

TASK ANALYSIS OF CURRICULUM CONTENT FOR EFFECTIVE WORKSHOP PRACTICE

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Abstract

In this paper, task analysis of curriculum content for effective workshop practice was examined. It defined curriculum content as the subject matter or topic that are contained in curriculum document. The curriculum content could be in form of knowledge, concept, facts, principles and skills to be taught to learners. The concept of workshop was discussed, explaining school workshop as a class, building, or room where students learn the methods and skills used in carrying out a work or repairing something. It sees workshop practice as the most effective instructional method used by technical teachers in teaching occupational skills, therefore maintained that school workshop should be seen as a mini industry that should be equipped for effective practical skills development in learners. For effective workshop practice and good job performance of students, the paper submitted that the broad curriculum content have to be analysed to break it down into teachable units. The task analysis conducted in this paper presented a step-by-step procedure to be followed to accomplish instructional tasks and the stated objectives. The approaches for conducting tasks analysis were highlighted. It was recommended among others that the workshop of technical institutions should be seen as a mini industry and equipped for effective workshop practice.

The curriculum of Technical and Vocational Education and Training (TVET) is theoretical and practical skills oriented. In line with this assertion, TVET is defined as a comprehensive term referring to those aspects of education process involving in addition to general education the study of technologies and related sciences and the understanding and knowledge relating to occupations in various sectors of economic and social life (Federal Republic of Nigeria, FRN, 2014). This definition implies that TVET is that aspect of education which leads to acquisition of practical and applied skills as well as basic scientific knowledge. It is recognized as one of the most effective human development strategies to train and prepare technical workforce for rapid technological development, industrialization and economic growth (Afet, 2012).

The goals of TVET apart from preparing students for further education are to:

1. Provide trained manpower in the applied sciences, technology and business particularly at craft, advanced craft and technical levels.

2. Provide technical knowledge and vocational skills necessary for agricultural, commercial and economic development, and
3. Give training and impart necessary skills to individuals for self-reliance economically.

These objectives are directed towards acquisition of practical skills and competencies which enable individuals among others to secure employment at the end of the programme, to set up their own business and be able to employ others.

In pursuance of technical college programme of TVET, the curricular activities are structured in foundation and trade modules. The module as used here is curricular or educational unit which covers a single trade, subject or topic. Emah (2014), added that a module involves designing a self-contained formally structured learning experience with explicit set of teaching strategies, learning opportunities and evaluation guideline. It shows the team, topic or break-down, the objectives, instructional strategies, learning activities, the instructional resources or evaluation guidelines (Ime, 2018). Teachers can prepare unit plans, lesson plans and lesson notes from the information provided by modules, therefore a useful guide to guide to teachers. The modular approach to selection of content is commonly used in technical and vocational education because it has complete units of instruction that provide employable skills (Udosen, 2018).

The curriculum for each trade consists of five components such as general education, theory and related courses, industrial and productive work, entrepreneurial training as well as workshop practice. A critical look at the features of this curriculum shows that it is practical skills oriented, therefore requires effective workshop practice for learners to be competent workers on graduation. In order to have good knowledge of production processes, manufacturing and repairing services, there is need for learners to be trained in a well equipped workshop for effective workshop practice.

Workshop practice is the practical activities carried out in the workshop. A workshop can be described as a room where things are made or repaired. In educational institutions such as technical colleges, workshop practice is carried out in the technical workshop for students to acquire practical skills and competencies as contained in the curriculum content.

Curriculum content is referred to as what is taught to learners in the school system (Udosen, 2018). It includes the cognitive, affective and the psychomotor skills. The cognitive skills is concerned with theoretical knowledge, the affective the value system while the psychomotor skill is for manipulative skills to be developed in students. The curriculum contents are usually broad and cannot be used in the raw form until it is broken down into smaller units. The breaking down of the curriculum content into smaller segments is known as content analysis.

For effective teaching and learning, the curriculum content is first of all broken down into smaller segments or teachable units. The units are then reduced into jobs, duties and finally into tasks. Tasks are series of activities or actions leading to meaningful job outcome. Each task can be performed independent of other tasks as a task has definite beginning and definite end. The task for performance of job is derived through task analysis. Having known these, let us look at the meaning of curriculum content.

Meaning of Curriculum Content

Curriculum content can simply be defined as the subject matter or topics that are contained in a curriculum document. Curriculum content can also be described as body of facts, information, ideas, values, concepts, principles, theories and skills that are presented or taught to learners as courses or subjects (Izuagba, Obiefuna&Anyanwu, 2012, Nzewi&Ibenegbu, 2018). This description shows that curriculum content is what is to be studied or taught by the teacher to the learner in teaching learning process. It is the totality of what is taught in the school system that are desirable to the individuals and the society. To Udosen (2018), it is the means through which the ends are met.

The content component of the curriculum refers to the important facts, concepts, principles, and laws to be taught to learners in the school. It could be in form of knowledge, attitudes, values, practical skills and competencies that are exposed to learners. Curriculum content is the information that is learned in the school which can come in form of texts, audio and video. This implies that curriculum content can inform, enlighten, entertain or teach learners good values. In its totality it includes the cognitive, affective and psychomotor skills. That is, the knowledge, the value system and manipulative skills.

The purpose of curriculum content is to furnish learners with valuable information thereby enabling them to attain maximum self-sufficiency in knowledge and practical skills. It develops the cognitive, affective and psychomotor skills in learners in order to achieve the set curriculum objectives. Curriculum content leads to acquisition of knowledge and manipulative skills that are considered useful to the individuals and the society. This might be the reason why it is considered as the most important component of the curriculum document. According to Duru (2011), Eze, Iwuamadi, Ajeka (2015) and Amadi (2018), curriculum content include the knowledge, capabilities and skills that are included in various courses or subjects' learners study in school which vary from subject to subject. While some contents are theoretical or knowledge-based as in arts subjects such as Literature, English language, History, etc. others are practical in nature as we have in vocational technical education, engineering and entrepreneurial studies where acquisition of practical skills is the main focus of instruction. Skill is the ability to do something (Okimedim, 2015). This implies having a particular ability to perform practical activities through training. It is the application of knowledge, ability or attitude to performance of task. A task may have one or more skills. Practical skills on the other hand, are manipulative tasks performed to a specific level of mastery or competency. It is also the ability to do something or perform a task practically as a result of training. Practical skills are skills acquired through practical training in technical vocational institutions. The curriculum content for development of practical skills involves acquisition of knowledge, mastery of skills and development of desirable work habits (Okparaekwe, 2021).

The teaching of curriculum content could be in the classroom, laboratory, workshop or any enabling environment. But, while the theoretical knowledge is usually taught in the classroom, the experimental studies or practical work is carried out either in the laboratory or

workshop through a laboratory or workshop practice. With this in mind, let us know the meaning of workshop.

Workshop: Concept Clarification

Before we delve into workshop practice, let us first of all know the meaning of a workshop. Hornby (2010) defined workshop as a room or building in which things are made or repaired using tools or machineries. A workshop can also be referred to as a manufactory, a plant, a factory, a shop workroom or a room for work. It is a building or set of buildings for the manufacturing of goods (Merriam Webster Dictionary, 2021). A workshop is a seat for production and a place for making or repairing goods, machineries, vehicles and other different types of article. In educational institutions, a workshop is described as a class, building or room in which students learn the methods and skills used in carrying out a work or repairing things. It is a place where workshop practice takes place. Typical examples of workshops are automobile workshop, carpentry workshop, building workshop, mechanical workshop, etc.

The purpose of establishing workshop or laboratory in vocational technical institutions is to create an enabling environment where practical skills are taught and learnt. In ideal situation, a workshop in educational institutions should be seen as a mini industry, therefore should be a replica of the industrial workshop where the students will work on graduation. Technical workshop should contain various tools and equipment, and consumable materials for effective workshop practice.

Workshop Practice: The Meaning

Workshop practice is all the practical activities and practices that are carried out in the workshop such as building, woodwork, electrical, mechanical, welding, and automobile and other workshops to develop practical skills and competencies in learners. Workshop practice involves students working with hand tools, machine tools portable power tools and consumable training materials in the workshop to ensure that students acquire the intended practical skills for work. Workshop practice is one of the most effective instructional methods used by technical teachers to develop occupational skills in learners. In workshop practice, students are exposed to the workshop environment where they are given the opportunity to carry out practical activities to enable them to acquire the intended practical and manipulative skill that equips them for the industry and related fields.

Effective workshop practice gives the basic practical knowledge required for the production of various engineering products. It expose learners to the use, function, and application of different tools, equipment and machines as well as the technique and procedure involved in the production, manufacture and repair of some products from the raw materials. Workshop practice is therefore the key to the skilled manpower development (Obi, Nwachukwu& Obi, 2021).

In order to have good knowledge of production, manufacturing and repairing processes, it is necessary for students to be conversant with workshop environment and

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workshop practices. Workshop practice included in the curriculum of technical colleges and other related vocational institutions provides hands-on experience about the use of engineering materials, tools, equipment and the processes involved in the field. Through workshop practice, the learner develops dignity of labour, safety consciousness, team work and work habit that are necessary in the world of work.

Effective workshop practices involve;

- Identifying the skills to be practiced or learnt
- Conducting content and task analysis
- Preparing working drawing
- Assigning the suitable tools and consumable materials to be used to students
- Demonstrating in sequence of operation the skills or tasks to be mastered
- Giving the students the opportunity to practice the skills demonstrated, and
- Evaluating students performance to ensure that they have mastered the desired skills

For successful workshop practice, the students should first of all be informed about the related theoretical knowledge of the practical work, and the content analysed to identify the topic or skill to practice. This leads us to content analysis.

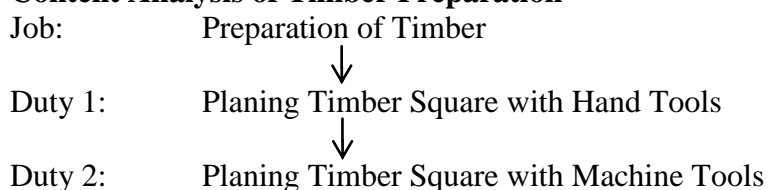
Content Analysis

We have known that curriculum content is what to be taught by the teacher and learnt by the students. The curriculum content in its raw form is very broad, and very bulky to teach as a unit. It cannot be taught to learners without first of all breaking it down into smaller segments or teachable units. Based on this explanation, content analysis can be defined as the process of reducing or breaking down the curriculum content into smaller teachable units. It is specific description of content or subject matter of the curriculum to identify the teachable units.

The break-down of a broad content into sub-units also known as job analysis forms the subject matters that are taught at different lesson periods. The units of instruction can be referred to as duties. The duties or topics can further be broken down into tasks. Tasks are series of activities to be followed to perform the job.

Typical example of a broad content or job that can be analyzed is preparation of timber in Woodwork Technology. This content cannot be taught as a unit until it is analysed or broken down into instructional units as shown in content analysis “Timber Preparation” below. Preparation of timber means to plane a piece of timber square

Content Analysis of Timber Preparation



In this job analysis, the job “Preparation of Timber” is broken down into duties or instructional units, duty 1 and duty 2 to make it teachable. The implication of this is that we should always breakdown our content into teachable instructional units. The duties 1 and 2 are the topics to be taught at different lesson periods. For clear understanding, let us discuss task analysis.

Task Analysis

First of all, a task is defined by Hornby (2010) as an activity designed to help achieve a particular learning goal. It is series of actions or activities that leads to meaningful job outcomes. It describes the step-by-step process involved in performing a job (Duru, 2015). In task analysis, each task can be performed on its own without depending on other task. This implies that a task is self-sufficient. The performance of a task also has definite beginning and definite end.

Task analysis, is used to determine how a job is performed or how to perform a job. It also document series of performance or activities to be carried out to accomplish a practical task. Basically, task analysis is a systematic process of:

1. Breaking a task or instructional objectives into step-by-step procedures required to accomplish a given job or instruction.
2. Identifying different types of learning that can facilitate the mastery of each procedure, and
3. Specifying the conditions necessary for effective learning of each task (Dike, 2006).

Task analysis is therefore, the next step to carry out after performing job or content analysis. Before we carry out task analysis, let us have better understanding of the concepts job analysis and duty.

Job analysis is the process of gathering and analyzing information about the content and the human requirements of a job as well as the context in which the job is performed. It is performed to determine what are included in a job, and defined the organization of jobs within job families. Job analysis is the process used to breakdown a job into duties and tasks. Duties on the other hand, are the major divisions of work in a job (Duru, 2015). Each duty is made up of a group of related tasks. When job and task analysis data are combined it shows exactly the tasks that are included in a particular job as well as how the job is to be performed.

Task analysis therefore helps to develop the training materials that enable learners or performers to perform a task. In task analysis, all the related tasks that are to be performed are identified. For clarity, the task analysis showing job, duties and tasks in timber preparation using hand tools is illustrated as follows:

Task Analysis

Job: Preparation of Timber
Duty: Planning Timber Square with Hand Tools

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- Major Task A:** Select Face Side
- Task Steps
1. Observe work piece
 2. Select face side
 3. Indicate face side with a mark
- Major Task B:** Select Face Edge
- Task Steps
1. Observe work piece
 2. Select face edge
 3. Indicate face edge with a mark
- Major Task C:** Plane Face Side
- Task Steps
1. Place work piece on bench side facing up
 2. Support work piece on bench stop
 3. Plane face side flat out of twist
 4. Test for flatness
 5. Put face side mark 'J'
- Major Task D:** Plane Face Edge
- Task Steps
1. Place work piece on bench face edge facing up
 2. Support work piece on bench stop
 3. Plane face edge square to face side
 4. Test face edge square to face side
 5. Put face edge mark joining face side mark “” ^
- Major Task E:** Plane Work Piece to Width
- Task Steps
1. Set marking gauge to required width
 2. Gauge to work piece to width
 3. Place work piece on the bench waste wood facing up
 4. Support work piece on bench stop
 5. Plane off waste wood to gauge lines
 6. Test for squareness with adjacent sides
- Major Task F:** Plane Work Piece to Thickness
- Task Steps
1. Set marking gauge to required thickness
 2. Gauge work piece to thickness
 3. Place work piece on the bench waste wood facing up
 4. Support work piece on bench stop
 5. Plane off waste wood to gauge lines
 6. Test for overall squareness

Following this procedure, the timber is now planed square.

Description of Task Analysis Document

The completed task analysis document contains the job, duty, major tasks and task steps. The job, Preparation of Timber is the broad curriculum content or job that is broken down into two duties – planing of timber square with hand tools and planing of timber square with machine tools as shown in the content analysis.

The duties serve as the teachable topics or the subject matter that resulted from the content or job analysis, which can be taught at different lesson periods. The task analysis has six major tasks. The six major tasks A – F are the instructional units to be performed. Each of the major tasks also has sub-units or task elements. The task elements or steps are the step-by-step procedures or activities to be followed in order to perform the major tasks in order to achieve the objective of the lesson. Let us look at the approaches for conducting task analysis.

Approaches for Conducting Analysis

The approaches for conducting task analysis are:

1. Stimulus – Response – Feedback approach
2. Learner sequencing approach
3. Time sampling approach
4. Critical incident technique, and
5. Job inventories (Dike, 2006)

These approaches are briefly discussed one after the other as follows:

Stimulus-Response-Feedback Approach

Stimulus-response-feedback approach to task analysis was conceived by Miller in 1962 who believed that every task should have a source of discrepancy, the discrepancy itself, remedy prescription and application, and knowledge of result or feedback.

- **Source of discrepancy:** Every task to be performed in a training programme has source of the problem. In technical colleges, for example the problem, gap or the discrepancy could be that the students lack knowledge of the skill required to perform a certain task. In this case, training is needed to enable the students to acquire the knowledge or perform the skill.
- **The discrepancy itself:** Discrepancy as used here could be inconsistency, anomaly or a problem. This means that there must be an indication of a problem, an anomaly or discrepancy before the training or task analysis should be conducted. In other words, there must be need for performing the task. A need is a discrepancy or gap (Eze, Iwuamadi&Ajeka, 2015). It is the difference or the extent to which the actual situation deviates from the expected or ideal situation. That is, the gap between the present condition and the desired condition. If needs analysis proves that the students lacks the knowledge for performing a task, it shows signal or need for training as well as the need for task analysis.

It does not necessarily mean that test must be conducted to identify a need. Needs can be identified through other means. If it is observed that students cannot perform a certain task correctly through simple pretest. This observation serve as an indicator that there is problem and the need for training.

- **Remedy prescription and application:** Training programmes must have ways of solving or rectifying the identified problems and the procedures to be followed in solving or rectifying the problem.

- **Knowledge of result or feedback:** Every training programme must have the means of making the trainees to know their performance or result, as well as a way of making the trainer to know the effectiveness of the programme. While the knowledge of result can motivate the students and spurs them on, feedback enables the trainer to know the strength and weakness of the programme, and the need for improvement. Feedback is a helpful information or criticism given to trainer on how to improve performance or product. It is signal or clues that inform a trainer about the adequacy of his performance.

Generally, the knowledge of result or feedback helps to know the strength and weakness of learners and that of the programme (Duru, 2014).

Linear Sequencing Approach

In this approach, the training content is analyzed into step-by-step details to enable a student who has no knowledge of the procedure to be performed to read the analysis and perform the task correctly without assistance from the instructor or fellow students. However, this technique is mostly suitable for simple tasks than complex tasks. For this reason, branching system is used to take care of complex tasks that require many decisions when performing task.

Job Inventory

This approach uses structured questionnaire that have a list of procedures to be followed in performing the task. Brainstorming technique is used to construct the questionnaire. To construct the questionnaire, about eight to twelve experts are charged to generate the essential steps or sequence of operation to be followed for effective performance of a task. The steps generated are incorporated into the questionnaire and rated by randomly sample of employees in terms of job performance and time frame for performing a task. After the rating, average score for each step is worked out and used for developing the training programme.

Time Sampling

In this approach, observers are trained to observe work activities. Observers who make direct observation of work activities of randomly selected workers at fixed time intervals are trained. These observers move from one work station to another to observe and record what job or amount of work that have been performed at a given time. Later, the records are analyzed to identified how job were sequenced and performed.

Critical Incident Technique

In this approach, a training manager identifies knowledgeable people such as supervisors, foremen, instructors, and others who are conversant with the aims and objectives of a given job, and who see operatives perform job regularly. The job analysts interviews and ask them to describe incidents of effective and ineffective job behaviours they have observed

for the past six months to one year. From this interviews, the analysts collect about five effective and ineffective job behaviours about the job from each observer. These records are then analysed for job and performance improvement.

Conclusions

In technical institutions such as technical colleges, workshop practice is carried out in the technical workshops where the students acquire practical, skills and competencies as contained in curriculum content. This could be the reason why curriculum content is described as the totality of what is taught in the school and the most important component of the curriculum which is desirable to the students and the society.

A workshop has been seen as a seat for production, and a place for making or repairing goods, machineries, vehicles and other different types of articles to serve humanity. In educational institutions, particularly technical colleges, a workshop is described as a class, building or room where students learn the methods and skills used to carry out work and repair services. This creates an enabling work environment where effective workshop practice takes place. Effective workshop practice among others involves:

1. Identifying the skills to practice
2. Conducting content and task analysis
3. Performing the tasks

While content analysis reduces broad curriculum content into teachable units, task analysis specifies step-by-step procedures followed to perform a job.

The broad curriculum contents, timber preparation in Woodwork Technology for example, was broken down into teachable units through content analysis while task analysis presented the step-by-step procedures to be followed to perform the job effectively. After the task analysis, the approaches for conducting task analysis were discussed.

Recommendations

It was recommended that:

1. Workshops in technical institutions should be seen as a mini industry and be well equipped. This will provide enabling work environment for effective workshop practice.
2. Technical educator should be conversant with content analysis. This will help them to break down the broad curriculum contents into teachable instructional units.
3. Technical educators should always conduct task analysis of their practical topics. This will provide the procedures to be followed by students to perform practical tasks effectively.

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