

An Investigation of Media Selection Parameters for Teaching and Learning of Introductory Technology in Junior Secondary Schools

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Abstract

This study investigated the influence of media selection parameters on educational media. Specifically the study investigated the joint and separate contributions of Availability of media, Cost, Facilities, Instructional objectives, Learner's characteristics, Motivational value, Sense of appeal and Teachers' ability on the selection of Video instructional format for teaching Introductory Technology in junior secondary schools (JSS). The participants (n=153) were Introductory Technology teachers selected from ten (10) local government areas (LGAs) in Osun State. The study adopted survey research design. Data was collected using Media Selection Questionnaire. ANOVA (Analysis of Variance) and Regression analysis were used. Alpha was set at 0.05. Results indicated that the eight independent variables jointly contributed to the dependent measure. Also, each of the eight independents variables contributed significantly to the selection of video cassette instruction.

Keywords: Investigation, Media selection parameters, Teaching and Learning, Introductory technology.

1. Introduction

Teaching and learning of any subject can only be effective when teachers are able to select appropriate media. Since media are not equally effective for a particular purpose, the role of teachers, therefore, is to select an effective medium and see that it is used to an advantage. Media selection according to Abolade (1998; p 9) is referred to the "modality for choosing an educational material for teaching or learning a specific topic". Whatever educational media a teacher intends to use, there should be factors that will determine the selection of such media. Educational media selection is multidimensional process, that is, it involves not only the consideration of factors that will guide the teacher, but also involves consideration of strengths and weaknesses of such media (Abolade,1998 & Akinwande,2003), characteristics of the media (Adekomi,2005) as well as the effective evaluation of such an educational medium (Abolade,1998 & Akinwande, 20003). In view of these points, teachers should be skilful in media characteristics and evaluation before any meaningful media selection can take place. There are various media selection approaches (e.g. Gagne, Briggs & Wager, 1992; Criticos, 1994; Kirkwood, 1994; Kemp, Morrison & Ross, 1994; Clark & Sugrue, 2000; Abimbade, 1997; Akinwande, 2003). Since there is no existing adequate practical theory for selecting media to teach a given topic, learning task and target population, teachers are not restricted to any model of selection as the most important thing is to select media that will be able to achieve the desired objective. For the purpose of this study, therefore, the researcher will anchored on the following media selection parameters; Availability of media (Abimbade,1997;Gagne, Briggs &Wager,1994;Kemp,Morrison &Ross,1994), Cost (Gagne, Briggs &wager 1994; Ajelabi,2000;Akinwande,2003),Facilities(Criticos,1994;Gagne,Briggs&wager1994; Ajelabi,2000), Instructional objective (Criticos,1994; Abimbade,1997; Gagne, Briggs &Wager 1994; Ajelabi,2000 ; Akinwande, 2003;Salih,2004), Learners' characteristics (Criticos,1994;Gagne, Briggs & Wager 1994; Abimbade,1997, Abolade,1998; Akinwande,2003), Motivational value (Akinwande,2003; Salih,2004), Sense of appeal (Gagne, Briggs & Wager 1994), Teachers' ability (Gagne, Briggs & Wager 1994; Abimbade,1997; Akinwande,2003).

1.1 Approaches to Media Selection

According to Kemp, Morrison and Ross (1994) cited by Sugrue and Clark (2000), there are three different approaches to media selection:

- Selection based on what is readily available.
- Selection on the basis of what a teacher is most comfortable using (this assumes that a teacher is the principal medium).
- Selection on more objective basis whereby some guideline can be followed, so that selection can be justified in a non –subjective manner.

They further stated that the selection of different media for different topics and learning task is controlled more by logistics, economics and human factors than by pedagogical consideration. This is because user friendly pedagogical criteria have not been developed to date: as a result, there is no consensus on the adequacy of any existing selection models Koumi (1994). There are various media selection model : Riser and Gagne (1982): Romiszowski (1988), Main and Paulson (1988), Heidt (1989): Gagne, Briggs and Wager (1992): Cantor (1988).

None of the models developed to date can be regarded as an easy to handle satisfactory instrument. Some only identify factors, which should enter the decision making process, while others suggest procedures, in which usually a sequence of difficult operations end, in some common sense decision (Sugrue and Clark, 2000). Since there does not exist an adequately practicable theory for selecting media appropriate to given topics, learning tasks and target population; Koumi suggested that the most common practice is not to use a model at all. In view of above submission, this section will deal with the various factors that may influence selection of educational media as viewed by different scholars in the field.

Koumi (1994) cited in (“media selection,” 2001) sees decision about media selection to be based on task, effect and cost, while Salih (2004) sees cost, accessibility, social-political suitability, cultural friendliness, openness/flexibility, motivational value, interactivity and effectiveness, as the parameters for media selection.

Criticos (1994) identified the following as the factors that influence media selection based on Romiszowski’s model:

- Subject matter
- Teacher’s attitude and skills
- Target population
- Practical constraints
- Physical conditions

Gagne, Briggs and Wager (1992) identified the following practical factors to be considered in media selection:

- What size of group must be accommodated in one room on a single occasion?
- What is the range of viewing and hearing distance for the use of the media?
- How easily can the media be “interrupted” for pupils responding or other activity and for providing feedback to the learners?
- Is the presentation “adaptive” to the learners’ response?
- Does the desired instructional stimulus require motion, colour, still picture, spoken words, or written words?
- Is sequence fixed or flexible in the medium? Is the instruction repeatable in every detail?
- Which media provide best for incorporating most of the conditions of learning appropriate for the objective?
- Which media provide more of desired instructional events?
- Do the media under consideration vary in probable “affective” impact for the learners?
- Are the necessary hardware and software items obtainable, accessible and storable?
- How much disruption is caused by using the media?
- Is a backup easily available in case of equipment failure, power failure, film breakage and so on. ?
- Will instructors need additional training?
- Is a budget provided for spare parts, repairs, and replacement of items that become damaged?
- How do cost compare with probable effectiveness?

Gagne and Wager (1992) also suggested how media could be selected using learning outcome by stating what should be excluded and considered (Table 1).

According to Abimbade (1997), before a teacher could select and use materials which will enable the learners to master the desired objectives, the following questions must be answered by the teacher:

- What medium/ media would I like to use for each instructional event?
- Where will I find the specific materials?

Answering question one will provide the rationalization to use and select any medium while question two is to provide answer to where the selected media is located. Abimbade then provided the following consideration for media selection:

1.2.1 The Task: Task here means the work that must be accomplished; that is, the needs or the problems. The task to be performed has been spelt out in the curriculum in form of subject matter.

1.2.2 The Behavioural Objectives: In deciding instructional materials to use, the behavioural objectives should be considered. Behavioural objectives are very important features in deciding which of the available media will carry the message to achievement stage.

1.2.3 Practicability of the media: Practicability here means using appropriate materials for appropriate situations. For instance, where motion picture is needed to teach certain, concept, using slide may not be appropriate.

1.2.4 Pupils Learning Styles: Selection of educational media should be based on the uniqueness of individual, That is, individual differences in terms of readiness, ability, physical and emotional states should be taken into consideration. In order to meet individual learning style, Fakomogbon (1996) opined that technology can be used to compensate for sensory impairment of handicapped learners, for instance, video can be/has been employed to translate print to textual mode and sound mode for the benefit of the hard of hearing and blind respectively.

1.2.5 Availability of media: Media to be selected to teach a topic/concept in a subject must be readily available. This view is shared by Akinwande (2003). According to him selection of media should be based on the range of resources available..... (p.536). but in a situation whereby the media to be selected cannot be available as a result of cost, the teacher needs to improvise using available local resources.

1.2.6 The Teacher's ability: Apart from the factors mentioned above, the teacher's ability in terms of media use, selection and operation is a vital factor. It will be a wasteful effort for a teacher to have selected appropriate equipment for teaching but unable to use/operate such equipment. In view of this, Abimbade (1997) and Adekomi (2005) opined that a teacher should be versatile in media education and media technology prior to certification in teacher education training programme.

Akinwande (2003) summarized the factors that influence media selection as follows:

- Some media are more likely to lack credibility with special population.
- Some media are better in attracting and holding audience attention than others.
- Some media are more complex to use than others.
- Some media have better outreach impact than others.
- Some media allow for more participation than others.
- Some media have 'political' advantage over others.
- Some media cost less than others, and
- Some media are more appropriate for providing certain types of information than others.

According to Ajelabi (2009) cited in Ojewumi (2001), factors for selecting educational media should include:

- Statement of objective.
- Suitability.
- Content accuracy.
- Adaptability.
- Size of the class.
- Availability of media.
- Cost.
- Operating facilities.

The study therefore, shall seek to ascertain the influences of Availability of media, Cost, Facilities, Instructional objectives, Learners' characteristics, Motivational value, Sense of appeal and Teachers ability as the parameters for selecting video cassette instruction for teaching and learning of Introductory Technology in JSS in Osun State.

1.3 Statement of the problem

Most of the time, researches on media have generally been concerned with measures of effectiveness of an instructional media on student's achievement in various subject areas. This paper therefore, determines the influence of availability of media, cost, facilities, instructional objective, learners' characteristics, motivational value, sense of appeal and teachers ability as the parameters for selecting educational media for the teaching and learning of Introductory Technology.

1.4 Scope of the study

The scope of this study is to determine the joint and specific contributions of media selection parameters (availability of media, cost, facilities, instructional objective, learners' characteristics, motivational value, sense of appeal and teacher's ability) on the selection of video cassette instructions to teach Introductory Technology in junior secondary schools (JSS) in Osun State, Nigeria.

1.5 Research questions

This study specifically provided answers to these research questions:

To what extent will the eight media selection parameters influence the selection of video cassette instruction to teach Introductory Technology?

What is the relative (separate) contribution of each of the eight media selection parameters on the selection of video cassette instruction to teach Introductory Technology?

2. Methodology

2.1 Research design: The study was an ex-post facto type of research which adopted Survey design.

2.2 Variables of the study

2.2.1 Independent variables: Media selection parameters

- Availability of media
- Cost
- Facilities
- Instructional objective
- Learners' characteristics,
- Motivational value,
- Sense of appeal,
- Teacher's ability

2.3 Dependent variables

Model of instruction: Video cassette instruction.

2.4 Sample and sampling technique

The population of this study consisted of all Introductory Technology teachers in all the public JSSs in Osun State. The researcher adopted stratified random sampling technique for the selection of 10 LGAs. From each local government, all the Secondary Schools offering Introductory Technology as subject in Junior Secondary classes were selected for the study. The sample for the study involved 153 Introductory Technology teachers from 10 LGAs selected from the 30 LGAs in Osun state (Table2).

2.5 Instrument

The instrument used for the study is Media Selection Questionnaire (MSQ) which was designed and constructed by the researcher to elicit responses from the teachers on the factors that will guide them in selecting Video cassette instruction for lesson(s) to be taught in Introductory Technology. The questionnaire has two sections: section 'A' - Biographical information (contains seven items: Name of the school, Local government area, Class, Gender of the teacher, Qualification, Teaching experience and Class size). Section 'B' - dealt with factors that influence selection of video cassette instruction covering eight items. In this section, teachers were asked to rank the factors as they perceive them to influence their choice using these points; 1,2,3,4,5,6,7,8. The factors were arranged in alphabetical order while the scoring was done in the reverse order. MSQ was given to experts in Educational Technology in a College of Education and a University for validation. The validated questionnaire was administered on 20 teachers who were not from the sample for the study. A reliability test using Cronbach alpha revealed a reliability of 0.86, which was considered good enough for the research study.

2.6 Procedure of data collection

The researcher conducted the study with the help of two research assistants. These research assistants were trained on how to administer MSQ. The researcher carried out the data collection in all the secondary schools that met the criteria in the selected LGAs of Osun-West senatorial district, while the other research assistants conducted the data collection in the Secondary schools in the selected LGAs in Osun-Central and Osun-East senatorial districts. The administration of MSQ was carried out on the first visit to teachers. At the second visit, the researcher and the research assistants collected the remaining questionnaires that were not returned on the first day.

2.7 Method of data analysis: The data collected was analyzed using multiple regression analysis and ANOVA.

3. Results

The results of this study are presented as follows:

3.1 Research Question 1: To what extent will the eight media selection parameters affect the selection of video cassette instruction to teach Instruction Technology?

In table 3a, the eight independent variables when taken together correlate positively with the dependent variable ($R=0.847$). This means that the eight independent variables have influence on the selection of video cassette instruction. Also, the adjusted R^2 value of 0.701 from the table indicated the 70.1% of the total variance in the dependent measure is accounted for by the eight independent variables when taken together. The remaining 29.9 % could be due to the other media selection parameters not included in this study. The adjusted R^2 value is tested for significant using ANOVA in table 3b. The ANOVA table indicates that the adjusted R^2 value is significant at 0.05 alpha levels ($F(8; 152) = 45.520; P(0.000) 0.05$).

3.2 Research Question 2: What is the relative (separate) contribution of each of the eight media selection parameters on the selection of video cassette instruction to teach introductory technology?

Table 4 shows that all the eight independent variables have significant influence on the selection of video cassette instruction for the teaching of Introductory Technology. The order of contribution of each of the eight independent variables are in the following decreasing order: Availability of media ($\beta=1.273; t=16.357; p < 0.05$), Teachers' ability ($\beta=0.897; t=10.429; p < 0.05$), Facilities ($\beta = 0.753; t = 12.12.294; p < 0.05$), Cost ($\beta = 0.688; t = 8.845; p < 0.05$), Motivational value ($\beta = 0.564; t = 7.988; p < 0.05$), Instructional objectives ($\beta = 0.516; t = 8.028; p < 0.05$), Learners' characteristics ($\beta = 0.498; t = 7.427; p < 0.05$), sense of appeal ($\beta = 0.352; t = 5.339; p < 0.05$).

4. Discussion of Findings

Contributions of the eight media selection parameters on the selection of video cassette instruction for teaching and learning of Introductory Technology

The result in table 3a and 3b reveal that the eight variables when taken together seem to be effective in predicting selection of video cassette instruction to teach Introductory Technology in junior secondary schools. From the tables 3a and 3b, the obtained F-ratio is significant at 0.05 levels, and this is an indication that the effectiveness of the combination could not have occurred by chance. The magnitude of the correlation between the independent variables with the dependent variable is reflected in the correlation values of multiple regression (0.847) and multiple R (0.701) in table 3a means that 70.1% of the total variance in the dependent variable could be accounted for by a linear combination of the eight variables while the remaining 29.9% could be due to other variables not considered in this study as well as residuals. Such variables may include interactivity, flexibility, size of the class, practicability, linearity, maintenance and availability of technical staff (Kirkwood 1994). The t-value of t-ratio in relation to the variables as shown in table 4 indicates that each of the variables contributed significantly to the selection of video cassette instruction. The values of the standardized regression (Beta) weight associated with the variables in table 4 reveal that availability of media is the most potent while the sense of appeal is the least potent of the eight independent variables. Again, availability of media made the greatest significant contribution to the selection of video cassette instruction. While sense of appeal made the least contribution. This finding supported the media selection factors given by Abimbade (1997), Salih (2004), Akinwande (2003), Ajelabi (2000) cited in Ojewumi (2001) and Kemp, Morrison and Ross (1994) Clark & Sugrue (2000).

5. Conclusion and Recommendations

The study has shown that all the eight variables jointly contribute to the prediction of selecting video cassette instruction for teaching and learning of Introductory Technology in JSSs. Also, the study revealed that availability of media is the most potent factor that influences the selection video cassette instruction. In the light of this finding, the following are therefore recommended:

Teachers should take note of these variables and some other ones as they may influence selection of appropriate media for teaching and learning. Media education should be part of teacher education programme and in selecting appropriate media for teaching and learning; teachers should be conversant with media affordances and constraints. Since media are not equally effective for a particular purpose, teachers should select appropriate media for the purpose. Government should provide in-services education in media training course for up-grading teachers in the use of educational media. Government should compulsorily establish in all secondary schools resource centres, so that teachers and students could be assisted in selecting and producing instructional media for teaching and learning. Also, more funds should be made available for the production and procurement of educational media. Lastly, instructional developers and designers should be encouraged in producing instructional materials relevant for teaching and learning.

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Table1: Media selection by learning outcome.

Learning Outcome	Exclusions	Selections
Intellectual Skills	Exclude media having not interactive feature.	Select media providing feedback to learner responses.
Cognitive Strategies	Exclude media having not interactive feature.	Select media providing feedback to learner responses.
Verbal information	Exclude only real equipment or simulator with no verbal accompaniments.	Select media able to present verbal messages and elaboration.
Attitudes	Exclude only real equipment or simulator with no verbal accompaniment.	Select media able to present realistic picture of human model and the model's message.
Motor Skills	Exclude media having no provision for learner response and feedback.	Select media making possible direct of skill, with informative feedback.

Sources: Curriculum Development and Management (1999)

Table 2. Specification for the sampling of Introductory Technology teachers in the sampled local government areas.

Senatorial districts	No. of LGAs selected	Number of secondary schools	Number of sampled secondary schools	Number of Intro-Tech teachers used
Osun-east	4	43	40	76
Osun-central	3	29	25	48
Osun-west	3	28	22	29
Total	10	100	87	153

Table 3a. Summary of Regression of Analysis of sample data

Multiple correlation R	R square	Adjusted R square	Standard Error of the Estimate	F-square	Significance F change
0.847	0.717	0.701	1.12824	45.520	0.000*

* Significant at $p < 0.05$

Table 3b. ANOVA

Source of variance	Sum of square	Df	Mean square	F	Sig.
Regression	1087.666	8	135.958	45.520	0.000*
Residual	430.099	144	2.987		
Total	1517.765	152			

* Significant at $p < 0.05$

Table 4. Relative contributions of the independent variables on the selection of video cassette instruction to teach Introductory Technology

Model: Independent variables(predictors)	Un-standardized co-efficient	Standardized co-efficient	Rank	T	Sig.	
	B	Std Error	Beta			
Constant	2.375	3.375			.704	0.483
Availability of media	1.927	0.118	1.273	1 st	16.357	0.000*
Cost	1.188	0.134	0.688	4 th	8.845	0.000*
Facilities	1.429	0.116	0.753	3 rd	12.294	0.000*
Instructional objective	1.005	0.125	0.516	6 th	8.028	0.000*
Learners' characteristics	0.961	0.129	0.498	7 th	7.427	0.000*
Motivational value	1.086	0.136	0.564	5 th	7.988	0.000*
Sense of appeal	0.767	0.144	0.352	8 th	5.339	0.000*
Teachers' ability	1.113	0.107	0.897	2 nd	10.429	0.000*

* Significant at $P < 0.05$

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