

Office Technology and Management Educators' Rating of the Teaching of Creative Digital Skills in Polytechnics in Delta State

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Abstract

Creativity is the fuel of innovative businesses and innovative businesses are powered by digitalization. Hence, the study determines the extent to which creative digital skills are taught by Office Technology and Management (OTM) educators in polytechnics in Delta State. Three research questions and three null hypotheses guided the study. A descriptive survey research design was adopted for the study. The entire population of 26 OTM educators in Delta State was studied without sampling. A four point rating scale questionnaire containing 22 items was used for data collection. Cronbach Alpha was used to establish the reliability of the instrument which yielded coefficients of 0.71, 0.79 and 0.86 for the different clusters with an overall coefficient of 0.79. Mean and standard deviation were used to answer the research questions while t-test was used to test the hypotheses at 0.05 level of significance using SPSS 23.0. Findings of the study revealed that computer animation, mobile app development and online content creation skills were poorly taught by OTM educators in polytechnics in Delta State. The study also disclosed that the male and female OTM educators did not differ significantly in their mean ratings on the extent of teaching of computer animation, mobile app development and online content creation skills. The study concluded that OTM educators do not have the requisite instructional experience to teach computer animation, mobile app development and online content creation skills among students in polytechnics in Delta State. Among others, it was recommended that OTM educators should develop a collaborative synergy with app developers to enable them help their students acquire advanced computer animation, mobile app development and online content creation skills to start-up digital oriented businesses in Delta State and Nigeria at large.

Keywords: creative digital skills, computer animation skills, mobile app development skills and online content creation skills.

Introduction

Creativity is the execution of original ideas generated from deep thoughts. Although, creativity is regarded as a natural ability or talent, it cannot be captured within a single definition because most accepted definitions of creativity consist of two major criteria; novelty and appropriateness. In line with these criteria, Saccardi (2014) defined creativity as a process producing an outcome that is novel, original, appropriate and valuable. Creativity can be viewed as a skill nurtured from out of the box intelligence (Ayob, 2011) and it is a higher-level process that works in conjunction with critical and higher-order thinking (Lin, 2011). Creativity is a thinking activity that includes generating new ideas, and elaborating, analyzing and evaluating personal ideas to improve and maximize creative endeavours (Sopianingsih & Lukman, 2021). The widespread acceptance and utilization of digital technologies does not only ensure that knowledge can be generated from different sources but also facilitates the development of creative industries where employees use information and communication technologies (ICTs) to process workplace activities.

The advent of social media platforms like Facebook, Instagram and Twitter, and ICTs powered businesses like Uber and Flutterwave showed that creativity can be facilitated by digital skills. According to Olaniyi (2022), the ability to utilize various digital technologies or applications to manage and access information is referred to as digital skill. Digital skills enable people to create and share digital content, communicate and collaborate, and solve problems for effective and self-fulfillment in life, learning, work and social activities (Lewin & McNicol, 2015). Digital skills refer to an individual's ability to find, evaluate and clearly communicate information through digital media on various digital platforms. Digital skills anchor around an individual's possession of communicative skills, computing and manipulative skills to produce text, images, audio and designs using technologies. Without doubts, digital technologies encourage innovative business environments with creative concepts, ideas, experience and designs. Hence, van Laar, van Deursen, van Dijk, and de Haan (2017) posited that creative digital skills refer to the ability to use ICT to generate new or previously unknown ideas, or treat familiar ideas in a new way and transform such ideas into a product, service or process that is recognized as novel. Creative digital skills entail working creatively within a digital medium (Sefton-Green & Brown, 2014). Creative digital skills, according to Lai and Yang (2014), refer to the ability to create user-generated content in creativity designs that are successfully accepted by online and offline audience. Comprehensively, Nesta in Lucas (2020) submitted that creative digital skills encompass the ability to engage in computer animation, interactive multimedia, computing/computational thinking areas of coding, mobile app development, games development, web development, 3D modelling, physical computing, web and social media skills, and information and data skills.

As educational institutions and workplaces are supported by ICTs, graduating students and future employees must be fluent in the creative digital skills of the 21st century. Some of the creative digital skills include computer animation, mobile app development and online content creation. Computer animation is the creation of moving images (animations) using digital technologies. Computer animation is the animation created by computer graphics using Adobe Flash or Adobe Edge Animate for 2D animation, and using 3Ds Max for 3D animation (Mongkolprasit & Arunrangsiwed, 2016). According to Connelly and Connelly (2011), 2D animation objects are created by traditional drawing method. That is, each moving image has to be created frame by frame with hand-drawing. However, today's 2D animators make use of software in developing action sequences. 2D animation is widely implemented in advertisements, films, cartoon shows, websites and e-learning courses among others. But in 3D animation, according to Mongkolprasit and Arunrangsiwed (2016), everything is carried out in the available computer software. The development of 3D animation consists of several phases or steps such as modelling, texturing, lighting, rigging and rendering among others. 3D animation is widely used in gaming, movies, medical, biotechnology and aerospace among others.

Business organizations are using computer animation for marketing purposes and educational institutions use it as an instructional strategy in the classroom. For effective utilization of computer animations, educators and students must acquire the requisite skills to create, store and manipulate images and objects with the computer. The skills needed in computer animation include artistic sensibility skills, technical skills and problem solving skills (Yihui, 2012). Computer animation has helped connect people throughout the world in ways that sometimes writing cannot. Another device that has increased widespread connectivity among humans is the mobile phone. Mobile phones are simple and sophisticated devices that facilitate voice communication from one location to another among people. Mobile phones have operating systems with mobile applications (apps) serving different purpose to the users. Mobile app development is the process by which software that primarily runs on mobile phones is developed. According to Thomas and Devi (2021), there are three major types of mobile app development. Firstly, native apps are built for a specific operating system. A native app developed for iOS operating system would not work on Android devices and vice-versa. If an app is developed for iOS, it will remain exclusive to that operating system. Secondly, mobile web apps are the web applications that run web pages on web browsers in mobile devices. Since these apps target browsers, they work on different mobile operating systems. One can view a mobile web app on Android, iOS or Windows tablets and phone devices. They also work on PC web browsers. Lastly, hybrid apps are a mixture of both native and mobile web apps. This type of application has cross-platform compatibility.

Skills are needed for developing mobile apps. Mobile app development skills are technical proficiencies and applicable industry knowledge that mobile application developers use for developing apps that run on phones. These skills, according to Rakestraw, Eunni and Kasuganti (2013) include programming language, cyber security, user interface, product management, network interconnection, data analytics and database management skills among others. Whether iOS or Android, the mobile development industry is in constant growth. There are approximately 2.7 billion smartphone users around the globe, making the mobile application market one of the fastest growing in history. It is not surprising that companies around the globe are now investing in digital marketing through online content creation. Online content creation is the creation of "the material", people contribute to the online world (Sun-Ho & Teresa, 2011). Online content creation is the contribution of information to digital media for an end-user/audience in specific contexts. The "content is something that is to be expressed through some medium, as speech, writing or any of various arts", for self-expression, distribution, marketing and/or publication (Holliman & Rowley, 2014). Online content creation is the use of online spaces to create digital materials using weblogging, photo and video sharing platforms (Brake, 2014). Typical forms of online content creation include maintaining and updating web sites, blogging, article writing, photography, videography, online commentary, maintenance of social media accounts, editing and distribution of digital media (Lai & Yang, 2014). Online content creation produces entertaining or informational material that attracts the target audience. In today's digital era, the skills of creating and editing text, images, making presentations with images and recording videos with a mobile phone or tablet are most important to online content creators. Creative digital skills such as computer animation, mobile app development and online content creation skills are useful to students offering office technology and management in Nigerian polytechnics because the programme is designed to productive smart entrepreneurs and office employees in the world of work.

Office technology and management programme was introduced into Nigerian polytechnics to expose students to the foundation of secretarial studies and office related occupations. In order to enable students understand the dynamics of today's fast pace office occupations, office technology and management programme in Nigeria is structured into office technology, office application, business administration and management, numeric, general studies and Students Industrial Work Experience Scheme (SIWES). Hence, Ezenwafor (2012) quipped that office technology and management is concerned with producing graduates who can quickly access data or information, process, disseminate, store and retrieve for future

use as demanded by their employers or supervisors. The integration of office technology in OTM programme demands that OTM educators must teach creative digital skills in the classroom.

The teaching of creative digital skills by OTM educators will produce creative professionals such computer animators, graphic designers, mobile app developers, software programmers and content creators who can continuously adapt to the new skill-intensive technologies in today's business world. In the course of determining the extent to which creative digital skills are taught in the classroom, gender could influence the opinion of OTM educators in this regard. Gender is the behavioural characteristics distinguishing between males and females in any society. Due to the technological know-how needed for effective teaching of creative digital skills, it is assumed that male OTM educators are technically adept to teach creative digital skills more than their female counterparts in Nigerian polytechnics. However, this assumption needs to be supported by empirical evidence. Upon this fulcrum, the study sought to explore the extent to which creative digital skills are taught by office technology and management educators in polytechnics in Delta State.

Statement of the Problem

Evidently, from visual arts/crafts, theatre, music, literature to media design, computing, publishing and advertising in today's business world are currently fueled by creative digital landscapes. Because workers in the creative industries are intensive users of technology, OTM educators need to equip students with creative digital skills that meet the demands of the workforce before graduation. The problem of the study is that graduates of OTM programme in Delta State are still struggling with unemployment nightmare when there numerous opportunities for freelance, full or short-term contractual engagements for computer animators, graphic designers, mobile app developers, software programmers and content creators in today's ICT powered labour market. From literature gathered, there seems to be no holistic empirical study on the extent of teaching creative digital skills by OTM educators in polytechnics in Delta State. This is the gap, this study sought to fill.

Purpose of the Study

The purpose of the study was to explore the extent to which creative digital skills are taught by office technology and management educators in polytechnics in Delta State. Specifically, the extent to which computer animation skills, mobile app development skills and online content creation skills are taught by OTM educators in polytechnics in Delta State.

Research Questions

The following research questions guided the study:

1. To what extent are computer animation skills taught by OTM educators in polytechnics in Delta State?
2. To what extent are mobile app development skills taught by OTM educators in polytechnics in Delta State?
3. To what extent are online content creation skills taught by OTM educators in polytechnics in Delta State?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

1. Male and female OTM educators do not differ significantly in their mean ratings on the extent computer animation skills are taught in polytechnics in Delta State
2. OTM educators do not differ significantly in their mean ratings on the extent mobile app development skills are taught in polytechnics in Delta State based on gender
3. Male and female OTM educators do not differ significantly in their mean ratings on the extent online content creation skills are taught in polytechnics in Delta State

Method

This study adopted a descriptive survey research design. The study was conducted in Delta State. The entire population of twenty-six (26) Office Technology and Management (OTM) educators in the two polytechnics in Delta State was studied without sampling. A structured questionnaire titled “Extent of Teaching of Creative Digital Skills (ETCDS) was used for data collection. The questionnaire contained 22 items on a four-point rating scale of Very Well Taught (VWT), Well Taught (WT), Poorly Taught (PT) and Not Taught (NT). Face validity of the instrument was determined by three experts; one expert in OTM unit of Department of Technology and Vocational Education, one expert in the Department of Computer Science and another in measurement and evaluation unit of Department of Educational Foundations all from Nnamdi Azikiwe University, Awka. A pilot test was conducted to establish the internal consistency of the instrument by administering it to 15 OTM educators in Anambra State which were not part of the study and the data collected were analyzed using Cronbach Alpha to obtain reliability coefficients of 0.71, 0.79 and 0.86 for the different clusters with an overall coefficient of 0.79. The researcher administered the instrument to the subjects in their offices with the help of two research assistants. Mean and standard deviation were used to answer the research questions and determine the homogeneity or otherwise of the respondents' views. Decisions on the research questions were based on the grand mean in relations to the real limits of numbers. Therefore, items with mean ratings of 1.00 - 1.49 are rated Not Taught, those with 1.50 - 2.49 are Poorly Taught, items with mean ratings of 2.50 - 3.49 are rated Well Taught and those with 3.50 - 4.00 are rated Very Well Taught. T-test was used to test the null hypotheses at 0.05 level of significance. A hypothesis was accepted where the p-value is equal to or greater than the alpha level of 0.05 ($p > 0.05$), at a degree of freedom; otherwise, the null hypothesis was rejected. The analysis was carried out using SPSS version 23.0.

Results

Table 1:

Respondents' mean ratings on the extent computer animation skills are taught in polytechnics in Delta State

S/N	Computer animation skills	X	SD	Remarks
1	Ability to create images in Adobe Illustrator	3.11	.94	Well Taught
2	Ability to create images in Adobe Photoshop	3.01	.51	Well Taught
3	Image resolution skills	2.27	.72	Poorly Taught

4	Ability to develop animations that meet clients' needs	2.46	.58	Poorly Taught
5	Visual effect skills on 2D and 3D animations	2.29	.92	Poorly Taught
6	Ability to produce animation for TV cartoons	2.18	.64	Poorly Taught
7	Ability to create animated movies	1.97	.49	Poorly Taught
8	Ability to produce short video animations for advertisement	1.74	.81	Poorly Taught

Data in Table 1 show that respondents rated six out of the eight listed computer animations skills with mean ratings ranging from 1.74 to 2.46 as poorly taught while the remaining two items with mean ratings of 3.01 and 3.11 were well taught. The cluster mean of 2.38 indicates that computer animation skills were poorly taught by OTM educators in polytechnics in Delta State. The standard deviations for the items are within the same range which shows that the respondents are homogeneous in their opinions.

Table 2

Respondents' mean ratings on the extent mobile app development skills are taught in polytechnics in Delta State

S/N	Mobile app development skills	$\bar{X}$		SD	Remarks
9	Programming language skills	1.73	.39		Poorly Taught
10	Cyber security skills	2.41	.64		Poorly Taught
11	User interface skills	1.92	.48		Poorly Taught
12	Product management skills	1.35	.72		Not Taught
13	Network interconnection skills	2.26	.54		Poorly Taught
14	Data analytics skills	1.18	.31		Not Taught
15	Backend Computing skills	2.32	.62		Poorly Taught

16 Customer service skills

3.15 .46 Well Taught

Data in Table 2 show that respondents rated five out of the eight listed mobile app development skills with mean ratings ranging from 1.73 to 2.41 as poorly taught while two items with mean ratings of 1.18 and 1.35 were not taught but one item with mean rating of 3.15 was well taught. The cluster mean of 2.04 indicates that mobile app development skills were poorly taught by OTM educators in polytechnics in Delta State. The standard deviations for the items are within the same range which shows that the respondents are homogeneous in their opinions.

Table 3

Respondents' mean ratings on the extent online content creation skills are taught in polytechnics in Delta State

S/N	Online content creation skills	$\bar{X}$		SD	Remarks
17	Ability to create high-quality multimedia content across online platforms channels	2.14	.56		Poorly Taught
18	Ability to differentiate between false and true information	2.29	.34		Poorly Taught
19	Ability to record videos with a mobile phone or tablet	1.86	.61		Poorly Taught
20	Verbal communication skills	2.97	.28		Well Taught
21	Ability to promote content engagement across online platforms channels	2.26	.50		Poorly Taught
22	Copywriting skills	2.18	.39		Poorly Taught

Data in Table 3 show that respondents rated five out of the six listed online content creation skills with mean ratings ranging from 1.86 to 2.29 as poorly taught while the remaining one item with mean rating of 2.97 was well taught. The cluster mean of 2.28 indicates that online content creation skills were poorly taught by OTM educators in polytechnics in Delta State. The standard deviations for the items are within the same range which shows that the respondents are homogeneous in their opinions.

Table 4: Summary of t-test analysis of mean ratings of male and female OTM educators on the extent computer animation skills are taught in polytechnics in Delta State

Variable	N	$\bar{X}$	SD	df	p-value	Decision
Male	15	67.12	5.06	24	0.81	Not Significant
Female	11	49.03	4.93			

Table 4 shows that there is no significant difference in the mean ratings of male and female OTM educators on the extent computer animation skills are taught in polytechnics in Delta State. This is shown by the p-value of 0.81, which is greater than the significance level of 0.05. The null hypothesis of no significant difference between the two groups is therefore accepted.

Table 5: Summary of t-test analysis of mean ratings of male and female OTM educators on the extent mobile app development skills are taught in polytechnics in Delta State

Variable	N	$\bar{X}$	SD	df	p-value	Decision
Male	15	58.09	4.46	24	0.67	Not Significant
Female	11	37.65	3.82			

Table 5 shows that there is no significant difference in the mean ratings of male and female OTM educators on the extent mobile app development skills are taught in polytechnics in Delta State. This is shown by the p-value of 0.67, which is greater than the significance level of 0.05. The null hypothesis of no significant difference between the two groups is therefore accepted.

Table 6: Summary of t-test analysis of mean ratings of male and female OTM educators on the extent online content creation skills are taught in polytechnics in Delta State

Variable	N	$\bar{X}$	SD	df	p-value	Decision
Male	15	60.44	8.06	24	0.32	Not Significant
Female	11	51.78	7.93			

Table 7 shows that there is no significant difference in the mean ratings of male and female OTM educators on the extent online content creation skills are taught in polytechnics in Delta State. This is shown by the p-value of 0.32, which is greater than the significance level of 0.05. The null hypothesis of no significant difference between the two groups is therefore accepted.

Discussion of Findings

Findings of the study revealed that computer animation, mobile app development and online content creation skills were poorly taught by office technology and management educators in polytechnics in Delta State. This means that graduates of office technology and management in polytechnics in Delta State cannot function interdependently in the today's digitalized economy because they does not have a clear understanding of creative digital skills. The finding of this study is in agreement with Timya (2022) who highlighted that graduates should possess the ability to set up a Wi-Fi network, the ability to back up to the cloud, Basic photo editing, Basic video editing, Google docs and Microsoft Office, HTML and basic coding to succeed in the business environment. The poor teaching of computer animation, mobile app development and online content creation skills implies that OTM students lack the skills to distribute and

maintain information across their digital devices for commercial purposes. Perhaps, this could be why, Chukwuemeka and Anaele (2015) reported that TVET lecturers require computer graphics and internet skills such as inserting graphics from various sources such as clip art, digital image, using digital camera to create a graphic file, using scanner to convert pictures into graphic file, creating a web page, teleconferencing, accessing, copying, and pasting information from internet to a different application among others to prepare students for the global economy.

The study also disclosed that office technology and management educators in polytechnics in Delta State did not differ significantly in their mean ratings on the teaching of computer animation, mobile app development and online content creation skills based on their gender. This means that both male and female OTM educators agreed that creative digital skills were poorly taught in polytechnics in Delta State. This finding corresponds with the work of Ukwueze and Onyia (2014) which found that there is low use of smart board for teaching creative digital skills in Nigerian schools. This finding aligned with Okoro (2018) who discovered that multimedia and hypermedia technologies which are basic requirements for teaching creative digital skills are not fully utilized in Nigerian schools as well as Onokpaunu (2016) which reported that the use of web-based technologies in Nigerian tertiary institutions is at a very low extent. The reported low utilization of ICT resources could be responsible for the poor teaching of creative digital skills by OTM educators in polytechnics in Delta State. This implies that OTM graduates in Delta State do not possess the requisite creative digital skills for self-reliance and lifelong learning in the Nigerian society.

Conclusion

Employers across industries are looking for digital communication professionals with a variety of creative digital skill-sets to engage their customers on social media platforms with the hope of promoting sales and increase profits. The permanent transformation of today's marketplace demands that business oriented professionals must be digitally creative. Based on the findings of the study, it was concluded that office technology and management educators do not have the requisite instructional experience to teach computer animation, mobile app development and online content creation skills among students in polytechnics in Delta State.

Recommendations

In the light of the findings and conclusion of the study, the following recommendations are made:

1. Office technology and management educators should develop a collaborative synergy with app developers to enable them help their students acquire advanced computer animation, mobile app development and online content creation skills. Upon graduation, the creative digital skills acquired would enable them to start-up digitalized businesses in Delta State and Nigeria at large
2. ICT trainings on the practical use of computer animation, mobile app development and online content creation should be offered to office technology and management educators in polytechnics in Delta State. This will encourage the educators to utilize computer-based instruction regardless of their gender for effective teaching of creative digital skills
3. Government at all levels should make provisions for adequate facilities and equipment in OTM programme to enable educators blend theory with practice in their instructional delivery to enhance students' acquisition of creative digital skills in tertiary institutions.

References

- Ayob, A. (2011). Nurturing creativity and innovative thinking through experiential learning. *Procedia Social and Behavioral Sciences*, 32, 247-254
- Brake, D. R. (2014). Are we all online content creators now? Web 2.0 and digital divides. *Journal of Computer-Mediated Communication*, 19(3), 591-609.

- Chukwuemeka, V.C., & Anaele, E.A (2015). Information and communication technology for integration into TVET for sustainable self-employment among Nigerian youths. *Computer Education Research Journal*, 2(1) 69-76.
- Connelly, J., & Connelly, M. (2011). History of animation. *TechTrends*, 55(3), 6 - 19
- Ezenwafor, J. I. (2012). Adequacy of exposure to information and communication technology by graduating business education students of tertiary institution in Anambra State. *Business Education Journal*, 8(2), 45-60
- Holliman, G., & Rowley, J. (2014). Business to business digital content marketing: Marketers' perceptions of best practice. *Journal of Research in Interactive Marketing*, 8(4), 269-293
- Lai, C. Y., & Yang, H. L. (2014). The reasons why people continue editing Wikipedia content-task value confirmation perspective. *Behaviour & Information Technology*, 33(12), 1371–1382.
- Lewin, C., & McNicol, S. (2015). Supporting the development of 21st century skills through ICT. In T. Brinda, N. Reynolds, R. Romeike, & A. Schwill (Eds.), *KEYCIT 2014: Key competencies in informatics and ICT* (pp. 98–181). Potsdam, Germany: Universitätsverlag Potsdam.
- Lin, Y.S. (2011). Fostering creativity through education. A conceptual framework of creative pedagogy. *Scientific Research*, 2(3), 149-155
- Lucas, B. (2020). *Digital creative skills: What are they? What does progression look like? How are they developed? What promising practices are there?* London: Nest
- Mongkolprasit, P., & Arunrangsiwed, P. (2016). Further the future: The exploratory study in 3D animation marketing trend and industry in Thailand. *International Scholarly and Scientific Research & Innovation* 10(3), 1013 - 1020
- Okoro, J. (2018). Application of multimedia and hypermedia technologies in the teaching of business education in Nigeria universities as perceived by lecturers in universities in South-South and South-West. *International Journal of Research in Humanities and Social Studies*, 5(6), 49-55
- Olaniyi, O. N. (2022). Digital skill and future of business education students. *International Journal of Multidisciplinary and Current Educational Research*, 4(1), 186-192
- Onokpaunu, M.O. (2016). *Analysis of web-based instructional technologies for use by business education lecturers in tertiary institutions in Delta State*. Unpublished masters' thesis, Department of Vocational Education, Faculty of Education, Nnamdi Azikiwe University, Awka
- Rakestraw, T.L., Eunni, R.V., & Kasuganti, R.R. (2013). The mobile apps industry: A case study. *Journal of Business Cases and Applications*, 9(1), 1-26
- Saccardi, M. (2014). *Creativity and children's literature: New ways to encourage divergent thinking*. California: ABC-CLIO
- Sefton-Green, J., & Brown, L (2014). *Mapping learner progression into digital creativity*. Oxford: Nominet Trust
- Sopianingsih, P., & Lukman, E.P. (2021). The establish of 21st century digital skills for young people's lived in the new normal era. *Advances in Social Science, Education and Humanities Research*, 636, 586 - 590
- Sun-Ho, C., & Teresa, J. (2011). Race and online content creation. *Information, Communication & Society*, 14(5), 638-659

- Thomas, C.G., & Devi, J.A., (2021). A study and overview of the mobile app development industry. *International Journal of Applied Engineering and Management Letters*, 5(1), 115-130
- Timya, N.N. (2022). Digital technology skills required for teaching and learning of business education courses in tertiary institutions in Plateau State. *Nigerian Journal of Business Education*, 9(1), 158 – 168
- Ukwueze, F.N., & Onyia, A.A. (2014). The effect of smart board on students' achievement in computer studies in Nigerian tertiary institutions. *Computer Education Research Journal*, 1(1), 134-139.
- van Laar, E., van Deursen, A.J.A.M., van Dijk, J.A.G.M., & de Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. *Computers in Human Behavior*, 72, 577–588
- Yihui, X. (2012). Animation: An R package for creating animations and demonstrating statistical methods. *Journal of Statistical Software*, 53(1), 935-946.