REVIEWED INSTRUCTIONAL DEVELOPMENT MODELS: THE BASIS FOR EFFECTIVE CURRICULUM IMPLEMENTATION

Dr. Cheta Williams *and* ***Dr. Dennis D. Duru***

Abstract

This paper examined the concept of instructional development model highlighting the uses of models in teaching and learning situations. It reviewed some instructional models found acceptable by some teachers and instructional developers. Such model are Gerlach and Ely model, Heinich, Molenda, Russell and Smaldino., Heinich, Molenda, Russell assure model, and Newby, Stepich, Lehman dnd Rusell Pie model. A novel workshop oriented instructional development model for teaching and learning practical joinery or furniture exercises was also developed.

Concept of Instructional Development Model

A model can be defined as the step by step procedure for attaining a task (Dike, 2008). It is a simple representation of more complex forms, processes and functions of physical phenomena or idea (Gustafson and Branch 2002). Models help us to conceptualize representations of reality. They provide conceptual and communication tools that can be used to visualize, direct and manage processes for creating high quality instruction or training. Models also assist in selecting or developing appropriate operational tools and techniques as they are applied.

On the other hand, instructional development models are workshops or classroom-oriented instructional models primarily of interest to professional teachers who are charged with the role of curriculum implementation. Curriculum implementation is the task of translating the curriculum document into operating curriculum with combined effort of the teacher, students and others concerned (Eya, 1999 in Mmeremikwu, 2007). The users of models include primary and secondary school teachers, technical and vocational school instructors, colleges of education and polytechnic lectures and university lecturers (Gustafson and Branch 2002). Some training programmes in business and industry also assume this classroom orientation. The teachers role in the use of models is to decide on appropriate content, plan instructional strategies, identify appropriate media, deliver the instruction, and evaluate learners. Although there are a number of classroom-oriented instructional development models, they are not widely known or adopted by teachers. This forms the basis for the review of instructional development models.

Reviewed Instructional Development Models

The three models reviewed below have been found to be acceptable and understandable by at least, some teachers. They represent a class of models which instructional developers or competency-based trainers should be familiar with. The models are: Gerlach and Ely (1980), Heinich, Molenda, Russell and Smaldino (1999) and Newby, Stepich, Lehman and Russell (2000). These models which are applicable in classroom environment will influence the development of a novel workshop-oriented instructional model for practical training. The reviewed models are discussed as follows:

1. **The Gerlach and Ely Model**

This classroom-oriented model of Gerlach and Ely (1980) consists of several steps that are simultaneously arranged diagrammatically as shown in fig.1 below.

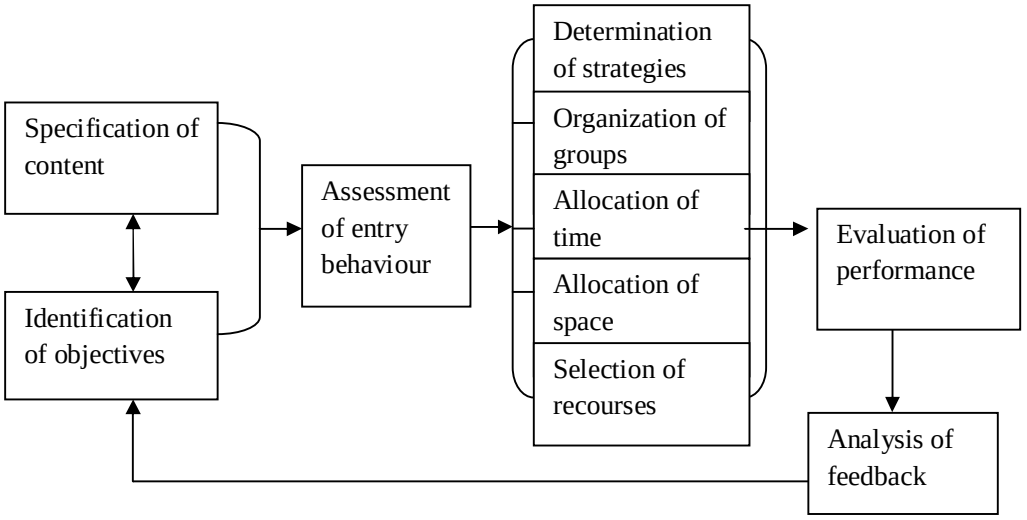

Fig. 1. The Gerlach and Ely (1980) Model

The first step of the model involved the identification of content and specification of objectives as simultaneous, interacting activities. Gerlach and Ely recognized that many teachers think about the content first. For this reason, they prefer the approach of specifying objectives as the first task in the model.

The second step in the model is assessing the entering behaviour or the background knowledge, attitude, skill etc. of the learner, a step common to many classroom oriented models.

The third step consists of five interacting activities to be performed simultaneously, with the decision in one influencing the decision in others as explained:

1. Determine strategy: The teacher's role here is to select one or more strategies to be adopted in instructional situation.
2. Organize groups: Here the students are organized into self study or whole class activities based on strategies, space, time and resources available.
3. Allocate time: Time is viewed as constant to be divided among strategies as against competency-based training where time is variable or not fixed.
4. Allocate space: Space is not constant because learning can be in the classroom, laboratory, workshop or extended beyond the classroom.
5. Selection of Resources: This focuses on the teachers need to allocate, obtain, adapt or supplement existing instructional materials.

The fourth step is evaluation of performance where the teacher measure students achievements and their attitude towards the content and instruction.

The fifth and last step in the model is feedback to the teacher regarding the effectiveness of the instruction so that an improvement can be made next time the topic will be taught. The analysis of the feedback focuses on reviewing all the earlier steps in the model particularly the objectives and strategies selected.

2. **The Heinich, Molenda, Russell and Smaldino Assure Model**

Heinich, Molenda, Russell and Smaldino (1999) ASSURE model is a classroom-oriented instructional development model. The ASSURE model is a procedural guide for delivering

instruction that incorporates instructional media. Unlike most instructional development models, ASSURE is not portrayed in graphics or pictorial form. The ASSURE model simply denotes:

A- Analyze learners
S - State objectives
S - Select media and materials
U - Utilize media and materials
R - Require Learners response
E - Evaluate and revise.

a. Analyze learner

The first step in ASSURE model is to identify the learners who may be students, trainees, apprentices etc, and their entry characteristics. Here, specific entry competencies such as background-knowledge, attitudes, skills, and learning style of learners are also examined. The knowledge of the teachers will help to select the best medium to meet the objectives.

b. State objectives

The second step emphasizes the need to state the desired out-comes of instruction in specific and measurable terms. The ABCD format representing audience, behaviour, conditions and degree for writing instructional objectives are applied here. What the learner will be able to do as a result of instruction, the conditions under which the student or trainee is going to perform and the statement of acceptable performance level should be included. In a simple form, an objectives is not what the teacher plans to put in a lesson but what the learners get from the lesson.

c. Select media and materials

Third step involves selection of available materials, modifying the existing materials and designing new materials. If the materials already available will allow the students to meet the instructional objectives, the materials should be used to save time and money. When the materials available do not match the objectives or not suitable for the audience, an alternative approach is to modify the materials. If this is not feasible, the final alternative is to design the suitable materials.

d. Utilize materials

In the fourth step, the teacher plans how the materials will be used and the time to be spent in using them. Next, the class is prepared and the necessary equipment and facilities kept ready. Then the lesson is presented using the materials. Finally, follow up with class discussion, small group activities, or individual projects or reports.

e. Require learner response

The fifth steps in ASSURE model require learners participation. Here learners practice what they are expected to learn and the correct response reinforced. In other words, the learners are actively involved with activities that will enable them to respond and receive feedback on the appropriateness of their performance or responses.

f. Evaluate and revise

The last step in the model is in reality two steps. Here the impact and effectiveness of instruction is evaluated to ensure the achievements of the objectives and the feasibility of the entire instructional process. Revision is then planned based on discrepancies between the intended and actual outcomes and any noted deficiencies of the methods or materials used.

3. **The Newby Stepich, Lehman and Russell PIE Model**

Newby, Stepich, Lehman and Russell (2000) model represent the PIE model which is portrayed in graphic form as shown in fig.2 below. Planning, implementing and evaluating are the three phases of the PIE model. This model is for classroom or workshop instruction and a shift from teacher centered to learner centered classroom environment with emphasis on use of media and technology to assist learners.

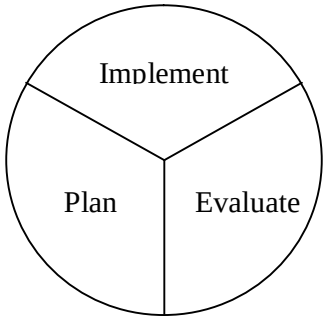

Fig.2. The Newby, Stepich, Lehman and Russell PIE model (2000).

a. **Planning:** This is the first phase of the model which involves gathering information about the learner, content and setting during instruction. It includes determining what the learner already knows, the role they are expected to play during instruction, the goal of instructional materials that exist and how technology can be used to increase the efficiency of planning and instruction.

b. **Implementation:** The second phase of the model addressed the various forms of media and methods to be adopted. It includes classroom management, how students attention and motivation can be maintained, and how technology can increase the impact of instruction.

c. **Evaluation:** This last phase of PIE model involves assessment of students performance and how to continuously improve performance. It assesses whether the quality and quantity of learning are at the level needed, what enrichment or remediation activities are necessary, how to improve materials and activities, and how technology can be used to measure the effectiveness and efficiency of instruction.

Novel Instructional Model for Effective Curriculum Implementation

The novel workshop-oriented instructional model developed by the researcher is required to teach the construction of any practical joinery or furniture topic in woodwork. The model shows a step by step procedure involved in the construction of any joinery work. The model which is represented in diagrammatic form as shown in fig.3 below is made up of seven major steps with step 3-6 having three activities, each to be performed in the construction of any joinery or furniture article. The model provides a common procedure for teaching competency-based practical exercises in the workshop, a feature which is lacking in the models reviewed. Specifically, the model among others, for example, will help to teach the construction of stop mortice and tenon joint and other practical topics to woodwork technology learners.

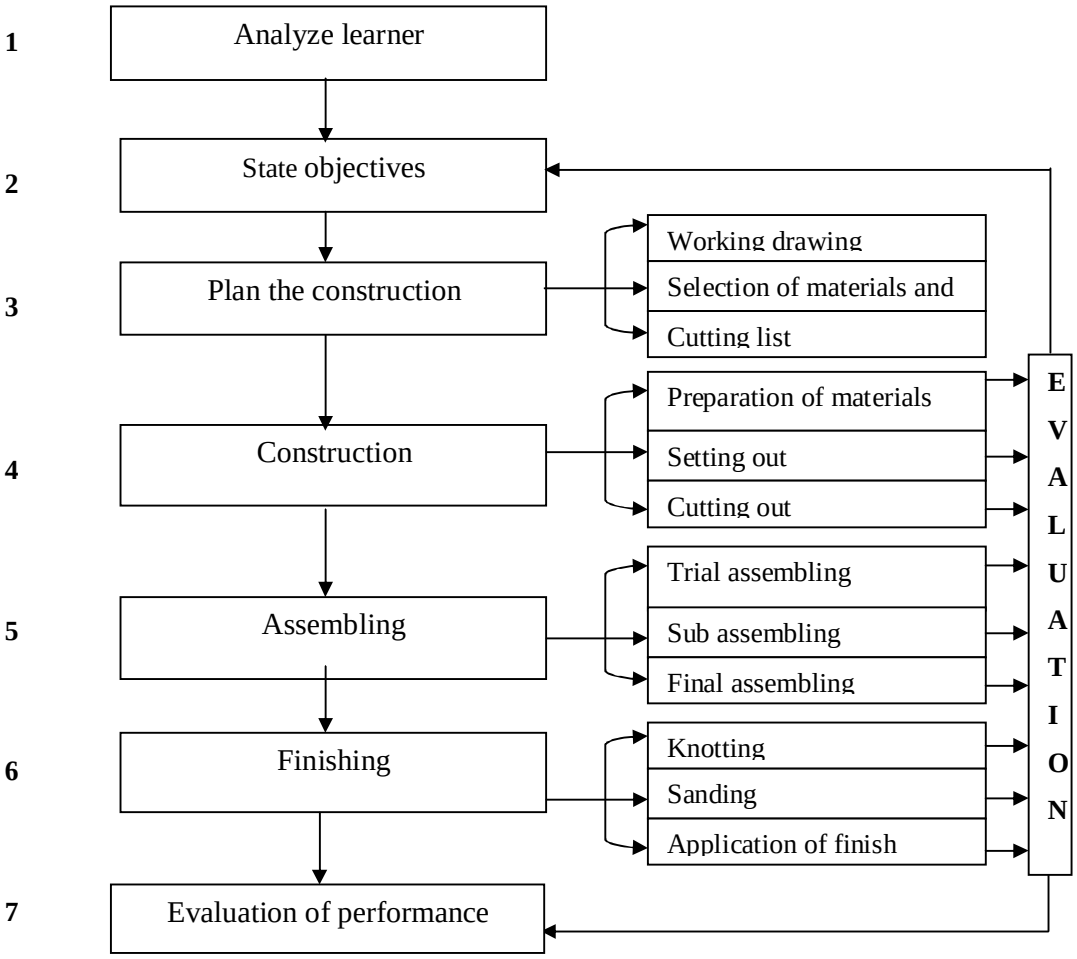

Fig.3. Novel Workshop Orientated Instructional Model

The description of the model is as follows:

1. **Analyze learner:** The first step in the model is to identify the target audience who may be a student or a trainee. That is, the learner or the class you teach. You must know your students in other to select the best medium to meet the instructional objectives. This is in terms of specific entry competencies such as previous background knowledge, practical skills and attitudes about the topic.

2. **State objectives:** The next step is to state the instructional objectives as specific as possible based on the topic. The objectives should be stated in terms of what the learner will be able to do at specific criterion level as a result of instruction. The condition under which the learner is going to perform and the acceptable performance level should be stated. For example, the student should be able to mortice a given piece of wood at 95% accuracy.

3. **Plan the construction:** The third step involves preparation of the working drawing of the practical work to be performed based on the topic, the selection of the materials, tools and equipment to be used, and the preparation of the cutting lists of the materials. Working drawing is a full size accurately constructed drawing intended to give all the necessary information of the article to be constructed, the methods of construction, the dimensions, sizes and shapes of

4.

5. the various parts, sections and specifications on the kind of fittings and finishing needed. (Walton 1976). Working drawing is usually produced in orthographic projection. Orthographic means to draw at right angle. On the other hand, cutting list is the summary of the materials required for the construction of the job. It indicates the type of materials to be used, the number of members and their sizes.

4. **Implementation:** The fourth step of the model is the construction of the article or job proper which consists of units of activities to be performed sequentially. They are: preparation of materials, setting out, cutting out and assembling.

a. **Preparation of materials:** This sub-unit involves planing the timber pieces to sizes, ready for setting out.
b. **Setting out:** This is otherwise called marking out. It involves marking out for the joints and positions of grooves, rebates, chamfers, mouldings etc if any on the work piece ready for cutting out.
c. **Cutting out:** This involves cutting out wastes from joints, planing grooves, rebates, chamfers, moulding etc ready for assembling.

5. **Assembling:** This implies putting or coupling work members together. It consists of three stages:
a. Trial assembling of members and joints without glue to ensure that they fit properly, square and out of winding.
b. Sub-assembling is required for such items like chairs, tables, framed carcasses etc. where it is necessary to glue up one or more units of the job separately, allowing them to dry before completing the assembling. This will enable any faulty part or members to be corrected before final assembling.
c. Final assembling consists of assembling the various sub- units to complete the job. However, it is necessary to clean up all internal surfaces and edges which cannot be planed after assembling before assembling.

6. **Finishing:** This is a term applied to the process of coating or polishing that gives a job its final appearance. This step of the model has three stages: knotting, sanding and application of finish explained below.
a. Knotting: Is the filling of holes, cracks and minor imperfections with a suitable compound colour to match the colour of the wood
b. Sanding: Is the smoothing or rubbing of sandpapers with the grain of the wood to ensure smoothness of the wood surfaces.
c. Application of finish: Is the spraying or polishing of the job with finishes such as paints, vanish etc. either for decorative, protective or hygienic reasons. It is carried out after sanding. In case of upholstery, all show wood should be finished before folding.

7. **Evaluation:** At this step of the model, competency attainment is evaluated to provide learners with immediate feedback on their performance. In this model, the trainee has to demonstrate mastery of the competence or skill learnt first and certified before he is allowed to move to the next skill, task or level. In other words, each task has to formatively evaluated and mastery attained before he progress to the next level. Success of the trainee is based on mastery of all the skills learnt and not on the course content, the principle typical of competency-based-training.

Conclusion

The National Policy on Education emphasized the study of technologies and acquisition of practical skills, relating to occupations in various sectors of economy and social life (FRN 2004). But

it is obvious that much have not been achieved in this direction. The novel workshop-oriented instructional model presented which dwells on the procedure involved in the construction of any practical joinery and furniture exercises for woodwork learners was designed for effective curriculum implementation. It is hoped that the effort will help to meet the set objectives of technology institutions.

Recommendations

Based on the developed instructional model, the following recommendations are made:

1. The model should be adopted for workshop practicals for woodwork learners. This will enable them to attain the desired level of performance in practical skills.
2. Teachers and instruction developers should be made to be aware of this model. The awareness will help them to employ it in teaching and learning.

References

Federal Republic of Nigeria (2004). *National Policy on Education*. Lagos: ERDC Press.

Gustafson, K. L. & Branch R.M. (2002). *A Survey of Instructional Development Models*. New York: Eric Clearinghouse on Information and Technology. Available: www.ed.gov.

Green, J. N. (2004). *Woodwork for G.C.E & C.S.E*. Bell & Hyman.

Gerlach, V. S. & Ely, D. P. (1980). *Teaching and Media: A Systematic Approach*. Eaglewood Cliffs, NJ: Prentice-Hall Incorporated.

Heinich, R., Molenda, M., Russell, J. & Smaldino, S.(1999). *Instructional Media and Technologies for Learning*. Upper Saddle River. NJ: Mcrrill. Prentice Hall.

Newby, T., Stepich. D., Lehman. J. & Russell, J. (2000). Instructional Technology for Teaching and Learning: Designing Instruction, Integrating Computers and Using Media. Upper Saddle River, NJ Prentice-Hall.

Walton, J.A. (1976). *Woodwork in Theory and Practice*. London: Australasian Publishing Company.