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Prospects and Challenges of Implementing Makerspace in Libraries in Nigeria

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Abstract
Information Technology (IT) no doubt has changed the function of the library. Libraries in Nigeria are using information technology to increase the efficiency and effectiveness of their day-to-day library work and services. The presence of makerspace in libraries can present new challenges and considerations. In view of the above, this paper, therefore examines prospects and challenges of implementing makerspaces in Nigerian libraries. It discusses the overview of information technology and libraries. The paper also looks into the concept of makerspace. It equally discusses the prospects of makerspace in Nigerian libraries and the challenges in implementing makerspace in Nigerian libraries, which includes cost, staffing and scheduling, staff and patron training, neatness, noise and maintenance, safety and liability, copyright and intellectual property, resistance to change. It concludes that as technology is changing the dominant form of recorded thought from print to electronic, libraries must evolve to fit into the changing nature of technologies in meeting the needs of library users.
Keywords: Makerspace, Libraries, Technologies, Information, ICT

1.1 Introduction

The pace of change brought by the emerging technologies in information exerted a considerable effect on the way people live, work, and play worldwide. It is obvious that this emerging trend in technology is challenging the traditional process of teaching, learning, and the way education and library is managed (Kalu &Ochepa, 2021). Information Technology (IT), as an important area of study in its own right, is having a major impact across all curriculum areas in our institutions and libraries as well (Fagbe, Amanze, Oladipo, Oyenuga and Adetunji, 2015).

According to Onuoha and Obialor (2015), IT has transformed the whole world into a global village with a global economy, which is increasingly dependent on the creative management and distribution of information. Over the past decades, the world has been experiencing significant changes in which the need to acquire, utilize and share knowledge has become increasingly essential. Haris (2016) noted that the 21st century technology might have advantage for business, industries, government, academic institutions and libraries as well. The library has improved its facilities and services for not being just the keeper for books.

Indeed, the evolving landscape of activities and operations can significantly impact an organization's outcomes and targets. For libraries, this dynamic

environment presents both challenges and opportunities. By staying attuned to the changing technological landscape and proactively addressing these challenges, libraries can continue to fulfill their role as custodians of information and resources in the digital age.

The use of library services has blossomed during the economic downturn and the makerspace are a reflection of the times. Already libraries of all types have been found to create makerspaces. Most of these early makerspaces are in public libraries, each with a different focus, some working only with children, and others with adults. Academic libraries also are developing makerspaces, as are school libraries. Early experiences show that the potential users of makerspaces are not limited to a specific demographic. If a library has patrons and are looking for a unique method of outreach, a makerspace might be the course of the library (Bagley, 2022).

2.2 Overview of Information Technology and Libraries

The application of IT in library and information centers has developed in the western countries since the 1940's. In the 1960's, the use of IT started in developing countries and that too is in different stages. The rapid development of Information and Communication Technology has made a special impact on the method of information acquisition, processing, storing and dissemination. The invention of the Internet has brought a major change in the scenario of library and information services. The impact of IT has created challenges and opportunities for the information professional around the world (Lisbnetwork, 2018).

IT no doubt has changed the function of the library. University libraries are using information technology to increase the efficiency and effectiveness of their day-to-day library work and services. Acquisition, cataloguing, circulation or binding are the

works connected with library services and these activities cover the administrative services, technical services, readers' services, and special services. According to Kumar (2017), these types of services can be managed with the help of integrated library automation software and the influence of IT can be seen in the following readers' services; selective dissemination and information (SDI) services, online searching, web-based indexes and databases, online public access catalogue (OPAC) to Web OPAC, digital reference service, electronic document delivery, electronic clipping services and internet based services.

Uddin and Hasan (2012), state that the computer is now an essential equipment of libraries for information acquisition, processing, management and dissemination. It is indisputable that no research and advance studies can successfully be carried out without using appropriate information resources/ materials. Most libraries and information centers provide such service with varying degrees of effectiveness and efficiency. An integrated information infrastructure links library systems, computer-based data centers with academic, special and public libraries. IT is the use of computer system and telecommunications equipment in information handling, consisting of electronic processing using the computer, transmission of information using telecommunication equipment and dissemination of information multimedia.

A vast number of different means of organizing information have been devised and exploited since the earliest times. With the vast output of new information and ever-increasing degree of specialization in all areas of human knowledge, heavy demands are being placed on library information storage and retrieval systems, which can be scarcely met by the traditional methods except with the use of IT devices. The improvements and changes in computing and telecommunications and the

integration of the two fields have had a huge role to play in the methods of information processing and dissemination in academic libraries; thus improving the quality of use to which such libraries are put ((Fagbe, Amanze, Oladipo, Oyenuga and Adetunji, 2015).

2.3 Concept of Makerspace

Makerspaces have evolved from hackerspaces and maker fairs. Defining a makerspace can be somewhat difficult due to the differences among spaces and activities, but the emphasis is on creating with technology. STEM education (science, technology, engineering, mathematics) has been quick to embrace these spaces and technologies, but it is important to stress that makerspaces are not for STEM activities only. A makerspace is a place where you can make things. It's a place for hands-on learning with all the tools for creativity. Every school's makerspace is different, but you might find a woodshop, 3D printing, audio-visual equipment, and hand tools. You might also find computers and computing devices like Arduinos or Raspberry Pi computers. Makerspace at American University has sewing machines and dress forms so students can combine fashion and engineering (Bagley, 2022).

Sometimes a makerspace is housed in the engineering department. Other times, it may be inside the university library, or in its own building on campus. At Ball State University in Muncie, Indiana, some residence halls have their own makerspaces. It might also be found even off-campus. Many libraries now have a makerspace set aside for people who want to create something new. A makerspace helps patrons turn their ideas into real, tangible objects. Assuming a student of engineering is in a class working on a design project, with a makerspace, the student can build a prototype of his design. Examples of what a student can make in a makerspace are: documentary films, model of a city for urban

planning, prototype of a prosthetic limb, metal sculpture and robot.

2.4 Prospects of Makerspace in Nigerian Libraries

One of the major goals of a makerspace is to provide students with the tools and environment to collaborate. Do not be surprised to see students from different programmes and grade levels working together in a makerspace. Professors and graduate students might get involved too. Libraries and librarians can work together to help students create and collaborate in the makerspace, by so doing, art students can work alongside engineering students. Community members outside the university can be invited to use the space. Students and teachers from nearby public schools can also come to the library regularly for workshops.

Makerspace creates the opportunity for students to join SPARC (Student Projects and Research Committee). SPARC weekly meetings provide plenty of opportunities for students to learn and create things together. Through collaboration, the group can build robots, a tesla coil, a portable device for cooling a person's internal body temperature, and more. Working and learning together is part of what makes a makerspace so interesting. A makerspace can help in engaging and connecting students with technology and interests in a completely different way than they are used to.

Libraries creating a space for makerspace whether big or small can hold any number of tools and materials for users to investigate and learn. The purpose of having a makerspace is to present people with an opportunity to explore their interests through hands-on, creative projects. Makerspaces in libraries can create a culture of curiosity and creativity, encouraging its users to learn about a variety of technology as well as craft making. Creating a makerspace in libraries can be beneficial for students, as a makerspace placed

in a library setting opens a whole new world of resources and exploration in students and can do plenty when it comes to their learning process. Since projects done in the makerspace are focused on student-centered inquiry, this makes them ideal to implement in school environments.

Modern libraries have always been at the hub of student activity. This is one that students will no doubt visit at some point during their education regardless of the classes they are taking or the subjects they are interested in. This is because libraries through makerspaces will offer the users resources to develop important skills that will be used as they progress throughout their education and transition into career opportunity. As libraries are at the center of student activity, incorporating a makerspace into libraries will help to connect curriculum, improve student achievement, and invest in a student's creative journey. Makerspace environments cover a range of topics in technology, science, and so on, and have equipment that helps people make videos, games, music, etc.

Makerspace environments in libraries will create different learning spaces for students to inquire and discover. While students are able to explore new ideas through building using 3D printers, construction tools, and other materials, they are also able to discover through deconstructing and "un-making" things. A makerspace can also serve as a launching point to develop entrepreneurship in students. Library users will be blended with makerspaces to serve as not only innovation centers but also develop entrepreneurship skills. Entrepreneurship encompasses many of the competencies that students are expected to develop. Students these days are faced with a changing world and will find themselves in different jobs and settings as they progress through their working lives. Putting entrepreneurship at the center of the makerspace helps students connect their learning with future payoffs.

A makerspace helps engage and connect students with technology and interests in a completely different way than they are used to. Rather than just learning how to consume everything around them, students are taught to create. This mindset sets students up for success because it takes them outside of passive thinking patterns and guides them in turning knowledge into action. Libraries hold an important role in providing students with this type of space. Implementing this type of learning environment promotes critical thinking skills and creativity. Housing these learning opportunities in an accessible and central area of the information centres is what will help students develop and apply these important skills.

2.5 Challenges of Implementing Makerspace in Libraries

According to Fagbe, Amanze, Oladipo, Oyenuga and Adetunji (2015), there are some constraints to effective information technology availability and application in libraries, most especially, academic libraries. The constraints include: lack of trained Information Technology (IT) Manpower, library staff and users negative attitude to change in technology, encountering technical problems in the course of usage, the conversion of analogue information into digital format and its storage capacity places a high demand on the bandwidth of the institution, crashing of computers due to virus, malware, hackers etc, can have a large negative effect of loss of data and exposure of information to non-users, lack of funds and maintenance culture. The above stated constraints are also factors that should be considered by libraries in setting up of fully functional IT-complaint libraries.

The presence of makerspaces in libraries will present new challenges and considerations. In many ways, makerspaces represent a new frontier in libraries, leading librarians into uncharted territory where few

have previously trekked or charted the way. Therefore, it is important to consider the following potential makerspace challenges as a "look before you leap" strategy.

Cost of Establishing Makerspace

While it is certainly possible to establish makerspaces in libraries without any significant costs in terms of supplies and space requirements, a developing makerspace will most likely involve extra expenditures over time. Depending on the makerspace focus, certain equipment, resources and technology purchases can prove expensive. For example, a number of makerspaces in both public and school libraries now feature equipment such as 3D printers which involve not only the initial purchase of the device, but the cost of maintenance, replacement components, and consumable materials that require replenishing. Makerspaces can require an additional budget that many libraries do not have readily available. As Slatter and Howard (2013) report, library budget constraints create challenges in the purchase of expensive technologies for makerspace programming, as well as the funding required for extra staffing.

Staffing and Scheduling

Sufficiently staffing a library makerspace and providing programming can be challenging. As Moorefield-Lang (2015) reports, librarians need to get creative with their staffing models when balancing the task of managing both a library and a makerspace. In many libraries there is only one person available to balance both responsibilities. Makerspaces add new demands on library staff, over and above their regular library programming. For example, a library makerspace may require staff to test out new equipment, source out and purchase new products, or design new projects or classes. Making connections with community members, other makers and resource people is another necessary makerspace task that takes time and commitment. Makerspaces have the potential to be time-consuming ventures with added planning, preparation, training and purchasing responsibilities for library staff.

Scheduling makerspace activities and open "making time" can also pose challenges within a school library maker model. For example, many teacher-librarians at the elementary level have part-time positions and they often cover teacher prep blocks so there is limited time available within the school day to provide open or curriculum-integrated maker time. As Martinez and Stager (2013) suggest that time is the most precious of classroom resources i.e. making, tinkering, and engineering may require schools to undergo structural changes that support inquiry and project development over much longer periods of time than they are accustomed. Therefore, school makerspace models will also require creative staffing or supervision models to provide students with sufficient opportunities to become "makers".

Staff and Patron Training

Both librarian and patron training are necessary aspects of library makerspaces, yet these training opportunities are not always readily accessible. Moorefield-Lang (2015) noted that training for maker learning locations continue to be difficult to obtain and most pre-service librarians are graduating each semester not knowing the skills needed to maintain and serve in makerspaces. Therefore, the impetus to obtain training, keep abreast of new technologies and trends and develop a professional learning network often lies with the librarian or library staff. Slatter and Howard (2013) also attest to makerspaces creating a unique set of challenges as participants found it a particular challenge to translate the value and relevance of new and different programmes and technologies to those who are used to a more traditional library model. Indeed there was a

steep learning curve for all.

Patron training is also essential to ensure that equipment is accessed properly and safely. According to Moorefield-Lang (2014), patron use is often cited as one of the challenges created by the introduction of makerspaces. User inexperience means that workshops, online tutorials, handouts, and overall information are important for their learning curve with this new technology. Makerspace training, for both staff and patrons, takes time, planning, dedication and consistency to ensure that the space and equipment are well used.

Neatness, Noise and Maintenance

Makerspaces, by their very nature, can invite "creative mess" and in some cases, maker activities have the potential to damage existing furnishings. For example, carpets, tables and other surfaces can be damaged with the use (or abuse) of maker tools on their surfaces. These realities then beg the question: who becomes responsible for the upkeep of the space, ensuring order, tidiness and damage control? According to Moorefield-Lang (2015), some libraries have addressed these challenges with user agreements which require patrons to return the workspace and tools to their original state and place responsibility on the patron to use equipment with care.

Furthermore, Burke (2014) asserts that some makerspace equipment are loud and may require a dedicated space with added noise reduction features. The added complications of noise, mess and maintenance need to be addressed within the library makerspace blueprint.

Safety and Liability

Patron safety becomes a primary consideration when makerspaces provide potentially hazardous equipment that could cause harm when used incorrectly or without proper supervision. For example, many makerspaces provide tools like soldering irons, laser cutting equipment and sharp implements such as woodworking tools or saws. As Burke (2014) reports, for some of the more complicated makerspace equipment there should be a certification process in place for users who wish to use such items.

Depending on the nature of the equipment and the maker activities offered within a library makerspace, the issue of patron safety can create additional challenges. According to Moorefield-Lang (2015), in addition to providing clear and consistent guidelines for equipment use, some libraries have established policies that prohibit the creation of items that could be perceived as weapons, or used commercially. Furthermore, as Moorefield-Lang (2015) reports, some libraries address makerspace safety by requiring patrons to wear proper attire, use provided safety equipment (glasses and gloves) and sign safety or health waivers. When there exists a potential for unsafe conditions to arise, safety protocols become a necessary standard to plan for in the creation of library makerspaces.

Liability and safety in the makerspace go hand-in-hand. With the concern for patron or student safety comes the consideration of protecting your school or library institution. In her study of user-agreements in library makerspaces, Moorefield-Lang (2015) reports on several public libraries that include liability statements within their user-agreements, which release their institutions of any liability in the event that a patron comes to harm.

Copyright and Intellectual Property

A "grey area" surfaces with the newness of rapid prototyping such as 3-D printing in library makerspaces: there are concerns over issues such as copyright infringement, liability and intellectual property. Slatter and Howard (2013) report on the unique challenges brought to the forefront

by content-creation spaces regarding ownership of materials created at the library and legal implications. Furthermore, Moorefield-Lang (2015) reports that a number of libraries have addressed copyright and intellectual property rights within their user-agreements, placing the onus on the patron to ensure that he/she is respecting copyright law when creating products in the makerspace.

Within a school library makerspace, the responsibility to ensure that students are respecting copyright and intellectual property would most likely rest with the teacher-librarian. As Martinez and Stager (2013) advised that given the ever-changing and somewhat confusing legal landscape, we believe that the best way to teach students to respect intellectual property is to use common sense.

Resistance to Change

Resistance to change can be a library makerspace challenge. As Slatter and Howard (2013) reported that library staff can be reluctant to embrace change in their libraries while patrons can be hesitant to accept new directions in library programming. Furthermore, Burke (2014) advises librarians to be prepared with strong rationale for library makerspaces adding the following caution: Library makers must expect that makerspaces will be questioned in their communities and will not have an easy road to universal acceptance. According to Slatter and Howard (2013), one means to address this change resistance to library makerspaces is by offering staff professional development and incorporating effective change-management models, while engaging community support in advance of implementation.

Conclusion

Technology is changing the dominant form of recorded thought from print to electronic. That change, in turn, is irrevocably altering the ways in which people create, find, and process information. As a result, libraries must evolve their philosophies, missions, and processes. IT has not left any human activity untouched with its influence as its tools like computers and communication have added new dimensions in information handling in libraries. New technologies supplement the older ones and form together with a complex of technologies, allowing for choosing a certain technology for a certain application from a broad variety of technologies. Makerspace, no doubt is one of the technologies that libraries can establish for the benefit of the students and library patrons.

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