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INTEGRATING ICT IN THE PEDAGOGICAL SKILLS OF TEACHERS IN SOME BASIC SCHOOLS IN THE GA SOUTH DISTRICT IN THE GREATER-ACCRA REGION OF GHANA

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Abstract- This study aims at integrating technology based on the conceptual change approach in the pedagogical skills of teachers in some Basic Schools (Primary and Junior High Schools) in the Ga South District of the Grater Accra Region, Ghana. The study site was Odorgonno Senior High School with a population of 40 teachers/participants selected from some Basic Schools within the Ga South District. Questionnaires, interviews and observations were used to solicit information from the sampled population. Several graphical charts were used to analyze the collected data. Teachers can now use internet facilities to source for teaching and learning materials (TLMs). The participants have gained enough confidence and satisfaction in the use of computers, and even the study has encouraged some of them to pursue further studies in ICT.
Keywords: Integration Technology, Information and Communication Technology, Pedagogical Skills

Introduction

Education in Ghana had undergone a lot of transformations over the years, from spreading the gospel to creating an elite group to run the colony. The main goal of education in the colonial era was to merge civilization with evangelization, and educating mulatto children the colonial merchants had with their indigenous wives. Besides reading, writing and arithmetic, workshops were organized for students to acquire skills in carpentry, masonry, blacksmithing, shoemaking and sewing were taught, as well as practical agriculture.

A plethora of educational reforms ever since had taken place, and now Ghana aims at reaching the middle-income status by the year 2020. For this purpose, she has developed an action plan known as Vision 2020. The basic objectives of the Vision 2020 document are to: reduce poverty, increase employment opportunities and average incomes, and to reduce inequities in order to improve the general welfare and the material well-being of all Ghanaians.

The idea of integrating ICT into teaching and learning (Integration Literacy) is another attempt by the Ministry of Education to ensure that teachers also take up the mantle and adjust themselves to the technological age.

Therefore, access to Information Technology (IT) is essential to any institution that aims at providing students with educational services of the highest quality. The pursuit and achievement of the mission of 2007 educational reform requires that the privilege of using IT resources be made available to the entire educational institutions.

Information and communication Technologies (ICTs) have become common entities in all aspects of life.

Across the past twenty years, the use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavour within business and governance. Within education, ICT has begun to have a presence but the impact has not been as extensive as in other fields. Education is a very socially oriented activity and quality education has traditionally been associated with teachers having high degrees of personally contact with learners.

The use of ICT in education lends itself to more student-centered learning settings and often this creates some tensions for some teachers and student. But with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century. If one was to compare such fields as medicine, tourism, travel business, law, banking, engineering and architecture, the impact of ICT across the past two or three decades has been enormous. The way these fields operate today is vastly different from the ways they operated in the past. According to Abdul-Wahed & Al-Awa (2006), ICT policy in Higher Education at Syria reveals that the use of ICT in Teaching and learning environment can:

1. Provide high quality study plan, curricular and academic activities
2. Enhance institutional and individual capacities
3. Provide enabling structure for course and research
4. Provide scientific research environment.

Another way in which emerging ICTs are impacting on the content of education curricula stems from the ways in which ICTs are dominating so much of contemporary life

and work. Already, there has emerged a need for educational institutions to ensure that graduates are able to display appropriate levels of information literacy, "the capacity to identify issue, locate and evaluate relevant information in order to solve a problem arising from it" (McCausland *et al*.,, 1999). The drive to promote such developments stems from general moves among institutions to ensure their graduates demonstrate not only skills and knowledge in their subject domains but also general attributes and generic skills. Traditionally, generic skills have involved such capabilities as ability to reason formally, to solve problems, to communicate effectively, to be able to negotiate outcomes, to manage time, project management, and collaboration and teamwork skills. The growing use of ICTs as tools of every day life have seen the pool of generic skills expanded in recent years to include information literacy, and it is highly probable that future developments and technology applications will see this set of skills growing even more.

Just as technology is influencing and supporting what is being learned in schools and universities, so is it supporting changes to the way students are learning. Moves from content-centered curricula to competency-based curricula are associated with moves away from teacher-centered forms of delivery to student-centered forms. Through technology-facilitate approaches, contemporary learning settings now encourage students to take responsibility for their own learning.

The growing use of ICT as an instructional medium is changing and will likely continue to change many of the strategies employed by both teachers and students in the learning process: For example, an increased use of the Web as information source allows internet users to choose the experts from who they will learn.

The use of ICT in educational settings, by itself acts as a catalyst for change in this domain. ICTs by their very nature are tools that encourage and support independent learning. Students using ICTs for learning purposes become immersed in the process of learning and as more and students use computers as information sources and cognitive tools (Jonassen and Reeves, 1996), the influence technology in supporting how students learn will continue to increase.

To help teachers properly complete the "learning cycle" of computer-related professional development, training must be ongoing and systematic (Kinnaman, 1990). In a study examining what hinders or promotes successful integration of technology into the middle-school curriculum, Persky (1990) noted that using technology is not easy and that learning how to effectively use technology in the context of the classroom does not happen overnight. The need to allot time for continual learning is echoed in studies outside of education, which suggest that providing workers with high technology on the job ultimately fails if employees do not receive adequate training and continuing, on-the-job support (Moursund, 1992).

Further, this need for continuing support means teacher training must be ongoing and not limited to "one-shot" sessions (Shelton & Jones, 1996). Harvey and Purnell (1995) stated that teachers want sustained staff development rather than short-term training and development programs in technology.

The technological training must have an instructional focus that guides teachers to think first about their curriculum and then helps them address how to integrate technology into the curriculum (Guhlin, 1996; Persky, 1990).

Teacher training often isolates technology as a separate discipline and focuses on training for specific computer applications, such as word processing (Persky, 1990; Shelton & Jones, 1996). Focusing on this skill development, however, is problematic since it offers teachers little opportunity to transfer their learning into their classrooms (Shelton & Jones, 1996).

Modern staff development must do more than simply help teachers embrace technology; it must also anticipate the classroom change that will accompany its widespread use (Guhlin, 1996; Kinnaman, 1990; Persky, 1990; Stager, 1995). This notion of technology as a separate and an isolated entity needs to be significantly altered so that teachers understand how technology can support educational objectives (Boe, 1989).

If educators are going to be convinced to change their practice by integrating technology into their teaching, they must see the relevance of technology to what they do in the classroom (Shelton & Jones, 1996).

The model of staff development for technology must put the teacher/learner at the center of the learning experience and provide a meaningful context for learning (Stager, 1995). Teachers need instruction that engages them and forces them to reflect on the benefits and limitations of teaching with technology (Persky, 1990; Shelton & Jones, 1996).

When teachers engage with others in ongoing reflection about what they have learned about the instructional use of technology, they are more likely to critically evaluate their own pedagogical practice and redesign their instruction.

If technology is to be used by students, then teachers must possess the confidence, understanding and skills to effectively incorporate technology into their teaching practices. This will only occur by providing adequate training and development for teachers.

We strongly believe that if teachers are well trained on how to use integration technology, they can construct knowledge in a more meaningful way with the involvement of their students through discussion, group work and learning by doing without harboring misconceptions but rather exposing misconceptions and finding remedy to them. The computer aided instruction therefore takes into accounts all the good aspects of the various learning theories, especially, the constructivism.

Mereku and Akomolefe (1999) pointed out that computers can serve as a resource in the three major areas which students in teacher education programme should know about. The areas are administration, teaching with computers and computer education. They went on to say that the student-teacher should be

exposed to the various forms of task the computer could be used to perform.

Forcier (1999), in his book, "The Computer as an Educational tool" was of the opinion that computer technology should be a means to an end, not to itself. The computer should empower the user to solve problems effectively and efficiently. He gave the reasons why computer studies must be introduce into the school as.

1. To help teachers and students to become proficient in computer application about solving everyday problem.
2. To encourage both students and teacher to integrate technology into their professional, academic and personal lives in useful meaningful ways.
3. The Science curriculum for Basic Schools states that learners should be exposed to situations that challenge them to be curious and attempts to solve problems. Teaching methods like demonstrations and inquiry techniques of learning are therefore needed by both the learner and the teacher. Concept formation should be the focus of teacher education programs instead of teacher training Certificate. Through reflective practices, teachers can be empowered to study and execute improvements in content and pedagogical practices (Ellis, 2002).

The main purpose of this research is looking at the misconceptions some basic school teachers have on the use of ICT in facilitating teaching and learning of science. This study therefore aims at investigating the effect of the use of Computer as an aid on the conceptual change approach on the pedagogical skills of teachers in some Basic Schools (Primary and Junior High Schools) in the Ga South District of the Grater Accra Region, Ghana.

Method

The study site was Odorgonno Senior High School with a population of teachers selected from the Basic Schools within the Ga South District of which 52% were from Primary Schools whiles the remaining 48% came from the Junior High Schools. Odorgonno Senior High is located at the Ga South Municipality and very close to the Ga South District Education office. The School is a Model school with a well resourced Science and Computer Laboratory which actually facilitated the effectiveness of the intervention strategies.

A sample size of forty (40) teachers was used for the study, and was made up of the following composition: twenty percent (20%) from the lower primary, thirty-two percent (32%) upper primary and the remaining forty-eight percent (48%) also from the Junior High Schools.

The actual composition of the sample was made up of;

a. Two teachers each, from primary one and two, and four teachers from primary three.
b. Three set of teachers each from primary four and five, and nine from primary six
c. Nineteen teachers were selected from JHS 1, 2 and 3 in the ratio of 9:6:4.

This study aims at infusing integration technology in the pedagogical skills of basic school science teachers as they participate in twelve carefully designed instructional activities that try to assist them on how they can effectively employ Information and Communication technology in teaching and learning of science.

An interview conducted in about two months before the commencement of this research revealed that some basic school teachers indeed had misconceptions about the use of ICT in facilitating teaching and learning of science. The search revealed that ICT through conceptual change approach is a possible instructional strategy needed to equip Basic School Science Teachers with the pre-requisite skills that will enhance their pedagogical skills.

Teachers from Science and ICT department of Odorgonno Senior High were engaged to provide assistance. In addition, a resource person from Ga South District Science Coordinating sector was there to offer assistance.

Questionnaires, interviews and observations were used to solicit information from the sampled population.

Several graphical charts were used to analyze the collected data.

Results

The results of the findings have been provided below:

Item 1

Item one (1) gives category of teachers used for this study. This has been presented in a graphical form in Fig. 1.

Item 2

Item two (2) was applied to identify the study participants' areas of subject specialization in their education career, and this has been expressed in Fig. 2.

Out of the sample population, teachers who studied education at the University level were 36%. Although 20% of the teachers went through tertiary education, they never studied education(they were not professional teachers). The teachers who went to training college(College of Education) constituted 32% whiles the remaining 20% were Senior High School graduates who have been employed to teach (Fig. 1).

The illustration in fig.2 indicates respondents' areas of subject specialization. Twenty-six (26%) percent of the teachers studied Science as their major course of study while 13% majored in Agriculture. Teachers who studied Mathematics and Home Economics were both 22% each. Teachers who majored in Visual Arts, Literature and Geography were 4%, 9% and 4% respectively.

Item 3

Item three (3) sought respondents' views on the difficulty nature of teaching science. Three categories of the difficulty nature of science teaching were identified by the participants (Fig. 3).

Item 4

This item also sought to identify whether teachers' or participants' uses teaching and learning materials (TLMs) and the sources they get these TLMs in teaching science (Fig. 4).

In all, twenty-eight (28%) percent of the participants confirmed that science teaching is challenging whiles twelfth (12%) percent said science teaching is difficult. The remaining sixty (60%) percent of the sampled population said science teaching is interesting (Fig. 3).

According to Fig. 4, teachers have diverse means of obtaining teaching and learning materials when it comes to the teaching of science. Eight percent of the population indicated they never used TLMs in teaching whiles the remaining eighty-two indicated they had been using the TLMs but indicated different sources through which they get them. Out of the Ninety-two (92%) percent, sixty-four (64%) percent indicated they provide their own TLMs and twenty-four (24%) percent also indicated they obtained them from the school resource centre. The rest consistituting four (4%) percent indicated that they obtain them from their students.

Item 5

This item looks at the level of teachers' knowledge in Information and Communication Technology (ICT) (Fig. 5).

Item 6

It assesses the percentage of participants having ICT knowledge before the introduction of the intervention (Fig. 6).

Those who said they used computer to access their mails, play music and watch movies, prepare notes and type letters were 36%, 18%, 5% and 15% respectively. A number of teachers representing 23% of the population said, they did not know how to use computer (Fig. 5).

A pre-interventional analysis on teachers' knowledge about information and communication technology (ICT) (Fig. 6) shows that 46.7% indicated their knowledge about the technology whereas 53.3% said they did not have any knowledge about the technology before the introduction of the intervention strategies.

Item 7

The item looks at the ICT knowledge gained by the teachers or participants after the introduction of the intervention (Fig. 7).

Fig.7 expresses the knowledge that was obtained by the teachers after the interventional strategies on the use of integration technology were introduced. Those who indicated that they have acquired knowledge on introduction to computer studies were 50% and 17% said they can now use computer on their own. Again, out of the sampled population, 17% said they have upgraded their knowledge on the use of computer while 16% confirmed their ability to use computer to teach science and also instruct their students on what to do.

Teachers' level of satisfaction on the implementation of the interventional strategies was assessed as shown in Fig. 8. Forty (40%) per cent each indicated they were highly satisfied and satisfied respectively. However, 20% indicated they were not satisfied with the implementation of the interventional strategies (Fig. 8).

Discussion

Even though Teachers have a very significant role in the realization of the correct educational concepts, the modern educational approaches put much emphasize on the student instead. These modern approaches require **st**udents to be more active in the classroom and participate at all levels (Demirel, 2005).

In support of Mereku and Akomolefe (1999) statement that computers can serve as a major area of resources for students in teacher education programme. The use of integration technology was found useful in the study, since teachers could obtain their TLMs from the internet (Fig. 5) without thinking of improvisation or buying them from the market. Again, since the 2007 educational reform emphasized integration technology in all the subjects, teachers who had little or no knowledge in ICT were motivated to take up the mantle and improve their skills in ICT.

The teachers or participants knowledge in ICT was not encouraging (Fig.6) but after the introduction of the integration technology, it raised the moral of the participants because they gained enough knowledge and their level of satisfaction were boosted as captured under figures 7 and 8. This actually buttressed the reasons proposed by Forcier (1999).

Acknowledgement

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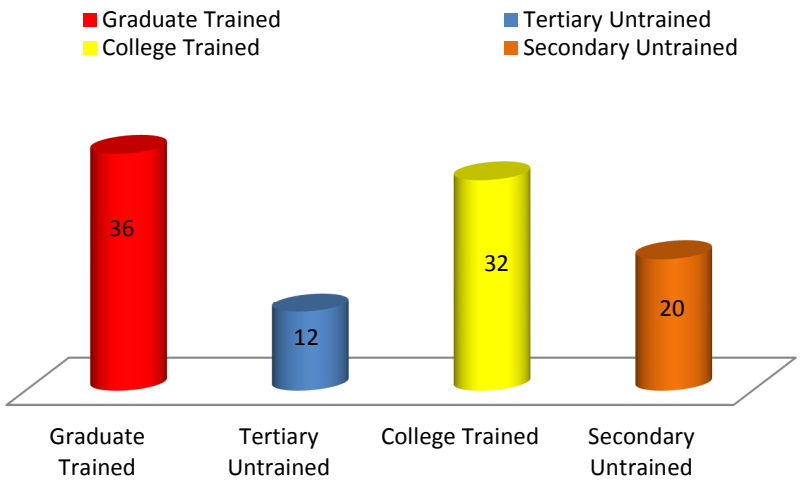

Fig. 1: The category of teachers used for the study.

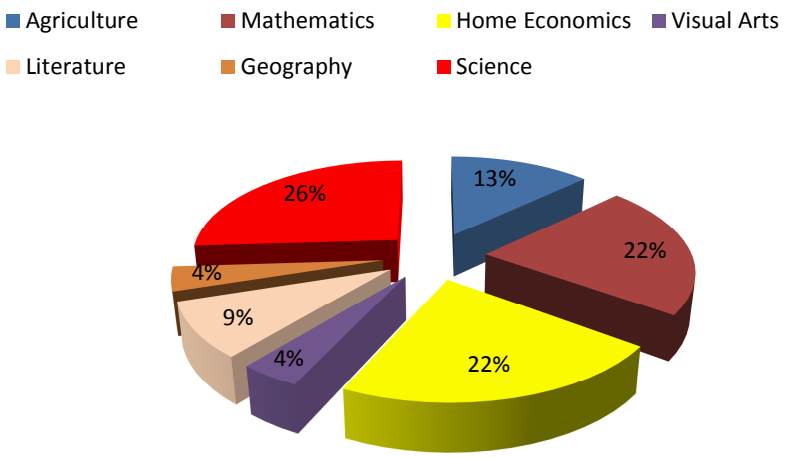

Fig. 2: Teachers' areas of subject specialization

Fig. 1 shows that fifty-two percent of the teachers were from the primary schools, and this comprise of twenty percent lower primary teachers and thirty-two percent upper primary teachers. The remaining forty-eight were teachers from Junior High schools.

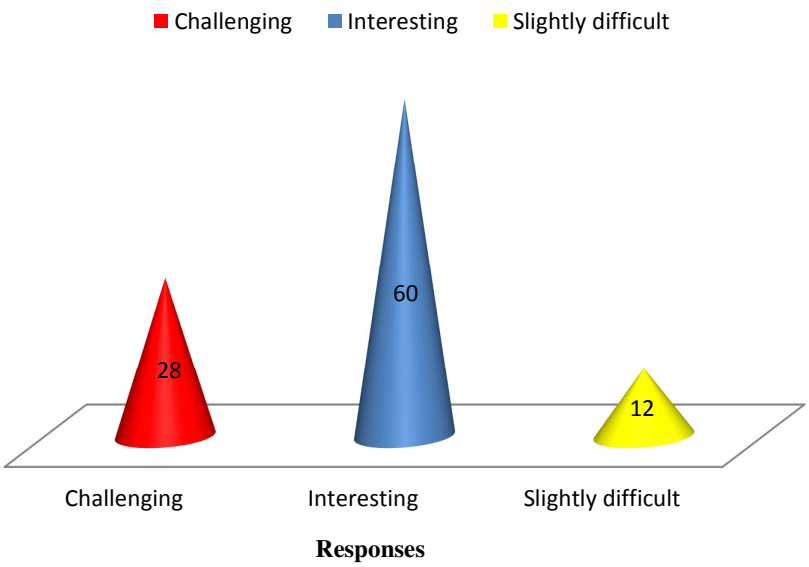

Fig.3: Views of participants on science teaching

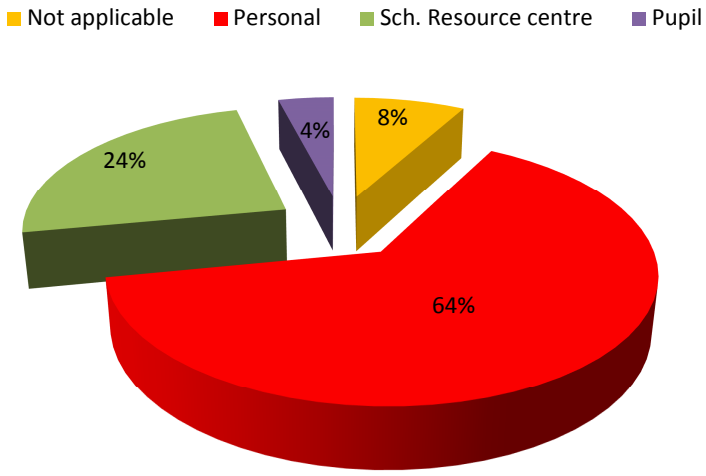

Fig. 4: Teachers' sources of teaching and learning materials.

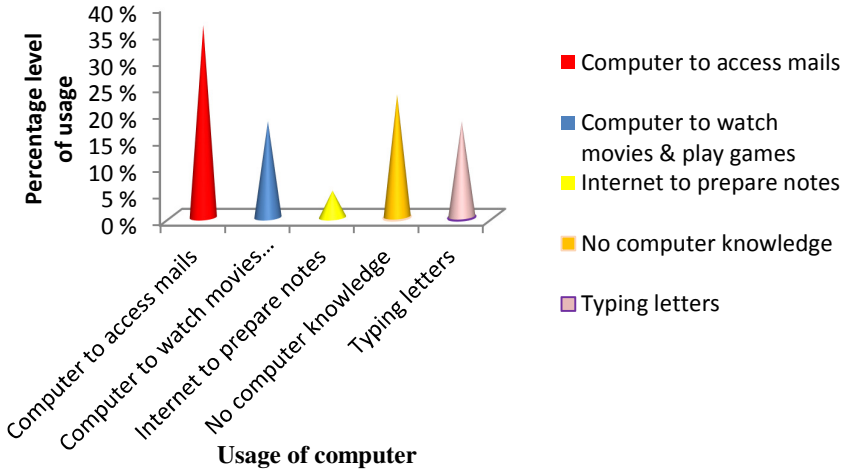

Fig. 5: Teachers' level of ICT usage

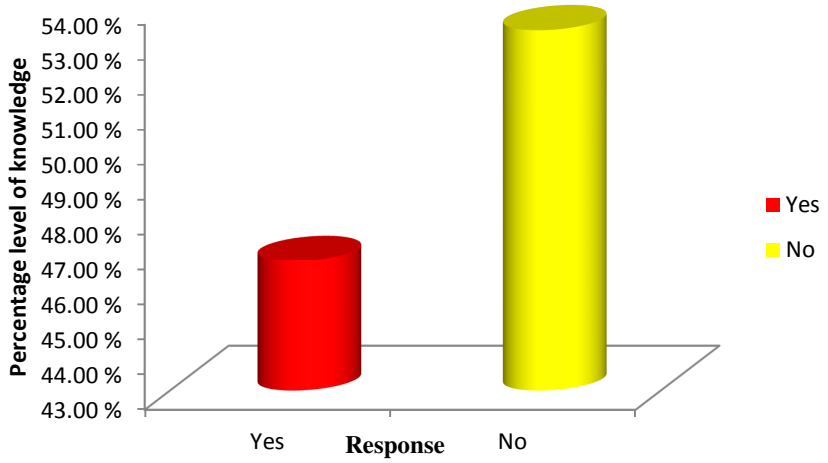

Fig.6: Teachers' ICT knowledge before intervention

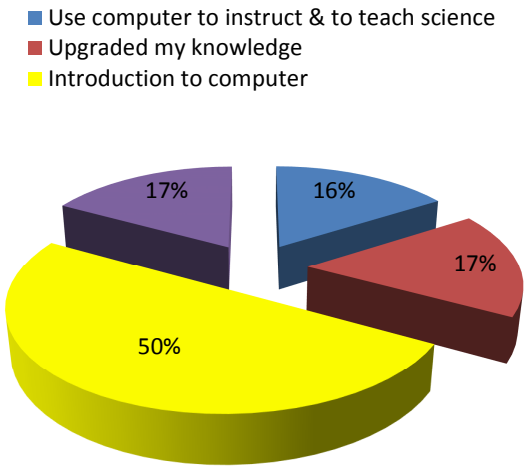

Fig. 7: ICT knowledge gained after intervention introduction

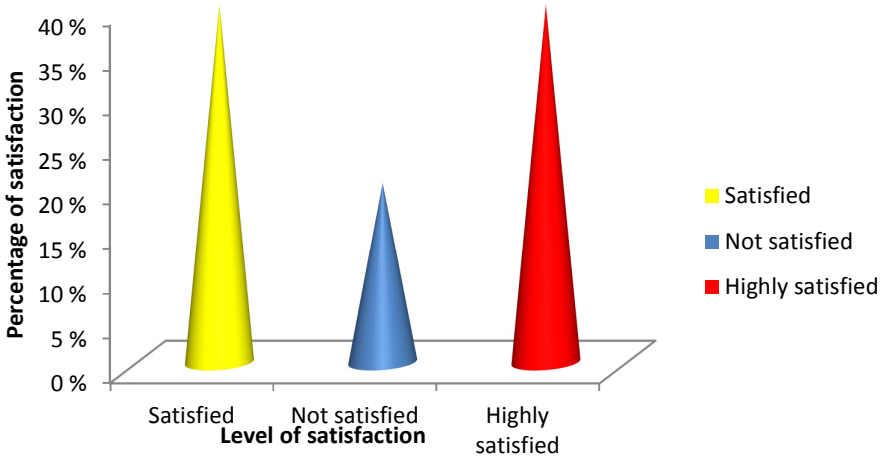

Fig. 8: Teachers' level of satisfaction after the implementation.