

## EFFECTS OF COMPUTERS ON CREATIVITY OF ART STUDENTS

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### ABSTRACT

*This study was made to investigate the effects of the use of computers by the Art students of the Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi on their creativity in art productions. A total of 200 art students of the fourth year were involved in the study. The instrument consisted of a 20-item Likert scale questionnaire designed and validated by the researcher to elicit the desired responses from the students. The elements of creativity that were investigated included among others, the computer's ability or otherwise to surpass humans in creative art productions in terms of speed, flexibility, versatility, precision, capacity, efficiency and aesthetics. The responses of the questionnaires were coded. The mean and Standard deviations of the responses were calculated. The responses were later correlated through the use of the Pearson correlation formula. Computer was used in processing all data. The results showed varied intercorrelation. The views of the respondents showed a positive stance, which the researcher believes, arose out of enough experience or exposure to computers and their potentials. Based on these results a conclusion was made.*

**Keywords:** Computer, Art Productions, Students, Creativity, Typography, Computer Graphics

### INTRODUCTION

Technology has in many ways changed and is still changing how Art is produced, disseminated and valued. Through computer technology the scope of Art has expanded by enabling the development of art forms that did not even exist in the past. Due to this, according to Prebles (1994), artists with dramatically divergent points of view and level of aesthetic sophistication are using computers either to create previously impossible forms, to speed up or make more manageable forms that would have hitherto, been too complex and time-consuming.

It is realized that the computer has no precedent as a medium for image-making because of its unparalleled range of possibilities. For, in the hand of a talented artist, the computer is a machine capable of producing images of captivating power and beauty. Art of our time has taken a new direction and assumed a new definition through the use of computers. Artists therefore have to switch from the divinity of masterful creativity and genius to computer skill to avoid technological unemployment. However not all artists subscribe to the idea that computers will solve all human problems of creativity and productivity as will be observed from the foregoing review of related literature.

Computers have enabled the development of different art forms, which according to Russell (1993), can be used in various fields of human endeavour. For instance, images produced on a computer screen are known as computer graphics, and they in turn pervade television, magazines, newspapers, books and even museum exhibitions today.

Further more Russell also observed that the special effects made possible by computers, commonplace in television news and sportscasts involve innovative techniques – assembling pictures electronically, changing their colours instantly, enlarging and reducing images and then adding on-screen colours that interact with the more traditional elements of forms and shading that we find, for example, in painting and sculpture.

In the field of typography, Russell (1993) reiterated that computers permit integration of type and artwork in a fraction of conventional typesetting time; and hundreds, even thousands of experimental arrangements can be, since the computer gives the artist the capability to rapidly summon images that have been created and stored in the computer memory by a layout artist. He concluded that there is no limit to which this technological device can be used for creative art productions.

Other writers like Gilbert and McCarter (1988) have also observed how the computer has changed the ways of graphic artists in all media work. For instance, designing, testing of ideas, forms and colours, are done on the computer screen with as much flexibility as the pencil or pen could offer, but faster. They emphasized the provision of unprecedented speed by computers in making drawings, speed in making corrections, speed in trying out various colours, shapes, and proportions.

One is reminded that before computer graphics became available, the designer whose drawing seemed almost right but not perfect – say, the

proportions were a little off – would have to start all over again and make a new sketch. Now the proportion can be altered in seconds and a new image displayed on the computer screen, with the push of a button.

Although the experts have established the versatility, flexibility, precision, speed, efficiency and capacity of the computer in creativity in art productions there seems to be some drawbacks. One of these is that because of the vast selection of possibilities offered by the computer, Taylor (1996, p. 70) warned that there is a danger of being tempted by the things the computer can do, rather than using its abilities to achieve what an artist wants. Another is that some artists have concerns about the development of Art and the influence of technology on culture as a whole. These concerns have generated protracted controversy among artists.

In conservative circles, it is believed that the use of the computer in creativity in art productions “threatened the foundation of the art establishment, which was based on hand skill.” (Lovejoy, 1991, p. 5) In other words the skeptics believed that the computer with its cutting-edge technology would devalue and eventually usurp artistic creativity and control.

This study therefore aims at finding out the effects of the use of computers by fourth year art students on their creativity in art productions in a bid to attempt to resolve this controversy.

## **MATERIALS AND METHODS**

### **Sample**

The sample for this research comprised 200 randomly selected fourth year (level 400) Art students of the College of Art, at the Kwame Nkrumah University of Science and Technology, (KNUST) Kumasi, Ghana. Out of a total of 200 questionnaires distributed to students 170 were properly completed and returned to the researcher. This represented 85% of the total. The

sample consisted of 74 students who were between the ages of 18-24; 70 who were between 25-35; and 12 who were over 36 years of age; while 14 were for missing system. The sample also consisted of 105 males (61.8%) and 65 females (38.2%). The students were drawn from 7 areas of specialization. The numbers from each of these areas are displayed on Table 1.

Section B required information on the use of computers in art productions and their effect on the creativity of the artist. Respondents were required to indicate their responses on a 5-point Likert Scale of Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD), and Neutral (N).

**Table 1: Areas of Specialization of Respondents of Art Form and Productions**

	Frequency	Percentage	Valid Percent	Cumulative Percent
1 BOOK INDUSTRY	43	25.3	25.3	25.3
2 CERAMICS	14	8.2	8.2	33.5
3 GRAPHIC DESIGN	20	11.8	11.8	45.3
4 METAL PRODUCTS	15	8.8	8.8	54.1
Valid 5 PAINTING	16	9.4	9.4	63.5
6 INTEGRATED RURAL ART & INDUSTRY	39	22.9	22.9	86.5
7 SCULPTURE	23	13.5	13.5	100.0
<b>Total</b>	170	100.0	100.0	

The above table shows that students specializing in Book Industry form the majority of the respondents. This is followed by students in Integrated Rural Art and Industry, Sculpture, Graphic Design, Painting, Metal Products, and Ceramics.

### Research Design

The research design was the questionnaire survey type. Here the researcher designed a 20-item questionnaire, which was validated and used to elicit the required responses from the students.

### Instrument

The instrument was a 20-item validated questionnaire. The instrument was divided into two sections: A and B. Section A required the details of the bio-data of the respondent. These include Sex, Age, Area of Specialization, and others.

### Procedure for data Collection

The researcher administered the questionnaires to the students in their lecture rooms and studios. The researcher explained the purpose of the exercise to them that it was for research purposes, as a result they should not indicate their names on the questionnaires. They were told that there were no right or wrong answers, as a result they should complete them as sincerely as they could.

After the completion of the questionnaires 30 were found to be either blank or improperly completed and so were discarded. The rest were coded as follows:

Strongly Agree (SA) = 5 points, Agree (A) = 4 points, Disagree (D) = 3 points, Strongly Disagree (SD) = 2 points, and Neutral (N) = 1 point. The questionnaires were submitted to the Com-

puter Centre of the University of Education at Winneba for computation and analysis.

## RESULTS

It was found that 157 (92.4%) students were computer literate while 13 (7.6%) students were non-computer literate. Fifty-seven (i.e. 33.5%) students owned computers while 112 (65.9%) did not own computers. There was one missing system.

Out of 112 students that did not own computers 84 (49.4%) indicated that they had access to computers while the remaining 28 (16.5%) had no access. Hundred and sixty-four (i.e. 96.5%) students indicated that they believed that it was necessary for a student to possess a personal computer.

Section B required the respondents to indicate their responses on 5-point Likert Scale against some factors, which may or may not enhance creativity among Art students in the use of computers for their work and study. The frequencies, mean scores and standard deviations of the their responses are displayed on Table 2.

Table 2 shows the frequencies, mean scores, and standard deviations of the responses of students on the effects of computers on human creativity in art productions. The trend of the data shows that students' responses are heavily tilted towards the positive column of the Likert Scale.

Item 1 (Computer is not as creative as human artist), item 2 (Computer doesn't improve human creativity), item 3 (Computer can improve the artist's creativity.), item 5 (Erosion of human creativity by computer is baseless.), item 9 (Students should adopt this machine because of its colour capabilities.), 13 (In this era of innovations, computers should play roles in artistic designs.), 15 (Computers are not substitutes to the artist.), 17 (Computer can enhance artist's creative and aesthetic values.) to 20 (Computer technology in Art is irreversible progress, however,

it can't reduce human creativity.) were highly rated by the students under the positive column. This means that students were optimistic that computers in art productions holds much promise for the future of artists.

Under the negative column students were pessimistic that computers curtail the artists' freedom hence are not conducive for creativity (item 6). The idea here is probably that freedom of expression by the artist enhances his creativity, which the stereotyped format provided by the computer does not encourage. They were also pessimistic that computers can ever replace or be a substitute to the human artist (item 14).

The respondents were also of the view that the mechanical nature of the computer contradicts the natural laws of creativity in art productions (item 8). Under the neutral column on the scale there were no dominant responses.

Table 3 shows the regression square of the data yielded by the analyses of the responses. The following are the researcher's observations from a study of the data displayed on the table. Some of the variables have negative relationships while others have positive. Item 6 (Computer does not give freedom to the artist to create), item 7 (Computer can surpass human creativity), item 9 (Students should adopt this machine because of its colour capabilities), items 13, 14, 16, and 17 have negative (inverse) relationships with the dependent variable of computer as a device for Art students' productions. This implies that the effects of these variable (with negative coefficients) tend to decrease with the exponential increase of the dependent variable, whereas those with positive coefficients increase as the students intensify their use of computers for work productions (i.e. the dependent variable).

This then means that the variables with positive coefficients are a function of the dependent variable, the more the Art students use computers for their work the more these variables enhance and

**Table 2: Frequencies, Mean Scores and Standard Deviations of Students' Responses on the Effects of Computers on Students' Creativity in Art Productions**

	FACTORS	RESPONSES FREQUENCIES						
		SA	A	D	SD*	N	Mean	SD**
1	Computer is not as creative as human artist.	12	62	59	32	5	3.26	.94
2	Computer doesn't improve human creativity.	38	57	51	16	7	3.61	1.06
3	Computer can improve the artist's creativity.	51	97	11	3	3	4.15	.77
4	Computer depends on artists' creativity can't therefore be more creative than the artist.	16	31	77	34	5	3.12	.95
5	Erosion of human creativity by computer is baseless.	12	92	32	18	14	3.42	1.05
6	Computer does not give freedom to the artist to create	8	23	74	62	3	2.83	.86
7	Computer can surpass human creativity.	9	58	69	21	12	3.18	.97
8	Computer involves mechanisms that contradict natural laws of art and creativity.	7	31	92	28	10	2.98	.87
9	Students should adopt this machine because of its colour capabilities.	77	75	5	6	7	4.23	.97
10	Artists should use computers since creativity has no bounds.	62	101	2	1	2	4.31	.65
11	Computer enables the gifted and ungifted to become perfect.	21	106	23	8	7	3.76	.89
12	Computer can't compete with human beings in display of creativity.	35	63	54	3	7	3.72	.97
13	In this era of innovations, computers should play roles in artistic designs.	74	77	4	4	3	4.33	.80
14	Computers can replace human creativity and skill in rendering 3-D objects.	9	34	61	43	17	2.85	1.04
15	Computers are not substitutes to the artist.	25	95	29	12	10	3.70	1.02
16	Although computers produce wonderful results they can't erode human creativity.	55	93	7	2	7	4.14	.89
17	Computer can enhance artist's creative and aesthetic values.	70	90	4	0	2	4.36	.65
18	Computers are created by human and can't surpass the creator	57	96	7	0	5	4.21	.79
19	Computers increase creativity and artistic designs so their uses should continue.	68	88	2	1	6	4.28	.84
20	Computer technology in art is irreversible progress, however it can't reduce human creativity.	46	78	6	21	11	3.88	1.08

SD\* = Strongly Disagree. SD\*\*= Standard Deviation

**Table 3: Regression Square ( $R^2$ ) of the Data yielded by the Analyses of Students' Responses On the Effects of Computers on Students' Creativity in Art Productions**

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.040	1.063		.979	.330
	B2 Computer doesn't improve human creativity	.141	.084	.162	1.670	.098
	B3 Computer can improve the artist's creativity	.150	.132	.104	1.130	.261
	B4 Computer depends on artists' creativity can't therefore be more creative than the artist	.152	.100	.155	1.520	.131
	B5 Erosion of human creativity by computer is baseless	.166	.082	.184	2.021	.046
	B6 Computer does not give freedom to the artist to create	-7.817E-02	.102	-.072	-.764	.447
	B7 Computer can surpass human creativity	-8.187E-02	.086	-.081	-.953	.343
	B8 Computer involves mechanisms that contradict natural laws of art and creativity	.131	.103	.119	1.275	.205
	B9 Students should adopt this machine because of its colour capabilities	-8.292E-02	.096	-.087	-.863	.390
	B10 Artists should use computers since creativity has no bounds	5.519E-02	.152	.033	.364	.717
	B11 Computer enables the gifted and ungifted to become perfect.	5.288E-02	.107	.048	.494	.622
	B12 Computer can't compete with human beings in display of creativity	.186	.094	.185	1.982	.050
	B13 In this era of innovations, computers should play roles in artistic designs	-.146	.119	-.118	-1.232	.220
	B14 Computers can replace human creativity and skill in rendering 3-D objects.	-1.000E-02	.082	-.044	-.487	.628
	B15 Computers are not substitutes to the artist.	.105	.093	.111	1.125	.263
	B16 Although computers produce wonderful results they can't erode human creativity.	-1.479E-02	.106	-.014	-.140	.889
	B17 Computer can enhance artist's creative and aesthetic values.	-.193	.147	-.125	-1.310	.193
	B18 Computers are created by human and can't surpass the creator	-2.192E-02	.116	-.018	-.189	.851
	B19 Computers increase creativity and artistic designs so their uses should continue	9.503E-03	.113	.008	.084	.933
	B20 Computer technology in Art is irreversible progress, However it can't reduce human creativity.	.189	.081	.201	2.327	.022

a. Dependent Variable: B1. Computer Graphics is not as attractive as manually rendered work

manifest in their skills and competence in their work speed and quality. A corollary to this result is that more computers need to be deployed to KNUST to accelerate Art students' productivity and effective learning.

Item 5 (Erosion of human creativity by computer is baseless) and item 20 (Computer technology in art is irreversible progress, however it can't reduce human creativity) yielded the highest significant t-values of 2.021 and 2.327 respectively. These imply a positive index to the good prospects, which the use of computers has for Art students. Deductions from the data on both tables 2 and 3 indicate a linear relationship because both analyses point to a similar direction. The trend is that the respondents were positive that human artists hold a lot of potentials and promises for the future success of art creations. The consensus is that though the computer, as a machine, is an effective tool, with many intricate applications, it is not omnipotent in creativity and functions. This means, according to the data interpretation, that the computer is still subject to human control and can therefore, not replace him.

## **DISCUSSION**

The trend of data described above shows a sequence of positive responses, which favours the idea that the human artist needs a lot of freedom to improve his creativity in art productions. The trend also suggests that though computers are effective tools in the hands of the artist, its potentials and applications should not be exaggerated or overemphasized above human ingenuity. The possible interpretation that can be given to this is that the machine is as good as how the creative artist designs and uses it.

The students used for this research were also of the view that there can be no substitute to human ingenuity and that freedom of expression is a catalyst to effective creativity in art production. In essence, therefore, the students are of the view that the mechanical and stereotype nature

of the computer cannot foster creativity, hence the superiority of the human artist to the machine.

Both the responses of positive and negative columns are congruent with each other because they seemed to be making the same point that human ingenuity should not be underestimated in relation to the machine. The responses are therefore coherent and consistent with one another. This result contradicts a previous one carried out on second year (level 200) students of the same College in which it was found that students' responses were incoherent with each other. In the end, research question was unresolved. (Dogbe, 2003)

## **CONCLUSION**

This study has revealed that the fourth year (level 400) Art students of KNUST were more positive of human artists in the production of creative artworks. Analyses show that they view computer as an indispensable tool of the artist but are pessimistic that the machine can ever replace the human artist in the production of creative artworks. They agree that computers can perform manifold and versatile creative functions.

They also agreed that the computer is an innovative machine, which should continue to be used for the enhancement of the artist's design and productions. Analyses show that the human artist holds the key to how much use and achievements the machine can be subjected to. This implies that the machine, despite its complexity in creative artworks, still owns its destiny to humans.

Based on the results of this study it is hereby recommended that the Art students of KNUST should be exposed to computers more regularly for their studies and practical works. Such an exposure will help improve and enhance their motivation, speed and quality of work. It will

also be a source of inspiration for them to exercise and improve their creativity. Though the natural creativity of the human artist cannot be substituted by the mechanical one provided by the computers, it is still the view of this researcher that the human artist should embrace and adopt the machine for all his creative productions. This is because, in the modern world the universal use of the computer is an index to the level of technological advancement of any race or nation. A nation, which constantly adopts the natural (human) or animate energy and ability for its educational and industrial activities will remain technologically and economically backward.

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