University Education vs Students' Productivity in Computing: The Environment as a Judge

Anayochukwu C. Obienu, M.Sc.[*] **and Frank I. Amadin, Ph.D.**

Department of Computer Science, Faculty of Physical Sciences, University of Benin, PMB 1154, Benin City. Nigeria.

E-mail: obienu.anayochukwu@physci.uniben.edu[*]
frank.amadin@uniben.edu

ABSTRACT

Many have had high expectations for the impact of computing education on societal development. By and large, these expectations have not been realized. It has become evident that several factors such as learning environment have tremendous influence in the quality of teaching students receive and the extent of attention they pay to lessons in school. This implies that schools with ill-equipped environments hardly put in the best in their students especially in the area of computing. This scenario has been among the primary reasons for low productivity of students in computing.

To this effect, this study investigated the influence of the learning environment on students' productivity in computing. Three research questions were formulated and one hypothesis was tested. The study employed the survey design. The sample comprised of one hundred and fifty (150) respondents randomly drawn from the Department of Computer Science and Computer Education, University of Benin. Researchers' self-developed environmental questionnaire (SMQ) was used to elicit information from the respondents. Data collected was analyzed using mean rating and standard deviation while t-test was used to test the hypothesis for significance at 0.05. The results of our data analysis revealed that the learning environment is very important for better output in academic pursuits. Based on these findings, some relevant recommendations were made.

(Keywords: computer science, learning environment, school activities, guardian support, student productivity)

INTRODUCTION

According to FRN (2004), education refines a person to become useful to himself and society. It is a potent tool for national development. Overtime, it has been identified as a very important instrument that can used to attain the desired goals of a society. It forms the basis for literacy, skill acquisition, technological advancement, and the ability to harness human and material resources towards the achievement of societal goal. In the light of this, computing education becomes one aspect of an educational program that prepares individuals to acquire practical skills as well as basic scientific knowledge; providing skilled manpower for the world of work, thereby increasing the workforce in the country. To this end, computing education is becoming absolutely vital for everyone who belongs to this modern-day society.

It is also an obvious fact that no human endeavor, being it industry or education can flourish in an ill-equipped environment. Supporting this Ayodele (2004) and Ajayi (2009) have shown that an enabling environment aids students' productivity. Learning environment is a place where the learner learns and interacts with learning facilities in order to be socialized and face the challenges in the society. Agusiegbe (2004) sees learning environments as consisting of all elements existing around child and which exert some influence on the child. These include physical, biological, social attributes and influences, both in the school and at home that affect the academic performance of the student such as laboratory equipment, library facilities, school activities, furniture, school building, good administrative management, teacher-pupil relationship, and parental/guardian support among others. It is against this background that Ajayi and Ashaolu (2005) opined that

environmental enrichment regarding physical facilities is a major factor in students' learning outcome.

Learning environment for the purpose of this work can be divided into two parts; the school environment and the home environment. School environment is the thread that connects the multitude of activities at the school. In many respects, this thread is almost invisible, yet everyone experiences its influence. Dudek (2000) opined that it could be said to be the external influences in the school that can influence student productivity irrespective of their intelligent quotient. Home environment, on the other hand, refers to activities at home that influences student learning. A healthy and attractive home environment is conducive for learning and promotes students pride in their schools and supports their interest to stay in school (Mgbodile, 2004).

Belanger in Eze (2010) writing on the importance of learning environment stated that people's educational life histories are influenced not only by provision of learning opportunities, but also by the quality of the environment where they live or learn. Continuing, he stated that learning is more than education provision and that the community in which learners live have a profound impact on their aspiration to learn, their curiosity and their desire to develop their own competency.

Despite the tremendous importance of computer studies, government, schools', pupils', and teachers' attitudes have shown that much is expected to be done to position it well. Many schools do not place computer studies within the favorable perception, interest, and vocational choice of a majority of learners as most of them tend to consider it as unnecessary and of less important than other academic disciplines. Based on the foregoing, research on how to enhance students' productivity should be considered a continuous process until there is evidence of improvement in interest and achievement of the learners particularly the undergraduate students. Essentially therefore, the present study is an effort in this direction. Hence the study investigates if the identified environmental needs of students actually enhance their productivity in schools.

Problem Statement

In recent years, there has this assumption that the standard of computing education in Nigeria has fallen, which manifest itself in low productivity of students. This has therefore led to a lot of argument regarding where blame rests. The government, teachers, students, and peer groups contribute to the students' productivity in computing but the learning environment in which the students are nurtured is most to be blame (Dudek 2000; Mgbodile, 2004).

Several researchers including Tsavga (2011) maintain that the learning environment plays a vital role in determining how students perform or respond to circumstances and situations around them. This implies that schools with ill-equipped environments hardly invest the best in their students, especially in the area of computing. This scenario has been among the reasons for low productivity of students in computing. That is why Hall (1989) believes that there is a need to motivate students so as to arouse and sustain their interest in school learning through ideal teaching and learning environments. It is against this backdrop that this study on university education versus students' productivity in computing with their environment as a predicting factor becomes imperative.

The objective of this study is to examine the relationship between learning environment and students' productivity in computing. Specifically, the research explored the extent to which school environment and school activities affect students' productivity. It also examined how guardian support will affect student's productivity.

Research Questions

Three research questions and one hypothesis were raised, tested and answered at 0.05 level of significance. They are as follows:

I. To what extent does school environment enhance students' productivity in Computing?
II. To what extent do school activities enhance students' productivity in Computing?
III. To what extent does guardian support influence students' productivity in Computing?

Hypothesis

H₀: There is no significant difference between male and female students' perception on the perceived influence of learning environment on students' productivity in computing.

Scope of the Study

The study was designed to cover the following aspects of learning environment: school environment, school activities and guardian support. Also the research was delimited only on two departments in University of Benin, Benin City, Edo State. These departments are: computer science and computer education.

METHODOLOGY

Research Design

A research design provides a framework for the collection and analysis of data (Mejabi et al., 2017). As noted by Garcıa and Caro (2010), choice of research design reflects decisions about the priority being given to the following; expressing causal connections between variables, generalizing to larger groups of individuals than those actually forming part of the investigation, understanding behavior and meaning of that behavior in its specific social context.

For this study, the descriptive survey research method was adopted, as it allows the results to be generalized from the sample perspective to the entire population. According to Nworgu (2006), a descriptive survey research method is the study that aims at collecting data of a population and describing the data collected in a systematic manner. Therefore, this research design was chosen since this study involves the collection of data from a population and describing the data collected in a systematic manner.

Research Instrument

The research instrument used for the survey is the questionnaire, tagged Student Learning Environment Questionnaire (SLEQ). The questionnaire consisted of two sections. Section A consisted of demographic information like faculty name, age, gender and academic level and Section B comprised of fifteen (15) items to answer the variables under study. The questions in Section B were sub divided into three sub categories. They were school environment, school activities, and guardian support, each covering five questions. A four point Likert scale ranging from 1 (Strongly disagree), 2 (disagree), 3 (agree) and 4 (strongly agree) was used to elicit responses from the respondents.

Sample and Methods

The sample size for this study comprises of one hundred and fifty (150) Undergraduate students selected from Computer Science and Computer Education Department of the University of Benin, Nigeria. Undergraduate students were chosen because they were at the early stage of their career in computing. Data collected underwent a screening process consisting of many steps, to ensure that subsequent analysis is based on a complete dataset that is void of any issues such as incomplete answers. On the completion of collating the data gotten from respondent, the data will be analyzed quantitatively.

The Statistical Package for Social Scientist (SPSS) software IBM version 20 will be used to analyze the relationship between the learning environment and students' productivity in computing. Specifically, Cronbach's Alpha, Descriptive Statistics, Mean Rating, Standard Deviation and T-Test were conducted.

RESULT AND DISCUSSION

Reliability Test for Core Construct

The reliability analysis was conducted for the core constructs using Cronbach's Alpha method (Santos, 1999). As shown in Table 1, several of the constructs are reliable since computed static is above 0.7, which shows that the questions related to the learning environment is highly reliable.

Table 1: Reliability Coefficients of Constructs.

Construct	Cronbach's Alpha	Number of Items
School Environment	0.874	5
School Activities	0.812	5
Guardian Support	0.711	5

Study Sample Characteristics

By analyzing the responses of section A of students' learning environment questionnaire, the study sample is appropriately in term of the diversity of gender, age and department. From the data presented in Table 2, majority of the participants were female undergraduate students totaling to 83 participants (55.33%) while male participants were 67 (44.67%). The mean age of respondents was 25.37 years. Among the participants, most of them were computer science students (53.33%) while 46.67% were studying computer education.

Research Question One:

Does school physical environment influence students' productivity in computing?

This question examined if school physical environment could help to motivate students in their academic productivity. The research question was tested with responses to items 1,2,3,4 and 5 in the students' questionnaire. The summary of data in Table 3 indicates the respondents' mean rating on the influence of the school environment on students' productivity in computing. The respondents agreed that factors such as Conducive Environment ($\overline{x}$ = 3.37; σ =0.751); Well-equipped classroom ($\overline{x}$ = 3.22; σ =0.810); Well-equipped Computer laboratory ($\overline{x}$ = 3.28; σ = 0.953); Standard and up to date library facility ($\overline{x}$ = 3.51; σ = 0.702), and provision of qualified staff ($\overline{x}$ = 3.51; σ = 0.588). With the aggregate mean of 3.38, it means that the respondents generally agreed that all the items are responsible for students' productivity in school.

Research Question Two:

Do school activities influence students' productivity in computing?

This question examined if school activities could help to motivate students in their academic achievement. The research question was tested with responses to items 6,7,8,9, and 10 in the students' questionnaire. The summary of data is in Table 4 indicate the respondents' mean rating of Students' response to the influence of the school activity on students' productivity. The respondents agreed that students' productivity is enhanced by classroom activities such as: Staff/Instructor's capacity building ($\overline{x}$ = 3.29; σ =0.710); Inter-class collaboration ($\overline{x}$ = 3.30; σ =0.781); Using appropriate learning approaches ($\overline{x}$ = 3.25; σ = 0.632); Practical Session, Workshops and seminars ($\overline{x}$ = 3.24; σ =0.880); Prizes and Scholarships ($\overline{x}$ = 3.07; σ =0.816). With the aggregate mean of 3.23, it means that the respondents generally agreed that school activities enhance students' productivity.

Table 2: Demographics of Respondents.

Character	Group	Frequency	Percent (%)
Gender	Male	67	44.67
	Female	83	55.33
	Total	150	100.0
Age	16-20	45	30.00
	21-25	60	40.00
	26-30	35	23.33
	31 & Above	10	6.67
	Total	150	100.0
Departments	Computer Science	80	53.33
	Computer Education	70	46.67
	Total	150	100.0

Table 3: Mean Ratings of Students' Respondents on the Influence of the School Environment on Students' Productivity. N= 150.

Items: School Environment	SA	A	D	SD	Mean ($\overline{x}$)	Standard deviation (σ)	Remark
Conducive learning environment	75 (50%)	60 (40%)	10 (6.7%)	5 (3.3%)	3.37	.751	Agreed
Well-equipped lecture room	62 (41.3)	66 (44%)	15 (10%)	7 (4.7%)	3.22	.810	Agreed
Well-equipped computer laboratory	80 (53.4%)	47 (31.3%)	8 (5.3%)	15 (10%)	3.28	.953	Agreed
Standard and up-to-date library facility	90 (60%)	50 (33.3%)	6 (4%)	4 (2.7%)	3.51	.702	Agreed
Provision of qualified staff	83 (55.3%)	60 (40%)	7 (4.7%)	0 (0%)	3.51	.588	Agreed

Scale Used: 1.00-2.49= Disagreed while 2.50-4.00= Agreed
Criterion mean=2.50
Aggregate mean=3.38 (Agreed)

Table 4: Mean ratings of Students' response to the influence of the school activity on students' productivity. N= 150

Items: School Activities	SA	A	D	SD	Mean ($\overline{x}$)	Standard deviation (σ)	Remark
Staff/Instructor's capacity building	60 (40%)	80 (53.4%)	4 (2.6%)	6 (4%)	3.29	.710	Agreed
Inter-class collaboration	70 (46.7%)	60 (40%)	15 (10%)	5 (3.3%)	3.30	.781	Agreed
Using appropriate learning approaches	50 (33.4%)	90 (60%)	7 (4.7%)	3 (2%)	3.25	.632	Agreed
Practical, workshops and seminars	68 (45.3%)	62 (41.4%)	8 (5.3%)	12 (8%)	3.24	.880	Agreed
Prizes and Scholarships	45 (30%)	80 (53.4%)	15 (10%)	10 (6.6%)	3.07	.816	Agreed

Scale Used: 1.00-2.49= Disagreed while 2.50-4.00= Agreed
Criterion mean=2.50
Aggregate mean=3.23 (Agreed)

Research Question Three:

Does guardian support influence students' productivity in computing?

This question examined if guardian support could help motivate students in their learning outcome. The research question was tested with responses to items 11,12,13,14, and 15 in the students' questionnaire. The summary of data in Table 5 indicates the respondents' mean rating on the extent of guardian support influences student learning outcome. The respondents agreed that students' productivity is also influenced by guardian support such as: Close supervision of student work ($\overline{x}$ = 3.32; σ =0.780); Feedback from Instructors ($\overline{x}$ = 3.50; σ =0.719); Prompt execution of students' need ($\overline{x}$ = 3.35; σ = 0.590); Good human relationship ($\overline{x}$ = 3.33; σ = 0.716) and Student support programs ($\overline{x}$ = 3.70; σ =0.458). With the aggregate mean of 3.44, it therefore implies that guardian support enhances students' productivity in computing.

Test of Hypothesis

H₀: There is no significant difference between male and female students' perception on the perceived influence of learning environment on students' productivity in computing.

Table 6 reveals that gender was not a significant factor in the perceived influence of learning environment on students' productivity in computing. The above result showed that the calculated t-value is -1.4599, while the table value is 1.960, with degree of freedom of 148 and significant level of 0.05. Since the calculated t-value is less than the table value, it implies that the calculated t-value falls within the accepted region. Hence, the hypothesis which states that there is no significant difference between male and female students' perception on the perceived influence of learning environment on students' productivity in computing is retained.

Table 5: Mean Ratings of Students' Response to the Effect of Parental Support on Students' Academic Performance. N= 150.

Items: Guardian Support	SA	A	D	SD	Mean ($\bar{x}$)	Standard deviation (σ)	Remark
Close supervision of my school work	70 (46.7%)	65 (43.3%)	8 (4.7%)	7 (5.3%)	3.32	.780	Agreed
Feedback from instructors	90 (60%)	50 (33.4%)	5 (3.3%)	5 (3.3%)	3.50	.719	Agreed
Prompt execution of students' need	60 (40%)	85 (56.7%)	3 (2%)	2 (1.3%)	3.53	.590	Agreed
Good human relationship	66 (44%)	72 (48%)	7 (5.3%)	5 (3.3%)	3.33	.716	Agreed
Students support programs	105 (70%)	45 (30%)	0 (0%)	0 (0%)	3.70	.458	Agreed

Scale Used: 1.00-2.49= Disagreed while 2.50-4.00= Agreed
Criterion mean=2.50
Aggregate mean=3.44 (Agreed)

Table 6: T-Test of Male and Female Students' Perception of the Perceived Influence of Learning Environment.

Groups	N	Mean ($\bar{x}$)	Mean difference	Standard deviation (σ)	Variance	Degree of freedom (df)	Table of t-values	Calculated t-values
Male	67	27.8657	0.4596	2.0736	4.3000	148	1.960	-1.4599
Female	83	28.3253		1.7745	3.1490			

$P < 0.05$

DISCUSSION OF FINDINGS

From the statistical analysis carried out so far, it is pertinent to discuss the revealing results of the study. The results obtained in the course of this study have been quite revealing and instructive. This study revealed that students need to be motivated both intrinsically and extrinsically. Both ways of motivation are necessary for a better academic achievement and the more students are motivated the better chance of being productive.

In fact psychologists believe that an enabling environment is a necessary ingredient for learning (Biehler and Snowman, 1986). They believe that satisfactory school learning is unlikely to take place in the absence of sufficient motivation to learn (Fontana, 1981). This agrees with Scales and Roehlkeparlain (2003) who, from the result of their study with Colorado Springs 9th and 12th grades concluded that comprehensive and appropriate learning approaches to education and staff development have tremendous potential to contribute to the academic success of students from all backgrounds.

Hall (1989) believes that there is a need to motivate pupils so as to arouse and sustain their interest in school learning. This study also revealed that school physical environment and structure have great role to play in the motivation of students for higher productivity. This result is not surprising because at least, 1/3 of students' daily life is spent in school. It is believed then that schools with better organization, good academic environment will motivate their students more and students from such schools stand the chance of better academic output than schools that do not have such academic environment organization. Brown et al., (2003) stressed the need to introduce asset building to staff/instructors to encourage them in helping for achievement gains of students.

The findings also showed that respondents strongly believe that provision of instructional materials, such as computer labs, library facilities, computer hardware and software, etc., would go a long way to motivate them in their academic pursuit. This is why Akabogu et al., (1992) opined that the more educational needs

are satisfied and good environment organization is provided, the better students perform.

The results obtained from this study also revealed that school activities have great role to play in the motivation of students for an improved academic output. Maehr (1990) gave teachers some skills to apply in carrying out their role in motivating students during their teaching/learning encounter. This includes: instructors' capacity training, use of appropriate learning approaches, practical sessions, and so on. Again, it is shown that students work harder academically in schools which recognizes and reward their hard work (Tsavga, 2011). As a matter of fact, students readily become interested in things, which are new, or exciting, or in things for which they can perceive practical value (Kumar, 2006).

Moreover, the results obtained from this study showed that guardian support has a great role to play in the motivation of students for improved academic achievement. It was discovered that students who are accepted, supported, and encouraged by their mentors stand a better chance of performing better in their academic pursuit. Again, It has been discovered that close supervision of students' work by their guardians motivate students to work harder. The results corroborated the views of Aluede and Omoregie (2005), who showed that teachers, as well as guardians have great role to play in motivating their students. This study therefore, contributes to the existing evidence (Scales and Roehlkepartain, 2003; Oniyama and Oniyama, 2005) to suggest that guardian support has a great role in student's achievement in their academic pursuits. We hold that if the guardian has the resources, supports their children, and creates an academic environment, children reared in such an environment do better in their academic pursuit. So, one can simply infer here that guardian support enhance students' productivity in computing.

In addition, the result of our hypothesis, which compares the perceived influence of learning environment on student's productivity using gender as a variable of interest, is found not to be significant. The findings show that learning environment enhances students' productivity in computing without respect to gender. This finding is in agreement with Siana et al. (1998) findings that Asian students of both sexes rated parents as more important in contributing to academic success. This implies that there is no significant difference between male and female students' perception on the perceived influence of learning environment on students' productivity in computing.

Finally, students' learning environment has high positive correlation in their learning outcome. The above results showed that learning environment is very important factor towards enhancing students' productivity in computing.

CONCLUSION AND RECOMMENDATION

The findings reported in this study justify the importance of learning environment to students' productivity in computing. The findings have implications for the educators of computer science in that it is their responsibility to motivate their students during the course of instructions. The guardians, as well as the government, should create an enabling environment, and also engage in programs that could motivate their students towards high academic performance. It is therefore, hoped that these findings will serve as resource materials for computer science educators, computer scientists, school authorities, and other stakeholders of learning towards improving students' productivity in computing.

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ABOUT THE AUTHORS

Anayochukwu C. Obienu is a Ph.D. student in the Department of Computer Science, University of Benin, Nigeria. He received his B.Sc.[Ed]. and M.Sc. in Computer Science from the University of Benin in 2011 and 2015, respectively. He is a member of IEEE and CIPDM. His research interests are in information and communication technology, database/information systems; and the management of information systems.

Frank I. Amadin is an Associate Professor in the Department of Computer Science, University of Benin, Nigeria. He holds a Ph.D. degree in Software Engineering from the University of Benin. He is a member of the Nigeria Computer Society (NCS), CPN, and IEEE Society. His areas of interests include software engineering, soft computing, artificial intelligence, and information and communication technology. To date, he has supervised several undergraduate and postgraduate students.

SUGGESTED CITATION

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