Motivational Strategies for Producing Teacher-Made Laboratory Aids in Science and Technical Colleges of Adamawa and Taraba States

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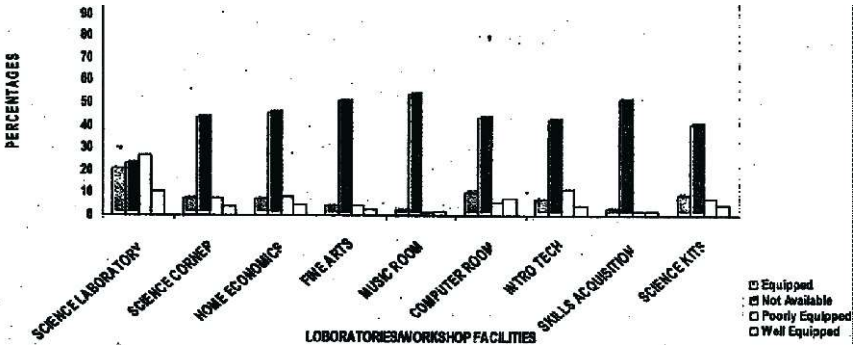
Abstract

This study sought opinions from teachers and students of block laying and concreting in science and technical colleges of Adamawa and Taraba states on motivational strategies for producing. Research question and hypothesis were used for the study. Survey research design was adopted for the work and 158 respondents, comprising 24 teachers and 134 learners were used for the study. Hypothesis was tested at 0.05 level of significance using t-test statistical tool. Five point rating scale structured questionnaire of 12 items was used for data collection. Cronbach Alpha reliability test yielded 0.76. Mean and Standard Deviation were used to analyze the research question. Results analyzed revealed that teachers and learners should be exposed to relevant computer graphics to improve their skills on improvisation and colleges should be encouraged to improvise instructional materials. This will replace negative impressions on teacher-made aids as reported by Federal Ministry of Education. It is recommended that learners should be involved in the improvisation of teacher made aids in order to enable them develop the skill and computer with relevant graphic soft wares should be provided by principals of the colleges to assist in improving the skills of teachers and learners in improvisation of block laying and concreting aids.

Key words: Laboratory aids, Motivation, Strategy, Science, Technical College

Introduction

The Federal Government of Nigeria (FME, 2007) reported that, of 11,928 secondary schools in the six geopolitical zones nationwide, 1,261 had well equipped science laboratories, 2,466 (20.7%) are moderately equipped while 3,200 (26.8%) are poorly equipped. Graphic illustration of the level of equipment available is presented in Figure



LABORATORIES/WORKSHOP FACILITIES

Figure 1. Facilities in secondary school laboratories/workshops. (Source: FME, 2007:87)

For Introductory-Technology, 4.5 per cent of the schools (536) had well equipped workshops, 7.4 per cent (88) had moderately equipped workshops and 11.6 per cent (1,382) had poorly equipped workshops, while 42.0 per cent (5,102) of the schools had no workshops for Introductory Technology at all.

Due to the poor state of facilities (buildings, services and equipment) available for teaching and learning practical courses; Olaitan, Nwachukwu, Onyemachi, Igbo, & Ekong, (1999) asserted that educational institutions produce unskilled graduates who are often rejected by the larger society. Studies in science and technology (Usman and Umeano, 2006 and FME, 2007) have shown that teachers of science and technology courses are more of theoreticians. This is among reasons Ezeliora, (2002) and Muodumogu, (2007) pointed out as some of the major problems of learners in Gombe state. Eventually, outputs (graduates) from various levels of education come out deficient and ineffective in practical ability and incompetent for recognition in the larger society

Motivational Strategies for Producing Teacher-made Aids: An overview of motivational strategies proves that sustainable strategies can go by different names; teaching strategy, planned lesson delivery, sustainable development strategy and others. Generally, Carew-Reid, Prescott-Allen, Bass, & Dalal-Clayton (1994) explained that strategies can be inspired by common features. These features are:

1. What to be improved - Is it the behaviour of the learner based on previous knowledge?
2. The goals of the strategy – Are they attainable?
3. The tactical choice of objectives – Are the objectives clear enough to assess progress?
4. The strategy process – Does it respond to change?
5. The participation techniques – Are responsibilities shared so as to change values, knowledge, technology or in-situ tuitions? Who decides the objectives?
6. The communication line – Do participants exchange perceptions, resources and actions?
7. Process of planning activities – What is the vision, result of assessment, design required and implementation?
8. The decision making system – Are the learners interested and committed to the benefits? Does the decision recognize local knowledge, values, skills and intuition?
9. The capacity building stage – Can existing curriculum be affected?
10. The position of external agencies – Is it helpful technically and financially?

Basically, sustainable strategies for workshop practice are decision making processes for planning, delivering and motivating practical training skills. They equally improve and maintain standard workshop performance requirements in science and technology education. It is therefore ,expected that in order to motivate and maintain practical skills possessed by trainees, they have to be subjected to strategic assessment under a workshop practice and participatory discussion environment.

Orlikovski and Hofman (1997) suggested strategic model of management in technology research and innovation to reflect the dynamic and variable nature of contemporary motivational organizations and technologies. The intention should accommodate iterative or repetitive experimentation, using and learning over time. Therefore, teacher-made construction laboratory aids used for classroom instruction are explained by Ihiegbulem, (2006) and Danjuma (2006) to mean improvisation, substitutes due to shortage, unavailability or lack of instructional materials.

Usman and Umeano (2006) however, regretted that most teachers of mathematics do not use instructional resources to motivate learners, this happens even under the condition of availability. The attention of such teachers may have to be drawn to the four conditions necessary for producing teacher-made aids. The conditions are unavailability of the standard equipment, ability of the teacher-made aids to satisfy the planned lesson objective, appreciation of the aids by learners and the unavailability of appropriate materials. (Kayode and Peter, 2006). Basically, teacher-made laboratory aids are required to motivate appreciation from both learners and teachers, therefore, selection strategies for such resources have been suggested by Mafwalai and Ajere, (2005), to satisfy lessons' objectives rather than teachers' personal preference and available substitutes.

Some theories stated that, people are motivated by the need to satisfy physiological needs, seek to maintain an optimum level of bodily arousal, focus on the ways in which people respond to external incentives such as money, grades in school, recognition and self-esteem (Kassin 2009).

Muodumogu (2007) ranked teachers' perception of learners' problems to include lack of concentration, lack of learning materials in laboratories and workshops. Consequently, the use of teacher-made instructional materials will increase the rate of learning, save teaching time and effort for communication to learners during curriculum delivery (Ezeliora, 2002). Similarly, Razak and Saad, (2007) shared the Malaysian experience whereby private industrial firms, entrepreneurial universities, government organizations and other public agencies are linked. The purpose being to generate motivation for collaborative network, build a spiral model of research and innovation for motivation. This is in order to share in the common characteristics of the vision and mission statements of the industry.

Statement of the Problem

Teachers of technology subjects are usually challenged by conditions of lack of teaching aids. This is where the teachers' professional, creative, practical technical ability and skills are required to be harnessed for producing teacher-made (improvised) instructional resources for effective teaching. Usman and Umeano (2006) found out that out of 16 skill areas required by teachers for improvisation, there are 10 problem areas concerning practical ability, namely; marking-out, cutting and trimming, drilling or boring, finishing surfaces, assembling parts together, folding, correct application of colours (painting), installation, literally selection of materials. and molding in clay or similar materials.

The same situation is also experienced at the primary school level (Oladele and Lasisi, 2006). The study was therefore undertaken to investigate if lack of motivational strategies for teachers in Science and Technical Colleges in Adamawa and Taraba States affect the production of teacher-made aids for blocklaying and concreting curriculum delivery.

This study is therefore designed to provide answers to the following research question and hypothesis.

What strategies can be used to motivate teachers in Science and Technical Colleges for producing teacher-made block laying and concreting laboratory aids?

Ho: There is no significant difference in the mean opinions of respondents (teachers and learners) on motivational strategies needed to produce laboratory aids for blocklaying and concreting curriculum delivery in science and technical colleges.

Research Methology

Survey research design was employed for the study. Respondents for the study comprised teachers and learners of Block-laying and Concreting of nine Science and Technical Colleges of Adamawa and Taraba States. The teachers and learners were 24 and 134 respectively. The learners are those in their final year of study, all respondents were 158.

Motivational strategies were obtained through Questionnaire Investigating Opinions on Teacher-made Building Equipment (QIOTBE). The questionnare was structured and scale ranked. The ranking is in order of how important a chosen motivational strategy is perceived. These include; Very important (VI), Important (I), moderately important (MI), Not important (NI) and highly unimportant (HU). Six pictures of teacher-made laboratory aids namely; slump cone, leveling staves, Casagrande soil test apparatus, compressed earth brick moulding machine, compacting factor apparatus and dependent scaffold model. Instrument for the study was subjected to both content and face validation by two technology education professionals of Department of Technology Education, Federal University of Technology, Yola and five Technical education teachers in Federal College of Education, Pankshin.

The reliability coefficient (alpha) of the instrument yielded internal consistency index of 0.76 using co-efficient alpha formula. The research was conducted by administering QIOTBE. The researcher along with twelve assistants distributed the instrument to the respondents.

The data was analyzed using mean, standard deviation and t-test. Mean and standard deviation was used to answer the research question and t-test was used to test hypothesis postulated for the study. Any mean value from 3.00 upward was accepted, while below 3.00 was rejected. In case of hypothesis, the decision rule was based on comparing t-computed with t-tabulated values. When the value of t-calculated is greater than t-critical value, it implies significance and the null hypothesis rejected.

Results

What are the strategies for motivating teachers in Adamawa and Taraba States' science and technical colleges to produce teacher-made laboratory aids? Answers to the question were based on the grand mean values of the respondents on the twelve possible strategies itemized under the question. The results are summarized in Table 1 and Table 2.

Table 1: Mean Responses and standard deviation of Teachers and Learners in GSTC on Strategies for Motivating the Production of Teacher-made Block-laying and Concreting Aids in Adamawa and Taraba States.

S/N	Strategies	Adamawa State $N_1=9$ $\bar{X}_1$	SD_1	Taraba State $N_2=15$ $\bar{X}_2$	SD_2	Grand Mean $\bar{X}$	Decision
1.	Provision of funds for Teacher-made lab./workshop equipment by school authority.	4.78	5.63	3.67	4.17	4.23	Accepted
2.	Inclusion of improvisation workshop equipment in teacher training curriculum.	4.11	2.71	3.93	3.51	4.02	Accepted
3.	Regular exhibition of teacher-made equipment in science and technology fairs, meetings of technology education students' associations and teachers' professional associations like the Nigerian Association of Teachers of Technology (NATT).	4.00	2.71	4.47	4.72	4.24	Accepted
4.	Provision of training programmes for for improvisation of laboratory equipment.	4.22	2.64	4.47	6.01	4.35	Accepted
5.	Establishment of improvisation quality link at school level.	4.22	3.35	4.40	5.07	4.31	Accepted
6.	Funding improvisation of laboratory/ workshop equipment by PTA.	4.11	5.56	4.40	5.50	4.23	Accepted
7.	Invitation of business community and industry captains to witness exhibition of improvised equipment by schools.	4.44	4.13	4.13	5.71	4.27	Accepted
8.	Exhibition of teacher-made building equipment during social functions of the college.	4.11	3.06	4.13	4.41	4.12	Accepted

9. Involvement of students in improvisation.	3.89	2.26	3.80	3.67	3.85	Accepted
10. Exposure of teachers and learners to relevant computer graphics course to improve their skills in improvisation.	4.33	2.65	4.27	4.65	4.30	Accepted
11.Encouraging colleges to market improvised instructional equipment.	3.78	2.77	4.33	4.88	4.06	Accepted
12. Recognizing innovations and improvisation for progression.	4.67	5.41	4.53	4.93	4.60	Accepted

Table 1 reveals that all items were acceptable strategies for motivating blocklaying and concreting teachers in Adamawa and Taraba States to produce teacher-made block laying and concreting aids. However, item 12 which has the highest value of grand mean response of 4.60 is in favour of recognizing innovations and improvisation for the professional progression of teachers. On the other hand, the grand mean value of 3.85 which is the least accepted is against the involvement of learners in the production of teacher-made block laying and concreting aids for curriculum delivery in Government Science and Technical Colleges in Adamawa and Taraba states. Generally, the results showed that all the strategies were accepted for motivating teachers for the production of blocklaying and concreting aids.

Hypothesis

There is no significant difference between the mean responses of respondents (teachers and learners) in Adamawa and Taraba States on motivational strategies for the production of teacher-made block-laying and concreting aids.

Table 2: T-test of responses of respondents (teachers and learners) on motivational strategies for producing teacher-made blocklaying and concreting aids.

Group	$\bar{X}$	SD	SE	N	t-cal	df	t-crit	Remark
Adamawa	3.08	8.21		83				
			0.46		0.0004	156	1.96	Accepted
Taraba	3.10	3.28		75				

Table 2 indicates that t-calculated is 0.0004 and t-critical is 1.96. The t-calculated is less than the t- critical. The result shows that there is no statistical significant difference, therefore, the null hypothesis is upheld. This means there is no statistical significant difference between the mean opinion of teachers and learners on motivational strategies for producing teacher made block laying and concreting aids in Adamawa and Taraba States Science and Technical Colleges.

Discussion

The analysis in Table 1 indicates that strategies for motivating teachers to produce block laying and concreting aids were accepted by all the respondents. The academic performance of students from Gombe State in Chemistry through the implementation of motivation on improvisation strategy is an evidence (Ezeliora, 2002). While Abbas (1980) advocated that there should be government policy for the development of appropriate technologies, especially in the area of subsidies and assistance. The t-test analysis also showed that t-calculated is less than t-critical, therefore the hypothesis showed no statistical significant difference in the opinion of both teachers and learners on motivational strategies for producing block laying and concreting aids. Therefore, the strategies should be embraced for motivating teachers for the production of block laying and concreting aids.

Conclusion

Teacher made aids is very essential in teaching block laying and concreting for enhancing understanding of the trade. Exhibition of teacher- made equipment in science and technology fair, meetings of technology education professionals should be encouraged so that others can get the idea. Students should be involved in the improvisation of teaching aids for block laying and concreting trade so that when working after graduation, those instructional aids lacking in the workshop can be improvised by these graduates.

Recommendations

Based on findings of the study, the following recommendations are made:

1. Industries and individuals within the community should be invited to witness the exhibition of improvised aids use for teaching. This will make them to know the efforts of teachers in promoting learning.
2. learners should be involved in the improvisation of teacher made aids in order to enable them develop the skill
3. Computer with relevant graphic soft wares should be provided by principals of the colleges to assist in improving the skills of teachers and learners in improvisation of block laying and concreting aids.
4. School authorities and PTA should create funds for research and innovation towards the production of teacher-made laboratory aids for curriculum delivery.

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