Journal of Education and Learning Technology (JELT)
ISSN 2720-7730 | Print – 2961-0184
Volume 4 Issue 5 – October 2023 pp 91 -101
Available online at: https://noyam.org/journals/jelt/
DOI : https://doi.org/10.38159/jelt.2023451

Digital Media Practices: Exploring the Challenges of Graphic Design Students in Senior High Schools in Ghana

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ABSTRACT

The development and introduction of digital technology for the past three decades have affected every aspect of human life. Since the introduction of digital technology in schools and colleges, most Graphic Design(GD) students have had difficulties making use of these digital technologies for their various artistic expressions. Therefore, exploiting the use of Information and Communications Technology (ICT) in the visual arts classroom has been rather challenging for students. This study thus set out to explore the challenges of Graphic design students in Senior High Schools (SHS) in Ghana. The study was conducted quantitatively. It employed the purposive sampling methodology to select four Senior High Schools where Visual Arts is studied in the Ho Municipality in the Volta Region of Ghana. The simple random sampling method was used to select 400 students from the four schools to answer the designed questionnaire. The result revealed that GD students do not involve computer applications in design knowledge to enhance creativity in the Visual Arts class because they were not taught how to use the computer application software for their practical work. It is recommended that there is a need to investigate to know the factors affecting the proper integration of ICT in the learning of Visual Art at the SHS level. Secondly, students should be trained to use ICT software to do Graphic Design work in the classroom.

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Publication History
Received 16th September, 2023
Accepted 24th October, 2023
Published online:
31st October, 2023

Keywords: *Graphic Design, Digital Technology, Visual Art Education, Computers.*

INTRODUCTION

The development and introduction of digital technology for the past three decades have affected every aspect of human life. It has been proven that the artistic world of the 21st century is filled with ICT gadgets such as computers, Android Phones, etc, which can quickly edit still images and motion images.[1] Students now work faster communicating with other end-users of the technology in relation to this learning with technical resources of the 21st century or better as they use the internet to get inspiration from the work of other people and relate to them to build their own original ideas. This is to say that the integration of ICT in various schools at the SHS has strong backing from the 2007 Educational Reform.

One of the major highlights of the 2007 Educational Reform in Ghana provided grounding with greater emphasis on ICT and Science and Technology. Thus, ICT integration in the SHS can enable students in the GD section to use the internet or intranet to gather information or inspiration and manipulate ideas to the point of producing a product like printing posters. This by far is assumed to make people digitally literate. In effect,

[1] Melanie L Lesswing, "Using the Torrance Incubation Model to Assist Parents with Developing Creativity in Their Children," 2014.

students are more interested in their own learning, and as the environment transitions into student-centered learning, teachers no longer hold a central role today unlike in a traditional classroom setting.[2] This shift includes a wide variety of instructional modules, including computers, DVDs, CD-ROMs, the Internet, and digital video conferencing, such as Zoom, WhatsApp, and many others.

The following are some of the advantages of integrating ICT into education in most countries as presented by Ghavifek and Rosdy.[3] They assert that ICT can be used in a number of ways to support teachers and students in learning about their subject areas. Finger and Trinidad believe that technology-based teaching and learning provide a range of interesting ways to make learning more fulfilling and meaningful, such as instructional videos, relaxation, data storage, database use, mind-mapping, guided exploration, brainstorming, music, and the World Wide Web.[4] Students will benefit from ICT integration because they will no longer be restricted by a limited curriculum and resources; instead, hands-on experiences in a technology-based course will help them stimulate their comprehension of the subject, thus increasing their learning habits.

In recent years, there has been the introduction of digital technology in the educational system in Ghana. The government has made the effort to supply computers to schools and individuals through the distribution of one laptop per child policy with the effort to integrate ICT into the educational system. Since the introduction of digital technology in art schools and colleges, most students have not been able to make use of these technologies for various artistic expressions. Therefore, exploiting the use of ICT in the visual arts classroom has been rather challenging for students. Students never use computers in the visual arts class because they were not taught how to use the computer application software for their practical work.

It has been observed over the years that design students only use the traditional method to do most of their practical work in class. As a result, there is an urgent need to investigate these factors as they influence negatively young Senior High School GD students to become digitally literate in the 21st century. This is because the creation of digitally literate students, who can work confidently and creatively in technology-enabled environments in all facets of their lives, is aided by the thoughtful adoption of digital learning modes in higher education,[5] and the adoption of digital learning modes in higher education.[6] Therefore, the objective of this study is to examine GD students' challenges in using digital technology to create art and design works in Senior High School. The research question underlying the study is what are the challenges faced by GD students using digital technology to create art and design works in Senior High Schools

LITERATURE REVIEW

The Nature of Visual Art Teaching Syllabi of Senior High Schools

The most successful teaching and learning is achieved with the help of a school curriculum, which serves as a reference for selecting appropriate instructional topics. The syllabi emphasize the successful use of ICT in treating a wide variety of topics in visual art. The overall curriculum seeks to acquire expertise in the use of the computer to design and create masterpieces, according to the 2010 General Knowledge in Arts (GKA) syllabus and several other Visual Art courses following the general aim item 10. The framework of visual art has been configured to provide an effective model for students who want to continue their studies in the field of art.[7] Students who finish their art education at the end of SHS will acquire adequate knowledge from the course because it provides them with sufficient expertise and skills. Students who have the SHS as their terminating point can easily establish their visual studios due to their exposure to other topics in the syllabi that deal extensively with entrepreneurial skills.

Analyzing the syllabus, especially the 2010 SHS GKA teaching syllabus, students could be assisted in using software programs such as CorelDraw, Page-maker, Publisher, Photoshop, Illustrator, Mayer, and

[2] K.S. Owusu, *Instructional Media as A Tool for Ensuring Quality Teaching and Learning for Pupils in The Junior High Schools (Selected Schools in The Kumasi Metropolis)* (Kumasi: Department of General Art Studies, 2009).
[3] Simin Ghavifekr and Wan Athirah Wan Rosdy, "Teaching and Learning with Technology: Effectiveness of ICT Integration in Schools.," *International Journal of Research in Education and Science* 1, no. 2 (2015): 175–91.
[4] Glenn Finger and Sue Trinidad, "ICTs for Learning: An Overview of Systematic Initiatives in the Australian States and Territories.," *Australian Educational Computing* 17, no. 2 (2002): 3–14.
[5] Claire McGuinness and Crystal Fulton, "Digital Literacy in Higher Education: A Case Study of Student Engagement with E-Tutorials Using Blended Learning," *Journal of Information Technology Education: Innovations in Practice* 18 (2019): 001–028, https://doi.org/10.28945/4190.
[6] McGuinness and Fulton, "Digital Literacy in Higher Education: A Case Study of Student Engagement with E-Tutorials Using Blended Learning."
[7] McGuinness and Fulton, "Digital Literacy in Higher Education: A Case Study of Student Engagement with E-Tutorials Using Blended Learning."

InDesign.[8] Students must learn how to handle and use a computer in order to create artwork. Students should be able to use the computer to draw simple shapes such as circles, squares, rectangles, ovals, and triangles. These help the students develop new learning habits. The 2010 GD Teaching Syllabus instructs students about how to use a computer to create greeting cards, posters, and other printed materials. It was stressed that computers, along with their adapters and other ICT devices, can be used to facilitate the teaching and learning of graphics and completing tasks such as drawing, modelling, painting, pattern designing, composing, illustrating, cartooning, and animation.

A student must be efficiently exposed to CorelDraw and other applications such as Paint Box, Photoshop, Illustrator, and Quark-express in order to accomplish his or her GD course. The importance of mastering the use of these software to produce images and using the computer to view and convey details is emphasized again in the GD curriculum. Learners must use the computer to design greeting cards and posters are part of the syllabus's assessment phase.

The Design Process

GD is an artistic practice that mixes art and technologies to express ideas.[9] It is worth noting that GD is the process of visual communication, and problem-solving through the use of type, space, image and colour. This means that a graphic designer must go through several steps before using visual communication to solve a problem

The use of computers and software in design improves students' motivation to study. The conventional (traditional) teaching method involves students learning passively, with little effort or timely contact with the instructor, resulting in low learning performance.The supply and use of computers can provide highly individualized learning and enable students to study at their own pace. Hence, students who skip class will miss all of the content studied every day in a typical classroom.The computer, on the other hand, would resume where the student left off the last time he or she was in class. The use of Computer Assisted Instruction (CAI) improves children's focus and concentration, especially in children with attention problems.[10] Most studies also show that students who used computer-assisted classrooms to support their learning performed better than students who focused entirely on traditional classroom teaching.[11]

THEORETICAL FRAMEWORK

TPACK Model

The theoretical framework that backs the study is the TPACK Model by Matthew J. Koehler and Punya Mishra.[12] The TPACK model is an acronym for Technological Pedagogical Content Knowledge. TPACK is a framework which provides the role that knowledge about technology can play in effective teaching and learning in the classroom. The TPACK model by Koehler and Mishra looks at the best practices to integrate ICT in teaching and learning in schools. The TPACK model also looks at the integration of ICT in the classroom comprising technological, pedagogical, and content knowledge.

[8] Ministry of Education, *Teaching Syllabus for Graphic Design* (Accra: Curriculum Research and Development Division (CRDD), 2010).

[9] Sylvanus Ametordzi, Patrick Osei-Poku, and Eric Francis Eshun, "Pedagogical Situations and Learning Outcomes in Graphic Design in Selected Senior High Schools in the Kumasi Metropolis of Ghana," *International Journal of Innovative Research & Development*, 2012.

[10] Hakan Sevki Ayvacı and Yasemin Devecioğlu, "Computer-Assisted Instruction to Teach Concepts in Pre-School Education," *Procedia - Social and Behavioral Sciences* 2, no. 2 (2010): 2083–87, https://doi.org/10.1016/j.sbspro.2010.03.285.

[11] Jared Keengwe, Grace Onchwari, and Patrick Wachira, "Computer Technology Integration and Student Learning: Barriers and Promise," *Journal of Science Education and Technology* 17, no. 6 (December 20, 2008): 560–65, https://doi.org/10.1007/s10956-008-9123-5.

[12] Punya Mishra and Matthew J Koehler, "Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge," *Teachers College Record* 108, no. 6 (2006): 1017–54.

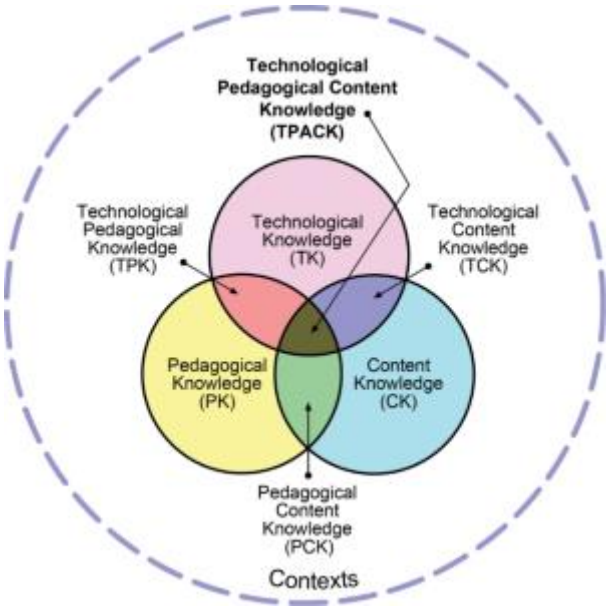

Figure 1 Source The TPACK Model. Adapted from Mishra & Koehler.[13]

METHODOLOGY

This study adopted the quantitative research methodology. Data was collected using the Descriptive survey method. Descriptive research is an appropriate choice when the research aim is to identify characteristics, frequencies, trends, and categories.[14] Ary has also noted that a descriptive survey is used to obtain information concerning the current status of the phenomena and to describe "what exists" regarding variables or conditions in the context. This design focuses on the present condition and aims to find a new truth.[15]

Sampling here refers to taking a subset from a chosen sampling frame or entire population. A purposive sampling method was used for the study to set the sample size. Purposive sampling also referred to as a judgmental or expert sample is a type of non-probability sample that can logically assumed to be a representation of the population and involves cases or participants in the sample because they believe that they warrant inclusion.[16] In effect, the adoption of purposive sampling method was used in the selection of four High Schools namely Mawuli Senior High, Mawuko Senior High, Ola Senior High, and Taviefe Senior High to formulate the sample from the target population in the Senior High Schools within the Ho Municipality in Volta Region of Ghana. The students were selected from the second and final year. This is because the second and third-year students have been taken through major components of the SHS GD curriculum and can provide accurate information for the study. Also, these year groups have some level of knowledge in the GD course. Simple random sampling was adopted to select 400 students from these four Senior High Schools. Simple random sampling is a sampling procedure where the elementary units of the universe are chosen in such a way that each student has an equal chance of being selected as noted.

Data was analysed using the statistical software SPSS. This software displays tables and charts for the distribution. Data was also tested for reliability. For reliability to be well assured, Cronbach's Alpha was used to determine the reliability of the data collected for each factor of the study. According to guidelines provided by Sekaran, a coefficient below 0.6 is considered to be poor, whereas 0.7 is acceptable, and over 0.8 is good.[17]

[13] Mishra and Koehler, "Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge."
[14] Donald Ary et al., "Introduction to Research in Education: Wadsworth," *Cengage Learning*, 2010.
[15] Alberto D. Yazon et al., "Digital Literacy, Digital Competence and Research Productivity of Educators," *Universal Journal of Educational Research* 7, no. 8 (August 2019): 1734–43, https://doi.org/10.13189/ujer.2019.070812.
[16] Encyclopaedia of Survey Research Method, 2008
[17] Uma Sekaran, *Research Methods For Business*, (New York: John Willey and Sons, 2003).

RESULTS

Table 1.1 Accessible Populations after Simple Random Sampling of GD Students

	Accessible Population after Simple Random Sampling of Graphic Design (GD) Students		
SCHOOLS	**SHS 2**	**SHS 3**	**TOTAL**
MawulI SHS	45	55	100
Mawuko GIRLS' SHS	50	50	100
OLA SHS	47	53	100
Taviefe SHS	56	54	100
Total	200	200	400

Source: Fieldwork, June 2021

Table 1.2 Testing for Reliability for GD Students' Variables

Reliability Statistics

Cronbach's Alpha	No of Items
0.730	17

Source: Fieldwork, June 2021

From the reliability statistics above in Table 1.2, it is observed that Cronbach's Alpha is 0.730, which means that the measurement has an acceptable degree of reliability assured for the variables used to measure ICT skills required for teaching and learning graphic design.

Why do GD students find it difficult to do basic design using ICT gadgets, and what are the challenges of using ICT tools in the classroom by GD students at the SHS level?

Table 1.3 **Students' Response to Why They *Find it Difficult to Do Basic Designs Using ICT Gadgets***

	Variable	**Measurement**	**Frequency**	**Percentage**
1	Provision of ICT lessons	Yes	197	49.2
		No	203	50.8
2	Availability of computers	Yes	64	16.0
		No	336	84.0
3	Instructions on the use of ICT tools for graphic designing	Yes	106	16.0
		No	292	73.0
4	Teaching of Corel Draw, Office Word, Excel, Photoshop and CAD in GD class	Yes	64	20.0
		No	336	84.0

5	Ability to use the design software in project-based assignments	Yes	112	28.0
		No	288	72.0
6	The use of internet to get information for studio-based work	Yes	136	34.0
		No	264	66.0
7	Access to internet in the schools	Yes	240	60.0
		No	160	40.0
8	Involving ICT use in art knowledge to enhance creativity in the studio based work	Yes	68	32.0
		No	332	68.0
9	The use of traditional techniques in designing	Yes	329	82.25
		No	71	17.75
10	The use of E-learning in GD classes	Yes	82	20.5
		No	318	79.5
11	ICT software is an ideal tool for graphic designing	Yes	313	78.25
		No	87	21.75
12	The use of computers for practical work	Yes	76	19.0
		No	324	81.0
13	Adequate lesson on how to use the internet for information	Yes	184	46.0
		No	216	54.0
14	Acknowledging the fact that the internet provides a lot of ideas for design	Yes	242	60.5
		No	158	39.5
15	Encouraged to share work on social media	Yes	175	43.75
		No	225	56.25
16	Uploading finished work on social media is a challenge	Yes	251	62.75
		No	149	37.25
17	Acknowledging benefit of using the computer to do practical work	Yes	372	93.0
		No	28	07.0
			400	**100**

Source: Fieldwork, June 2021

From Table 1.3 above and considering variable 1, 197 students representing 49.2% of the GD students responded that their school provides enough ICT lessons to them whilst 203 (50.8%) responded no. This shows that the majority of the GD students responded that their school does not provide them with enough ICT lessons.

With variable 2 looking at the availability of computers in the visual art studio, 64 of the students representing 16.0% of the GD students responded yes whilst 336 (84.0%) responded no. This shows that the majority of the GD students do not have computers in their visual art studio.

Also, with variable 3 to know whether students receive instruction to use ICT tools for graphic designing, 106 students representing 27.0% of the GD students responded yes whilst 292 (73.0%) responded no. This implies that the majority of GD students have not received instruction to use ICT tools for graphic designing.

Responding to variable 4, the result showed that 64 students representing (20.0%) of the GD students declared yes that they were taught the use of Corel Draw, Office Word, Excel, Photoshop and CAD in GD class

whilst 336 (84.0%) of the student said that they were not taught. This implies most students were not taught the use of Corel Draw, Office Word, Excel, Photoshop, and CAD in GD class.

Whether students have the ability to use design software in project-based assignments in variable 5, it is noted per the result that 112 students representing 28.0% responded yes whilst 288 (72.0%) responded no. This implies that the majority of the GD students do not have the ability to use the design software in project-based assignments. Per the result in variable 6, only 136 students representing 34.0% declared that they use the internet to get information for studio-based work whereas 264 (66.0%) of them declined. It is easy to say that majority of the GD students do not use of Internet to get information for studio-based work.

The result from variable 7 also shows 240 students which make up 60.0% of the GD students responded that their school has access to the internet whilst 160 (40.0%) responded No. This means that the majority of the GD students have access to the internet in their schools. Per the result in variable 8, only 68 students representing 32.0% of the GD students declared yes that they involve ICT use in design knowledge to enhance their creative ability in studio-based work whereas 332 (68%) declared no. This means that the majority of the students do not involve ICT use in design knowledge to enhance their creative ability in studio-based work. Also, 329 students representing 82.25% of the students responded yes that they use traditional techniques in designing whilst 71 (17.5) responded no from variable 9. It is clear to say here that the majority of the GD students use traditional techniques in designing.

With variable 10 to know whether students use E-learning during GD class, 82 students making up 20.5% responded yes whilst 318 (79.5%) responded no. This means that the majority of the students do not use E-learning in GD class. Per the result in variable 11, it is revealed that 313 students which represent 78.25% of the GD students responded yes that ICT software (design software) is an ideal tool for graphic designing whilst 87 (21.75) of the students responded no. This means that the majority of the GD students are of the feeling that ICT software (design software) is an ideal tool for graphic designing.

Responding to variable 12, the result showed that 76 teachers representing 19% of the GD students responded that they use computers for their practical work whilst 324 (81%) students responded no. This implied that the majority of the GD students do not use computers for their practical work. It is also noticed per the result in variable 13 that 184 students representing 46.0% of the GD students responded that they receive adequate lessons on how to use the internet for information for GD lessons whereas 216 (54.0%) declared no. This implies that the majority of the students do not receive adequate lessons on how to use the internet for information for GD lessons. 242 students representing 60.0% of the GD students acknowledged the fact that the internet provides a lot of ideas for them during GD practical lessons with only 158 (39.5%) students declining in variable 14. These show that the majority of the GD students acknowledged the fact that the internet provides a lot of ideas for them during GD practical lessons.

To know whether students are encouraged to share their design work on social media, Facebook, WhatsApp, Twitter, or Instagram in variable 15, it was revealed that 175 students representing 43.7% of the GD students responded yes whilst 225 (56.25%) of the students said no. This is also an indication that the majority of the students are encouraged to share their design work on social media, Facebook, WhatsApp, Twitter, or Instagram. Per the result in variable 16, it was revealed that 251 students representing 62.75% of the GD students responded that uploading finished work on social media is a challenge to them whilst 149 (37.25%) of the students responded no. This shows that the majority of the students find uploading finished work on social media a challenge to them.

Lastly in variable 17, it is noted that 372 students representing 93.0% of the GD students responded yes to acknowledge the benefit of using the computer to do practical work whereas 28 (07.0%)of them declined. This means that the majority of the students have acknowledged the benefits of using the computer to do practical work.

DISCUSSION

Reasons why GD students find it very difficult to do basic designs using ICT gadgets in SHS

These researchers sort to find out the reason why GD students find it very difficult to do basic design using ICT gadgets in SHS. Analysis from the variables in Table 1.4 showed that students gave affirmative responses to variables 7, 9, 11, 14, and 15 which are presented as follows. Internet access in schools; Over-concentration on the use of traditional techniques in graphic designing; ICT software is an ideal tool for graphic designing; Acknowledging the fact that the internet provides a lot of ideas for design; Acknowledging the benefit of using the computer to do practical work.

Variable 18 as described in table 1.4 has shown that there is internet access in their school. Internet facility in schools is a good indicator of digital literacy as described in Mishra, and Beetham and Sharpe's,

pyramid model.[18] Looking at variable 9 as described and shown in the same table above revealed that GD students over-concentrate on the use of traditional techniques in designing in class. Over-concentration of the use of traditional techniques in graphic designing affirms the fact that GD students have not acquired the necessary skills for ICT advancement. It also indicates that teachers have not recognized that using digital tools for creative illustration is increasingly displacing the traditional method of hand drawing, a development that is unavoidable, and teaching GD in a computerized world is important as GD education is now influenced by technology.[19] This also shows that GD students have not been exposed to technological content knowledge (TCK) as contained in the GD syllabus which is the result of over-concentration on the use of traditional techniques in graphic designing. Should GD students be instructed about how to use a computer to create greeting cards, posters, and other printed materials it will limit the over-concentration on the use of traditional techniques in graphic designing.[20]

Even though students use the traditional method to design in class, GD students gave one acknowledgment that ICT software is an ideal tool for graphic designing with another acknowledgment that looked at the benefit of using the computer to do practical work as shown in variables 14 and 15 respectively. This affirms the standpoint of Perez, who believes that modern GD software is a big help because it allows students to overlook the traditional methods of doing Graphic Design, which is different from the old approaches where graphic designers might use the same techniques on painting to create an artwork.[21] These two variables provide a broad indication that students actually feel the impact of using the ICT gadget to get ideas or inspiration for their practical work and also derive a lot of benefits from using the computer to do practical work.

It should be noted here that these GD students are already tech-savvy as they acknowledge the use of ICT in graphic design. This affirms some aspects of the assertion raised by Sario which suggestes hat future teachers who will be working with tech-savvy students should develop the skills and knowledge necessary to work with the rapidly evolving tools and software, and should be able to tackle even artificial intelligence.[22]

On this note, it is possible to say that positive responses to variables 7, 11, 14, and 15 are indicators showing some small ICT integration in the teaching of GD at S.H.S. In the category of variables discussed above, only variable 19 could be used to form part of the reasons why most GD students find it very difficult to do basic designs using ICT gadgets in SHS.

Aside from the positive responses to the reasons why most GD students find it very difficult to do basic designs using ICT gadgets in SHS. GD students also responded negatively to variables 1, 2, 3, 4, 5, 6, 8, 10, 12, 13, 15, and 16 in Table 1.4. These negative responses for those variables are the basis to establish the fact these variables provide the reasons why most GD students find it very difficult to do basic designs using ICT gadgets in SHS in line with the conceptual framework underpinning the study.

The challenges that GD students face are as follows: No provision of ICT lessons, non-availability of computers, lack or no instructions on the use of ICT tools for graphic designing, and no practical lesson on the use of Corel Draw, Office Word, Excel, Photoshop, and CAD in GD class. The students lacked confidence or were unable to use the design software in project-based assignments. The students also stated their inability to use the internet to get information for studio-based work. They were also not involving computer applications in design knowledge to enhance creativity in studio-based work. Other issues included, no use of E-learning in GD classes by students, the lack or inability of students to use computers for practical work, inadequate lessons on how to use the internet for information, no encouragement for students to share work on social media and the inability of students to upload their finished work on social media.

In analysing this objective in the study, it was realized that there is a total neglect of pedagogical content knowledge (PCK) as well as Pedagogical Technological knowledge (PTK) on the part of the teachers to provide ICT lessons to students, no instructions on the use of ICT tools for graphic designing, and inadequate lessons on how to use the internet for information taking variable 1, 3, 13 into consideration. This is a case of total deviation from the integration of ICT in teaching and learning as discussed in the TPACK model by Mishra & Koehler and the GD syllabus. Matters arising from, variables 1, 3, and 13 also affect the digital literacy ability

[18] Mishra and Koehler, "Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge"; Helen Beetham and Rhona Sharpe, *Rethinking Pedagogy for a Digital Age: Designing and Delivering e-Learning* (Routledge, 2007).
[19] Salman Alhajri, "The Effectiveness of Teaching Methods Used in Graphic Design Pedagogy in Both Analogue and Digital Education Systems.," *Universal Journal of Educational Research* 4, no. 2 (2016): 422–25.
[20] Ministry of Education, *Teaching Syllabus for Graphic Design*.
[21] Carlota Perez, "Technological Revolutions and Techno-Economic Paradigms," *Cambridge Journal of Economics* 34, no. 1 (2010): 185–202.
[22] Alvin A Sario, "A Discourse On Educational Praxis Model Of Development Education," *PHAVISMINDA Journal* 11, no. 1 (2012): 1.

of students on the grounds that GD students need to get adequate knowledge of ICT use in GD as well as know how to get information from the internet.[23]

The negative response to variables 4 and 8 also provides insight into the feeling of total neglect of Pedagogical Content Knowledge (PCK) as well as Pedagogical Technological knowledge (PTK) on the part of the GD teachers. This is because it falls on the teachers to help GD students understand the concept of using design software such as CorelDraw, Office Word, Excel, Photoshop, and CAD in GD class, for teaching GD students to involve computer applications in design knowledge to enhance creativity in studio-based work and so on. These affect the integration of ICT in education in that the whole process of CT integration in teaching involves the use of computer-based communication in the regular teaching process in the classroom.[24]

It is easy to say that negative responses to variables 1, 2, 3, 4, 5, 6, 8, 10, 12, 13, 15, and 16 implied a serious gap in applying Technological pedagogical knowledge (TPK) by teachers. A strong emphasis was laid by the Digital Skills Enhancement Programme (DSEP) survey, 2017 to this effect that the application to ICT and the development of practical skills are the first steps in being a truly capable and autonomous ICT user under Beetham and Sharpe's pyramid model for digital literacy.

The second objective also revealed that GD students believe ICT software is an ideal tool for graphic designing by acknowledging the fact that the internet provides a lot of ideas for graphic designing and there is a great benefit of using the computer to do practical works. This is a good awareness of ICT integration and digital literacy.[25] Other findings show that GD students over-concentrate on the use of traditional techniques in graphic designing. There is no provision for ICT lessons for DG students; The nonavailability of computers and lack of instruction on the use of ICT tools for graphic designing; No practical lessons on the use of CorelDraw, Office Word, Excel, Photoshop, and CAD in GD class; GD students' lack of confidence or inability to use the design software in project-based assignments.

Other issues included, Students' inability to use the internet to get information for studio-based work; Lack or no internet access in the schools by GD students; Not involving computer applications in design knowledge to enhance creativity in studio-based work; No use of E-learning in GD classes by students; Lack or inability of students to use computers for practical work; Inadequate lessons on how to use the internet for information gathering; No encouragement for students to share work on social media and The inability of GD students to upload their finished works on social media. All these issues are shortfalls from ICT integration and a total deviation from the TPACK model by Koehler and Mishra and Beetham and Sharpe's pyramid model which is the conceptual framework of the study. These indicators show the reason why GD students find it very difficult to do basic designs using ICT gadgets in SHS. In effect, they are some of the factors affecting the ICT integration in the teaching of GD thereby militating against student digital literacy ability in today's digital world.

SUMMARY

The research investigated the factors affecting ICT integration in the teaching and learning of GD in Senior High School and how these factors affect the digital literacy ability of SHS GD students in the 21st century in Ho Municipality in the Volta Region of Ghana. The study stressed on ICT integration and how S.H.S. GD students view the use of ICT in studying GD in schools and how that can make them digital literates in the 21st century. The result showed that GD students in the Ho Municipality did not demonstrate much ICT skills required for learning GD which makes SHS GD students digitally literate. From the results, the reasons why GD students find it very difficult to do basic designs using ICT gadgets in SHS were also outlined. A major one is the over-concentration on the use of traditional techniques in graphic designing. Another major challenge is GD teachers do not demonstrate the use of design software to their students which means most teachers lack TCK, PCK, and PTK of TPACK as suggested by Koehler and Mishra.

RECOMMENDATIONS

The integration of ICT in the teaching pedagogy of GD cannot be overlooked. Critical attention needs to be given to the opportunities that go with ICT integration in our educational program at all levels, especially in the teaching of GD in the Second Cycle Institutions in the 21st century. ICT integration in Education does not only facilitate teaching in school, it also helps students to become digital literate. Digital literacy entails a great deal more than just knowing how to use a computer. Teachers who will be working with tech-savvy students should

[23] Sario, "A Discourse On Educational Praxis Model Of Development Education."
[24] Ghavifekr and Rosdy, "Teaching and Learning with Technology: Effectiveness of ICT Integration in Schools."
[25] Beetham and Sharpe, *Rethinking Pedagogy for a Digital Age: Designing and Delivering e-Learning*.

develop the skills and knowledge necessary to work with the rapidly evolving tools and software and should be able to tackle artificial intelligence. It is therefore recommended that

GD teachers should take up the steps to teach GD students the need to use computer software for graphic designing, using GD applications software for project-based assignments, using online research for brainstorming, drawing inspiration online for project-based assignments, posting visual communication media designed by them on social media to gain likes, and turning hard copies of portfolio onto CD-ROM. GD teachers should also teach Corel-draw, Adobe Illustrator, Adobe Photoshop, Corel-Photo Paint, Page-maker, Publisher and InDesign 'Desktop Publishing' as part of Technological Content knowledge in ICT integration. Again, they should demonstrate how to use design software to GD students. These skills are noted to be digital literacy ability which is derived from ICT integration.

Students should be encouraged to combine traditional methods with the use of ICT tools in creating communication media. They can practice making simple outlines on the computer print them out and paint them in the traditional way. Line drawing can also be incorporated into other digital forms where digital photography is turned into a very elegant pen and ink sketch with a watercolour wash and a line drawing it can be printed on fine art paper and used to begin a traditional media painting. Digital painting offers a lot of opportunities where the painter can make changes to the work at any time.

The West African Examinations Council (WAEC), a body that examines students' capability in the visual arts should encourage and incorporate GD students' use of ICT with the traditional methods in rendering their final practical works. This is because ICT integration in education means a technology-based method of teaching and learning that is closely linked to the use of learning technologies in classrooms.

CONCLUSION

ICT integration in teaching and learning has a lot of benefits as learners will use ICT confidently and creatively to help develop the skills and knowledge, they need to achieve personal goals and to be full participants in the global community in the wake of the 21st century. It can be said therefore that the more ICT is integrated in teaching, the more teachers and learners become digital literate.

Findings revealed under the first objective that most GD students have acquired some basic ICT skills such as properly turning on (booting) the computer and proper launching of computer programs. They are also familiar with computer hardware. The ability to turn on (boot) and launch computer programs are good indicators of basic ICT skills for ICT integration which form part of the digital literacy ability of students. These are also some good Technological Content Knowledge indicators for ICT integration.

It was also revealed that most GD students have not acquired these other basic ICT skills such as familiarity with computer software for graphic designing; accomplishing basic designs using design software; using GD applications software for project-base assignment; using online research for brainstorming; drawing inspiration online for project-based assignments; posting work on social media to gain likes; and turning hardcopies of portfolio onto CD ROM. Most GD students do not know or are not familiar with at least two of the GD software such as CorelDraw, Adobe Illustrator, Adobe Photoshop, Corel-Photo Paint, Page-maker, Publisher and InDesign 'Desktop Publishing.' This means that students lack TPACK in the GD teaching syllabus which is an indication of a bad step in the digital literacy ability of students.

GD students believe ICT software is an ideal tool for graphic designing by acknowledging the fact that the internet provides a lot of ideas for graphic designing and there is a great benefit of using the computer to do practical works. This is a good awareness of ICT integration and digital literacy. Other findings from the analysis show that GD students over-concentrate on the use of traditional techniques in graphic designing. There is no provision for ICT lessons for GD students. Thus, GD students lack confidence or are unable to use the design software in project-based assignments. Students' inability to use the internet to get information for studio-based work, lack of internet access in the schools by GD students, and other factors listed earlier are shortfalls from ICT integration and a total deviation from the TPACK model by Koehler and Mishra and Beetham and Sharpe's pyramid model. These indicators show the reason why GD students find it very difficult to do basic designs using ICT gadgets in SHS.

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