REINFORCING PARADIGN-TRANSITION EFFECT OF PROGRAMMED INSTRUCTIONS ON TECHNOLOGY

OSAIGBOVO LOUIS O.

Dip. Engineering, NCE (T) Electrical-Electronics, B. Sc. (Ed) Technical Education, (Electrical/Electronics) M. Ed. (Tech Education), Electrical/Electronics; MIEEE
Department of Vocational and Technical Education, Faculty of Education,
University of Benin, Benin City

ABSTRACT

The essence of teaching and learning is the realization of paradign-transition effect which is necessary for individual and societal development. The low appreciation, poor performances and consequent slow acquisition of skills has been issues of prime concern to stakeholders in technology education. This study was carried out generally to reinforce paradigin-transition effect necessary for a growing technological economy and to verify whether poor performance and slow acquisition of skills in technology education could be due to the instructional methods and materials used in comparison to programmes instructions copied in video compact disk plates. A random sampling of forty students divided into two (2) equal groups each was used for the research study out of a population of a hundred students. Three hypotheses were formulated for the study. The statistical tools used for the analysis of the result were mean, standard deviation and t-scores. The results show that programmed instructions in areas of technology has a serious influence on the performance of students and that poor performance could also be due to instructional methods and materials used. Recommendations were made which included the fact that programmed instructions in all areas of science and technology should be massively produced and distributed to schools; workshops and laboratories should be built and equipped with e-learning facilities.

INTRODUCTION

Technology had been variously defined by different authors in different ways but the most consistent terminology in these definitions is practical application of sciences, or scientific phenomenon. Hence Osaigbovo, (1996) defined technology as the practical application of knowledge and science for the production of goods and services. It is the production of goods and services for the subsistence of livelihood that results in economic development.   Several national development plans have been formulated in the past since the attainment of independence in 1960. The most recent is the vision 20:2020. These national development plans are geared towards socio-economic transformation. The National Policy on Education (NPE) 1977 and revised in 2004 had identified Education as the instrument per excellence in the attainment of the national development goals. It was in view of this realization that the Nigeria's Educational system was structured into the 6-3-3-4 system of education which is to introduce practicability and vocational training at all levels of the system to ensure that the system produce results meant for development and self reliance

According to the National Policy on Education (2004) the quality of instruction at all levels has to be oriented towards inculcating the following values:

(a)   Respect for the worth and dignity of the individual;
(b)   Faith in man's ability to make rational decisions.
(c)   Moral and spiritual principle in inter-personal and human relations;
(d)   Shared responsibility for the common good of society
(e)   Promotion of the physical, emotional and psychological development of all children and
(f)   Acquisition of competencies necessary for self-reliance.

It is in view of all the above that the structure of education now stresses vocational education which emphasizes the need for manpower directed at undertaking massive and industrial production of goods and services needed by the society. This implies that there should be paradign-transition from mere literacy to acquisition of technical skills.

According to Aliu (2000) from earliest times, society has undertaken the task of instructing its youths through the transition of skills and attitudes peculiar to the society. This is also instructive of our educational system today.

MERITS OF PROGRAMMED INSTRUCTION

Everyday experience consists of facts or data which should be processed into information which are programmed in such a way as to produce a learning effect that results in paradign-transition effect on individuals. Reinforcing the paradign transition effect would entail the planning and production of learning materials that are arranged in progressive sequential order . Furthermore, programmed instruction has the following advantages:

- Enhances immediate response
- Individualized and specialized
- Has the quality of speed and precision and accuracy
- Used for private learning
- Not always requiring teachers presence.
- Has alternative focusing advantage
- They are very portable
- Can use both electricity, battery or other power sources available
- Can enable internet connectivity so as to bring other experts and latest updates in the field
- Practical sessions are enhanced, even without adequate workshop and laboratory facilities in as much as the programmed instruction are available.

Osaigbovo (2008) listed the following as capability of computer, speed, reliability accuracy, precision, indefatigability, security and communication. All these advantages are also the capability of programmed instructions as they are software items of the computer.

The software programmes determines the types of learning domain achievable while using the instructional programmes. These learning are:

- Programmed mastery learning
- Simulation and creation of an artificial atmosphere.
- Repeated practice and drills
- Wide application and exemplifications
- Learner controlled environment.
- Problem solving method of learning.

Osaigbovo and Amoren (2008) stated that any vocational and technical educator without adequate knowledge of these advancement cannot fit into a modern business or industrial world effectively.

According to Osaigbovo (2008) a computer program is a sequence of instruction that can be executed or carried out by a computer. A computer program contains a series of instructions which directs the computer to perform those tasks necessary to process data and produce the desired output.

Therefore programme instructions could be defined as a software instructional aids that have been carefully assembled, arranged and written into computer storage devices that would help to present learning instructing in colour, format, video and audio-visual perceptions to learners or students.

According to Agu and Imogie (1998), software materials are products of technology that carry instructional content based on specific objectives. It then becomes imperative that the education of the students who are to generate these technological awareness from grass roots should be equipped with advance scientific knowledge, technological skills and well grasped knowledge of what the needs are.

They further stressed that it should be pointed out that today's technology and science lecturers need competence for effective facilitations and thus should possess enough knowledge and skills in the use of the new technologies that would then teach the subjects confidently.

It should be noted that the paradign transition process for most individuals in a society is a protracted bout of failures and successes. The arousal of interest and understanding of the complexity of technology requires that a good learning process and well programmed learning materials must be made available to learners. Research studies have established that students interest, perception, and performance, would be increased through programmed instruction that produce positive learning effects.

PURPOSE OF THE STUDY

The use of programmed instruction materials has proved to be very effective in the impartation of knowledge and skills. This is the paradigm transition effect that learning processes are supposed to produce.

The low appreciation, the poor performances and consequent slow and poor acquisition of skills had been issues of prime concern to all educational stakeholders. It is therefore essential that efforts be made at popularizing the use of instructional materials to reinforce the paradigm transition effect necessary for a growing industrial economy vis-à-vis our educational systems. This is the general purpose for this study

The specific purpose of the study therefore is to:
(i)   Determine the effect of programmed instruction in the performance of students in technology.
(ii)   Determine whether poor performance in technology could be due to the instructional methods used.
(iii)   Investigate if programmed instructions could make a difference in the performance of students in electrical/electrical technology.

RESEARCH QUESTION

The above analysis posits the following research question:
(1)   Has programmed instruction in areas of technology in our tertiary institutions any influence on the performance of technology students?
(2)   Could poor performance in technology be due to the instructional methods used by lecturers and institutions?
(3)   Is there a difference in the mean score of students taught with traditional demonstration method and those taught with programmed instructions?

HYPOTHESES

The above research questions were hypothesized as follows:
H_0 There is no a significant difference in the performance of technology students who are taught with programmed instructions and those who are taught with traditional methods.
H_1:   There is significant difference in the performance of technology students who are taught with programmed instruction and those who are taught using traditional methods
Ho_2 Poor performance in technology is not due to the instructional methods used by lecturers.
$H1_2$ Poor performance in technology is due to the instructional methods used by lecturers.
Ho There is no significant difference between the mean scores of students taught with traditional chalkboard demonstration method and those taught with programmed instructions in practical skills test.
H_3 There is a significant difference between the mean scores of students taught with traditional chalkboard demonstration method and those taught with programmed instructions in practical skills test.

SIGNIFICANCE OF THE STUDY

The findings of this study will enable policy planners and lecturers in tertiary institutions develop programmed instructions in their areas of specialization with a view to helping students perform better in those courses in technology.

POPULATION AND SAMPLING

A population of one hundred (100) students of Edo State Institute of Technology and Management Usen was considered for the quasi-experimental study, out of which a sample of forty (40) students were taken and then divided into two groups by random sampling.

Twenty students: three females (3) and seventeen (17) men were used for the experimental group, while the other twenty (20) comprising of seventeen (17) males and three (3) females were used for the control group. The experimental group was taught the principles of circuit theories using the programmed

instructions, while the control group was taught the same topic using the traditional method of chalkboard demonstration.

After two weeks, the two groups were evaluated using the same test instrument for evaluation.

INSTRUMENTATION
The main instrument used for the research study was a video compact disc (VCD) which is a programmed software. It contains aspects of introduction to circuit theories in electrical/electronics technology, both theory and practical and an achievement test consisting one hundred (100) test items.

Four lecture periods of sixty minutes each was used for the teaching of the two groups for two weeks after which an achievement test was administered to them.

VALIDITY AND RELIABILITY OF THE INSTRUMENT
The instruments were lecturer standardized tests sent for external moderation based on the new syllabus of the National Board for Technical Education (NBTE).

They were tested for reliability using test-retest reliability test technique. This involved administering the test to the same group of students who did not constitute part of the study sample on two different occasions. The time lag between the first and second test was 14 days. Computation of the scores of the two test was done using the Pearson Product Moment Correlation Coefficient and the r value obtained was 0.78 for the achievement test and 0.72 for the test of psychomotor skills. This showed that the instrument was reliable for the study.

STATISTICAL ANALYSIS
The raw-score obtained from the administered instruments were analyzed and processed using the mean and t-score as the statistical tools. Percentages were also used.

According to Owie (1996), many research efforts which involves two independent or dependent samples, the t-test can be used very effectively in these situations. He further stated that when we are working with the means of one or two samples, the t-test will, in majority of cases, meet our inferential statistical requirements.

RESULTS
The table shows the respective raw scores of the experimental and control groups which consist of 3 females and 17 males in each group.

Table I: Table of Raw Scores of Students' Achievement Test.

Experimental Group	Control Group
58	46
50	47
54	48
60	55
70	65
75	62
76	65
88	68
70	45
77	62
65	55
75	65
78	47
58	53
47	42
60	71
75	61

78	45
56	47
60	52

Table 2:   ***Mean Score and Calculated t-Score of Students in Experimental and Control Group.***

	Class Size	Mean	Cal. t-score	Table Critical	Decision
Experimental Group	N_1 = 20	$\overline{X_1}$ = 64.5	2.435	2.000	Ho is rejected
Control Group	N_2 = 0	X_2 = 55.05			

References to table critical values of student's t-distribution is given by the degree of freedom.

The df = 20 + 20 − 2 = 38 with a level of significance ∞ = 0.05 table critical value or the two tailed test is given as 2.000.

t-cal. > t-critical, Ho is rejected

Table 3:   Table of Percentage Analysis of Scores between the Mean Score for Experimental and Control Groups.

	No. of Students.	Mean $\overline{X_1}$	Above mean score	No. below mean score	% below mean score	Decision
Experimental Group	20	64.5	11	9	45%	Ho_2 is rejected
Control Group	20	55.05	8	12	60%	

Ho_2 Poor performance in technology is not due to the instructional materials used by lecturers.
$H1_2$ Poor performance in technology is due to the instructional
materials used by lecturers.

The result from the table shows that the control group i.e. group taught with chalkboard demonstration method has a higher percentages score below the mean while the experimental group i.e. group taught with programmed instruction has a higher percentage score above its higher mean and the alternate hypothesis is accepted. Hence, poor performances in technology are due to the instructional methods used by lecturers.

INTERPRETATION OF RESULT

Hypothesis 3:
There is no significant difference between the mean score of students taught with programmed instruction and chalkboard demonstration method in practical skills test.

Table 4:   *Decision table for mean and t-score of students in practical skills tests*

	No. of Students	Mean $\overline{X}$	S.D.	Cal. t-score	Table Critical	Decision
Experimental Group	20	60.5	55.08	2.70	2.000	Ho is rejected
Control Group	20	50.05	45.37			

Table 4 shows that the calculated *t* score for practical skills. *t* is higher than the table critical value of 2.00. This shows that Ho is rejected. The alternate hypothesis $H1_3$ There is a significant difference between the mean scores of students taught, with programmed instructions and those taught with the chalkboard demonstration method in practical skills tests

The result of this findings indicates that Ho is rejected. This implies that there is a significance difference in the performance of the student taught with a programmed instructions and those taught with the traditional method.

SUMMARY AND CONCLUSION

The study was carried out with the aim of highlighting and reinforcing the paradign-transition effect of programmed instruction on technology courses.

It is therefore obvious from the above findings that the paradign shift especially in all areas of the three domains of learning is more visibly achievable through programmed instructions, skills practices and drills are more readily carried out and learning outcomes could easily be measured.

RECOMMENDATION

(1)   In the light of the above findings, programmed instructions in all areas of science and technology should massively be produced and distributed to all tertiary institutions for use in both classrooms and laboratories.

(2)   Workshops and laboratories should be built and equipped with e-learning facilities, computers and ICT devices.

(3)   Companies like Rank Xerox, Zinox, and Information and .communication Technology Companies and Internet Service Providers should be approached to train lecturers on the use of their facilities for learning.

(4)   Promotion of specialized training for technology instructors, and lecturers should e carried out.

(5)   Governments and governing councils of tertiary institutions should carry out survey study of the technology competence of their lecturers.

(6)   Scheduled broadcast and regular teleconferences should be organized to provide annual technology updates.

REFERENCES

Agum I. & Imogie I (1988), *Fundamentals of Educational Technology,* Ibadan Y-Books, a Division of Associated Book Makers (Nigeria) Ltd.

Aliyu M. M. A. (2000) Computer Assisted Instructions: A challenge to Nigeria Educational system. *Journal of Nigeria Educational Research Association* (14), p.10

Owie I. (1996), *Fundamentals of Statistics in Education and the Social Science* Benin City. United City Publishing Company.

Osaigbovo L.. O. (2008) *Introduction to Computer software for Engineering Fields*, Benin City, St. Louis Publishers.

Osaigbovo L. O. & Amoren L. I (2009), Pilot Study On Emerging Technologies Its Implication On Training of Technology. *Journal of Engineering Research and Development* (2) 2.

Osaigbovo L. O. (1996) Introductory Technology For Schools, Benin City; Pen Consults.