

## **The Effect of Physics in the Development of Indigenous Technology in Akwa Ibom State of Nigeria**

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### **Abstract**

*This study was an attempt to determine empirically the effect of physics in the development of indigenous technology (production of local talking drum and canoe) in Akwa Ibom State. A total of 70 indigenous technologists (40 canoe makers and 30 talking drum makers) from Ikot Abasi, Essien Udim and Ikot Ekpene Local Government Areas of Akwa Ibom State randomly selected formed the sample for the study. One researcher-made instrument, Physics and Indigenous Technology Questionnaire (PITO) was used in gathering the data for the study. The reliability coefficient of the instrument was 0.86. Three hypotheses were stated to guide the investigation. The data generated in the study were analyzed using t-test at .05 significant level. The findings of the study showed that there is a significant effect of physics in the development of indigenous technology. Findings further revealed that Physics has a significant influence in the making of local talking drums and canoe.*

### **Introduction**

The need for economic and physical survival has been identified as great motivating forces for technological advancement (Clark, 1997). In Akwa

Ibom State of Nigeria the rate of development of indigenous technology is increasing. The term indigenous refers to being grown or produced in a locality. Indigenous technology refers to the production of materials or goods by the people within a community. It is the custom or home made tools available in a society at a particular time whose usage causes satisfaction to the inhabitants (Macaculey, 1989).

The indigenous technology in the state has brought forth the production of soap locally, cassava processing, talking drum, canoe carving and mat making etc. Banigo (2000) pointed out that the floating of these local technologies can help us in the production of goods which can be exported to earn much needed foreign exchange. He went on to say that no effective indigenous technology programme can exist without a good knowledge of sciences in general and physics in particular. The application of physics principles in the development of our indigenous technologies will help in the productions of more valuable goods that conform to modern standards and can be marketed beyond our traditional communities. The need for our home made good (indigenous technologies) to conform to modern standards has therefore created a gap that this study seeks to fill.

### **Statement of Problem**

According to Banigo (2000), there is an urgent need to systematically develop our traditional technology. This is necessary because recent attempts made by government to expand the economy by importing foreign technology have ended in failure since we lack infrastructural base to support such technology. Tallen (2000) asked for promulgation of national policy to guide the development of indigenous technology. Any policy framework for the development of our indigenous technology must start from the foundation on which any technology is built. This foundation according to Banigo (2000) is science and physics in particular. It is against this back ground that the study is undertaken to provide the empirical data on the effect of physics in the development of indigenous technology in Akwa Ibom State.

### **Purpose of the Study**

The purpose of this study was to:

1. Determine the effect of physics in the development of indigenous technologies.
2. Specifically, determine the effect of physics in the production of local talking drums and canoes.

### **Significance of the Study**

The finding of this study is expected to provide empirical data to the claim that physics is a foundation on which technology is built. This study is also expected to provide the basis for further research.

### **Research Questions**

The following research questions were posed to guide the investigation:

- (i) Is there any significant effect of Physics in the development of indigenous technology?
- (ii) Is there any significant effect of physics in the production of canoes?
- (iii) Is there any significant effect of physics in the making of talking drums?

### **Research Hypotheses**

- (i) There is not significant effect of physics in the development of indigenous technology.
- (ii) There is no significant effect of physics in the making of canoes?
- (iii) There is no significant effect of physics in the making of local talking drums

### **Methodology**

The sample for the study consisted of 70 indigenous technologists, 40 canoe producers and 30 talking drums makers, randomly drawn from Ikot Abasi, Essien Udim and Ikot Ekpene Local Government Areas of Akwa Ibom State. Fifteen (15) out of the 40 canoe producers had background knowledge in physics and twelve (12) out of the 30 local talking drum makers had physics background knowledge. The remaining respondents had no background knowledge in physics. Ikot Abasi, Essien Udim and Ikot Ekpene Local Government Areas are the three local government areas in Akwa Ibom State that are involved in the indigenous technology of making canoes and talking drums.

A researcher-made instrument, Physics and Indigenous Technology Questionnaire (PITQ) was used in generating the data for the study. It was a twenty item questionnaire which sought the opinion of the respondents on physics related activities involved in the making of local drums and canoes.

A four point likert scale of strongly agreed (SA), Agreed (A), Disagreed (D) and Strongly Disagreed (SD) was used. Strongly agree was scored 4 points, Agree was scored 3 point, Disagree was scored 2 points and strongly disagree was scored 1 point. The means difference in the responses of respondents with physics background knowledge was then compared with those without physics background knowledge.

After being face validated by eight technologists and colleagues in the university, the instrument was administered on a pilot sample of 10 each of local talking drum and canoe makers from the same population who were not part of the sample for the study. The reliability coefficient ( $r$ ) calculated using Kudar Richardson formular 21 was 0.86.

The researcher administered the instrument directly on the respondents. The data generated were analyzed using t-test statistics as follows:

### **Hypothesis One**

This hypothesis states that there is no significant effect of physics in the development of indigenous technology. The results from Table 1 showed that t-cal (7.21) was greater than t-critical (2.00) for df of 68 at an alpha level of .05. Hence, hypothesis one is rejected. This implies that there is significant effect of physics in the development of indigenous technology.

### **Hypothesis Two**

This states that there is no significant effect of physics in the production of canoes. From Table 2, t-calculated (4.47) was greater than t-critical (2.03) for df of 38 at .05 level of significance. Hypothesis two was therefore rejected and this implies that there is significant effect of physics in the production of canoes.

### **Hypothesis Three**

This hypothesis states that there is no significant effect of physics in the production of local talking drums. The results in Table 3 showed that t-calculated (4.96) was greater that t-critical (2.05). Hypothesis three was therefore rejected and this implies that physics has a significant effect in the production of local talking drums.

### **Discussion**

The results in Tables 1, 2 and 3 confirmed significant effects of physics in the development of indigenous technology and in the production of local talking drums and canoes. This result is because science and physics in particular is

the foundation upon which any technology is built. The findings are supported by the previous works done by Banigo (2000) and Tallen (2000). The implications of these findings are that the indigenous technologists should make use of the appropriate physics principles in the production of local goods if such goods are to conform to the modern standards.

### **Conclusion and Recommendation**

This result obtained showed that:

- 1) Physics has significant effects in the development of indigenous technology.
- 2) Physics significantly influences the production of local talking drums and canoes.
- 3) Physics should be considered as an important criterion in the development and implementation of indigenous technology.

### **Reference**

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**Table 1:** The Effect of Physics in the Development of Indigenous Technology

Sources of Variation	N	$\bar{X}$	s	df	t-cal	t-crit	P<.05
Indigenous technologists with background knowledge in physics vs Those with no background knowledge in physics	27	46.40	4.70	68	7.21	2.00	*
	43	40.20	3.20				

\* = Significant at P < .05

N = Number of respondents

$\bar{X}$  = Mean performance in the

S = Standard deviation

S<sup>2</sup> = Variance

df = degree of freedom

**Table 2:** The Effect of Physics in the Production of Canoe

Sources of Variation	N	$\bar{X}$	S	Df	t-cal	t-crit	P<.05
Respondents with background knowledge in physics vs Those with no background knowledge in Physics	15	33.20	3.90	38	4.47	2.03	*
	25	28.10	3.15				

\* = Significant at P < .05

**Table 3:** The Effect of Physics in the Production of Local talking Drums

Sources of Variation	N	$\bar{X}$	S	Df	t-cal	t-crit	P<.05
Respondents with background knowledge in physics vs Those with no background knowledge in physics	12	29.60	4.1	28	4.96	2.05	*
	18	22.30	3.8				

\* = Significant at P < .05