhance their effectiveness is the mastery of the subject matter. For Mezieobi et al., (2008), any meaningful conception of teaching Social Studies should recognize the nature of the subject and the good-objects to be taught and learned. Teachers should sufficiently familiarize themselves with the subject matter to be taught.

According to Rena (2000), good knowledge of the subject matter helps the teacher to teach the learners correctly. This in turn leads to the achievement of set objectives and the consequent interest of the learners' to continue in the learning process. This scholar adds that, it has been established that there is a high correlation between what teachers know and what they teach.

Ehindero and Ajibade (2000) confirmed that a teachers' performance is influenced by the level of his pedagogical knowledge, as different from his knowledge of subject matter. It is to be noted that pedagogical knowledge is not exactly the same thing as knowledge of subject matter. However they are nevertheless intimately linked. This is because teachers' mastery and use of pedagogical knowledge in the classroom will indicate the depth of their competence in the use of his knowledge of subject matter. The competence in the subject matter is an indispensible foundation for the display of good and effective pedagogical skills. Teacher's level of knowledge on the subject matter has much influence on the process of achieving the lesson's objectives. Teachers without good grasp of subject matter, if he can succeed in bluffing the students, he has only succeeded in impacting incorrect information. This is likely to bring difficulties to the learners and subsequently to other teachers.

Rice (2003) made his contribution that teachers must possess sufficient knowledge in their area of teaching. Any teacher that does not possess the required

knowledge of subject matter in his area of teaching cannot be effective. Rice (2003) added that it is not difficult for students to perceive teachers' insufficient knowledge of subject matter in his teaching area. This leads to students' loss of respect for and confidence in the teacher. Consequently, it leads to learners' poor academic performance. Still on this, Ehindero and Ajibade (2000) showed that the average academic performance of students in five selected subjects correlate and depend significantly on students' perception of teachers' knowledge of subject matter. This result is consistent with previous findings of other scholars such as Akpan, Essien and Obot (2008) and Adediwura and Tayo (2007).

In another instance, Aboderin (2001) wrote that teaching is a profession and intending teachers should have mastery of the subject in which they specialize in. In line with this, Esu (2001) saw basic knowledge of related subject matter as a required condition for effective teaching. Thus she continued that effective teaching implies teacher's ingenuity, sound knowledge of the subject matter, professional commitment, imaginative and sound knowledge of the underlying psychology, the history, the sociology and philosophy of the subject matter.

Teacher Training and Teacher Competence

The teaching profession comprises one of the most important human resources in every country. This is so because the efficient human capital development depends partly on the quality and effectiveness of the teachers (BekićZlatić, 2010) and Okumbe1999).The quality and effectiveness of the teacher is among others a function of the talent and the professional training. Moraga (1983) and (Naoreen et al., 2011) observe that trained teachers yield better results in mathematics compared to the untrained teachers. The trained teachers confidently exhibit better understanding of the knowledge, principles and concepts in delivery of mathematical content.

According to Moraga(1983) training of teachers is one of the most important aspects of curriculum development and implementation in any education system. In this study, the training of teachers is considered from two perspectives i.e. a pre-service training and in-service training.

According to Kiige and Atina (2016), the Assistance for Development of Education in Africa (ADEA) states that the adequate pre-service skills training which is somewhat sufficient for providing orientation to the teacher into the profession is generally formed in the classroom. Other than the basic training teachers receive in colleges and universities, professional training and development is also very necessary in the teaching profession as a means of enhancing teacher competence and student performance (Bjekić, Zlatić and Čaprić, 2008).

Kiige and Atina (2016) explain that science education development especially at the secondary level is a prerequisite for industrial and technological development. In the past, great efforts have gone into ensuring qualified teachers and provision of equipment and materials, but in most cases science and mathematics teachers remain inadequate in most African countries. Even where they are adequate, quality of students' achievement in science and mathematics in particular is not always high (Kiige and Atina, 2016).

It must be highlighted and reechoed that earning an academic qualification such as a Bachelor of Science (B.Sc) or PhD in Biology Chemistry, Physics, Mathematics etc. does not automatically make one a teacher. The certificates make one a content expert (Nkpa, 1993) and something else, usually a Diploma in Education is needed to enhance pedagogical competence. This is the practice in other countries but unfortunately not the case in Cameroon especially in higher education. These are the considerations we must start to make if we are to make significant progress in developing the required science base; the person teaching matters.

At the secondary level however, Higher Teacher Training Colleges (ENS) exist (even though still lacking in specialized laboratories) to train teachers for public schools but the private, and confessional proprietors remain largely in the dark drawing their teachers from University graduates who are largely not "teachers". Gladly enough, in-service pedagogic training and mentoring is helping out even though the efforts remain inadequate.

Interest Construct and It's Dimensions

Renninger and Hidi, 2011) consider that "the decisive criterion of the interest construct which enables it to be clearly distinguished from several neighbouring motivational concepts (such as attitude and motivation) is its content specificity" (Krapp and Prenzel, 2011, p. 30). "One cannot simply have an interest: one must be interested in something" (Gardner, 1996 in Krapp, 2007). "The interest construct is conceptualized as a relational concept: an interest represents or describes a more or less enduring specific relationship between a person and an object in his or her life-space" (Krapp, 2007, p. 8).

The object of interest in the field of Science can be a specific subject (biology, physics, chemistry, etc.), a specific area or field of knowledge (the study of animals), a concrete operation or object (lab manipulations), an abstract scientific activity (formulating a scientific problem or question, or analyzing data), etc. (Häussler, 1987; Häussler and Hofmann, 2000; Krapp, 2007; Krapp and Prenzel, 2011). When discussing Science as an object of

interest, it is also important to distinguish the way Science is perceived in society (outside school) from the way it is taught and learned in school context. The focus of our research is the latter.

While some researchers have characterized interest as an 'affective variable' or stressed this particular aspect in their studies (Rennie and Punch, 1991; Steinkamp and Maehr, 1983), others believe in the importance of not simply equating it with 'enjoyment while learning' (Krapp and Prenzel, 2011). Interest is a multidimensional construct whose operational definition requires emotional, cognitive (knowledge) and related value [value attributed to the object of interest] dimensions (Hidi, 2006; Hidi and Renninger 2006; Hidi et al., 2004; Krapp, 2007; Krapp and Prenzel, 2011; Renninger and Hidi, 2002, 2011; Schiefele, 2009). Models such as the 'four-phase model' of interest development by Hidi and Renninger (2006) propose interdependency between these dimensions as interest grows and is maintained. "Hidi and Renninger suggested that for interest to develop, knowledge and value, in addition to affect, need to be present" (Ainleyet Ainley, 2011).

a) Emotional (affective) characteristics – According to the authors cited above, this "feeling-related" dimension refers to emotion and the sense of enjoyment provided by the actual or evoked presence of a given object, as well as the involvement in an interaction with it. For example, this can mean enjoying science, having fun with science or with its specific objects (contents, teaching methods, etc.). As Krapp (2007) recalls, "it has been proposed that emotional experiences are considered as related to the basic needs of competence, autonomy and social relatedness in order to characterize interest-specific emotional experiences" (p. 11).

b) Cognitive aspects –This dimension bears on object-related knowledge: what students know or think they know about it. Indeed, without knowledge, there is no interest. Students cannot be hoped to express interest in the inquiry process or in biology knowledge (such as photosynthesis), for example, without having some minimal knowledge of these objects. Moreover, interest in an object prompts a desire to find out more about it. Krapp (2007) noted that: A person who is interested in a certain subject area is not content with his or her current level of knowledge or abilities in that interest domain. Rather, there is a high readiness to acquire new information, to assume new knowledge and to enlarge the competencies related to this domain. But there is also a high readiness for activating interest-related competencies in situations that do not require new learning (p. 10).

c) Value-related characteristics – Ainley and Ainley (2011) "used data from the PISA international study of science achievement to suggest that value is a strong predictor of students' enjoyment of science and that enjoyment mediates the predictive effects of value in learning science" (Renninger and Hidi, 2011, p. 171). In our case, this is the value individuals attribute to the object of their interest (Science or its components).

Levels of interest

Numerous authors make a distinction between two levels of interest, which some consider to be two current directions of research in this area (e.g., Ainley et al., 2002; Hidi, 2001; Hidi and Harackiewicz, 2000; Hidi and Renninger, 2006; Krapp, 2007; Renninger and Hidi, 2011; Schiefele et al., 1992; Swarat et al., 2012): situational interest and individual (personal) interest.

a) Situational interest is characterized by its association with an external factor (a situation, a task, a context, etc.) to which an individual is exposed and in which the individual is involved in an interaction (Ainley et al., 2002; Hidi and Renninger, 2006). The situation may produce a positive feeling (for example, the joy of engaging in a scientific experiment) or a negative one (for example, disgust in observing and describing the parts of a scorpion) (Swarat et al., 2012). In the school context, this situation may involve, for example, specific knowledge to which students are exposed or the tasks in which they are involved (conducting experiments, listening to the teacher, reading textbooks, etc.).

According to Hidi (2001, 2006) "this psychological state involves focused attention, increased cognitive functioning, persistence, and affective involvement" (Krapp, 2007, p. 9).Another characteristic of this type of interest is that even if it is transitory, under some conditions it can provide the basis for longer situational interest (Krapp, 2007): "When situational interest is maintained over time, or when it occurs repeatedly in response to the same stimuli, does it possibly lead to long-term interest, increased knowledge, changes in values, and consistent positive feelings" (Swarat et al., 2012, p. 4).

In an extensive review, Hidi and Harackiewicz (2000) conclude that "situational interest can contribute to the development of long-lasting personal interest" (p. 155). In other words, certain conditions in the learning environment can do more than momentarily catch one's interest, they can also hold it (Hidi and Harackiewicz, 2000). When situational interest is sustained (held) by conditions in the learning environment, it may lead to intrinsic motivation and individual interest (Hidi and Harackiewicz, 2000).

b) Personal (individual) interest, a particular focus of this study, is characterized by the intrinsic desire to understand a specific topic that persists over time (relatively stable) (Krapp, 2007; Renninger and Hidi, 2011; Schraw and Lehman, 2001; Wade, 2001). It is a cognitive and affective quality that individuals carry with them from place to place. "The basis of personal interest appears to be pre-existing knowledge, personal experiences and emotions, high value" (Schraw and

Lehman, 2001, p. 28). It develops slowly over time and tends to be long lasting (Schraw and Lehman, 2001).

Over time, individual interest may be integrated into the person's value system and become one of its basic components. Therefore, it is suggested that people carry with them a set of individual interests, which influence how they interact with various objects. When people with certain individual interest encounter a situation that matches the particular interest, their individual interest is actualized —referred to as actualized individual interest by some researchers (Swarat et al., 2012). Individual interest is based on existing knowledge about and values concerning tasks, objects, or ideas and is the desire to be involved in activities related to these concepts (Swarat et al., 2012). This type of interest is personal, broad, and often long-lasting.

Hidi and Harackiewicz (2000) describe individual interest in greater detail, stating that it is "a relatively stable motivational orientation or personal disposition that develops over time in relation to a particular topic or domain and is associated with increased knowledge, value and positive feelings" (p. 152).

c) Predisposition or intention to act. Another important characteristic of individual interest is that it leads to "a relatively enduring preference for certain topics, subject areas, or activities" (Schiefele et al., 1992, p.152) or to an "enduring predisposition to attend to certain objects and events and to engage in certain activities, contents or objects" (Hidi and Renninger, 2006, p.113). This behaviour or predisposition "is associated with a psychological state of positive affect and persistence and tends to result in increased learning" (Ainley et al., 2002, p. 545).

The predisposition to act is understood here as a favourable response to a given object on a consistent basis. As regards the research on interest (Ainley and Ainley, 2011) we can predict that having a coherent body of science knowledge and understanding (knowledge), enjoying science (affect), and valuing science (value) will be predictive of the level of general interest in learning science (individual interest), which in turn will predict being currently engaged in science activities and having the intention to engage with science activities in the future (current and future engagements). In the context of our study, we consider that this predisposition to act can be examined at different levels, including a) the engagement in science classes and b) the intention to pursue science-related studies or careers. In-between having an interest in learning and sustaining it, is found an important variable, the teacher.

Statement of the problem

Teacher's primary role of transmission of knowledge and skills is never in dispute. Therefore a teacher would need to demonstrate efficiency in this primary role. Indeed teacher's academic background, training and professional competence is at stake here Ivowi (1986). There is deficiency and poor academic performance of students in science and this could be traced to lack of teachers' competence and learning resources in our classrooms (Nwosu, 2000). The Education System in Cameroon has a comprehensive science curriculum that prepares students for pursuing their studies in other fields at the University. The sciences provide a solid foundation for other fields such as medicine, engineering, agriculture among others. The development of manpower in the sciences, research has shown, is the surest bet for any country that seeks industrial development. It is however observed that students' attitudes towards these subjects is usually not the best with a vast majority of them abandoning the course as early as Form three; thereby making it seems as if science is for the gifted only.

Interest as a psychological construct is a key in academic achievement and skill development in the sciences especially given that some of its concepts are usually complex and abstract. Despite the numerous opportunities the Sciences offer, in the job market that should activate students' interest, it remains unclear as to why many students associate Science with some mystery and even those who choose to belong, do so in preference to some particular subjects judged to be less challenging. Furthermore, academic achievement in examinations organized by the GCE Board within the last decade in the sciences has witnessed a steady drop averaging about 42.5% (CGCEB, 2008-2018).This has attracted the attention of many education stakeholders including parents, teachers, the government and other external stakeholders funding education projects in the country.

Faced with this down trend and given the enormity of resources spent on the recruitment and retention of science teachers, and above all the cost of constructing, equipping and maintaining a Science Laboratory, the question on many lips now is "could teachers' competence be a significant factor?" Studies have been done to explain the factors underlying the reported poor achievement in the sciences and various correlates established. This study sought to assess the influence of teacher competence on students' interests in science in Secondary Schools in Fako Division.

Research Questions

To achieve the above objectives, the following research questions were posed:

- To what extent does teacher's mastery of subject matter affect students' interest in science?
- To what extent does teacher's training affect students' interest in science?

Table 1. Number of trained teachers sampled

School Type	N° of trained teachers	Percentage (%)
Public	13	40.63
Denominational	4	12.50
Lay Private	2	6.25
Total	**19**	**59.38**

Table 2. Distribution of teacher training certificates according to schools

School Type	Qualification				Total
	DIPES	B.Ed	M.Ed	B.Sc	
Public	10	2	00	00	12
Denominational	1	2	00	7	10
Lay Private	00	1	00	7	8
Total	11(34.4%)	5(21.8%)	00 (0%)	14(43.8%)	32

Table 3. Pearson Product Moment Correlation analysis of the relationship between teacher's mastery of subject matter and students' interest in science (N=341)

Variable	$\sum X$ $\sum Y$	$\sum X^2$ $\sum Y^2$	$\sum XY$	Γ_{xy}
Mastery of Subject Matter (X)	6412	124905	118513	0.224**
Students' Interest (Y)	6231	118083		

$p^*<0.05$; df=341; critical Γ_{xy} =0.113

Hypothesis

- There is no significant relationship between teacher's mastery of subject matter and students' interest in science.
- There is no significant relationship between teachers' training and students' interest in science.

RESEARCH METHODOLOGY

The descriptive survey research design was used in this study which allowed for rapid collection of data about an issue over a large area, community or population within a short time using questionnaires, observation techniques etc. This study targeted all Lower Sixth Science students and their teachers effectively enrolled in Public, Lay Private and Denominational secondary schools in Fako as at September 8th, 2016. About 3200 students and 120 teachers made up the target population of the study. Data was collected from a total of 19 randomly selected schools (thirteen public, two lay private and four denominational). A total of 373 respondents (341 students and 32 teachers) used. This sample was selected from the parent populations using the simple random sampling and the purposive sampling techniques. Two sets of questionnaires were constructed one for teachers (to measure their educational qualification and training) and the other for students to measure students' perception of different competency areas in their teachers' vis-à-vis their interest in science. A four point Likert Scale was used in constructing the instruments.

Procedure for Data Analysis

The data analysis was done descriptively and inferentially to establish the relationship between teacher competence and students' interest in science with the assistance of the SPSS. The Pearson Product Moment Correlation Analysis was used for the verification of hypotheses in view of establishing the link between these variables as the main statistical tool.

PRESENTATION OF FINDINGS

Hypothesis-by-Hypothesis presentation of Findings

Hypothesis one

There is no significant relationship between teacher's mastery of subject matter and students' interest in science. (Table 1 and 2)

The result of the analysis reveals that the calculated

Table 4. Pearson Product Moment Correlation analysis of the influence of teachers' training on students' interest in science (N=341)

Variables	$\sum X$ $\sum Y$	$\sum X^2$ $\sum Y^2$	$\sum XY$	Γ_{xy}
Teachers' training (X)	2621	43651	79111	0.214*
Students' interest in Science (Y)	4839	147160		

p*<0.05; df=341; critical Γ_{xy} =0.159

Γ_{xy} -value of 0.224 for mastery of subject matter is greater than the critical Γ_{xy} -value of 0.113 at .05 level of significance with 341 degrees of freedom. With the result of the analysis, the null hypothesis (H_0) was rejected and the alternative hypothesis retained. This result therefore means that there is a significant relationship between teacher's mastery of subject matter and students' interest in science in Fako division.

Since there is a significant relationship between mastery of subject matter and students' interest in science, a further exploration of the result showed that the Γ_{xy} =0.224 was positive and high. This indicates that the more teachers demonstrate a mastery of the subject matter to be taught, the more interested students will be in studying science.

Hypothesis two

There is no significant relationship between teachers' training and students' interest in science (Table 4).

The result of the analysis reveals that the calculated Γ_{xy} -value of 0.214 for teacher training is greater than the critical Γ_{xy} -value of 0.113 at .05 level of significance with 341 degrees of freedom. With the result of the analysis, the null hypothesis (H_0) was rejected and the alternative hypothesis retained. This result therefore means that there is a significant relationship between teacher's training and students' interest in science in Fako division. A further exploration of the result showed that the Γ_{xy} =0.214 was positive and high. This indicates that the more trained teachers of science are, the more interested students will be in studying science.

DISCUSSION OF FINDINGS

There is enough evidence to support the fact that teachers' competence influences students' interest in science as reported by findings in this study and significant others conducted by other researchers. These findings tied with past writings and findings of other authors, as demonstrated below:

- There is a significant relationship between teacher's mastery of subject matter and students' interest in science in Fako division.

This finding indicates that the more teachers demonstrate interested students will be in studying science.

The above findings are partly in line with the view of researchers such as Rena (2000) who observed that a good knowledge of the subject matter helps the teacher to teach the learners correctly and also helps the learner to learn correctly. This in turn leads to the achievement of set objectives and the consequent interest of the learners' to continue in the learning process. As highlighted above, teachers' level of knowledge on the subject matter has much influence on the process of achieving the lesson's objectives.

In line with this, Rice (2003) also asserts that teachers must possess sufficient knowledge in their area of teaching. Any teacher that does not possess the required knowledge of subject matter in his area of teaching cannot be effective. According to Tella (2008) it may lead to learners' loss of interest in studying. It also negatively influences the students' performance.

It can be established from the above that there is a high correlation between what teachers know and what they teach. However, teacher's competence in the subject goes beyond teacher's knowledge of subject matter. This must have been implied by Ehindero (1990) when he put forward that a teacher's performance is influenced by the level of his pedagogical knowledge as different from his knowledge of subject matter. It is to be noted that pedagogical knowledge are not exactly the same thing as knowledge of subject matter though they are nevertheless intimately connected. Teachers' mastery and use of pedagogical knowledge in the classroom and other factors come together to make up the important indicators of the depth of the teacher's competence in subject matter.

Furthermore, Aboderin (2001) wrote that teaching is a profession and intending teachers should have mastery of the subject in which they specialize in. In line with this, Esu (2001) saw basic knowledge of related subject matter as a required condition for effective teaching. Thus she continued that effective teaching implies teacher's ingenuity, sound knowledge of the subject matter, professional commitment, imaginative and sound knowledge of the underlying psychology, the history, the sociology and philosophy of the subject matter.

The findings above goes beyond these to articulate the importance of students' interest in the learning process among the learners in the study area. Teachers'

competence in subject matter must go beyond mere knowledge of the subject matter. The teachers' competence in subject matter should involve his skill to develop learning interest among the learners. This ability is usually for the most part catered for by teacher education programmes or training.

- There is a significant relationship between teacher's training and students' interests in science.

This indicates that the more trained teachers of science are, the more interested students will be in studying science.

The issue of non-qualified teachers, although progressively being tackled in our education system still remains a problem to be solved to enhance teachers competence in subject matter and students' interest in the teaching and learning process especially of science. Ugwoke (2012) notices a great need to secure a qualitative upgrading of level of teachers' subject matter competence of staff of teacher education.

In a related study, Din, Khan and Mahmood (2010) observed that the teachers teaching qualification impacts on his competence and the quality of students' produced. Teachers' qualifications impact in many ways on the technique, method and strategy of their subject matter delivery of and consequently on the learners' interest and performance. The teachers' qualifications impact on the teachers' competence to meet the needs of the learners and this is an important factor in sustaining the interest of learners in learning. Thus the quality of teacher contributes to learners' interest through the teachers' quality of subject matter input.

In addition, Poor facilities in our learning environment have factored much for poor interest and performance of learners in teacher education. The connection between the environment of teacher education and the subsequent performance of learners was alluded to by Gbadebo (2011) who in his study concluded that qualitative education may not be possible in a condition where the medium for desirable value and skill cannot be properly and effectively put across to learners. This is especially true in Cameroon where teacher training colleges conspicuously lack laboratories. In cases where they are present, the labs are poorly equipped. Clearly, teachers who are trained in such institutions may not be competent enough to produce the desired learning experiences for science students given the weight of the practical component in these subjects.

Gbadebo (2011) noted that negative economic factors in the developing world have negatively impacted on the society's ability to provide capacitating learning experiences to students including those of teacher education. The contemporary negative effects of poor resources and facilities on education especially teacher education cannot be over emphasized. Teacher education under an incapacitating environmental condition cannot develop in the trained teachers themselves the competence in subject matter that can develop in learners the necessary interest for learning.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations have been made especially relating to the learning of science in secondary schools:

- The curriculum for teacher education programmes should lay a lot of emphasis on the mastery of content to be taught in secondary schools.
- Teacher training institutions should possess at least the basic laboratory equipment that allow trainees adequate practice rather than graduating "half-baked" teachers who are unable to live up to the practical demands of the sciences.
- Teacher educators should ensure the development of effective pedagogical skills in would be teachers.
- Teacher Education should focus attention on learner interest as an important aspect of teacher competence.
- People with academic qualifications should mandatorily go through teacher education courses that will equip them with pedagogical skills before allowed to teach.

CONCLUSION

From the above, it is clear that teachers' competence is a significant factor in students' interest in science. Particular considerations were for teacher's mastery of subject matter to be taught and teacher's training. It must be said that teachers acquire mastery of subject matter through formal education while their ability to effectively teach blending with pedagogic content knowledge makes the competent teacher.

It should however be noted that subject matter mastery and pedagogic content knowledge is not all. Marzano (2007) speaks of students' rejection of science teachers whose subject matter knowledge and whose pedagogical content knowledge are sound and contemporary, but whose interactions with students are cold, distant, and rigid. Other factors of importance in the quality of teachers is the conditions of admission of students for training and significantly how the trainers were trained bearing in the general conducive of the learning environment. The interest of the learner in learning sciences is fundamental given its sometimes abstract nature; that is why the role of the teacher in motivating the learners – making sure that their interest are arose and sustained cannot be overemphasized.

REFERENCES

Aboderin AO (2001). *Planning for effective teaching.*In S.C.Uche&O.I.Enukoha (Eds).*Proffessional Skills For Effective Teaching*. Lagos: Rehoboth Favors.42-52.

Adediwura AA, Tayo B (2007). *Perception of teachers' knowledge, attitude and teaching skills as predictors of academic performance in Nigerian secondary schools*.Educational Research and Review.2 (7), 165-171.

Ainley M, Ainley J (2011).A cultural perspective on the structure of student interest in science. *Int. J. Sci. Edu. 33*(1), 51-71, DOI: 10.1080/09500693.2011.518640.

Ainley M, Hidi S, Berndorff D (2002). Interest, learning, and the psychological processes that mediate their relationship. *J. Educ. Psychol. 94*(3), 545-561, DOI: 10.1037//0022-0663.94.3.545.

Akpan OE, Essien EE, Obot MMI (2008). Teachers' level of mastery of subject matter and students' academic achievement in Social Studies in Cross River State.*West Afr. J. Educ. Res. 11*,(1&2)11-17.

Alsop S, Bencze L, Pedretti E (2005). *Analysing exemplary science teaching*. Buckingham, UK: Open University Press.

Amunga JK, Musasia AM (2011). Disparities in mathematics achievement among secondary schools. *Problems of Education in the 21st Century*, Vol. 28, pp. 8-11.

Barmby P, Kind P, Jones K (2008). Examining changing attitudes in secondary school science. *Int. J. Sci. Edu. 30*(8), 1075–1093. doi:10.1080/09500690701344966

Bekić D, Zlatić L (2010).*Teacher education and training system in Serbia*, in: Karras, K. G. &Wolhuter, C. C. (eds.). International Handbook on Teacher Education World Wide: Training, Issues and Challenges for Teachers Profession, Athens: Atropos Edition.

Bjekić D (2000). Teaching effectiveness and teachers' empathy, Psihologija, 33 (3-4), 707-724, http://scindeksclanci.nb.rs/data/ pdf/00485705/2000/0048-57050003499B.pdf

Ehindero OJ, Ajibade YA (2000). What our student say about how we teach. Ife *Journal of Educational Studies.7*(1), 1-9.

Esu AEO (2001) "Competence for effective teaching". In S. C. Uche and O. I. Enukoha (Eds).*Professional Skills for Effective Teaching*.Lagos: Rehoboth Favours.

Freeman TM, Anderman LH, Jensen JM (2007). Sense of belonging in college freshmen at the classroom and campus levels. *J. Exp. Edu. 75*(3), 203–212. doi:10.3200/JEXE.75.3.203-220

Gbadebo S (2001). Poverty: An analysis of its effects on the teaching-learning process variables in Oyo state. *Int. J. Res. Edu.* The Development University consorting. Vol. 8; No. 1.54 – 66.

Häussler P (1987). Measuring students' interest in physics: Design and results of a crosssectional study in the Federal Republic of Germany. *International Journal of Science Education, 9,* 79–92.

Haussler P, Hoffmann L (2000). A curricular frame for physics education: Development, comparison with students' interests, and impact on students' achievement and self-concept. *Science Education 84*(6), 689-705.

Hidi S, Harackiewicz J (2000). Motivating the academically unmotivated: A critical issue for the 21st century. Revi*ew of Educational Research, 70*, 151–179.

Hidi S, Renninger A, Krapp A (2004). *Interest, a motivational variable that combines affective and cognitive functioning*. In DY. Dai, RJ Sternberg (Eds.), Motivation, emotion, and cognition: Integrative perspectives on intellectual functioning and development (pp. 89–115). Mahwah, NJ: Lawrence Erlbaum Associates.

Kajuru YK, Ibrahim MO, Olaleye OO (2015). Effects of Teachers' Qualification and Competency on Performance in Further Mathematics Among Senior Secondary School Students in Kaduna State, Nigeria. *Int. J. Edu. Res. Info. Sci. vol. 2* (4), pp. 93-97.

Kiige MJ, Atina JO (2016). The effectiveness of smasse teacher training programme on kcse performance in Mathematics and Chemistry Subjects in Kikuyu District, Kenya. *J. Edu. Practice, Vol. 7*(6), 2016.

Krapp A (2007). An educational-psychological conceptualisation on interest. *Int. Edu. J. Educational and Vocational Guidance, 7*, 5-21.

Krapp A, Prenzel M (2011). Research on interest in science: Theories, methods, and findings. *Int. J. Sci. Edu. 33*(1), 27-50, DOI: 10.1080/09500693.2011.518645.

Maharaj-Sharma R (2007). Students' attitudes to science in urban and rural schools in Trinidad and Tobago. *Caribbean Curriculum*, *14*, 31–47.

Marzano RJ (2007). *The art and science of teaching: A comprehensive framework for effective instruction*. Alexandria, VA: ASCD.

Moraga GY (1983). *Evaluation of 1982 in-service of secondary school teacher education programmes in Ethiopia*. Department of teacher education, Ministry of Education, Ethiopia.

Naoreen B, Aslam S, Nausheen R, Arshad M (2011). Impact of In-Service Teacher Training on Students' Learning Achievement in Mathematics. *Int. Conference on Social Science and Humanity IPEDR vol. 5 (2). pp. 168-174*.

Nasr AR, Soltani A (2011). Attitude towards biology and its effect on students' achievement. *Int. J. Biol. 3*(4), 100–104.

Ochieng KR, Kiplagat P, Nyongesa S (2016). Influence of teacher competence on mathematics performance in KCSE Examinations among Public Schools in NyatikeSubcounty, Migori County Kenya. *Int. J. Sec. Edu.* 4(5), pp. 44-57.doi: 10.11648/j.ijsedu.20160405.11

Odhiambo MN, Toili WW (2013). The Implications of the Use of Electrical Calculators on Students' Performance in Mathematics in Seondary Schools in Kenya. *Afr. J. Edu. Technol. Vol. 3* (1), pp. 10-17.

Odumbe GA, Simatwa EMW, Ayodo TMO (2015). Factors Influencing Student Academic Performance in Day-Secondary Schools in Kenya.A case Study of MigoriSub County. *Greener J. Edu. Res. Vol. 5* (3): 078-097, http://doi.org/10.15580/GJER.2015.3.071815099.

Okumbe JA (1999). *Education Management: theory and practice*. Nairobi: University Press.

Osborne J, Dillon J (2008). *Science education in Europe: Critical reflections* (A report to the Nuffield Foundation). London, UK: Nuffield Foundation. Retrieved from: www.nuffieldfoundation.org/sites/default/files/ Sci_Ed_in_Europe_Report_Final.pdf.

Osborne J, Simon S, Collins S (2003). Attitudes towards science: A review of the literature and its implications. *Int. J. Sci Edu. 25*(9), 1049–1079, DOI: 10.1002/tea.10105.

Parkinson J (2004). *Improving secondary science teaching*. London, UK: Routledge.

Passos AF (2009). A Comparative Analysis of Teacher Competence and Its Effect on Pupil Performance in Upper Primary Schools in Mozambique and other SACMEQ Countries. University of Pretoria. Unpublished PHD Thesis, pp. 38-45.

Rena (2000). *Who will teach: A Case study of teacher education reform*. California: Caddo Gap Press.

Rennie LJ, Punch KF (1991). The relationship between affect and achievement in science. *J. Res. Sci. Teaching, 28*(2), 193–209.

Renninger KA, Hidi S (2002). Student interest and achievement: Developmental issues Renninger, K. A. &Hidi, S. (2011). Revisiting the conceptualization, measurement, and generation of interest. *Educational Psychologist, 46*(3), 168-184, DOI: 10.1080/00461520.2011.587723

Rice JK (2003). *Teacher quality: Understanding the effectiveness of teacher attributes.* Washington, DC: Economic Policy Institute.

Rice, J. K. (2010). The Impact of Teacher Experience: Examining the Evidence and Policy Implications. *National Center for Analysis of Longitudinal Data in EducationResearch*.Brief 11. pp. 1-8.

Schiefele U (2009). *Situational and individual interest*.In K. R. Wentzel., & A. Wigfield (Eds.), Handbook of motivation at school. Mahwah, NJ: Erlbaum.

Steinkamp MW, Maehr ML (1983). *Affect, ability, and science achievement: A synthesis of correlational research*. Review of Educational Research, 53, 369–396.

Swarat S, Ortony A, Revelle W (2012). Activity matters: Understanding student interest in school science. *J. Res. Sci. Teaching, 49*(4),515-537, DOI: 10.1002/tea.21010.

Tambo (2012).*Principles and Methods of Teaching*. (2nd Edition), Limbe: ANUCAM.

Tchombe TM, Nsamenang AB (2011). *Handbook of African educational theories and practices: A generative teacher education curriculum.* Bamenda, HDRC Publications.Pp 185-187

Thompson GL, Warren SR, Foy T, Dickerson C (2008). What makes a teacher outstanding? A contrast of teachers' and African American high school students' perspectives. *J. Urban Learning, Teaching, and Research*, *4*, 122–134.

Tobin K, Fraser BJ (1990). What does it mean to be an exemplary science teacher? *Journal of Research in Science Teaching*, *27*(1), 3–25. doi:10.1002/ tea.3660270103

Trinder JC (2008). *Competency standards - a measure of the quality of a workforce*. The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences. 37(B6a), pp. 165-168.

Ugwoke (2012). "The Need for IT skills Acquisition and Staff Retraining in Nigeria Universities". *Int. J. Res. Advanc. Edu. Method, Vol. 9*, 1001, 6- 9.

Umar-ud-Din Khan KM, Mahmood S (2010). *Effect of Teachers' Academic Qualification On Students' L2 Performance at Secondary Level. Language In India*. 10, 235-245.

Wade SE (2001). Research on importance and interest: Implications for curriculum development and future research. *Educational Psychology Review, 13*, 243-261.

Wilson H, Mant J (2011). What makes an exemplary teacher of science? The pupils' perspective. *School Science Review*, *93*(342), 121–125.

Zuzovsky R (2003). Teachers' Qualifications and their Impact on Student Achievement: Findings from TIMSS 2003 data for Israel. *Center for Science and Technology Education.* Tel Aviv University, Tel Aviv, Israel. Pp. 37-62.