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THE IMPACT OF LIBRARY MAKER SPACES ON ENTREPRENEURIAL STUDIES AMONG STEM STUDENTS IN SELECTED ACADEMIC LIBRARIES IN SOUTHWESTERN NIGERIA

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ABSTRACT: *As global demand for innovative and entrepreneurial people grows, established educational institutions are under pressure to provide practical and experiential learning environments and opportunities. Library maker spaces, which are outfitted with cutting-edge tools and technologies, have the potential to provide a solution by encouraging practical learning and innovation. However, previous study has primarily focused on librarians' opinions, ignoring the important perspectives of the students who are the main patrons of these spaces. This study investigated the impact of library maker spaces on entrepreneurial studies among science, engineering and mathematics students in Southwest Nigeria. The study employed a descriptive survey design, while a multistage sampling combining random, stratified and purposive sampling techniques was used to select 400 STEM students across the selected tertiary institutions. The questionnaire was chosen as the instrument for data collection. 400 copies of the questionnaire were distributed, out of which 360 were duly filled, yielding a return rate of 90%. The results of this study revealed that the use of maker spaces in the selected library was fairly high, while awareness level was also fairly high. The study also found that the use of maker spaces positively influences the development of entrepreneurial activities among the students, despite the various challenges facing the adoption of maker spaces identified in the study. The study hereby concluded that the use of maker spaces has to be encouraged by proffering solutions to identified obstacles, in order to enhance creativity and innovation among university students, thereby fostering entrepreneurial development.*

KEYWORDS: Maker spaces, Academic libraries, STEM, Students, Entrepreneurship.

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INTRODUCTION

The rapidly changing landscape of higher education has led to a growing focus on helping students- especially those majoring in Science, Technology, Engineering, and Mathematics (STEM)- develop entrepreneurial abilities. These abilities are critical for promoting economic expansion, innovation, and solving difficult global issues. Academic libraries are becoming essential sites for interdisciplinary learning and innovation as old educational methods change. In this perspective, the creation of maker spaces in libraries is a noteworthy development.

STEM education plays an important role in preparing students for success in modern economies. Students with solid scientific and technological backgrounds are probably going to have an advantage in the employment market as technology plays a bigger role in many businesses (Stef, Teban and Mirea, 2023). Furthermore, STEM education can support the development of critical thinking and creative thinking abilities, which are beneficial in a variety of industries (Shen, 2023). STEM education lays the groundwork for entrepreneurship, which can result in increased autonomy, happiness, financial security, and life satisfaction (Mirea, Draghici and Baesu, 2023).

Makerspace, according to Al-Mousawi (2018), is the phrase used to designate a physical space in the library that takes on a particular interest for its users to share resources, collaborate on projects, and exchange information. Cavalcanti (2013) opined that a makerspace is just a place where people get together to create things using shared technology tools. The space's original objective is to "legitimize the act of creating something from base as well as not refurbishing what currently exists."

The majority of libraries in advanced countries have long recognized the connection between makerspaces and public libraries. Most times, makerspaces have replaced traditional public library facilities in an effort to address the growing demand for an area that fosters creativity and innovation while providing access to cutting-edge technologies. In order to advance the concept of makerspaces in Nigerian libraries, more work needs to be done in raising awareness and altering the way that Nigerian librarians view services (Aiyeblehin, Onyam and Akpom, 2018).

Notwithstanding the potential advantages of maker spaces, little is known about their effects, especially when it comes to STEM students in Nigeria who study entrepreneurship (Davis, 2018). Southwest Nigeria offers a singular chance to investigate this dynamic because of its thriving academic institutions. The objective of this study is to offer insights that can guide educational practices and policies by examining the function of library maker spaces in developing entrepreneurial skills and knowledge.

Statement of the Problem

Innovative, enterprising people are in greater demand in the global economy, especially in the STEM (Science, Technology, Engineering, and Mathematics) departments. The job of colleges and universities is to provide students with the skills and information they need to meet these needs (Kennedy & Odell, 2023). But in order to develop the creativity, critical thinking, and practical problem-solving abilities that are essential to entrepreneurial competency, standard pedagogical approaches frequently fall short. Academic libraries have started including maker spaces- collaborative, resource-rich places meant to promote hands-on learning and creativity- in response to these problems (Aiyeblehin, Onyam & Akpom, 2018).

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Academic libraries in Southwest Nigeria are gradually implementing the maker space approach (Onifade & Olatoye, 2022). These areas are furnished with cutting-edge equipment, including electronics kits, paper, cardboard, laser cutters, and printers, to support hands-on learning and entrepreneurial endeavors. The true effect of these maker spaces on STEM students' entrepreneurial studies is still poorly understood, despite their promise. This is especially troubling because there is a great need in Nigeria for creative STEM graduates who can propel the country's economy forward.

Based on available research, maker spaces have the potential to substantially improve learning outcomes through the provision of chances for experiential learning, multidisciplinary cooperation, and the real-world application of theoretical knowledge (Davis, 2018; Aiyeblehin, Onyam & Akpom, 2018; Okpala, 2016; Murray, 2014). Nevertheless, there are few empirical studies that explicitly look at how they affect STEM students' entrepreneurial knowledge and skills, especially when it comes to Africa. The majority of maker space research has been done in Western nations, which leaves a big knowledge gap about how effective they are in other cultural and educational contexts. There is also limited research on availability and accessibility, usage patterns, impact on education as well as integration of library maker spaces into curricula.

By performing a thorough investigation on the influence of library maker spaces in entrepreneurial studies among STEM students in certain academic libraries in Southwestern Nigeria, this research seeks to close these gaps. Through an examination of maker spaces' accessibility, use, effects, and integration, this research aims to offer significant insights that can improve the educational environment and foster the growth of a STEM workforce that is more inventive and enterprising.

Objectives of the Research

The general objective of this research is to investigate the impact of library maker spaces on entrepreneurial studies among STEM students in selected academic libraries in Southwestern Nigeria. The specific objectives are to:

- assess the availability and accessibility of maker spaces in academic libraries in Southwestern Nigeria;
- evaluate the usage patterns of these maker spaces by STEM students;
- determine the effect of maker space activities on students' entrepreneurial skills and knowledge; and to
- identify the challenges of integrating maker spaces into entrepreneurial studies curricula.

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LITERATURE REVIEW

Though it is still small, research on makerspaces in libraries is expanding. Journals, trade publications, and blogs are prominent writing venues where the issue of makerspaces is more frequently explored. Less research has been done on education, professional growth, and training in makerspaces. In the realm of librarianship, maker learning spaces are still relatively new venues and offerings. Due to this novelty, it is challenging to identify peers with makerspaces, acquire project ideas, and obtain training possibilities. Thankfully, more librarians decide to add makerspaces every year, but there are still not many libraries in Nigeria as well as in other countries that offer maker learning spaces.

Moorefield-Lang (2015) studied the dynamic library environment and makerspaces, which are examples of change in the making. The purposeful sampling strategy was used in the research. The method of conducting one-on-one interviews was employed to gather data in order to conduct a thematic analysis of the integration of makerspaces in library environments. Respondents to the interview were librarians. For the study, twelve librarians were interviewed. Four were located in public libraries, four in academic or university libraries, and four in K–12 school libraries. One library was located in Canada, and the other eleven were in the United States. Nvivo 10 qualitative data analysis software was used to analyze the data. According to the study, when the librarians were interviewed, one had already adopted her maker learning space the month before, while an academic librarian who was involved had established the makerspace or 3D printing lab ten years prior. The librarians' experiences with the realization of makerspaces also varied.

The idea of makerspaces and its apparent advantages in Nigerian academic libraries have been emphasized by Okpala (2016). The findings from the research show that people are turning to libraries to stimulate their imaginations and ingenuity. Maker spaces are a great way for educators, staff, and students to learn new things while collaborating with one another, pondering novel concepts, exploring, experimenting, and creating. It was suggested that librarians take use of training and workshop opportunities to improve their makerspace abilities.

The academic library is a place where students congregate to work together and acquire knowledge, making it a perfect setting for a makerspace to flourish. Additionally, students like using cutting-edge technologies firsthand and getting accustomed with the kind of experimenting that results in a completed project (Julian & Parrott, 2015). Julian and Parrott (2017) posit that any committed teacher, despite financial constraints, can establish a makerspace if they have the will and the vision to do so. Their study reported that makerspaces at university libraries offer a concerted effort and a dedicated place to handle new opportunities and challenges while also helping to elevate STEM learning at the collegiate level. They also support STEM engagement in relation to long-term academic objectives of universities.

A similar study on establishing makerspaces in Nigerian public libraries as a strategy for achieving national integration and development was carried out by Aiyeblehin, Onyam, and Akpom (2018). According to the study, the government should strive to create an efficient library service and support the growth of makerspace initiatives and creative spaces in public libraries in order to achieve national integration and development. Additionally, libraries are urged to serve as a hub for digital engagement, exploration, and skill development with an eye

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toward entrepreneurial and creative thinking. This will greatly advance national integration and development and give communities access to an invaluable resource for capacity building.

Ahn and Noh (2018) studied and surveyed public library users' perceptions on makerspaces. The study's research questions included whether public library librarians believe it is necessary to introduce makerspace and why, their perceptions of makerspace's operational direction and support policy, and their thoughts on the spread of makerspaces. The study used questionnaires to get feedback on the establishment and functioning of public library makerspaces. Data were collected and analyzed using a survey questionnaire, frequency counts, and percentages. According to the study, the majority of public librarians responded that they needed makerspaces, while a minority said it was unimportant. Those who disagreed with the study's findings stated that the introduction of new work in an environment where the existing work could not be faithfully performed would interfere with the work that is currently being done in libraries. This was followed by the difficulty of introducing additional work given the current library's space and staffing levels, as well as the shortage of gadgets and space.

Kalu and Chinyere (2019) also studied makerspaces as an emerging trend in academic libraries in Nigeria, advocating for their adoption and domestication. The data was obtained via an interview schedule, which was delivered to 35 University Librarians via telephone, email, and in-person. Data were analyzed using basic percentages. The study discovered that only two of the 150 Nigerian universities approved by the National Universities Commission (NUC) owned makerspaces, despite the fact that university librarians were aware of this emanating learning space. Respondents showed optimism about the acceptance and domestication of makerspaces in academic libraries.

Okuonghae (2019) examined the challenges and issues associated with establishing makerspaces in Nigerian libraries. The study used a theoretical approach and analyzed data from primary and secondary sources, including journals, textbooks, and online resources. The study examined the requirements for setting up makerspaces in Nigerian libraries, the process of building them, and the benefits for library users. The study reported that makerspaces, in addition to building the critical thinking ability of citizens, will also foster the development of their interpersonal, communication, teamwork, leadership and mentoring skills.

Adamu, Abubakar, and Dogara (2020) investigated staff development at federal university libraries in Northern Nigeria by looking at the availability, awareness, and acceptance of maker spaces. A significant number of respondents had a positive view towards the installation of a maker space for personal growth in university libraries, yet none of the surveyed university libraries had one. The results also showed that the majority of respondents were aware of the maker space. The study suggested, among other things, that university library administration consider how to make better use of already-existing spaces or how to create new spaces by clearing out existing ones. This would allow libraries to collaborate with other learning centers, like workstations and study rooms, to create spaces that will facilitate efficient and fruitful learning.

Efe (2021) evaluated the knowledge of librarians in South-South Nigerian university libraries regarding the Maker space idea. The results demonstrated that South-South Nigerian university library librarians are well-versed in the Makerspace idea. But the results of the survey also revealed that not a single university in the South-South region had maker spaces implemented in their libraries. The results also showed that the lack of space for Makerspace, low funding

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for libraries, high costs for Makerspace facilities, and a shortage of trained staff to manage the Makerspace are among the issues impeding the implementation of Makerspace in university libraries in South-South Nigeria.

The review of the literature indicates a significant research gap: most earlier studies on the use of maker spaces have primarily focused on the opinions of librarians and library staff, frequently ignoring the important perspectives of the main beneficiaries, which are students, especially those pursuing STEM fields. Due to this neglect, the direct effects of maker spaces on students' entrepreneurial abilities, usage patterns, and overall educational experiences are not well understood. This study aimed to close this gap by focusing on the perspectives of the students and offering insightful information about how STEM students in Southwestern Nigeria interact with maker spaces, how these spaces affect their entrepreneurial development, and what particular needs and difficulties students face. This effort will ultimately lead to more student-centered innovations in educational practices and policy creation by providing a greater awareness of the efficacy and potential enhancements for maker spaces in academic libraries.

RESEARCH METHODOLOGY

The descriptive survey design was deemed most appropriate for this study because it allows the researcher to obtain exact information from a large number of respondents in a short amount of time through the administration of questionnaires. Additionally, this design provides flexibility in terms of data gathering techniques, enabling the distribution of structured questionnaires to STEM students across universities in Southwestern Nigeria. By guaranteeing inclusivity and diversity of viewpoints, this method improves the findings' generalizability and dependability.

The target population for this study includes university students who are enrolled in the Science, Technology, Engineering and Mathematics (STEM) courses in the selected universities in Southwest Nigeria. This is because these students are the primary users of library maker spaces and the main beneficiaries of entrepreneurial studies.

The sampling technique employed for the study is the multistage sampling technique. This type of sampling technique entails three or more stages of sampling based on the hierarchical structure of natural clusters within the population. The first stage was to randomly select some academic institutions out of the many tertiary institutions located in Southwest Nigeria, the second stage employed the use of stratified sampling to classify the population based on the universities they attend, thus ensuring representation from various universities within Southwestern Nigeria. The third stage involved using a purposive sampling technique to identify the STEM students among the students, while the final stage involved the use of simple random sampling technique to select a representative sample of the stem students. This is to ensure that all the STEM students have equal probability of being included in the sample. This approach ensures that the sample reflects the diversity of the student body in terms of academic disciplines, year of study, and demographics.

The specific sample size for the study was adjusted according to the total number of students enrolled in the STEM disciplines across the selected institutions using the sample size suggestion table suggested by Glenn (2012) to obtain an approximate sample size. The

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approximate sample size for the study is 400 as shown in the sample size suggestion table in figure 2.

Table 1: Sample Size Representation at 95% Confidence Level

Size of Population	Sample size (n) for Precision (e)	
	± 5%	± 10%
500	222	83
1,000	286	91
2,000	333	95
3,000	353	97
4,000	364	98
5,000	370	98
7,000	378	99
9,000	383	99
10,000	385	99
15,000	390	99
20,000	392	100
25,000	394	100
50,000	397	100
100,000	398	100
>100,000	400	100

Source: *Glenn (2012)*

The primary data was collected through the use of a questionnaire. Both open and closed ended questions were used in the questionnaire design. Each of these variables was measured by various other variables identified from the review of related literature pertaining to them as the questionnaire items.

The questions in the questionnaire were constructed by the researchers using the variables in the research objectives and questions of the study as guidelines. The questionnaire was administered by the researchers with the aid of employed research assistants to retrieve the copies of the questionnaire from the respondents. The research assistants were trained for one week in order to ensure that due process is followed while interacting with the respondents.

Data Analysis

Data collected from the field was coded and analyzed using the Statistical Package for Social Science (SPSS) software. Descriptive statistics was used to describe the demographic characteristics of respondents and address the research questions. Descriptive statistics used included frequencies, percentage, mean and standard deviation. The results are presented in tables and charts.

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RESULTS AND DISCUSSION OF FINDINGS

Table 1: Demographic Characteristics of Respondents

Demographic Characteristics	Frequency	Percentage
Gender		
Male	169	46.9
Female	191	53.1
Total	**360**	**100**
Age		
16-20 years	88	24.4
21-25 years	105	29.2
26-30 years	73	20.3
31-35 years	45	12.5
36 and above	49	13.6
Total	**360**	**100**
Level of Study		
Bachelor's degree	184	51.1
Master's degree	118	32.8
PhD	58	16.1
Total	**360**	**100**
Discipline		
Pure Sciences	155	43.1
Engineering and Technology	134	37.2
Applied Sciences	71	19.7
Total	**360**	**100**

Demographic characteristics of the respondents (Table 1) include gender, age, level of study and department. Among the respondents, 46.9% were male while 53.1% were female. In terms of age, 24.4% of the respondents were between ages 16-20, 29.2% were between ages 21-25, 20.3% were between ages 26-30, 12.5% were between the ages of 31 and 35, 13.6% were aged 36 and above. According to the level of study, 51.1% of the respondents were undergraduates, 32.8% were master's degree students while 16.1% were doctoral degree students. Grouping the respondents according to discipline, 43.1% of them were found to be studying pure sciences, 37.2% belonged to faculty of engineering and technology, 19.7% were students of applied sciences.

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Table 2: Availability and Accessibility of Maker Spaces

S/N		SA (%)	A (%)	N (%)	D (%)	SD (%)
1	The maker space in my academic library is well-equipped with modern tools and technologies (e.g., 3D printers, laser cutters, etc.)	61 (16.9)	132 (36.7)	25 (6.9)	104 (28.9)	38 (10.6)
2	The maker space is easily accessible during library hours	111 (30.9)	114 (31.7)	34 (9.4)	53 (14.7)	48 (13.3)
3	There are sufficient maker space resources for all students who wish to use them	99 (27.5)	92 (25.6)	33 (9.1)	58 (16.1)	78 (21.7)
4	I am aware of the availability of a maker space in my academic library	96 (26.7)	114 (31.6)	29 (8.1)	49 (13.6)	72 (20)
5	The maker space is accessible to all students, regardless of academic level or background	116 (32.2)	62 (17.2)	31 (8.6)	64 (17.8)	87 (24.2)
6	I have received sufficient information from the library on how to use the maker space	79 (21.9)	91 (25.3)	32 (8.9)	72 (20)	86 (23.9)

*** SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree**

The data from table 2 reveals that there is a noticeable need for development, especially in the area of equipment and resources that can enhance the use of maker spaces, although many students perceive that their library maker spaces are accessible and somewhat well-equipped. Libraries would particularly benefit from expanding the resources that are available, making sure that all academic levels are included, and improving communication efforts to increase awareness and offer adequate instructions on how to use these spaces efficiently. This is in tandem with the submission of Julian and Parrot (2017) that makerspaces are becoming a big deal in academic libraries, even though there is a need for more improvement. It however negates the findings of Efe (2021) who surveyed universities in the South-South zone of Nigeria and submitted that not a single university in that political region had a functioning makerspace in their library. The finding also confirms the position of Kalu and Chinyere (2019), who despite recording low acceptance and implementation of maker spaces in Nigeria, found that the respondents were optimistic about acceptance and domestication of maker spaces in Nigeria.

Table 3: Usage Patterns of Maker Spaces

S/N		VF	F	O	R	N
1	How often do you use maker spaces in your library?	74 (20.6)	93 (25.8)	90 (25)	58 (16.1)	45 (12.5)
		SA (%)	**A (%)**	**N (%)**	**D (%)**	**SD (%)**
2	I use the maker space frequently to work on my academic projects	106 (29.4)	127 (35.3)	15 (4.2)	52 (14.4)	60 (16.7)
3	I use the maker space for entrepreneurial or personal innovation projects	95 (26.4)	107 (29.8)	17 (4.7)	62 (17.2)	79 (21.9)

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4	I use the maker space to collaborate with peers on group projects or joint ventures	111 (30.8)	106 (29.4)	23 (6.5)	61 (16.9)	59 (16.4)
5	I use the maker space to experiment with new technologies (e.g., virtual reality, electronics, robotics)	104 (28.9)	101 (28.1)	17 (4.7)	76 (21.1)	62 (17.2)
6	I use the maker space for developing software or digital products (e.g., app development, coding projects)	100 (27.8)	109 (30.3)	13 (3.6)	88 (24.4)	50 (13.9)

*** VF = Very Frequently, F = Frequently, O = Occasionally, R = Rarely, N = Never**

*** SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree**

The data obtained from table 3 shows the usage patterns (frequency and purpose) of maker spaces among the respondents. The study found that over 70% of the students have made use of maker spaces at one time or the other, with nearly half of them using them frequently or very frequently. This connotes a fairly high level of maker spaces usage among STEM students in the selected universities. This result differs from that of Ahn and Noh (2018) who found in their study that the use of maker spaces among university students was on the low level and needed to be encouraged. It also slightly disagrees with the findings of Okuonghae (2019) who reported that the use of maker spaces in Nigerian libraries is limited due to insufficient equipment and lack of knowledge on how to integrate these spaces into academic and entrepreneurial activities. This study shows a positive shift from these earlier positions, with close to 50% of respondents frequently using maker spaces for academic projects, entrepreneurial innovation, and digital product development. This is likely due to increased institutional support and a growing recognition of maker spaces' importance in fostering innovation.

Table 4: Impact of Maker Space Activities on Entrepreneurial Studies

S/N		SA (%)	A (%)	N (%)	D (%)	SD (%)
1	Using the maker space has improved my creativity and ability to innovate	108 (30)	97 (26.9)	14 (3.9)	81 (22.5)	60 (16.7)
2	Maker space activities have enhanced my problem-solving skills	120 (33.3)	89 (24.7)	17 (4.7)	69 (19.2)	65 (18.1)
3	I have developed practical business skills (e.g., product design, prototyping) through maker space activities	101 (28.1)	94 (26.1)	12 (3.3)	79 (21.9)	74 (20.6)
4	Participating in maker space activities has increased my interest in entrepreneurship	106 (29.4)	109 (30.4)	17 (4.8)	69 (19.3)	58 (16.1)
5	I have developed collaborative and teamwork skills by working with others in the maker space	110 (30.6)	99 (27.5)	11 (3.1)	67 (18.5)	73 (20.3)
6	Maker space activities have given me a better understanding of how to turn ideas into viable business ventures	97 (26.9)	102 (28.4)	7 (1.9)	86 (23.9)	68 (18.9)
7	I feel more confident in my entrepreneurial abilities after participating in maker space activities	81 (22.4)	100 (27.8)	15 (4.2)	87 (24.2)	77 (21.4)

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Discussing the impact of maker spaces on entrepreneurial activities of the respondents, table 4 reveals that although many students find that maker spaces have a beneficial impact on their creativity, problem-solving skills, teamwork, and interest in entrepreneurship, there is a noticeable disparity in the attainment of these outcomes among all students. The importance of maker spaces in providing students with critical entrepreneurial competencies might be further strengthened by filling these gaps with more resources, entrepreneurial mentorship, and specialized training programs. This lends credence to the assertion of Van Holm (2015) that makerspaces help to encourage problem solving methods that include self-discipline and ambiguity tolerance, and that learning new skills in a supportive environment makes individuals better prepared for the uncertainty that accompanies innovation. The findings also agree with the submission of Dos Santos and Benneworth (2019) that maker spaces offer the opportunity for students to share their projects, innovate using rapid prototyping equipment, use low and high technology that serves as a starting point for launching start-ups, and relate to potential lenders.

Table 5: Challenges of Integrating Maker Spaces

S/N		SA (%)	A (%)	N (%)	D (%)	SD (%)
1	Insufficient budgetary allocation	99 (27.5)	110 (30.6)	17 (4.7)	74 (20.5)	60 (16.7)
2	Inadequate qualified staff	99 (27.5)	106 (29.4)	11 (3.1)	79 (21.9)	65 (18.1)
3	Poor maintenance culture	91 (25.3)	93 (25.7)	7 (1.9)	79 (21.9)	91 (25.2)
4	Incessant power outages	109 (30.3)	95 (26.4)	14 (3.9)	76 (21.1)	66 (18.3)
5	Copyright and intellectual property infringement	104 (28.9)	106 (29.4)	12 (3.3)	65 (18.1)	73 (20.3)
6	Inadequate library opening hours	96 (26.7)	98 (27.2)	17 (4.7)	81 (22.5)	68 (18.9)
7	Cost of personnel/ patrons training	113 (31.4)	101 (28.1)	16 (4.4)	60 (16.7)	70 (19.4)
8	Vandalism and theft by the students	98 (27.2)	111 (30.8)	17 (4.8)	70 (19.4)	64 (17.8)
9	Others					

Table 5 presents some of the challenges associated with the adoption of maker spaces in the selected university libraries. One major challenge identified in this study is insufficient budgetary allocation, which can restrict resources, equipment, and maintenance essential for effective maker space operation. The study also discovered a slight variation of maintenance culture among the selected university libraries as indicated by the respondents. While some identified poor maintenance culture as a barrier, others indicated that maintenance culture was not a barrier to their use of maker spaces. Inadequate qualified staff to manage maker spaces, copyright and intellectual property infringement, and incessant power outages were also

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identified as major obstacles to the use of maker spaces by the respondents. Other challenges discovered in this study include inadequate library opening hours, cost of personnel training and vandalism/theft of equipment by students. These findings are consistent with that of Efe (2021) who reported that inadequate space, insufficient funds, high equipment cost, and shortage of trained personnel were some of the hindrances to the use of maker spaces in university libraries in South-South Nigeria. The findings also agree with Okuonghae (2019) who identified inadequate funding, poor infrastructure, theft and vandalism, and lack of skilled personnel as some of the challenges that hinder the use of maker spaces in Nigerian libraries.

CONCLUSION

This study has established that creating maker spaces in academic libraries is a creative way to help STEM students develop their entrepreneurial abilities. Stakeholders, including academic institutions, legislators, and business partners, must cooperate to secure sufficient funding, improve operational support, and resolve infrastructure problems affecting maker space accessibility if maker spaces are to realize their potential as centers of innovation and entrepreneurship. By doing so, academic libraries may take the lead in promoting entrepreneurship and ultimately aiding Nigeria's economic and technical development by giving priority to these areas.

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