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INNOVATIVE INSTRUCTIONAL STRATEGIES IN TEACHING AND LEARNING PROCESS (ICT IN FOCUS)

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Abstract

Innovative Instructional Strategies are teaching systems that are basically aimed at improving the quality of teaching and learning in schools, particularly in the classroom setting. They are, in the main based on the psychological principle of operant conditioning which are to reinforce school performance and provide the right answers to questions: They are structured in a way that the students (learners) are given the opportunity to control learning processes on their own, and therefore, take full control of the environment. However, the strategies alone cannot bring about the desired result without using the media, or the ICT facilities. This paper is therefore, rationalizes the imperative of ICT in enhancing the effectiveness of the teaching strategies.

Introduction

Many teaching strategies have been adopted to enhance the achievement of different educational goals or curriculum objectives. Teachers are expected to comply strictly with the "modus operandi" of these strategies or methods in order to bring about desirable teaching and learning outcomes (Fajenyo, 2003). Yet, teachers rely far more on the teaching styles or methods they have experienced as learners than on the new strategies that have been uniquely endorsed as very effective in facilitating teaching and

learning. In fact, lecture-based teaching is common in primary schools, colleges and universities. Teaching should change more systematically to emphasize central ideas and underlying themes that help student, including the prospective teachers, to apply scientific principles in solving real problems in education (Ofegbu, 2007).

The role of teacher is therefore, imperative in bringing about effective instruction. He must not only have flexibility built into his total professional and academic make-up but should be helped through regular in-service training to keep fully abreast of the technique, skills and research in his field (Alaba,2008). Effective teaching is a prerequisite for building the intellectual base of the students, and enhancing a good level of confidence in them and in the teachers too. To ensure this, the technique the teacher adopts matters. It must be a technique or teaching method that inspires the student to learn, that produces highly motivated and creative minds, that improves instruction in schools, that enables the teacher to teach well, and that strongly conveys a broad vision of scientific, literary and intellectual soundness.

According to Akinloye (2008), "any teaching strategy that does not provide regular feedback to students on how well they were coping, or gives learners the opportunity to collaborate and critically review their own work, or enable teachers to track students progress and achievements and know the areas they needed to improve, will remain futile in achieving its desired objectives of enhancing learning".

For a learning technique to be effective therefore, the teacher must have detailed knowledge of the subject being taught to help learner; must ensure that the objectives to be achieved must be made clear so that student will not be confused about what they ought to be doing; must provide greater opportunity for independent learning and creative thinking; and provide grounds for adequate questioning with unlimited challenges.

It is imperative to note that there have been innovations in teaching strategies for schools globally. These innovations are mainly based on the application of technology in education (Ukadike, 2000). The application of technology is broad-based. New training have begun to enable teachers integrate new information and communication technologies into their teaching programmes. Presently, initiatives have been taken to create an environment which facilitates innovative ways of using new ICT facilities

for expanding teaching and learning; and more importantly, adapting them to the teaching methods persistently used by teachers in classroom.

This is the basis for innovative instructional strategies by educational planners and researchers.

In this paper, the commonly used teaching strategies are examined; the imperatives of the ICTs to the enrichment of the methods are discussed and recommendations for effective utilization of ICT for instruction are made

Conceptual Definitions

Many initiatives and programmes have been introduced by educational planners, researchers and administrators to address the problems confronting education, teaching and learning. The aim is to "stimulate change and create new learning environment that addresses localized and specific needs of learners in different places and settings (Shrestha, 2008). The challenges has however, been persistently undermined by problems related to access to ICT facilities, finance; shortage of infrastructures, equipment and teaching materials and of course, low morale of teachers orchestrated often by poor remunerations. However, the gravity of the complex challenges has exacerbated a greater commitment in ensuring that the innovative instructional strategies are fully adopted by teachers to enhance teaching and learning.

Innovative instructional strategy is a novel approach to teaching and learning which enables the learner to operate at the interface between curriculum and new technology. This is imperative because new technologies such as computer and communication satellites open up new vistas for transmitting educational and learning programmes; and for them to be effective, curriculum and the strategies will have to adopt these new technologies. New instructional strategy is a learning package that is germane to the realization to the goals of effective teaching and learning.

On a more pertinent note, it is a strategy that enables the learner to access resources outside their immediate environment through the electronic means or the new communication technology. Innovative strategies are basically technologically-based and gives teaching and learning a more robust effect (Ukadike, 2009). Akingbade 2004 stated that the innovative strategies improve individual choices of learning patterns and provide the

basis for a comprehensive and comparative assessment of self-skill and performance on a given educational assignment or task.

Abdullahi (2003) observed that the intrinsic value of the new strategies include the capacity to add meaning and values to what is learned; make learning more interesting and simple, discourage rote learning and enable the individual to achieve a good level of freedom that is necessary to enhance the achievement of rudimentary levels of knowledge acquisition, and which serves as a functional key to greater educational development. Indeed, the new strategies are considered to be effective if they enhance the learners capabilities for self study and stimulate his interest in learning.

Teaching Methods

Teaching methods are suigeneric to the attainment of academic excellence. They are basically geared towards ensuring that learners learn well, and understand the logics inherent in what is being taught them (Okeke, 2003:64). Effective teaching method is expected to be rooted in the psychological domain of the learners, and anchored on the need to fully develop the potentials of the learners to enable them grapple with the challenges of learning. Put simply, the methods are very imperative in impartation of knowledge on the student". Although, some of the methods have been considered in effective in achieving the goals of teaching and learning, the type the teacher adopts determines to a large extent what the learner would assimilate.

According to Olorede (2003), "when an ineffective methods is adopted and used by the teacher, the learners would encounter morbidity of knowledge, and consequently would likely be worse than what he was before exposed to such method". But if the appropriate and effective method is adopted, the level of knowledge acquired would be high, and the potentials of the students could easily be developed. However, it is still argued that educational system can rise above the quality of its teacher, or can a nation rise above the quality of her educational system. Yet, when appropriate methods are used in combinations, the aims and objectives of teaching could be achieved

Some of the methods of teaching teachers adopt include, Pedagogical methods (lecture or Chalk and Talk method), Assignment or

Project method, Excursion or Field trip methods, Discovery method, Individualized instructional method, and so on.

It is imperative to note that the use of ICT facilities would enhance the effectiveness of these methods. Before rationalizing the basis for ICT utilization, these, methods will be examined one after the other in order to determine their effectiveness and reliability in the teaching and learning process.

Pedagogical Method

This method emphasizes on the potentials of the teachers in bringing about effective learning and instruction in the classroom setting. It is a purely lecture-based, and the teacher dominates the teaching process. It is therefore, a didactic method. The teacher is fully engaged in talking while the student simply listen, taking notes and intermittently asking questions that are purely orchestrated by non-comprehension of what is being taught. The method is mostly adopted by institutions of higher learning in Nigeria.

The method can effectively be used for a large group of students, and to give vast amount of knowledge in a short timeframe. However, when used, some of the students may, perhaps due to difference in their levels of intellectual capabilities, not be able to cope favourably, and therefore, learn less than others. Aside this, the use of the method is limited to some certain concepts and subjects; it cannot allow the students to prove or demonstrate their communication skills, and it is not effective for individualized instruction.

Assignment Method

The method is either individual or group-based. The student are given specific assignments that almost always bother on research. That is why it is also referred to as project method.

The method cuts across all levels of educational system, it spurs the students to want to work harder; it gives the student the opportunity to display their intellectual abilities, and creativity in any given area of research Yet, the method does not give room for thorough intellectual assessment and abilities of students, as their levels of participation cannot be ascertained.

Excursion or Field Trip Method

This is purely a field-based method aimed at exposing the student to certain information on the areas of the subjects being studied. (Ukadike,2009). The method in fact "involves taking the learners on an excursion outside the classroom for the purpose of making relevant observation...." (Abdulahi, 1982: P63). The method is more appropriate for the teaching of some science subjects and art subjects. According to Adeyemo (1985), it sharpens the student's observational abilities, useful in developing the students' senses, and motivates the students to read about what they have observed". Despite its benefit, the method may create conflicts with other classes, and prove difficult for class supervision.

Androgogical Method

This method is strongly based on the ability of the learner to learn, and be guided by the teacher. According to Murray (1999), the method could be more appropriate for students of higher institutions who need to engage in independent study. The method stimulates the students to always read, craft appropriate ways of improving on their abilities to grasp what is being read, and become creative. Yet, the method cannot bring out the desired learning outcomes since the teacher only guides them on self study, and not engage in teaching.

Demonstration Method

The method is purely demonstrational. The teacher demonstrates or displays or exhibits what he wants the students to know and see, while the students watch. For example, the teacher could show the students the modus operandi of science or laboratory equipment, or how to perform experiment in the laboratory. The method stimulates greater interest in learning as the students sees and hears what is being taught them by demonstration. It is helpful in the area of skills development and attitude formation. Yet, it is not appropriate for large group or classrooms, especially where small objects or equipment are displayed.

Discussion Methods

This method also emphasizes the importance of self as a major factor in learning. "It is based on the philosophy that knowledge arises within the students and not from external source.

The student take over the subject from various points of view and the teacher serves as a moderator" (Shipley, 1972). The method holds the attention of learner; develops their mental alertness leads to positive attitudinal change and engender greater commitment to always learn and practice what is being discussed.

Laboratory Methods

It is a method that allows the student or group of student to performing experiment in the laboratory. According to Adeyemo (1985), "it is an activity method designed to be carried out by an individual student or a group of students for the purpose of making personal observations from experiments in which students can get conclusion by themselves".

It has the advantages of reinforcing theoretical learning, promotes problem-solving, developing in the students scientific knowledge and attitudes, and developing in them manipulative skills. Yet, it is time-consuming and requires procurement of expensive materials and equipment.

Discovery Methods

This method is a learner-centered approach, as it emphasizes on the imperative of the self in a learning process. The students are basically required to find answers to the problems presented before them. In a guided discovery method, the students are being directed or guided; but in an unguided discovery method, the students are required to discover for themselves.

The method creates in the student the ability to carry out research; makes for retention of knowledge, provide intrinsic motivation, and encourages intuitive thinking (Mayer, 1978).

Individual Instructional Method

The method is purely programmed to aid the individual to learn, and learn well. "it is therefore, a programmed instruction in which the learning programmes are presented in carefully structured steps and steps depend

on the individual student and the nature of the materials to be learned" (Abdullahi, 1982:57).

The method engenders students greater participation in what is being taught; it allows the student to go on his own pace; and allows the teacher to assess the performance and the skills of the student. However, the method may not produce the desired outcome as the studenst are not given the opportunity to interact with the other students, and compete favorable with them.

Some Reflections

Reflecting on these methods reveals a high degree of consideration on the potentials of the individual to effectively influence learning. Virtually all the methods, aside from the pedagogical method, are deeply anchored on self-learning. No doubt, a process of social transformation is taking place as more individuals are striving to become part of an emerging learning society.

Clearly, the methods have helped students to acquire basic knowledge on their respective disciplines or subjects (Ashet, 2004). But sometimes, despite an underlying commitment of teachers, shortcomings remained in the applications of the methods. Therefore, teacher's individual initiatives are required to bring about the desired strategic outcomes.

Ofegbu (2007) argued that "any teaching method that does not focus sharply on the intended learning outcomes for students, and rarely reflect on the school's practice and aim, would remain defective not only in application but in its substance". Aside this, there have always been poor measurement of impact of the methods on improving teaching and learning, which makes it difficult to access the potency of the methods. Yet, learning is usually enhanced further by informative and helpful feedback from the teachers. They ought to record their progress and indicate the steps they have taken to improve on student's performance. Although other factors such as teachers' lack of detailed subject knowledge to help students, superficial questioning with limited challenges and lack of clearly spelt out objectives, often constrain effective realization of the teaching outcomes, the application of technology in instructional systems delivery has provided greater hope for success of the teaching methods. Put differently, the adoption of Information Communication Technologies (ICT) in teaching and learning process has

significantly improved learning, and stimulated greater commitment by student to learn.

Any teaching method that is bereft of ICT facilities and does not reflect the innovative systems approach to learning will not achieve the desired goals (Ukadike, 2000).

Instructional Innovations: Adoptation of ICT Facilities

The innovations in instructional strategies are simply defined by the level of adoptation of ICT facilities for teaching and learning. Instructional system approach involves combining all elements involved in teaching and learning process. The elements include the learners, their previous knowledge, experience and exposure; the instructional system (which includes all the elements such as the teacher, the media, etc and the output which includes the experience, skills and knowledge the learner acquired.

The increase in the learning needs of students, the difficulty of the educational system to bring about qualitative and quantitative changes in the systems, couples with the outdated methods of instruction the teachers often adopt, provide a strong ground for the appraisal of the new technology for instruction (Akingbade, 2004). The new ICTs, particularly the computers and networking technologies have, by creating conditions for raped connections, opened up possibilities for many different educational and learning opportunities (Grovinda, 2007). With the computer in the classroom, teacher would be able to demonstrate a new lesson, present new materials, illustrate how to use new programmes and show new websites. A webpage can easily be designed for the class, and displayed. Teachers can even post homework assignments, students work, and games. Many student now know how to use the computers and navigate their way through a website. Yekini (2008) stated that, ".....E-mail and the internet, as components of new ICTs could be used to transmit information to and from remotely inaccessible areas very quickly..... New ICTs can be used to facilitate education through distance learning; this will equally aid the crucial goal of development of local content with the populace actually depending on the extent of their educational status....."

Students can be introduced to a freeware application which would enable them to design and program a two-dimensional computer game; they can be asked to design the graphics and functionality of their own computer

game and write the program to implement their ideas for its design they could learn to use sophisticated programme, construct, such as 'repeal..... until' "if then', in capturing keyboard, managing variables and testing whether particular conditions had been met.

Effective use of ICTs enables the students to develop their independence as learners and improve their creativity, problem- solving, and thinking skills. Using software for creating cartoon imagery help pupils to learn subjects such as English, and construct sentences, vocabulary, grammar and phonology. Often times, students work collectively on computers and usually carefully and considerably, following their teacher's guidance.

According to Fajenyo (2009), effective teaching using ICTs requires the following:

1. Ensuring that assessment are used to inform tasks;
2. Using engaging and relevant contexts
3. Providing regular feedbacks to student ton how well they have performed on a given task;
4. Using feedback or assessment to track student's progress and achievements.

The increasing use of ICT could encourage school authorities to explore ways of making resources available in the classroom at the point of learning rather than locating them solely in a computer room. ICT has the greatest impact on learning when there is greater availability of resources, particularly laptops and hand-held computers (Shirpley, 2009). Digital cameras, projectors, and a wide range of software applications, laptop and wireless networks, etc, provide more flexible opportunities for pupils to apply and develop their ICT capability. And such facilities help students to foster independent working and sense of responsibility. For a more effective impact, the teachers should first, understand first, understand the strength and areas for development in ICT, both as a subject and as a cross-curricular key skill. They should monitor the quality of planning for ICT and, through observation of lessons, the quality of teaching and learning. They should produce comprehensive documentation, such as handbook which clearly states all working practices, policies and procedures for the subject. They should provide good demonstration lessons and opportunities for the observation among students.

Haruna (2009) stated that "ICT-trained teachers could teachers could easily teach the student how to use ICT for manipulating digital media, and reviewing their performances in different subjects; to appreciate the imperative of design, layout and the function of tools in analyzing information and modeling real-world scenario. They can also be taught the complex uses of spreadsheets and principles", Also critical in the application of the ICT for instruction is the need to expose students to the knowledge of constructing and designing a database with appropriate fields and data control facilities. They should be able to use search routines well, and Boolean logic within the search parameters. A full grasp of the knowledge of using data logging, and development of the skills to access remote cameras from around the world over the internet, would be quite beneficial to them (students)

It is quite interesting that in most schools today, students have begun to use digital video camera effectively, particularly in sciences to record their experiments. They analyze and evaluate the way the experiments are carried out, and were later able to comprehend and explain their findings.

Ideally, teachers must have learning objectives that are explicit; their explanations must be clear, unambiguous and accurate; they must ensure that students are engaged, challenged and required to review, evaluate and improve their work. Their planning must take into account the needs of individuals and groups of students. Such lesson must also incorporate a variety of interesting tasks which should tackle the more challenging aspects of the ICT curriculum, such as data handling, modelling and programming (Ndubuisi, 2008) observed that "modern design and technology equipment allows students to try out different ideas and realize their finished product much more quickly than would be the case using traditional teaching methods". Already, interactive whiteboard have been installed in the classrooms in most schools where learning take place. Learning has improved significantly because ICT facilities or resources to which students need immediate access are mostly in computer rooms

ICTs Directions on Effective Usage by Pedagogists

Despite the value of ICTs in the teaching and learning process, the input of the teacher is very central to their effectiveness. In other words, without the guidance and direction of the teachers, they cannot, particularly at the initial stage of learning, be used. That perhaps explains why the efforts

of the teacher are suigeneric to the success of the student in any intellectual enterprise, (Ukadike, 2003).

For the ICTs to be effectively adopted in any teaching process, the teacher must make ICTs, especially their moving imagery, vital in learning all subject; plan lessons in such a way that they provide regular, extended opportunities for students to learn using their creative skills; learn how to use ICTs to make moving imagery; research, experiment and keep their skills up to date; ensure that there are sufficient ICT resources for students to use in classrooms; encourage collaborative learning; ensure that the schemes of work are updated to ensure that teaching keeps pace with the developments in the media industry; and always accessing online ICT resources to use on their interactive whiteboards.

System Approach to Instruction

The system approach is conceptualized as another form of innovation in the learning process. It is simply a wholistic way of examining the teaching and learning process. It is aimed at bringing about effective teaching and learning through proper consideration and integration of most of the factors or elements in an instructional situation. Basically, it is aimed at correcting the deficiencies of the traditional teaching methods or lesson plan that only emphasise on presentation or procedures through which the teacher will guide the pupils in the process of content acquisition. In fact, the traditional lesson plan or teaching method are in dissonance with the demand for the proper planning of instruction in schools today.

According to Ogunranti, et al (1982), the deficiencies of these plans or methods are generally narrow in scope, too sketchy in description of previous knowledge, vague in statement of objectives and corresponding disjointed presentation section hidden under superficial sub-title of "steps" and the evaluation that often does not relate to the aims and objectives of instruction".

In fact, the major problem teachers face is how to ensure that student achieve their objectives. That explains therefore, why programmed learning becomes absolutely necessary.

Aside the fact that systems approach is on operational plan combining content, methods, materials, personnel, equipment, facilities, and other related elements, all co-ordinated to serve instructional activities that

will achieve specific learning outcomes, it is simply borne out of the application of technology in solving problems of education, particularly in the areas of designing and managing instruction in a systematic way.

The media that are ICT-based are several digital projectors, films, audio media, instructional television, internet, computers, etc. presently, the computer has some learning packages that have been programmed to make learning effective. They include Computer-Assisted-Programs such as Audio-tutorial system (ATS), Programmed instruction (PI), Computer-Assisted-Instruction (CAI), Individualized Prescribed Instruction (IPI), personalized System of Instruction (PSI), etc (Obianwu and Azubuike, 1994).

Conclusion

This paper has clearly defined the perspectives of innovation in instructional strategies. It argued that the use of ICTs could enhance the effectiveness of the teaching methods adopted in most school today. The new technologies such as computers and communication satellites open up new vistas for transmitting educational and learning programmes. Curriculum and methods of teaching and learning will therefore have to adapt to these new innovations and programming in order to be effective. Interestingly, new developments are already taking place in content and curriculum development.

It is therefore, imperative that the technological devices created to make learning more interesting, and permanent be procured for use by schools.

Recommendation

The following steps should be taken to further improve the quality of teaching and learning in our schools:

1. Teachers should be skilful and effectively trained on how to use ICTs to supplement other teaching methods;
2. All educational institutions in Nigeria should expose students to the latest ICTs and insist always on computer and internet training for them;
3. Teachers should always make good planning that enabled further improvement to the curriculum. The planning should focus firmly on

how students learn, and on keeping them to become independent and creative users of technologies.

4. All schools connected to the internet should install automated monitoring systems that check internet and network traffic for the use of specific key words, and alert authorities if there is evidence that a student is either at risk or abusing others;
5. Government should distribute computers and other ICT facilities to schools to help improve the quality of instructions;

References

Abdullahi, A (1982). Science Teaching in Nigeria. Ilorin: Atoto Press Ltd.

Abdullahi, J.S. (2003). Teaching Methods. Zaria: Ahmadu Bello University Press.

Adeyemo, P.O (1985). Principles of Education and Practice of Education. Ado-Ekiti: Omolayo Standard Press and Bookshops Nig. Ltd.

Akingbade, T. (2004) Perspective of Instructional Designs. Ibadan: Golden Millennium Books.

Akinloye, O.M. (2008). Introduction to Educational Technology. Ilesha: Olaolu Publishing Company Ltd.

Asheti, D.A. (2004). Tactics and Knowledge of Teaching Impartation. Alberta, Canada:
Athabasca University

Campbell, J.R (1972). In touch with Students. Columbia. Educational Affairs Publisher

Fajenyo, E.B (2009). The Potentials of ICTs for Instructional Delivery. Ilorin: Golden
Millenium Books.