

Science Educators Interest in an Awareness of Technology Transfer in Tertiary Institutions in South Western States of Nigeria

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Abstract

The changes that have accompanied Globalization and improved technological processes have increased rapidly over the past twenty years resulting in the creation of a new global economy “powered by technology, fuelled by information and driven by knowledge”. The emergence of this new global economy has new implications for the nature and purpose of educational institutions especially higher institutions of learning with respect to their involvement in the process of Technology Transfer (T T) . T T is the process of transferring skills and knowledge, procedures and methods involve in the manufacturing process among universities, other institutions, government agencies and manufacturers to ensure that scientific and technological developments are accessible to a wider range of users who can then further develop and exploit the technology into new products, processes, applications, materials or services. It also involves identifying research which has commercial value and strategies for their exploitation. Science and technology teachers in higher institutions of learning (universities) should be actively involved in initiating and ensuring the success of this process. However many lecturers are either ignorant of or are indifferent to the fact that provisions and projections for T T should form an integral part of their teaching and research objectives and outcomes. This study investigated interest and awareness of science educators on technology transfer in south western states in Nigeria. The sample comprised of 120 purposively selected science educators from twenty government owned tertiary institutions in south western states in Nigeria. Data were collected directly from the selected science educators with the use of a 4 point Likert scale questionnaire designed and validated by the researchers. T T issues examined included; creation of technological transfer offices in all institutions, creation and funding of science programs in schools , provision of research incentives to scholars as well as promoting findings and suggestions in researches to implementation stages , development of patents and issues relating to intellectual property.

Keywords: *Technology Transfer, Science Educators, Intellectual property, Government.*

Introduction

Many of us in the past have seen technology as tools and machines. But recently it has gone beyond this to applications of science to man. Technology to man is not only in tools and machines but in problem solving. However, as academic institutions become focal points for economic development according to Obanya (2002) this will undoubtedly lead to more expectations and this has implications particularly to make science teaching relevant in a globalized world, when the crave for improved skills, entrepreneurial skills and self – reliance is at crescendo. Emphasis on science teaching should go beyond impartation alone to application of scientific knowledge. This research

therefore, serves as a springboard to awareness in this knowledge driven society. This is a reflection on several studies such as Maskus (2000), Schiff and Wang (2002), Kim (2002), Correa (2003) and Peri (2003) that Technology Transfer involves exchange of information between those that have it and those that do not.

Technology as documented in STAN (2001) is regarded as applications of scientific discoveries or knowledge or principle in the production of mechanisms and in the solution of problems which confront man in his environment. One thing which is incontestable is that science and technology will be ultimately for man's survival if they are not abused. Yesterday we knew, today we know but as for tomorrow we can only project what it has in stock for mankind based on the facts of today and yesterday.

Technology is the future of today's science, because without it, science has no future, hence, the level of development of a people depends on the level of advancement of their science and technology. Africa as a whole over the time have been taunted with the idea of transfer of technology and the concept of intermediate technology or even appropriate technology. This shows that the development of indigenous technology, borrowing from the existing western technology and the development of local raw materials to service some of the viable existing industries appear to be the only viable route to develop science and technology in order to meet up with some of the challenges of the future.

In spite of Nigerians amazing human and material resources and its tremendous revenue from oil, its government has continued to bury its head in the sand while all infrastructures, including education are in deplorable states with the majority of Nigerians living below the minimum level of human dignity and sustenance. However, in a submission of Hargadon(2003), Technology Transfer(TT) also called Transfer of Technology (TOT) and Technology for commercialization is the process of transferring skills, knowledge, Technologies, methods of manufacturing, samples of manufacturing and facilities among governments or universities and institutions generally. This is to ensure that scientific and technological developments are accessible to wide range of users who can then further develop and exploit the technology into new products, processes, applications, materials or services. This corroborates Danquah (2007) who identified technology transfer in two components as tangible and intangible. It is also closely related to (and may arguably) be considered a subset of knowledge transfer.

As the transition from a manufacturing based economy to knowledge – based economic continues according to Obanya (2002) as supported by Tinio (2003), the role of institutions intellectual property will pay an increasingly important part. In the same vein researches such as Canada Science, Technology and innovation system (2008) and World Bank (2006) considered technology transfer as a process of moving promising research topics into level of maturity ready for bulk manufacturing or production. In a similar submission of Association of University Technology Managers (2010), Technology transfer is the process of transferring scientific findings from one organization to another for the purpose of further development and commercialization. Investments in intellectual property are returned to the

public through products that benefit the public, increased employment and taxes.

At no time in history has improving science education been more important than it is today. According to Wolfram(2003), the major policy debates about such topics as cloning, the potential of alternative fuels, and the use of biometric information to fight terrorism requires scientifically informed citizenry as never before. Therefore, science education in Nigeria should be a subject of pressing concern since the whole world has become a global village, and so Nigerian government in particular have to take right decisions in a way that will enable the positive impact of advances in science and technology to bring relief to their people. Therefore, this study was specifically designed to investigate the perceptions of science educators on Technology transfer in tertiary institutions in South-Western States of Nigeria.

Research Hypotheses

The following null hypotheses was tested at 0.05 significance level.

HO¹ There is no significant difference in the perceptions of male and female science educators on Technology Transfer in Tertiary Institutions in South-Western States of Nigeria.

HO² There is no significant difference in the perceptions of experienced and less experienced Science Educators on Technology Transfer in Tertiary Institutions in South-Western States of Nigeria.

HO³ There is no significant difference in the perception of Science Educators selected from the Universities' faculty of education and Colleges of Education on Technology Transfer in Tertiary Institutions in South-Western States of Nigeria.

Theoretical framework

The study is predicated on the assumption that Technology transfer goes a long way in affecting the standard of living of the people which will indirectly affect the economic development of the nation. The study zero in on the theory of constructivism, a philosophy which perceives learning as a process of adjusting mental models to accommodate new experiences, constructing knowledge, developing thinking skills, building ability to reject and generating strategies for redefining a problem and then working out solutions to the problem. It is also a promotion of learning to learn according to Tinio (2003), Funderstanding (2001) and International Labour Organization (2000).

Methodology

This study uses qualitative data collected using a variety of sources. Multiple research methods (MRM) were used including questionnaire, notes based on observation, discussion, and interview comments. Technology transfer perception questionnaire (TTPQ) was used in collecting data for this study and it comprises of Section A seeking for the bio data of the respondents. Section B consist 10 items questions to assess the awareness of science educators on Technology Transfer while the second part also comprises 10 items to assess the interest of science educators on

Technology Transfer. TTPQ was administered on 120 purposively selected science educators from twenty recognized federal and state owned tertiary institutions in South Western States of Nigeria by using the criterion of government ownership.

The questionnaire has a reliability coefficient of 0.88, which was considered reliable for the study. The questionnaire had five (5) positive scoring of strongly agree = 4, agree = 3, disagree = 2, strongly disagree = 1, and not sure = 0. The remaining (5) has reverse scoring such that strongly disagree = 4 and strongly agree = 1.

Data were gathered using semi – structured interviews conducted with 20 of the science educators. These lecturers were asked to comment on their awareness and interest in Technology transfer, and the possible problems they may have with it. Also, observations were carried out about some of the journals and books published by the educators. The study investigated the interest in, and awareness of science educators on Technology transfer in Nigeria using South-Western States of Nigeria as a case study. The educators were not informed or previously notified of the observation to ensure that reality was observed. After each observation, discussions were held with the science educators.

Results and Discussions

All the relevant data collected were collated, coded and subjected to the necessary statistical analysis. Specifically, Means and Standard Deviations were computed for each group and the respondents t-test for independent data was used to test all the stated null hypotheses at $p < 0.05$ level of significance as presented one after the other below:

Table I: Response rate distribution of the respondents on technology transfer.

Category	Gender		Years of Experience						Perceptions							
	M	F	Less experienced			Experienced			Awareness				Interest			
			<5	5-10	%	10-20	>20	%	+ve	%	-ve	%	+ve	%	-ve	%
Universities	42	18	12	20	53.33	16	12	46.67	34	56.67	26	43.33	46	76.67	14	23.33
Colleges	34	26	16	22	63.34	12	10	36.67	36	60.00	24	40.00	26	43.33	34	56.67
Total	76	44	28	42	58.33	28	22	41.66	70	58.33	50	41.67	72	60.00	48	40.00
Grand Total	120		120						120				120			

The table compared the percentages of interest and awareness of the university and college of education science educators. It considered male and female educators based on their experiences.

Hypothesis I: There is no significant difference in the perceptions of male and female science educators on Technology transfer in tertiary Institutions in South-Western States of Nigeria.

Table II : T – test Analysis on the perceptions of male and female science educators on Technology transfer in tertiary institutions in South-Western States of Nigeria.

Variables	N	\bar{X}	SD	tc	tt	df	Result
Male Science educator.	75	23	9	3.39	9.80	118	NS
Female Science educator.	45	18	7				
Total	120						

$p < 0.05$

* Significant result

T-test analysis in table I showed that the $tc=3.39$ is less than the $tt = 9.80$ at $p < 0.05$ level of significance and $df = 118$. The $tc = 3.39$ is not significant and hence the null hypothesis I is not rejected. Resultantly, there was no significant difference in the perceptions of male and female science educators on Technology transfer in tertiary institutions in South-Western States of Nigeria. A further look at the table showed that the mean and SD of 23 and 9 by male Science educators as compared to the mean and SD of 18 and 7 by female science educators revealed a generally low awareness of, and interest in technology transfer by female science educators in tertiary institutions of South-Western States, Nigeria.

Hypothesis II: There is no significant difference in the perceptions of experienced and less experienced science educators on Technology Transfer in tertiary institutions in South-Western States of Nigeria.

Table III: T-test Analysis on the perceptions of experienced and less experienced science educators on technology transfer in tertiary institutions in South-Western States of Nigeria.

Variables	N	\bar{X}	SD	tc	tt	df	Result
Experienced Science educator.	50	30	8	13.83	9.80	118	*
Less experienced science educator	70	54	11				
Total	120						

$p < 0.05$

* Significant result

The t-test analysis in table II showed that the $tc = 13.83$ is greater than the $tt = 9.80$ at $p < 0.05$ level of significance and $df = 118$. The $tc = 13.83$ is

significant and hence the null hypothesis II is rejected. Therefore, there was a significant difference in the perceptions of experienced and less experienced science educators on technology transfer in tertiary institutions in South-Western States of Nigeria. Furthermore, the mean and SD of 30 and 8 by experienced Science educators as compared to the mean and SD of 54 and 11 by less experienced science educators revealed a generally low awareness of, and interest in technology transfer by experienced science educators in tertiary institutions of South-Western States.

Hypothesis III: There is no significant difference in the perceptions of science educators selected from Universities faculty of education and College of Education on Technology transfer in tertiary institutions in South - Western States of Nigeria.

Table IV: T – test Analysis in the perceptions of science educators selected from Universities and Colleges of Education on technology transfer.

Variables	N	X	SD	tc	tt	df	Result
Universities Sc. Educ.	60	31	8	0.73	9.80	118	NS
C.O.E. Sc. Educ.	60	30	7				
Total	120						

$$p < 0.05$$

NS : Not Significant result

The analysis in table IV above showed that the $tc = 0.73$ is less than the $tt = 9.80$ at $p < 0.05$ level of significance and $df = 118$. The $tc = 0.73$ is not significant and hence the null hypothesis IV is not rejected. Hence, there was no significant difference in the perceptions of science educators selected from Universities faculty of education and those selected from Colleges of Education on technology transfer in South-Western States of Nigeria. Furthermore, the mean and SD of 31 and 8 by universities Science educators as compared to the mean and SD of 30 and 7 by colleges of education science educators revealed no disparity in awareness of, and interest in technology transfer by science educators in tertiary institutions of South-Western States, Nigeria.

Conclusion

This research notably embraced the fact that Technology transfer is a move for applying science to practical problems. The non significant difference in the perceptions of male and female science educators on Technology transfer and a significant difference in the perceptions of experienced and less experienced science educators on technology transfer calls for a re-think. Also the non significance result between the perception of science educators either from Universities or Colleges of Education buttressed a resounding necessity for Technology transfer in tertiary institutions in South-Western States of Nigeria, this of course, can be generalized to other states of the federation as well as research institutes, companies and other government organizations.

Recommendations

The following recommendations are considered necessary based on the findings of this study:

- (i) Creation of Technology transfer offices in tertiary institutions to serve as a medium of exchange of ideas and information regarding technology transfer.
- (ii) Science educators should raise their technology readiness level for the economic recovery and the betterment of the entire populace since science and technology has been seen as a vehicle for nation building.
- (iii) Technology transfer organizations can emerge in schools and society in general for sensitization and establishment
- (iv) Provision of incentives and partnership by the government to the people to share both the risks and rewards of bringing new technologies to market.
- (v) Establishment of regulating body on Technology transfer especially for licensing agreement and quality assurance by the government.
- (vi) Encouragement of researchers for necessary will, resources or skills to develop new technology.
- (vii) Provision of adequate information and communication flows with multilateral cooperation in recognition of the role that technical standards play in diffusing production and certification of technologies.

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