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The Influence of ICT on Creativity: Impact, Attitude and Perception

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Abstract

Art educators and the stakeholders in allied industries have expressed concern about the deficiency of creativity among art and design students in the classroom. Considering such circumstances, many design students in the tertiary institutions are finding it difficult to apply the techniques of ICT into meaningful and accomplished learning and creative activities. In light of this, the study seeks to explore the influence of ICT on creativity. The aim of this study therefore is to evaluate the impact, perception and attitude of students towards the use of ICT on creativity. The study design employed a qualitative research approach where, based on purposive sampling method, students pursuing the Communication Design programme, were selected for the study. This was because students in this programme were often involved in using ICT to develop creative designs. Simple random sampling was employed to administer questionnaire to 150 students from the four-year groups in the Department of Communication design who had taken part in design projects and assignments one way or the other. The results from the study indicated that majority of students had no much idea about the use of ICT on creativity. It is

recommended that learners can improve upon the knowledge and skills in creativity only if they change their perception and attitude towards the use of ICT.

Keywords: ICT, Creativity, Design, Education, Impact, Perception

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INTRODUCTION

Digital media technologies are always developing, each complemented by conventions and practices. Today, new digital learning technologies are integrating global content and intensifying learning scopes within and further than existing classroom models (Wilks, Cutcher and Wilks 2012). Therefore, creativity is explored as a dynamic and fundamental intellectual thinking of modern times. The implication is that the ability to appropriately use computer imageries and integrate them into the learners' creative works has become crucial.

However, in recent years, art educators and stakeholders in the industry have expressed concern about the deficiency of creativity among design students in the classroom and the need to enhance creative thinking skills (Brad Hokanson, 2006; Mokaram et al, 2011). Consequently, art educators are striving hard to help students (Lee et al 2011) to become conscious of the encrusted perspectives of the art and design world and its evolving connection with Information Communications Technology (ICT). Considering such settings, many design students in the tertiary institutions find it difficult to explore the methods and techniques of ICT into meaningful and accomplished learning and creative activities.

Therefore, in exploring the influence of ICT on design students' creativity, the objectives of this paper are to assess the impact of ICT on creativity among design students. The second objective is to explore their perception and attitude towards the use of ICT on creativity. The research questions are: What is the extent of the impact of ICT on creativity among design students? Secondly, what are the attitudes and perceptions of such students towards the use of ICT on creativity? Therefore, the introduction of (ICT) education in schools and colleges has come as a relief in the development of creativity among students' learning in the classroom. Consequently, there has been a resultant increase in educational exploration to back the significance of digital media technology and creativity in fields of intelligence and learning.

The new discovery, output and fast development of information and communications technologies (ICT) on creativity have presented a challenge for both students and art educators. Therefore, there is an urgent need for collaboration between art and computer science researchers and instructors to develop an interdisciplinary curriculum to address the issues of students' inability to create art and design works

Creativity Contexts

The development of ICT and its impact on creativity has been observed for some years now (Hopson, 1998; Heaston & Bedell, 1999; Shehab, 1999; Hussein, 2002; Wheeler et al, 2002; Lubart, 2005). According to Sternberg & Lubart (1995), creative thinking is of prime importance and worth nurturing, like the Torrance Test of Creative Thinking (TTCT), for the ultimate development of societies through wider applications. Thus, Creativity could be described as the use of original concepts or resourcefulness to create something new (Sawyer, 2006).

Over the years, scholars, critics and other stakeholders have made many attempts to define creativity in different contexts. Whilst Ausubel (1963) defined creativity as ‘a rare and unique talent in a particular field of endeavour’, Bruner (1965) indicated that it was ‘an act that produces effective surprise’. Boden (2001; p 95), then provides a corollary, that creativity is ‘the ability to come up with new ideas that are surprising yet intelligible, and also valuable in some way.’

Lewis (2008) in his statement noted that creativity is an important aspect of novelty and change, often a sought-after quality of intellectual thinking. Reviewing literature on creativity there are a lot of theoretical perspectives of which the most significant are the gestaltist, psychoanalytic and humanistic ones (Allegra et al 2001). Creativity could be described as multidimensional which could be classified into three different categories such as technological, artistic and cultural creativity.

Loveless (2002) pointed out that where there is understanding of, and opportunities for, the variety of creative processes in which instructors and students can engage, creativity can be promoted and extended with the use of digital media technologies. Loveless (2002) asserted that Students and instructors in education can use ICT to promote creative expression, fashioning and creating original works with cognitive tools. When technologies are used to assist students’ learning and problem-solving, they become cognitive tools

Cognitive Education, ICT and Creativity

Cognitive tools are instruments that can regulate learner’s activity. Cognitive tools are technologies that aid learners in the knowledge construction stage. Creating design with digital technology is a cognitive activity that adds much economic, social and cultural value. ICT and creativity are desired core competencies of individuals and

organizations alike. Therefore, ICT and creativity with its main goals of learning and teaching also facilitates individual creativity through knowledge sharing (Lee et al 2011). However, some art educators do not fully understand the relations between creativity on the one hand, and between ICT education and creativity on the other.

What are the principles for generating activities and curricula that promote ICT and creative activities? What scaffolding do learners need to become more creative and to learn with digital technologies? (Lee et al 2011). Constructivist and social constructivist theories of learning and teaching became prominent and influenced creativity and ICT education (Savery & Duffy 1996; Jonassen 1999; Palinscar 1998; Lee et al 2011). Consequently, few research questions come to mind that need answers. These are as follows; what can educators deduce from constructivist and socio-constructivist theories of learning? How can these theories of learning help students in the classroom learn to employ technology to design and solve problems creatively? (Lee et al 2011).

These attributes in turn affect the attitude and perception of the learner using either the traditional medium or ICT in creativity. Pioneering cognitive education, there are series of advantages and disadvantages of using either the traditional or computer technology to develop ideas. Appiah and Cronje (2012) pointed out that each of the process has its own merits and demerits despite the fact that students are usually encouraged to begin from the traditional way of conceiving ideas before refining them using the ICT tools.

There is no denying that young people have embraced the digital world. They are intuitive learners of ICT, and many have developed their skills unprompted and independent of what they are doing at school (Wilks, Cutcher, and Wilks 2012). The challenge for students and educators is to continue to create high quality, relevant, exciting, and demanding learning experiences in art classrooms using ICT. Students'

lack of creativity in their design art works cannot entirely be blamed on them. Some art educators must also be apportioned parts of the blame for lack of creativity when it comes to the use of ICT to create art works.

The information is that some art educators also become deficient when it comes to the use of ICT skills and competences. According to Wilks, Cutcher, and Wilks (2012), the challenge for art and computer instructors is to carry on to make high excellence, applicable, exciting, and challenging erudition experiences in art classrooms by usage of ICT. Due to these challenges, art instructors have been motivated by theoreticians to embrace ICT in order to create new pedagogics for knowledge and training. Therefore fresh thinking and employment of new methods to the ways in which ICT can be applied into art classrooms are necessary. Notwithstanding the associated issues explored here, there is the need for practical use of ICT that responds to vast variations in levels of material practice, expression as well as students' desires and benefits (Wilks, Cutcher, and Wilks 2012).

Traditional methods or standards-based instruction has often clutched creativity out of the core curriculum (Giroux & Schmidt, 2004). Robinson (2011) also pointed out that orthodox methods of teaching tend to infatuate students' natural tendencies toward creative and divergent thinking. The best uses of digital media technology in education must be impacted in a creative mind-set that clasps ingenuousness for the new and scholarly venturesome. Loveless (2002) pointed out that the features of ICT can make a unique contribution to creative practices, providing new tools, environments and digital technology and for learning to be creative and being creative through learning

Nevertheless, using Information and communications technologies (ICT), students and learners can access current art productions and models that will ignite creative thinking

and prospects, predilections and possibilities and lead to richer, better designs and artworks (Wilks & Cutcher, 2012). Wilks and Cutcher (2012) further explained that learners and students can make use of digital media technologies to visualize and be able to generate and construct artworks and to critically and creatively assess their own art works as well as other people's art concepts and products. In supporting this argument, Nettelbeck (2007) accentuated that ICT can assist learners and students to shed light on thoughts by visually coding and representing their thinking beside recognizing patterns and form relationships between new and existing knowledge.

METHODOLOGY

A purposive sampling method was used for the study. The nature of the study necessitates for non-probability sampling method which was employed to select and bunched samples in a process that did not give all the participants in the programme an equal opportunity of being selected ((Battaglia, 2008; Etikan et al, 2016). That is, participants were selected on the basis of their availability, proficiency, knowledge, and experienced through purposive approach and personal judgment of the investigators (Etikan et al, 2015; Zikmund & Babin, 2010).

Thus, based on the purposive sampling method, students pursuing Communication Design programme were selected for the study. This was because students in this programme were often involved in using ICT to develop creative designs. Simple random sampling was employed to administer questionnaire to 150 students from the four-year groups in the Department of Communication Design who had taken part in design projects and assignments one way or the other.

Out of the two hundred questionnaires distributed to Communication Design students, 150 students responded to the questionnaire. The questionnaire contained demographic

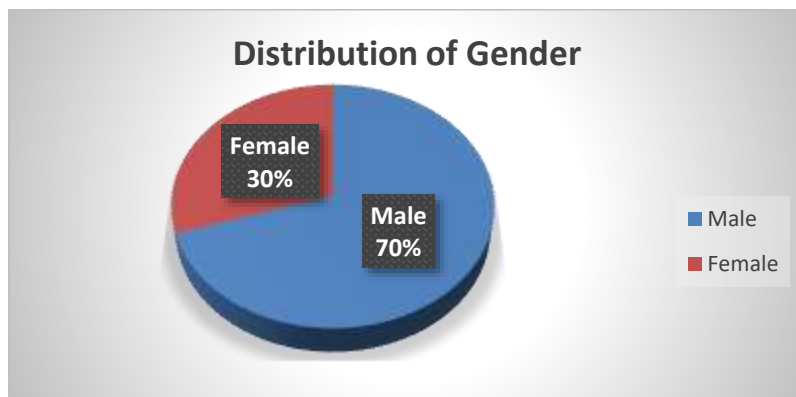
information and other nine statements. The nine statements were structured into two sections to collect information based on three important factors: the impact of ICT on learners' creativity and students' attitude and perception toward the use of ICT on creativity. For the statistical analysis, the researchers used the SPSS (version 25.0) to generate the percentages, frequencies and charts of the results attained, through data gathered from primary data sources.

RESULTS AND ANALYSIS

Impact, Attitude & Perception of ICT on Creativity

A) Demographics

Figure 1: Gender Description of Respondents



Source: Field data, 2020

In general, one hundred and fifty (150) students responded to the questionnaire, and out of these 105 students representing 70% were males and 45 students representing 30% were females respectively, as shown in Figure 1. This indicates that majority of the respondents in the class were males, compared to female students in the department.

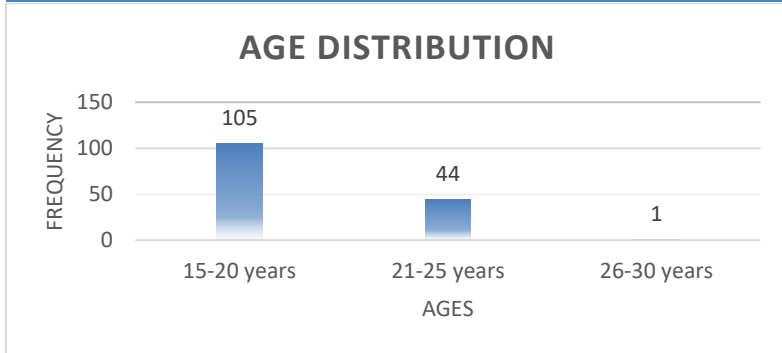


Figure 2: Age distribution

Source: Field data, 2020

From Figure 2 above, 66% (105) of the respondents were between the ages of 15 to 20 years, 29.3 % (44) were between the ages of 21 to 25 years, while one respondent was between the age of 26 to 30 years, accounting for about 0.7%. Thus, we can say that respondents were mostly young adults and suitable for the study.

B) Impact of ICT on Student’s Creativity

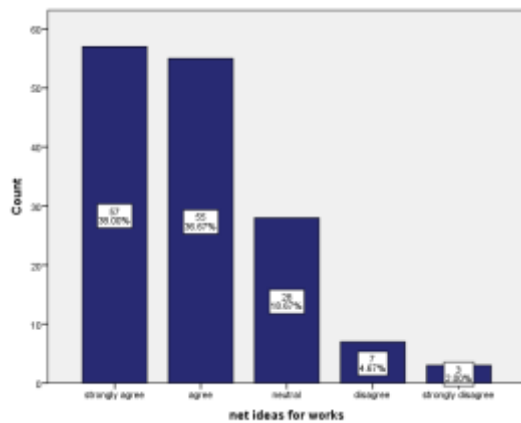


Figure 3a: Searching for ideas on the internet

Source: Field data, 2020

To know whether ICT has an impact on students’ creativity or not, respondents were asked if they search for ideas on the internet for their creative design works always. The analytical results in Figure 3a shows that, 38% representing 57 respondents strongly

agreed to the fact that they always search for ideas from the internet for their design works. 36.67% representing 55 respondents agreed that they always search for ideas from the internet. 18.67% representing 28 respondents were neutral about the statement while 4.67% representing 7 respondents disagreed to the fact that they search for ideas on the internet for their creative design works always. 2% representing 3 respondents strongly disagreed that they always search for ideas from the internet for their design works. This implies that majority of respondents (74.67%) always search for ideas from the internet for their creative works.

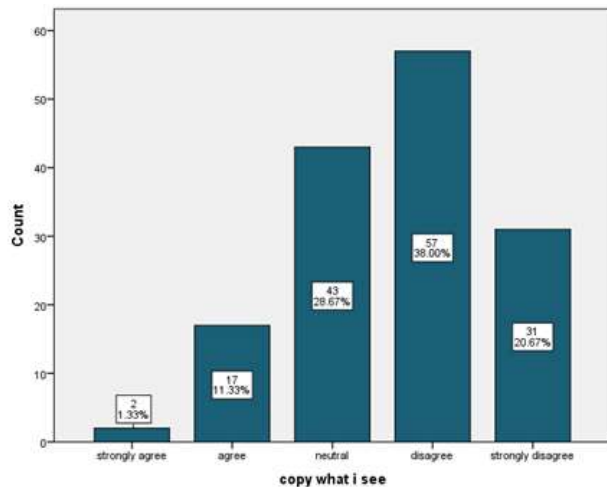


Figure 3b: Copying what is seen on the interne

Source: Field data, 2020

As shown in Figure 3b, Respondents were asked whether they copy what they see on the internet into their design works or not. 1.33% representing 2 respondents strongly agreed that they copy what they see on the internet into their design works while 11.33% representing 17 respondents agreed that they also do the same. 28.67% representing 43 respondents are neutral. 38% representing 57 respondents disagreed to the fact that they copy what they see on the internet into their design works while 20.67% representing 31 respondents strongly disagreeing.

This therefore implies that majority of respondents (58.67%) do not copy what they see on the internet into their design works even though they search for ideas on the internet for their creative works.

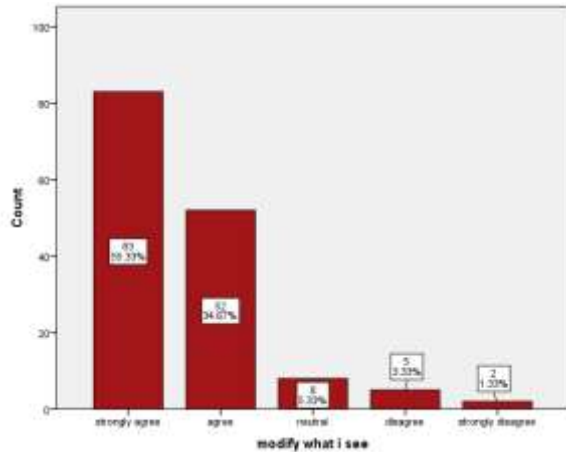


Figure 3c: Modifying what is on the internet

Source: Field data, 2020

Figure 3c above sought to enquire whether respondents modify what they see on the internet to make it their own. 55.33% representing 83 respondents strongly agreed that they modify what they see on the internet to make it their own while 34.67% representing 52 respondents agreed that they modify what they see on the internet and make it their own. 5.33% representing 8 respondents were not sure whether or not they modify what they see on the internet to make it their own or not. 5.33% representing 5 respondents disagreed to the fact that they modify what they see on the internet to make it their own while 1.33% representing 2 respondents strongly disagreed that they modify what they see on the internet and make it their own. This implies that majority of respondents (90%) do not copy what they see on the internet but they modify what they see on the internet and make it their own.

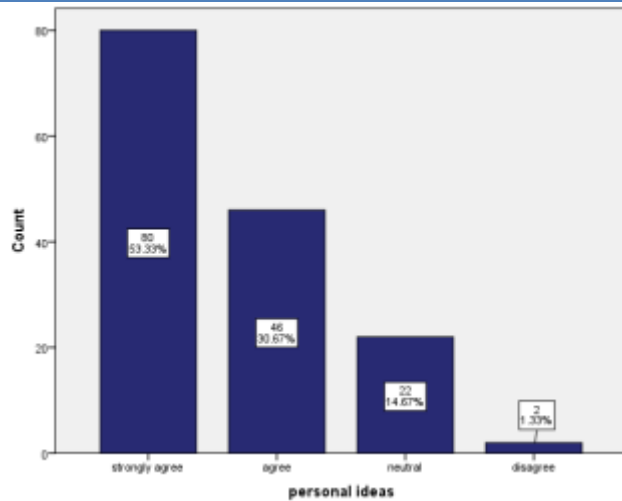


Figure 3d: Critical original ideas before going to the internet

Source: Field data, 2020

The research question, as shown in Figure 3d above, sought to enquire whether respondents think critically about the design project given and come up with original ideas before going to the internet for examples. 53.33% representing 80 respondents strongly agreed that they think critically about the design project and generate original ideas before going to the internet for examples. 30.67% representing 46 respondents agreed that they think critically about design projects and come up with original ideas before going to the internet for examples. 14.67% representing 22 respondents were neutral with the statement “I always think critically about the design project and come up with my original ideas before going to the internet for examples”, while 1.33% representing 2 respondents disagreed to the fact that they think critically about design projects and come up with original ideas before going to the internet for examples. No respondent strongly disagreed. This implies that majority of respondents (84%) think critically about the design project and generates original ideas on their own before going to the internet for similar examples.

C) Attitude & Perception of ICT on Creativity

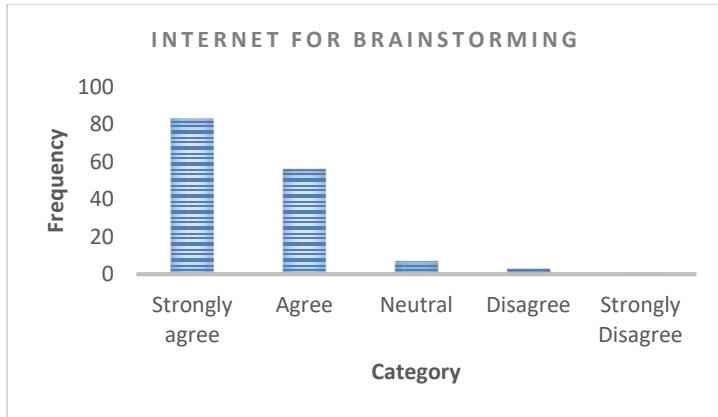


Figure 4: Internet is Useful for Brainstorm

Source: Field data, 2020

In exploring the usefulness of the Internet for brainstorming, as shown in Figure 4, 83 (55.3%) strongly agreed that the internet was useful for brainstorming; 56 (37.3%) agreed that the internet was useful for brainstorming; 7 (4.7%) were neutral; 3 (2.0%) disagreed about the usefulness of internet in brainstorming, while 0.67% strongly disagreed that the internet was useful in brainstorming.

Table 1: Internet makes creative process easier

Category	Frequency	percentage
Strongly agree	18	12%
Agree	91	60.7%
Neutral	27	18%
Disagree	6	4%
Strongly agree	8	5.3%

Source: field data, 2020

As shown in table 1 the following were the responses pertaining to how the internet makes the creative process easier. Strongly agree 12%, Agree (60.7%), Neutral (18%), disagree (4%) and Strongly agree (5.3%). Thus 72.7% generally agree that the internet makes the creative process easier.

Shown below in table 2, a significantly great figure of 92% of responses, generally agreed that the internet gives inspiration from other creative works. This was due to 60.7% strongly agreeing and 32% agreeing that the internet provides access to other creative works as sources of inspiration

Table 2: Internet gives inspiration from other creative works

Category	Frequency	percentage
Strongly agree	91	60.7%
Agree	48	32.0%
Neutral	5	3.3%
Disagree	2	1.3%
Strongly agree	4	2.6%

Source: field data, 2020

Whilst 39.3% strongly agree and 40.7% agree that the internet hastens processing during brainstorming, implies that a majority of 80% agree to this rate, as shown in table 3

Table 3: Internet hastens processing during brainstorming

Category	Frequency	percentage
Strongly agree	5	39.3%
Agree	61	40.7
Neutral	19	12.7

Disagree	10	6.7%
Strongly agree	1	0.7%

Source: field data, 2020

Table 4, 20% strongly agree, whilst 42% agree that creative works are influenced by the internet. Hence a total of 62% generally agree that their designed works are influenced by the internet.

Table 4: Designed works are influenced by the internet

Category	Frequency	Percentage
Strongly agree	30	20%
Agree	63	42%
Neutral	37	24.7%
Disagree	16	10.7%
Strongly agree	4	2.7

Source: field data, 2020

DISCUSSIONS

From the descriptive statistics, the demographics expressed in Figures 1 and 2, reveal that most of the students are males (70%), whilst female students make up 30%. This is reflective of a general trend in issues of gender parity, where there are more males than females in Ghanaian universities. Furthermore, the incidence of a total of 95.3% representing 149 students below the age of 26 years shows that Ghana's pre-tertiary educational system tilts towards an average of 18 years by the time of entry into the universities to pursue undergraduate programmes (Owusu-Ansah, 2013; Akanyako et al, 2020).

Impact of ICT on Student's Creativity

The impact of ICT on the students' creativity is reflected on how majority of them easily access other creative ideas, gain facilitation of better creative processes and inspiration.

ICT makes the creative process easier because a lot of ideas can easily be found on the web (both bad and good). Since majority of respondents (74.67%) always sought for ideas on the internet, the key reason is that one can easily find what he or she is searching for. However, 90% of respondents do not copy directly these designs but rather modify them into their own meaningful concepts or creative works. Avoiding direct copying of others' works on the internet may be possibly due to intellectual property issues, particularly, the avoidance of plagiarism (Noh et al, 2018; Hare, & Choi, 2019). That would account for why 84% of respondents think critically about the design project and generate original ideas on their own before going to the internet for similar examples, for possible affirmations and feedback. For an individual to practice creatively there is a necessity for information to be acquired, skills to be practiced and knowledge to become tacit (Dormer, 1994). Judging from the majority's use of ICT in a generally superficial manner, there is the need for the application of ICT related techniques to enable more meaningful in-depth accomplished learning and creative activities.

Thus, the impact of the use of ICT on creativity cannot be overemphasized. The results showed that there is great correlation between the use of ICT and the level of creativity activities that students are enabled to engage in. The provision of the relevant technology infrastructure affects their learning outcomes in creative design projects. This could be promoted to lead to the realization of opportunities where both teachers

and learners can engage to their mutual satisfaction within the context of the creative design learning outcomes.

Attitude & Perception of ICT on Creativity

The perception towards the use of ICT by the majority (92.6%) is that the internet is useful for brainstorming, since it offers a plethora of creative ideas to work on. It may bode well for these students in this respect but when it becomes a fixation that could possibly prove to be counterproductive. This is because defining design problems in their contexts before providing solutions is of prime importance (Dorst, 2004; Björklund, 2013).

72.7% generally agree that the internet also makes the creative process easier. This is because of the affordances it provides for the students (McGrenere & Ho, 2000). This also implies that, majority of respondents are of the perception that using the internet for design works makes the creative process easier. Additionally, inspirations from other creative works can also be found on the internet. It is no wonder that 92% of respondents generally agreed that the internet provides inspiration. Through the internet, inspiration and ideas, which are daily evolved, are derived from mentors, coaches, gurus, experts on desired areas rather than relying on books which take several years to be updated with newer ideas.

As these young adult students spend time looking for new ideas on the internet by carefully reviewing various web pages for ideas, 80% of them claim that it hastens their thinking processes during brainstorming. Although consulting books and journals also aids in brainstorming, it is not as fast as the internet because books are limited in version, unlike the internet. Attitude and perception towards the use of ICT in relation to design works is greatly influenced by internet usage. This is borne out by 62% of

respondents that they look for better ideas than their own original thoughts on the internet, incorporate those ideas into their own ideas and distil inspiring and creative designs.

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the researchers infer that although majority of respondents indicated ICT usage in their creativity activities, there was much superficiality lacking depth. The extent of real impact was low and not encouraging. Surfing the internet for ideas, inspiration, faster modes of brainstorming and being influenced in one's creative work outcomes is quite limiting. Although, none indicated any particular software usage in creative activities, originality of creative works produced and superior usage of ICT was low. Students can, thus, improve upon the requisite knowledge and skills in creativity only if they change their perception and attitude towards the use of ICT. Students using ICT for creativity do not only need the acquisition of software competency but also a degree of aesthetic sensibility and technical aptitude. This is because the digital setting has been observed to lead to the generation of ideas and for design students to function in creative way with a resulting positive impact of ICT on creativity (Csikszentmihalyi 1996; Amabile 1996; Nicholl and McLellan 2008).

It is therefore recommended that students and artists who are immersed in visual production or the creative industry should make efforts to get in-depth involvement with ICT technical skills and competencies to create premium creative works. It is again recommended that further studies be done on creative activities within the context of assessment rubrics or frameworks of design digital studio pedagogy, and perception and attitude of ICT design instructors. Visual design educators, policy makers and curriculum planners should also focus on developing authentic computer-based literacy

assessments that require students to focus on originality of creative works that adds to the corpus of literature on Ghanaian creative visual culture.

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