Teaching and Learning of Technical Education Curriculum Content: A Multimedia Approach

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Abstract
This paper discusses the use of multimedia approach for a better transaction in teaching and leaning of technical education curriculum content. Relevant theories as applicable to multimedia usage are also examined. The application of multimedia, approach for teaching a unit on wood work joints in technical education at the university level is thereafter presented as a guide for users adaptation in various disciplines.

Keywords: *Curriculum, Instruction, Learning, Multimedia, Teaching*
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Introduction
The expansive focus on learners in the education process for the development and enhancement of their innate potentials as well as stimulating them for independent learning makes education around the world, especially in the 21st century, to be under increasing pressure to adapt and adopt social media strategies in teaching and learning in higher education. This is a step in the right direction which aims at utilizing the potentials of Information and Communication Technology (ICT) in

education for national development (Akinola, 2010). This suggests that many teaching and learning tools with great potentials are available in sickle to engage intending learners' senses of sight, hearing and touching. Through various information - technology-mediated potentials therefore, effective curriculum delivery system operations in educational programmes become visible where the social learning environment is conducive and well-catered for.

Of much importance in this paper is that reforms in vocational technical education worldwide have always advocated the use of activity-based approach to learning so as to help learners master curriculum contents. The actualisation of curriculum objectives in practical terms lies on appropriate methods and strategies. Avalanche of methods based on expert perspectives, research and experience in the education field abound in literature, but the fact remains that there is no such thing as the best method (Alade, 2010). An approach is a set of correlative assumptions about how to present a subject matter. A strategy may be seen as a contrivance used to accomplish an immediate objective, while a method is the level at which theory is put into practice and the order in which the content is presented.

The move from traditional didactic technology classrooms where concepts, principles and work skills are taught in theory calls for a more practical and radical approach. This is where the use of multimedia approach becomes paramount. No doubt, the utilisation of multimedia approach in Nigeria, especially in the teaching and learning of technical education curriculum contents, is at a very low ebb. This is due to various issues and challenges confronting the use of Information and Communication Technology (ICT) in technical teacher preparation. This notwithstanding, various communication facilities can support sharing of knowledge. By doing this, knowledge is transformed back and forth, retained by those who want it, transformed, and transferred again (Hadzie and Ho-Hur, 2005). When learners interact with various forms of technology, learning is made more real. Using multimedia in teaching

enables teachers and students combine different information sources and learning environment (Ige, 2003).

The trend becomes clear that both the brain and the hands of technical education students would be highly used and developed if they are surrounded by multimedia environments and interact with them in everyday life. Through this approach, technical education trainees or students would be able to interact with the dictates of the curriculum content in activity form on a one-to-one basis with the expectation of significant impact in their education. It is on this premise that this paper examined the use of multimedia channels in teaching the curriculum contents of technical education vis-a-vis proposing and presenting a multimedia approach in the teaching of a unit in the content of woodwork option in the technical education field at the university level.

Multimedia Packages in Education
Media generally are channels and carriers of messages which are the medium or means through which information pass. In respect of education, education media are audio, visual and audio-visual materials which help in the achievement of specified objectives. Multimedia are information carrying technologies which are used for instructional purposes, in this case technical education, with the hope of delivering vocational information very quickly, more clearly and very widely. Media are altogether a collection of materials and equipment which are strong weapons used for instructional purposes.

A multimedia package is a package which can be used to present and explain an idea by integrating various tools, e.g. text, pictures, illustrations, graphs, animation, sound video clips, etc. (Ige, 2003). Orion, Dubowki and Dodick (2000) described multimedia package as involving the use of a spectrum of media to present ideas in an interesting and concrete manner. In education, the use of multimedia may be teacher initiated or may be assembled cooperatively by students. It may also be jointly initiated by both the teacher and the students in classroom/ workshop environment. The usage of multimedia can be computer-based

45

in which pieces of information are packaged and displayed with various tools used to illustrate the chosen subject. Graphs, scanned photographs and animation, among others, may be used. For a non-computer based multimedia usage, text, pictures, models, video tapes, charts and audio tapes may be displayed and used.

In technical education, the use of multimedia authenticates whatever the vocational teacher or instructor says. It provides experiences that may not otherwise be available to learners, and learning is made more real, practical based and permanent. It is obvious that the use of conventional teaching approach for many years in Nigeria has grossly affected skill acquisition identified in technical education curriculum of tertiary institutions. However, the use of multimedia approach which may incorporate computer simulations would expose technical trainees to what happens in real life situations in the industrial world or labour market at large.

Media which may be used in technical education classrooms and workshops include print, pictures, illustrative charts, slides and overhead projectors, among others. The use of audio and video tapes along with computers singly or individually to illustrate various technical concepts, principles and skills is still yet to gain ground in Nigerian tertiary institutions. Nonetheless, in a study conducted by Alade (2002), instructional video usage was found to be among the methods applauded for effective acquisition of manipulative skills in technical education. Of emphasis in this paper is that multimedia channels are important tools which should become popular in the classroom and workshop instruction in technical education curriculum delivery so as to ensure a favourable competition and relevance with the globalized world.

Constructivism and Classroom/Workshop Instruction in Technical Education
Constructivism is a philosophy of learning which is founded on the premise that people construct their own understanding and knowledge of the world by experiencing things, reflecting on previous experience

and constructing new knowledge and understanding of the world. That is, everyone generates his or her own rules, mental models and opinions based on the existing experience. In a technical education classroom or workshop, when students encounter new concepts, principles and/or skill, they have to reconcile such with their previous ideas and experience, may be changing what they know, or may be discarding the new information as irrelevant. Learning, therefore, is simply the process of adjusting one's mental models to accommodate new experiences in term of concepts, principles, skills, knowledge or belief. Constructivism makes every learner a creator of his/her knowledge by asking questions, exploring, and assessing what is already known or experienced.

The purpose and basis of learning in a technical education classroom/ workshop instruction is for a technical trainee to construct her own meaning, not just memorize the "right" answer and regurgitate someone else's meaning. In fact, mere memorisation and regurgitation of facts are not helpful, nor the ultimate in technical education classroom/ workshop instruction. Constructivism encourages students to use active techniques like projects, investigation/inquiry, expertness, problem-solving, etc. to create more knowledge and skills, and then to reflect on and talk about what they are doing and how their understanding is changing or enhanced.

A vocational instructor should understand the student's previous and pre-existing conceptions to a certain extent and guide the activity to address them, build on the existing knowledge and create new knowledge and skills.

The beauty of constructivism in a well-planned classroom and workshop environment is that the students "learn how to learn". Despite the fact that the technical instructor knows the skill and answer to a "problem activity" as stipulated in the subject-matter of technical education curriculum, he focuses on helping students reflect on and examine his/ her current knowledge. A technical trainee may come up with the relevant clue to solving a problem or performing an activity. The instructor seizes

upon it, and mediates to the group that this might be a fruitful avenue to explore until the final solution is obtained and ultimately drawing conclusions from their findings.

Social Learning Theories and Multimedia Approach in Technical Education Curriculum Delivery

The person-environment interaction theory attempts to focus on the transaction and interaction that occurs between the individual and environment. Within the context of knowledge and skills acquisition in technical education curriculum delivery, technical trainees transact with multimedia tools in the social and physical environment. This affords the learner opportunity to advance their understanding of the concepts, principles and skill acquisition in their vocational trades.

Social development theory developed by Lev Vygotsky (undated) is a theory of cognitive development. Within a certain range aided by the interaction among peers, in this case, technical education students, specific tasks are solved within a social context and environment. Multimedia approach provides the field for the interaction among peers. Vygotsky in his theory opined that the potential for cognitive development depends upon the Zone of Proximal Development (ZPD) which examines an individual development within settings. The Zone represents the developmental distance for learning in isolation and in relationship with others. Multimedia approach stimulates independent learning and collaborative teamwork within a classroom and/or workshop environment/setting. The Zone of Proximal Development, however, suggests that students need to work together to construct their learning, and teach or explain to each another in a socio-cultural milieu. Multimedia approach provides the opportunity for interaction with more capable students who mediate transactions between the struggling students and the curriculum content of technical education. In all, every student will benefit.

The use of multimedia approach transactions thus occurs in social transactions with other learners in a classroom and or workshop where there are methodological procedures and the use of tools and equipment to accomplish specific tasks. Suffice to say that the "More Knowledgeable Others" (MKO) that is, vocational instructor should have a better understanding or at a higher ability level than the learner particularly as regards the specific vocational skill.

Characteristics and Classification of Multimedia

Generally, media have the capability to diffuse information and knowledge. Also media have the characteristics for showing some symbolic representation, motion and colour, pictures, photographs, maps, etc. They may be locally designed or produced by classroom practitioner, while some other media may be commercially produced. Media classification may vary, still, the common classification includes:

(a) *Little/Big Media*: Little or big in investment structure, pervasive in coverage, cost, analysis and influence. Some common examples are Big-computer, television, radio, satellite, books and printed material, recorded squad, visual materials and so on.

(b) *Audio/Visual/Audio-visual*: Visual is further sub-divided into projected and non- projected. Non-projected is in form of a 2-dimensional or 3-dimensional. Projected ones could be in form of "still" or "motion". However, the projected visuals have a power source while the non-projected do not have a power source.

(c) *Hardware/Software (Device/Materials)*: Hardware devices transmit messages stored in materials while the software retains stored messages for transmission by devices.

(d) *Print and Non-print Media*

(e) *The Federal Ministry of Education, Nigeria Media Classification*

(i)   Audio Visual Aids: Audio, Visual and Audio Visual (AV) aids radio sets, audio cassette, tape recorder, audio tape, record players and record television sets, flip charts, video sets, slide projectors, video tapes and transparences.

(ii)   Graphics, charts, posters, pictures, cartoons, graphs and maps.

(iii)   Printed: Textbooks, storybooks, newspapers and magazines.

(iv)   Display Materials: Flannel boards, chalkboards and portable boards

(v)   Realia: Models, real objects, globes, specimens and projects.

(vi)   Electrical gadgets: Quiz boards, puzzles, jigsaw and electrical maps.

(vii) Tear bag odds and ends: Drawings, cuttings from newspapers, journals and magazines, stories, slates, pencils, crayons, pictures, etc.

The use of any combination of the above classification exemplifies multimedia approach in teaching and learning.

Table 1: *Teaching Plan on Woodwork Joints in Technical Education:*
A Multimedia Approach

Behavioral Objectives	Instructor/Technical Trainees Activity	Multimedia Channel	Evaluation
By the end of the unit, Students should be able to: i. Classify woodwork joints into different groups. ii. Describe lengthening joint, box-like or carcase joint and framing joint(Angle joint) iii. Distinguish between different types of joints. iv. Explain the stages involved in constructing a typical lengthening joint, widening joint and angle joint. v. Construct a selected woodwork joint.	i. Technical trainees listen to the technical instructor's introduction on woodwork joints. ii. Interact with multimedia package on woodwork joints individually or in group/peers under the tutelage of the technical instructor. iii. Discuss the type of joints with specific classification into groups. iv. Make a classroom/ workshop working drawing for a joint construction. v. Demonstrate the construction stages involved in a typical woodwork joint.	A multimedia package/collection containing charts and illustration of the various types of joints, how they are classified and constructed i. Slides on various types of joints in their group category. ii. An instructional video showing the constructional stages involved in a typical joint construction and how they are constructed. iii. Computer based software e.g. VCDS showing how the joints are assembled together. iv. Models of completed woodwork joints and their applications in interior decoration and house furniture at large.	Technical trainees are to answer the following questions. i. Make a list of at least ten types of joints and classify them into their respective groups. ii. Produce the working drawings of a typical woodwork joint and construct it showing the constructional stages involved. iii. Where can the woodwork joint be applied? iv. List some furniture items produce with a typical joint.

Source: The Author

Implication of Using Multimedia Approach for Classroom Instruction.

Learning is an active, social process where learners should learn to discover concepts, ideas, principles and facts for themselves. In Wikipedia (2008), the free encyclopedialism, learning is agreed upon to be a social process which is not a process that only takes place inside our minds, nor is it a passive development of our behaviours that is shaped by external forces, and that meaningful learning occurs when individuals

are engaged in social activities (p.3). Thus, technical instructors in the use of multimedia approach have to adopt the role of facilitators. Where a lecturer gives a didactic lecture, which covers the subject-matter in the curriculum of higher education, a facilitator helps the learner get to his or her own understanding of the content of the curriculum. Where an academic who lectures makes the learner to play a passive role in a teaching-learning situation, multimedia would not work, and transformative teaching would be a mirage. Conversely, where a technical instructor allows a learner to play an active role in the learning process, he, the technical instructor as a facilitator asks, supports and provides guidelines and the environment for the learners to arrive at their own conclusions using multimedia.

In classroom and workshop instruction, the use of multimedia approach allows a facilitator to be in continuous dialogue with the technical trainees. The learning environment should also be designed to support and challenge the learners thinking. This will steer the learning experience to where the learners want to create value. Transformation in teaching using social media strategies generally in higher education may look like a hard knot difficult to break where the transformer (facilitator) is not ready to apply new approaches/findings in research, multimedia approach using packages inclusive.

There is therefore a great challenge before the teaching facilitator. He has in reality to combine in himself the various historical roles of teachers from that of the priest to that of technicians (Balogun, 2002). The use of multimedia packages makes a greater demand on the creativity and ingenuity of the teacher (Ige, 2003). The previous and traditional educational viewpoints where the responsibility rested with the teacher to teacher and where the learner played a passive, receptive role must be jettisoned in higher education. Constructivists' approach support that learning is accomplished best using a hand-on approach. Learners learn by experimentation, that is, practical-based work, and not by being told what will happen. They are left to make their own inferences, discoveries and conclusions.

Multimedia approach could do it. In most pedagogies based on constructivism, the teaching role is not only to observe and assess but to also engage with the students while they are completing activities, wondering aloud and passing questions to the students for promotion of reasoning (Devries *et al.*, 2002). It becomes important for instructors and classroom practitioners generally to realize that although a curriculum may be set down for them, it is inevitably shaped by them in their ways of implementing it. They should structure the learning activities set up in their use of multimedia approach just enough to make sure that the students get clear guidance and parameters within which to achieve the learning objectives. Yet, the multimedia approach should be open and free enough to allow for the learners to discover, enjoy, interact and arrive at their own socially verified version of truth in the teaching and learning process.

Conclusion

The focus of this paper has been to shift from the teacher to students for an effective transformation in the educational process. The classroom and workshop should no longer be places where the professional teacher pours knowledge and skills into passive learner, who wait like empty vessels to be filled, and multimedia approach is recommended for this. The learners are urged to be actively involved in their own process of learning so as to be job creators rather than being mere job seekers. In the multimedia classroom and workshop therefore, both the instructor and the trainees/learners should think of knowledge and skills not as invert factoids to be memorized, but as dynamic, ever-changing views and values of the world we live in, and the ability to successfully sketch and explore the views and values.

The multimedia approach advocated for in this paper sees learning as being interactive, building on what the students already know. Teachers have a dialogue with students, helping students construct their own knowledge and the teacher's role is interactive, rooted in negotiation. Students could be assessed through their works, observations and points

of views. Process is thus as important as product. On the whole, this approach which finds basis in constructivism sees learning as being transferable because students can create organizing principles that they can take with them to other learning settings. This brings progress to the learning process.

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