

USING EDUCATIONAL COMPUTER GAME TO FOSTER QUALITY AND FUNCTIONAL ENGINEERING EDUCATION AMONG NIGERIAN YOUTHS

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Abstract

Exposing youths to quality and functional education is a means for achieving socio-economic development in Nigeria. The paper discussed the issue of encouraging quality and functional engineering education among Nigerian youths using educational computer game. Educational computer game is a resource that can enhance the acquisition of quality and functional education because the use of the game can bring relaxation to the youths for conducive learning, promote technological consciousness among the youths, occupy the mind of the youths to avoid engaging in social vices, which inhibit development. Certain recommendations were made in the paper to support the use of educational computer game in engineering education.

Nigeria is among the developing nations of the world and there are a lot of socio-economic problems in nation. However, effective engineering education given to the youths (as future leaders of tomorrow) can help to achieve socio-economic development in Nigeria. Effective education has to do with education that is qualitative and functional. Quality and functional engineering education pertains to achieving the goals and objectives of teaching-learning processes in engineering.

A means of exposing youth to quality and functional engineering education is through the use of educational game. Educational game can be card game, board game or electronic game. However, the paper looks at fostering quality and functional engineering education among Nigerian youths using electronic game like educational computer game.

For explicit understanding, the paper discusses: issue of quality and functional education; need for quality and functional engineering education among the youth; computer game and its use in education; importance of educational computer game to the youths studying engineering. Certain recommendations were made in the paper to support the use of educational computer game in engineering education.

Issue of Quality and Functional Education

Quality education is so much desired for happy living in society (Nwosu, 2010). Quality is a normative variable which is based on a number of indices that are themselves defined by the values, goals, orientation and level of development of the society (Okonkwo, 1990).

Education quality is viewed from the point of output by some scholars while other scholars view it from the point of input; hence, educational quality has many dimensions. Maduewesi (2005), in quoting UNESCO (1998), pointed out that quality in education is a multi dimensional concept which should embrace all functions and activities: teaching and academic programmes, research and scholarship, staffing, students; buildings, facilities, equipment, services to the community and academic environment. Changes for quality education may imply availability of instructional materials, improving classroom facilities, school library services as well as in-service training of teachers and so on. Quality is also a function of how much time is spent on learning in and out of

school. In addition, the importance of quality depends on some learning variables at home, in the community and through the media. Basically, the teacher and the school constitute the major factor when considering educational quality (Oyewole and Olanrewaju, 2005).

Nwosu (2006) noted that quality education is a means to achieve great and dynamic economy because it deals with efficiency in the attainment of national goals for economic and social reforms. Ndili (1983), in Okonkwo (1990), stated that quality education pertains to issue of relevance, validity, functionalism and efficiency of an educational system in achievement of national goals and priorities. As stated by Oyewole and Olanrewaju (2005), quality of an educational programme is often associated with the students' level of academic achievement. It should be noted that academic achievement of students is an output of educational programme.

Quality education brings about education that is functional and of great value (Nwosu, 2006). It is expected that education in Nigeria should be functional. Functional education is the form of education that develops the individual physically, mentally, socially, intellectually and provides skills that make him/her productive; and should emphasize practical, demonstrations, modeling and the acquisition of skills in the use of tools and equipment (Igbemi, 2006). Fayam (2005) pointed out that functional education is one of self-reliance and so the education processes prepare an individual for a more effective life by having educational experience that must be adapted to his/her local conditions to enable him or her fit well in the environment, so that the individual can improve his or her standard of living and that of the society consequently.

Creation of a labour force that acquires the necessary technical skills and ability to adapt to economic and technical changes will aid in the economic development of a nation. Human capital enhancement, through educational investment in man, does not only raise the productivity and income of workers, but also enhances the flexibility and mobility of labour force in response to changes in the demand for labour, and so a nation that aims at achieving a buoyant economy must improve the quality of her labour force through functional education (Afolabi and Loto, 2004).

Ukeje (1979), in Fayam (2005), noted that functional education is a major step towards educating people such that they can increase in their capacity to work, be creative and derive pleasure in being alive. Functional education that creates room for self-reliance means educating an individual for self-preservation and helping the individual desire and be equipped with the necessary skills in preparation for the individual to work (Fayam, 2005).

Need for Quality and Functional Engineering Education Among the Youths

Engineering is a profession that deals with the use of scientific principle in designing devices that make man feel more comfortable in his environment (Nwosu, 2010). It then implies that engineering is a discipline that has technological value in human society for man has used engineering to exploit his environment to his benefit. It is no doubt that engineering has positively transformed human life and activities. Modern civilization is possible through the application of engineering. It can be said that engineering is a vital resource for achieving development.

There is great need to ensure that youths studying engineering are exposed to effective engineering education for sustainable socio-economic development in Nigeria. As noted by Afolabi and Loto (2004), in recent times there has been a keen awareness that education constitutes the greatest instrument which could be used for solving the multifarious socio-economic problems of the nation and for the fullest realization of the potentialities and aspirations of the people. They went further to state that government now perceives education as an investment in human capital, with the sole aim of wiping out ills such as ignorance, disease, malnutrition, corruption, bribery, tribalism,

nepotism, superstitious beliefs, unemployment, political instability and economic stagnation that usually plague an illiterate society. Igbemi (2006) posited that the essence of education is to solve the problems of life and education is life itself, not a preparation for life.

It is an axiom that the youths are the pride of the nation and so they need to be equipped for future leadership. Quality and functional engineering education of the youths prepare and equip them with the knowledge and the skill to serve as future hope for survival and progress in the nation. Maduewesi (2005) posited that the youths occupy a strategic position in the political, social and economic processes and reforms. Based on the role and value of youths in the family and society, investment is made on them by educating them (Nwosu, 2005). Most youths are students, and so talking about youths can make one to focus on students.

Serious efforts should be made to educate engineering students because there are certain problems that militate against effective engineering education in Nigeria. Some of the problems are:

1. Some engineering students encounter some difficulties in understanding some engineering topics (subject matters of engineering).
2. There are negative attitudes (lack of interest) towards learning among some Nigerian youths studying engineering.
3. There is inadequate supply of instructional materials and equipment needed for effective engineering education.
4. Some youths (engineering students) spend some of their time in useless activities.

Based on the problems that hinder effective engineering education of the youths, electronic technology can be employed to promote quality and functional engineering education in Nigeria. This can be achieved using educational computer game to foster learning among the engineering students. It then implies that adequate exposure of the youths to such electronic technology can help to bring about promotion of effective engineering education needed for sustainable socio-economic development in Nigeria.

Computer Game and Its Use in Education

A game is a recreational activity that involves competitors that desire to achieve pre-specified goals or objectives, following accepted set of rules, for determining the winner and the loser.

Playing of games is a vital educational function for any creature capable of learning. Game play is an important component in the development of many creatures because the original and fundamental motivation for all game-playing is to learn. The educational motivation may not be conscious. Indeed, it may well take the form of a vague predilection to play games. The fact is that there is credence to the assertion that learning is a truly fundamental motivation for playing games (Crawford, 1997).

A game can be an educational game. Educational game is a game designed to teach people about a certain subject, expand concepts, reinforce development, understand an historical event or culture, or assist them in learning a skill as they play (<http://en.wikipedia.org/educational> game). According to Agwagah (2001), criteria for development and selection of game for instruction are:

1. the game should have simple rules
2. the game should not take too long to play. Lengthy games leads to frustration and boredom considering the attention span of children.
3. the game setting should be simple and few game pieces should be required.

4. the game should be easy to set up
5. the game should be easy to score.
6. the game should be a learning experience for the children.
7. the physical make-up and action of a game should not distract the players from the intended learning outcomes.
8. the game should be suitable for variety of situations.

Recall that educational game can be board, card or electronic game. Electronic game is a game that is played using electronic circuitry (system) such as personal computer (PC), video game console, and handheld system. While video game systems are used solely for games, gaming is only one of the many uses for computers. A computer game that is an educational game is one built and played on computer circuitry to aid in teaching-learning processes.

In computer games, players can use keyboard to type in commands, mouse to move a cursor around the screen, or sometimes both. Many computer games also allow the use of joystick or game controller (Microsoft Encarta, 2007).

Computer games can aid the development of proficiency in education by allowing users to interact with objects and manipulates variables. They are said to be particularly effective when designed to address a specific problem or teach a certain skill in school subjects, where specific objectives can be stated and when deployed selectively within a context relevant to the learning activity and goal (Akudolu, 2004).

Simple types of games can be designed to address specific learning outcomes such as recall of factual content. For instance, the Nobel Price Foundation website uses online games to aid children understand the discoveries made by its laureates by cleverly embedding the scientific knowledge as part of the game environment. Other genres of games can enhance the teaching of life skills to students such as financial planning or political knowledge ([http://en.wikipedia.org/wiki/educational game](http://en.wikipedia.org/wiki/educational_game)).

There is need to regulate game content as educational game ought to be an effective learning tool. Thus, the game designers and game developers should have a comprehensive understanding of users and their educational needs. There should be a balance between entertainment content of the game and the content of the curriculum (education syllabus).

Akudolu (2004) stated that types of computer games basically used in education are adventure game and instructional game. Adventure game presents challenges of problems, which players should solve so as to progress and succeed in the game. In the game, there is opportunity to practice some key problem-solving skills and vital reasoning skills, and so enable players devise strategies which apply appropriately in different contexts. Instructional games present learning content in game formats. The game is designed and structured specifically for instructional use or for the learning of different school subjects.

Importance of Educational Computer Game to the Youths Studying Engineering

A game is designed in such a way that it has as its final goal the education, entertainment or edification of the game-player. A game should have special effect to support the fantasy of the game. Good graphics, colour, animation, and sound are all valued by game players and are part of enjoyment factors of game-playing (Crawford, 1997).

In the use of computer for educational game, the computer can serve as a competitor, judge and scorekeeper. The learner competes with the computer or with another person. In the process

he/she learn facts, strategies and skills. He/she makes choice and evaluates the results. The computer tells the player how he/she is playing and how many games lost (Akudolu, 2004).

Use of educational computer game is valuable in bringing about quality and functional engineering education of youths studying engineering because the game can: foster learning among the engineering students; enhance acquisition of technological and creative skills by the students; and remove the mind of the students from useless and destructive activities.

Computer game can foster learning in engineering by serving as an educational medium (instructional material). As an instructional material in teaching-learning process, the computer game creates an atmosphere for achieving instructional objectives. It should be noted that instructional materials are teaching aids that help to make teaching-learning activities effective. Computer game can be structured such that there is acquisition of sound knowledge and skill during the teaching-learning process. As pointed out by Akudolu (2004), advantages of Computer-Aided Instruction (CAI) game are:

1. A CAI game provide training in decision making
2. It helps learners (participants) acquire problem-solving skills
3. It develops co-operative attitude in the participants
4. A participant acquired competitive skills as he/she tries to excel in his/her performances.
5. It develops in a participant the ability to recognize the impact and consequences of his/her and other participant's actions.
6. It creates opportunity for inter-disciplinary learning because experiences required in one situation can involve knowledge from different subject areas.

Students learn better in a conducive environment or atmosphere. The use of computer game in engineering education can provide multimedia that stimulates and encourages learning among the engineering students. A well designed computer game can incorporate graphics, sound, animations that can draw the mind of the students towards playing the educational game for learning engineering topics. Thus, the educational content in the game can be imparted to the students in a manner enjoyable to them.

Computer game, by its nature, can involve the use of many sense organs (touch, sight, and hearing) in its operation. It is an axiom that the more the learning content appeal to the senses, the higher the level of understanding by the learner. In fact, the use of computer game can enable the youths studying engineering get equipped in the cognitive, psychomotive and affective domain of engineering education. Engaging in educational computer game can help engineering students get familiar with use of computer system for education purpose. For instance utilization of computer can expose the youths studying engineering to the use of Internet for online education games, browsing in search of educative information, sending and receiving of educational knowledge.

Educational computer game can serve as a medium for exposing the youths to technological skills needed in engineering. Computer system is a technological product and so, the use of computer system for games is a means of creating technological consciousness among the youths. Designing and building of educational computer game requires application of technology, hence, through the playing of educational computer game, the youth can be engaged in acts relating to technology education. For Nigeria to progress or advance, there should be quality technology education inculcated to the students and we cannot talk of national development without a sound technology education in our school system (Nwosu, 2005).

Computer game can enhance creative ideas among the youths. So, playing of educational computer game can help in acquisition of creative skills needed in engineering. Okeke (2006) is of the

view that play is a good training opportunity for the development of creative skill and so children should be encouraged to engage in play activities that will arouse creative thinking in them as they grow. Creativity equips individuals with skills to solve everyday problems. It serves as a resource for everyday coping and adjustment, thereby improving the quality of life of people.

Engaging in educational computer game can also prevent idleness among the youth. It is an axiom that idle mind leads to immoral acts and social vices that inhibit development. Effective time usage is vital in human development. With the use of educational computer game, the youths can be engaged in meaningful and educative activities that are valuable.

Educational computer games can be built to expose the youths to ethics by displaying ethical texts and graphics in the game. Thus, ethical values needed for effective engineering education can be achieved using such games. Nwosu (2005) noted that acquisition of ethical values is essential in promoting technology education among students.

Conclusion

Quality and functional engineering education is essential for the development of the youths. No nation can develop without educating the youths. So, Nigeria should encourage effective education of the youths for socio-economic development of the nation.

Use of educational computer game is vital in fostering quality and functional engineering education among Nigeria youths because the use of such game can serve as an effective instructional strategy that can get youths (students) actively involved in learning activities, promote technological and creative skills among the youths; and provide recreation that can remove the minds of the youths from engaging in social vices.

Recommendations

Based on the values of educational computer game in promoting effective engineering education among the youths, the followings are recommended:

- (1) Government and concerned organizations should ensure constant supply of electricity for powering of computer system.
- (2) Designing of educational game should be a learning content in school curriculum for engineering courses.
- (3) The youths should avoid computer crimes in the use of computer system by being of good moral conduct.
- (4) The youths should concentrate more on the educational aspects of the game than on its entertainment aspect.
- (5) Government and reputable organizations should establish industries that build educational computer games needed in engineering and other disciplines.

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