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BRIDGING TRADITION AND TECHNOLOGY: CORELDRAW SOFTWARE AS A TOOL FOR TEACHING AND LEARNING TEXTILE DESIGN IN NIGERIAN TERTIARY INSTITUTIONS OF LEARNING

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ABSTRACT

This study aim at bridging the technological gab in teaching and learning textile design within the Nigerian tertiary institutions of high learning, CorelDraw software was explored to bridge the gap between tradition and technology training methods and technology-driven global practices. The research examines the potential of CorelDraw to enhance students' technical skills, perceptions of the software, challenges encountered, and its influence on engagement and motivation. A survey questionnaire was administered to a total of 73 participants across selected Nigeria tertiary institutions of high leaning. The data was purposively collected and analyzed using descriptive statistics. The findings reveal a positive impact of CorelDraw on students' technical skills and engagement; though challenges related to software access and training persist. It is recommended that institutions invest in adequate software licenses and provide comprehensive CorelDraw training to maximize its benefits for textile design education and equip students with industry relevant skills.

Keynote: CorelDraw software, Digital Textile Design, Teaching and Learning

1.0 INTRODUCTION

Over the past decades, digitalization shapes the overall educational structure worldwide, digital technologies are bringing massive changes across education, skills, and employment. These changes mirror how technology is increasingly central to education (Qureshi, 2021). Textile and clothing is the oldest craft in the history of Man (Gausa, 2020), similarly, textile design is one of the rudimental in teaching and learning Fine and Applied Arts and Industrials design in the Nigerian tertiary institutions. Textile design and production have witnessed technological advancement in the adoption of Computer Aided Design (CAD) and Computer Aided Manufacture (CAM). CAD-CAM in textile mass production because it has greatly changed the production phase in terms of speed, and reduces lead time and product finishing. (Mitra, 2014). The acceptability of CAD-CAM usage in textile production is far advanced in countries like USA, Britain, China, Italy, France, Japan, and Germany (Zhang, Kong & Ramu, 2014). In Africa, according to Fukunishi (2014), nations like South Africa, Tunisia, Mauritius, and Madagascar are ranked as the leading countries in CAD-CAM usage. Unfortunately, a good number of the Nigerian textile and fashion industry are left behind in this technological advancement, this is because of so many factors some of them are most of educational most

Volume: 08, Issue: 02 March - April 2025

ISSN 2582-0176

our education institution, where textile technologies', textile designers and fashion designers are been trained manually, using obsolete equipment, apparatus, tools, materials, and method that is not applicable in the contemporary textile industry. Gausa, (2020) Stressed that, in Nigeria, the use of CAD-CAM in textile production is at a very slow pace due to a lack of knowledge of the software application. In the 1980s, the textile industry provided about 25% of jobs for over a million people in Nigeria (Kraak, 2015). However, as the world moves towards a technology-driven era, there seems to be a disparity between most of the Nigerian textile industry's production techniques and the ones in most of the developed countries. Studies show that Nigeria's over-dependence on oil, foreign expatriates, and foreign textiles at the expense of the technology-driven textile industry and upgrade may be responsible for the low production (Kraak, 2015). Digital technologies are expanding beyond innovative and less traditional techniques of teaching and learning via educational collaboration. However, the present study will explore the research conducted on digital technologies and education.

1.1 Statement of the Problem

In recent years, the integration of technology into educational practices has become increasingly essential, particularly in creative fields such as textile design. CorelDraw, a vector graphics software, has gained popularity as a valuable tool for teaching design concepts and techniques. However, the extent to which this software effectively enhances learning outcomes among students in textile design programs at tertiary institutions globally.

Despite the potential benefits, the researcher is unaware of any textile Department or section in the Nigerian tertiary institutions of high leaning that digitalized their teaching and learning process by assimilating CAD and CAM in their curriculum. Therefore, some students individually who are try to digitalized the program encounter various challenges when using CorelDraw as part of CAD and CAM, including limited access to resources, inadequate training, and varying levels of digital literacy. These factors can impact their learning experience, skill acquisition, and overall engagement in the design process. Consequently, there is a need to investigate how students perceive the effectiveness of CorelDraw in textile design as well as the challenges they face in its application.

Understanding these dynamics is crucial in improving design curriculum design in the Nigerian tertiary institution of high learning, it will support and enhance students' learning experiences in textile design and it will make the students self-reliance and more relevant in the labour market. This study aims at bridging the between tradition and technology by using CorelDraw software as a tool for teaching and learning textile design in Nigerian tertiary institutions of Learning, as well as to provide insights and recommendations for the effective integration of CorelDraw in textile design curriculum.

1.2 Objectives of the Study

The study was guided by the following objectives:

1. To examine the impact of using CorelDraw software on the development of technical skills among students enrolled in textile design programs at Nigerian tertiary institutions.

Volume: 08, Issue: 02 March - April 2025

ISSN 2582-0176

2. To explore the students' perceptions and attitudes towards the use of CorelDraw as a learning tool in the textile design studios.
3. To identify the challenges students encounter when using CorelDraw in their textile design programs and to investigate the impact of these challenges on their academic performance and learning outcomes.
4. To examine the influence of incorporating CorelDraw into the textile design curriculum on students' engagement, motivation, and overall learning experience.

1.3 Research Questions

The study answered the following research questions:

1. How does the use of CorelDraw enhance the technical skills of students in textile design programs at Nigerian tertiary institutions?
2. What are the perceptions of students regarding the effectiveness of CorelDraw as a tool for learning textile design concepts and techniques?
3. What challenges do students face when using CorelDraw in their textile design coursework, and how do these challenges impact their learning outcomes?
4. In what ways does the integration of CorelDraw into the textile design curriculum affect students' engagement and motivation to learn.

2.0 LITERATURE REVIEW

The researcher reviewed related literature according to the objectives of the study. After a thorough review of the literature, it was observed that different scholars have indicated eminent contributions to the use of CAD-CAM technology globally, in Africa, and also in Nigeria.

2.1 CAD and CAM technology

CAD is an acronym that stands for Computer Aided Design, and CAM simply means Computer Aided Manufacturing. CAD is the use of technology in the design process, which comprises specialized software (depending on the particular area of application) and peripherals, which, in certain applications, are quite specialized (Daniel N., Nkeiruka N., Oayinka J.S. & Mellah Ethel U. 2024). CAM is a technology that aids in the manufacturing of a product with greater efficiency, effectiveness, and precision. According to Ebelhauser (2014), CAD-CAM technologies are concerned with the use of computer software and hardware in various disciplines to perform certain functions in design and production with greater efficiency, effectiveness, and precision for competitive advantage. Globally, CAD-CAM has gained acceptance in industries since the early 1970s. In developed countries, CAD-CAM is used in the design for mass production and mass customization to boost production in the textile and apparel industries (Dzikite, 2015).

Mao (2015) affirms that CAD-CAM technology is the third phase of the industrial revolution era of mass production. Hence, many developed countries are quick to apply CAD-CAM in most manufacturing sectors to build competitive capacity and a strong economy. CAD-CAM applications by manufacturing industries cover a wide range of processes. Countries like the USA, Britain, China, Italy, France, Japan, and Germany have embraced these technologies in the various production processes such as designing, production, communication, retailing,

Volume: 08, Issue: 02 March - April 2025

ISSN 2582-0176

advertising, and marketing of goods and services for product value addition (Zhang et al., 2014). These technologies are used as major tools in every human activity by many manufacturing industries. Their areas of application include the automobile industries, textile and apparel, and ceramic and glass industries for design and production (Ros-Zapata, Osorio-Gómez, & Mejá Gutiérrez, 2014).

CorelDraw as CAD and CAM technology: CorelDraw software can be used in teaching and learning textile design as computer aided design software. CorelDraw software can provide the designer with an extremely detailed design. CorelDraw is a vector graphics program developed and marketed by Corel Corporation. It was revealed by CREL (2008) that Corel Corporation is a Canadian computer software company with a vector-based illustration program developed to bundle with desktop publishing systems. Additionally, it stated that it is the first software that combines vector graphics software with a photo editing program. It has a full range of editing tools that allow users to adjust contrast and color balance. CREL (2008) stated that CorelDraw is capable of handling multiple master layers from within the main program. CorelDraw is used to make simple technical drawings, create figures, garments, and garment features with the aid of grids and guides, design textile fabric, embroidery, mood boards, and collages for wall hanging, and develop presentations for the screen and for print Daniel (2024).

2.2 Popular Textile Design Software Packages

The computer can make the design from scratch, using a tablet and stylus, with colour and texture. Software packages or programs for fashion designers satisfy a particular need, such as apparel design, pattern making and grading, fashion illustration, and accessory design. Some software programs are made especially for some particular computers, such as the Mackintosh. Some examples of modern computer software for the fashion industry are Gerber, Lectra Polygon, Apparel Computer Aided Design (CAD), Snap Fashun, CADTERNS, CAD Fashion, Fashion Computer Aided Design (CAD), Design Concept 3D, Assyst Bullmer, Investronica, and APS-ethos embroidery software. These programs are not common in Ghana because of their high prices, and there are also no experts to operate them. Some CAD software that can be obtained in Ghana is AutoCAD, CorelDraw, Illustrator, and Photoshop. Students can make the most of this software in these aspects of fashion design.

2.3 Role of CAD and CAM in Teaching Textile Design in the tertiary institution of high learning

2.3.1 Photoshop Adobe

Photoshop is a pixel-based editing program developed and published by Adobe Systems. It is the current market leader for commercial image manipulation and the leading image editing program in the world. Burke (2011) indicates that Photoshop is a market-standard image editing software. In fashion, it can be used for editing and correcting digital photos and preparing images for mood boards, story boards, magazines, and posters. It can be used to create designs for wall hangings and print designs for fabrics and ‘Tee’ shirts. It can also be used to make basic patterns, figures, simple garments, and garment features with the aid of grids and guides. It is also used to create a digital design portfolio, which provides visual evidence of capabilities, strengths, and qualities. A digital portfolio allows students to send their work to any part of the world.

Volume: 08, Issue: 02 March - April 2025

ISSN 2582-0176

2.3.2 The teaching and learning process

Learners tend to develop a complex mental model through a cycle of segments that includes physical and mental action, reflection, and abstraction (Battista, 2007). Another important aspect of the learning experience is informal learning, in which educators encourage student engagement through learning activities (Bergeson, 2000). According to Rosenshine & Furst (1971), effective teachers are those who plan, organize, and adopt appropriate activities and tasks while engaging themselves in continuous self-improvement and reflective practices. Moreover, being optimistic is a contributing factor to teaching and learning. Challenges Faced by the educator, teaching software systems has become a substantial part of teaching for students from the ages of 11 to 16. Winn & Banks (2012) stated that for teaching the functionality of a CAD program, the teaching strategy must have a new approach to the training of CAD. According to this study, Winn and Banks (2012) remarked that the new teaching methods when using the program result in more complex and creative outcomes (Winn & Banks, 2012, p. 488).

Since CAD programs are rapidly advancing and perhaps slightly difficult to learn, these might discourage students from being creative. This apprehension is compounded by a lack of confidence in educators when teaching CAD. Consequently, the teaching of CAD is just a minor component of the lessons that need to be taught, so educators do not have the time to become professionals or even remotely familiar with using the program. (Winn & Banks, 2012, p. 489)

2.3.3 Pedagogical Strategies to Teach Software

The term pedagogy is described as the technique and practice of how educators teach it and how the curriculum content is delivered in class. It embraces different teaching styles, teaching theories, feedback, and assessment. While planning lessons, teachers always consider ways to convey the content to their students. The delivery method will be constructed based on personal teaching inclinations in relation to their knowledge within the field and the context in which they have to tutor. Teachers frequently rely on academic sources and the syllabus to plan lessons and decide which teaching styles should be used. The explanations behind the planning and decision-making will become pedagogical ideologies, which every educator will acquire over time (Editorial, Cowan, Gibbons, Stannard & Bates, 2020). Behaviorism, constructivism, social constructivism, and liberationism are the four different pedagogical approaches that teachers may follow to conduct their lessons (Editorial et al., Pedagogy, 2020).

The behaviorist approach is considered to be teacher-centered, in which each lesson is lecture-based and involves the use of direct instruction. Thorndike (1911), Pavlov (1927), and Skinner (1957) came up with the behaviorism theory, whereby the educator leads the lesson and is the only authority figure within the classroom setting (Mcleod, 2017). This approach may also be known as the traditional teaching approach. The second approach, known as constructivism, is defined as a progressive teaching pedagogy in which pupils learn through experiences and reflection. This theory sets the student at the midpoint of learning and may encompass inquiry-based learning and project work.

3.0 METHODOLOGY

Volume: 08, Issue: 02 March - April 2025

ISSN 2582-0176

The study employed both qualitative and quantitative approaches (Mixed-Methods) to analyses the leveraging of CorelDraw software as a tool for teaching and learning textile design in Nigerian tertiary institutions of learning, the justification for adapting mixed-methods approach is to provide a comprehensive understanding of the research problems. The qualitative component was used in interviewing the lectures, instructors, and participants, as well as to organized workshops, and tutorials using CorelDraw software in teaching and learning textile design. Similarly, the quantitative component was used in collecting data using questionnaires, as well as to assess the participants' skills techniques and knowledge before and after the use CorelDraw in teaching learning textile. Furthermore, the use of mixed-methods was helped to combine multiple data sources for simplicity, clarity precision and understanding of the concept, and increasing the validity and reliability of findings. The target population study was purposively selected from Federal university of Education Kano, Ahmadu Bello University, Zaria, Kano state Polytechnic, and Saadatu Rimi College of education, Kano. Both textile and graphics students, on Students Industrial Work Experience Scheme (SIWES) were participated others are ex- design-students, professional designers and instructors, resulting in a total of 73 participants. A structured questionnaire was developed to gather data from participants. Furthermore, studio practice was adapted to determine the effectiveness of CorelDraw software in bridging gap between the tradition and digital technological approaches using pre and post-test experiment on the participants. In pre-test, the participants were tested in traditional method of teaching using conventional materials such as poster color, cardboard paper, ruler, drawing set and so on, secondly digital gadget principally CorelDraw software was used to determine the gap between the two methods.

4.0 RESULT

4.1 Demographic Characteristics

The demographic characteristics are summarized in Table 1.

Table 1: Demographic Characteristics of Respondents

Characteristic	Frequency (n)	Percentage (%)
Gender		
Male	27	37.7
Female	46	62.3
Prior Exposure to Graphic Design Software		
Yes	59	80.8
No	14	19.2
CorelDraw Experience		
1 year or less	22	30.1
More than 1 year	51	69.9

Source: Field Data, 2025

The demographic characteristics of the respondents are summarized in Table 1. A total of 73 individuals participated in the study, with a gender distribution of 37.7% male (n = 27) and

Volume: 08, Issue: 02 March - April 2025

ISSN 2582-0176

62.3% female (n = 46). In terms of prior exposure to graphic design software, 80.8% of the respondents reported having prior exposure (n = 59), while 19.2% (n = 14) did not. Regarding their experience with CorelDraw, 30.1% of the participants had one year or less of experience (n = 22), whereas 69.9% reported more than one year of experience (n = 51).

4.2 Perceptions of CorelDraw

Participants' perceptions of CorelDraw were assessed using a Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The results are summarized below in Table 2.

Table 2: Perceptions of CorelDraw

Statement	Mean	Standard Deviation
CorelDraw software is creative, easy to learn, and free cost materials	3.8	0.9
CorelDraw software can revolutionized the teaching and learning textile design.	4.0	0.7
I find CorelDraw useful design tool in promoting Nigerian cultural and artistic heritage in textile design.	4.1	0.7
CorelDraw has a user-friendly interface and can be explore for teaching and learning textile design in the Nigerian tertiary institutions	3.2	0.6
As Nigerian design students, a storming CAD and CAM textile design with artistic values can be created using CorelDraw software in my studio.	4.1	0.7

Source: Field Data: 2024

Overall, respondents rated their perceptions positively regarding CorelDraw. The statement "CorelDraw is easy to learn" received a mean score of 3.8 (SD = 0.9), indicating a favorable view of the software's ease of learning. Participants felt that CorelDraw significantly enhances their design capabilities, reflected by a mean score of 4.0 (SD = 0.7). Furthermore, the majority considered CorelDraw a useful tool in achieving a creative and cultural design, have a mean of 4.1 (SD = 0.7), which indicates strong agreement. However, the perception of the software's user-friendly interface was highest mean score, with a mean score of 4.2 (SD = 0.6), Lastly, participants expressed confidence in their ability to come out with a creative design using CorelDraw software, as shown by a mean rating of 4.1 (SD = 0.7).

Volume: 08, Issue: 02 March - April 2025

ISSN 2582-0176

Fig. 1: Participant design that adapts CorelDraw software Muhammad (2024)

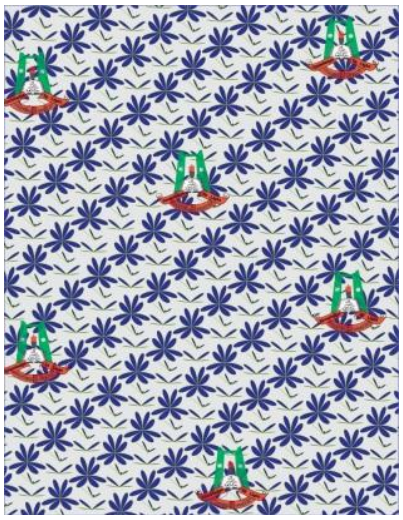

Fig. 2: Participant design that adapts CorelDraw Muhammad (2024)

5.0 DISCUSSION

The findings of this study illuminate both the perceptions of CorelDraw and the challenges faced by students using the software in textile design instruction. Overall, student perceptions were mostly positive, with high mean scores for statements indicating that CorelDraw enhances design capabilities (M = 4.0) and is a useful tool (M = 4.2). These results align with previous research, suggesting that effective design software is crucial in fostering creativity and innovation in textile design education. This in line with the finding of Musa & Agu (2021) and Oppong, J.A, Biney-Aidoo V. & Antiaye E. (2013) who stated that, the used of digital software in textile design is easier, creative and costs effective.

5.1 Challenges Faced in Using CorelDraw

The challenges reported by respondents while using CorelDraw are summarized in Table 3 below. The findings indicate that respondents encountered not much difficulty, which were rated on a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

Table 3: Challenges Faced in Using CorelDraw

Challenge	Mean	Standard Deviation
Limited technical support	4.1	1.0
Insufficient training	3.9	0.8
Software complexity	3.6	1.1
Difficulties in troubleshooting issues	4.0	0.9
Lack of access to updated software	3.8	1.0

Source: Field Data: 2024

The challenge identified with the highest mean score was "Limited technical support," with a mean rating of 4.1 (SD = 1.0), suggesting that many respondents strongly felt this was a significant issue. Similarly, "Difficulties in troubleshooting issues" also received a high mean score of 4.0 (SD = 0.9), reflecting considerable concern about the support available for resolving software-related problems. Respondents reported "Insufficient training" as a

Volume: 08, Issue: 02 March - April 2025

ISSN 2582-0176

challenge, with a mean score of 3.9 (SD = 0.8), indicating a moderate to high level of agreement about the need for better training resources. The complexity of the software was rated with a mean of 3.6 (SD = 1.1), showing that many participants found it challenging to navigate CorelDraw. Lastly, "Lack of access to updated software" was also noted as a concern, shown by a mean rating of 3.8 (SD = 1.0).

6.0 DISCUSSION

Despite the positive perceptions, the study highlighted significant challenges, particularly concerning limited technical support (M = 4.1) and difficulties in troubleshooting issues (M = 4.0). This indicates a strong need for institutions to enhance their support systems for students using CorelDraw. Insufficient training (M = 3.9) also points to the necessity for more comprehensive training programs that empower students with the skills required to utilize CorelDraw effectively. This is consistent with the findings of Okoro and Chinwe (2019), who noted that CAD and CAM technologies have some limited despite the technologies' apparent advantages—such as increased efficiency and creativity. Furthermore, Ezugwu and Njoku (2020) discovered that a major obstacle to the successful integration of cutting-edge technology in educational settings is restricted access to contemporary equipment. According to Adeyemi et al. (2018), Frequent interruptions and limited usefulness result from a lack of technical help for CAD and CAM system maintenance and troubleshooting. The study emphasizes the need for comprehensive curriculum reform to include practical applications of CorelDraw technology.

6.1 Engagement and Motivation

Engagement levels among respondents were assessed through statements regarding their enthusiasm for using CorelDraw. The results are summarized in Table 4. The mean engagement scores reflect a generally positive attitude towards using CorelDraw among the participants.

Table 4: Engagement Levels with CorelDraw

Statement	Mean	Standard Deviation
I am enthusiastic about using CorelDraw	3.7	0.7
I feel motivated to express my inner felling using CorelDraw	3.8	0.9
I regularly practice using CorelDraw	3.4	0.8
I enjoy learning new features of CorelDraw	3.9	0.7
I collaborate with peers when using CorelDraw	4.0	0.6

Source: Field Data, 2024

The statement "I feel motivated to design a storming pattern using CorelDraw software" received the highest mean score of 3.8 (SD = 0.9), indicating that most respondents feel a significant level of motivation when using CorelDraw software. Similarly, participants expressed enthusiasm about using CorelDraw, with a mean score of 3.7 (SD = 0.7) and enjoyed learning new features, reflected by a mean score of 3.9 (SD = 0.7). Respondents indicated a positive trend toward collaboration with peers while using CorelDraw, achieving a mean score of 4.0 (SD = 0.6). However, the statement "I regularly practice using CorelDraw" received the

Volume: 08, Issue: 02 March - April 2025

ISSN 2582-0176

lowest mean score of 3.4 (SD = 0.8), suggesting that while engagement is relatively high, there may be room for improvement in the regular practice of using the software.

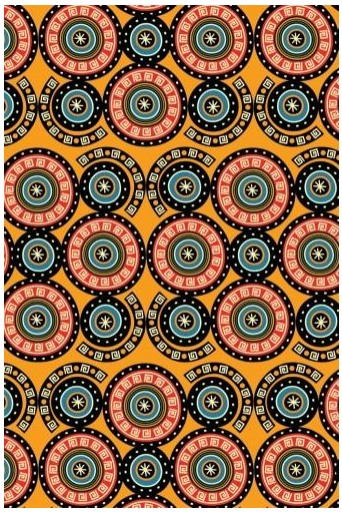

Fig. 3: Participant design that adapts CorelDraw software Saleh (2024)

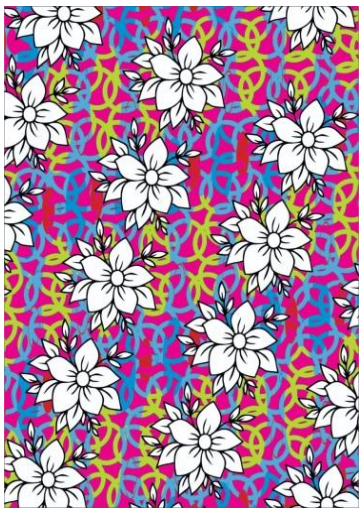

Fig. 4: Participant design that adapts CorelDraw Ishaq (2024)

7.0 DISCUSSION

Engagement levels, as indicated by mean scores close to the neutral midpoint, suggest that while students are generally motivated and enthusiastic about using CorelDraw, there is potential for improved practice frequencies (M = 3.4). This could impact their proficiency and comfort with the software over time. The study emphasizes the importance of continuous practice and collaboration among peers, reflected by the highest engagement score for collaboration (M = 4.0). This is in line with findings of Chen F. (2016) who opines that, the use of computer technology in the teaching of textile design occupies the important position and can not only greatly improve the working speed and efficiency, better to grasp the overall design, but also can save the storage space, from the truly realize resources sharing. In the future, therefore, textile design teacher applied all kinds of design software in order to improve the overall quality of teaching.

8.0 CONCLUSION

The purpose of this study is to reform and digitalized the teaching and learning textile design in the Nigerian tertiary institutions of higher learning by developing a systematic approach and recommendations for effective assimilating CorelDraw software as a CAD technology into textile design curricula, the use of CorelDraw software as a CAD technology in textile design has offers a range of tools and features that makes digital textile design simpler, and allows designers to create an indigenous designs, patterns, and textures that will supports various file formats, making it easy to import and export designs for different textile manufacturing processes, this is because the software provides precise control over textile design elements, for simple and intricate sketches, swatches, patterns and designs, in conclusively, CorelDraw software is a cost-effective solution compared to others textile design software, and traditional teaching and learning materials.

While students have a positive outlook on CorelDraw's functionalities and its impact on their design capabilities, the challenges regarding technical support and training infrastructure must be addressed. These factors significantly influence their overall experience and the effectiveness of CorelDraw as a learning tool in textile design education. Enhancing support systems and providing targeted training programs will likely improve students' engagement and competency in using CorelDraw.

8.1 Recommendations

Based on the findings of this study, the following recommendations are proposed:

The purpose of this study is to reform and digitalized the teaching and learning textile design in the Nigerian tertiary institutions of higher learning

i. Nigerian tertiary institutions of higher learning especially should textile section should explore and assimilated CorelDraw software as first step in CAD and CAM teaching and learning digital textile design in their institutions, which will in turn, makes their students more relevant in the labour market.
ii. Nigerian tertiary institutions of higher learning should establish dedicated technical support teams that can assist students in resolving software-related challenges promptly.
iii. Nigerian tertiary institutions of higher learning should implement structured training programs that cover both basic and advanced functionalities of CorelDraw software, potentially including workshops or online tutorials to enhance skill acquisition.
iv. Evaluate and Update Software Access: Regularly assess the software needs of the curriculum and ensure that all students have access to the latest versions of CorelDraw to align with industry standards.
v. It’s recommended that, Computer Aided Design (CAD) and Computer Aided Manufacture (CAM). CAD-CAM should be assimilated into the textile design curriculum

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