MAKERSPACE AS EMERGING TREND IN ACADEMIC LIBRARIES: ADVOCACY FOR ADOPTION AND DOMESTICATION IN NIGERIA

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ABSTRACT

The study examined Maker space as an emerging trend in academic libraries globally. The descriptive survey research design was adopted for the study, because the data is nominal. Four objectives and four research questions were formulated to guide the study. The population of the study comprised university librarians in the 165 universities in Nigeria approved by NUC, made up of federal universities, private universities and state universities. Purposive sampling technique was used to derive a sample size of 35 university librarians. The instrument for data collection was an interview schedule. 35 copies of the interview schedule were distributed and administered to the university librarians through email, telephone and face to face conversations and yielded a returned rate of 35(100%). Simple percentage was used for data analysis. Results from the analysis of the data revealed that university librarians were aware of the maker space concept as an emerging learning spacein academic libraries; academic libraries in Nigeria neither had maker spaces, nor had any plans to establish any in the nearest future. Results also showed that university librarians have positive perspectives of the adoption and domestication of maker spaces in academic libraries, but with caution. The study therefore advocates for university libraries in Nigeria to embrace and explore the maker space concept for adoption and domestication. Finally, thestudy recommends among other things that academic libraries should come up with policy initiatives and strategies for the adoption and domestication of maker spaces in academic libraries in Nigeria.

Keywords: Maker spaces, emerging trend, adoption, domestication, academic libraries.

Introduction

The major role of universities and other tertiary institutions revolve round the development of the society through research, teaching, and community service. As the 21st Century progresses, tertiary education is becoming more dynamic and technology driven and academic libraries are not left out. Some of the changes and innovations include online learning and research, open access publishing, institutional repositories and other forms of digital literacy. In addition to this, universities and academic libraries are seen to be maximizing the use of space to support both the libraries‟ activities and the mandate of its parent body, sometimes in competition with other stakeholders in the institution. A recent innovation and development in universities and academic libraries, especially in America and

Australia is the introduction of maker spaces (Turner, Welch and Reynolds, 2013). A maker space is defined as a collaborative learning environment where people come together to share materials and learn new skills. It is a collaborative work space inside a school, library or separate public/private faculty, for making, learning, exploring and sharing, that uses *high tech to no tech* tools. (Makerspace.com, 2014).

An academic library is an integral part of a college, university or other tertiary institutions, administered to meet the information and research needs of its students, faculty and staff (Reitz, 2004). Alluding to this, Oduagwu (2006) describes academic libraries as libraries in institutions of higher learning, which are devoted to the academic activities of their parent institutions. Academic libraries provide information services to the academic community. Academic libraries by their functions ensure the development of intellectual consciousness and potentials of members of the academia on one hand and the larger society on the other hand.

Since the first official maker space convened in a library in upstate New York in 2010, libraries have remained an ideal setting for maker space events in America (Open Education Database, 2016). The 2015 NMC Horizon Report predicted the increasing adoption of maker spaces by libraries, arguing that these creative spaces for hands-on-work will further position libraries as gateways to new skills, in addition to new knowledge (The NMC Horizon Report, 2015). In line with the prediction, makerspaces are cropping up in libraries everywhere, but the process for creating one of these areas in an academic library can often be layered and confusing. This is especially true for librarians and staff that have had very little prior maker space experience. A factor that can make the process even more difficult is the lack of agreement over what exactly a maker space is (Association of College and Research Libraries (ACRL), 2016).

Statement of problem

As universities look for ways to encourage innovations and entrepreneurship, many academic libraries in America and Australia have begun providing access to maker resources and services (Radniecki and Klenke, 2017). However, it is not yet certain whether university libraries in Nigeria are embracing this emerging trend. It is against this background that this paper seeks to investigate makerspaces as emerging trend in academic libraries, with a view to sensitizing university librarians on its adoption and domestication in university libraries in Nigeria. The findings of this research will significantly inspire serious discussion on the adoption and domestication of maker spaces in academic libraries in Nigerian universities.

Objectives of the Study

The general objective of this paper is to highlight maker space as an emerging trend in academic libraries and advocate for its adoption and domestication in academic libraries in Nigeria. The specific objectives are:

i. To determine university librarians' awareness of the concept and domestication of makerspace in academic libraries in Nigeria;
ii. To find out university libraries in Nigeria that have makerspaces in their libraries;
iii. To ascertain the universities that have plans for maker spaces in their libraries in the near future;
iv. To ascertain the perspectives of university librarians on the adoption and domestication of makerspaces in academic libraries in Nigerian universities.

Research Questions

This study was predicated on the following research questions:

i. Are university librarians aware of the concept of makerspaces and their domestication by university libraries?
ii. Are there any university libraries in Nigeria that have maker spaces?
iii. Which university libraries have plans to create makerspaces in the near future?
iv. What is the perception of university librarians on the adoption of maker spaces in academic libraries in Nigeria?

Literature Review

Maker Space: Conceptual Review

The term "Maker space" has been variously described. A maker space has been described by Educause (2013) as zones of self-directed learning. It is a collaborative workspace inside a school, library or separate public/private facility for making, learning, exploring and sharing that uses high tech to no tech tools (Makerspaces.com, 2014). They arecommunity workspaces where users have access to manufacturing tools and machines tobuild physical prototypes and objects (Weinmann, 2014). Educause (2013) asserts that their hands-on character coupled with the tools and raw material that support innovation; provide the ultimate workshop for the tinker and the perfect educational space for individuals who learn best by doing. Interaction among inventors at these facilities fosters a highly collaborative learning dynamic that is excellent for team efforts and for peer support, advice and assistance.

Halverson and Sheridan (2014) provide the context for research on maker movement to be considered the emerging role of making in education. The authors described the theoretical roots of the movement and draw connections to related research on formal and informal education. They present points of tension between making and formal education practices as they come into contact with one another, exploring whether the newness attributed to the maker movement is really all that new and reflecting on its potential pedagogical impacts on teaching and learning.

Origin and Brief History of Maker Space

The idea of having a place to make things is not new. Workshops, garages, studios, sewing rooms and backyards have long been spaces for making. Bell (2010) notes that a brief history of makerspaces origin is not easily articulated, as there are a multitude of contributing factors that brought about makerspaces. The birth of makerspaces can be traced to the maker movement outside of the university system at the turn of the century as the next iteration of the Do-It-Yourself (DIY) culture (Anderson, 2012). Britton (2012) asserts that makerspaces started appearing in the form of open spaces where members would pay membership fees for access to the technology inside, which typically includes a variety of types of rapid prototyping equipment such as 3D printers, laser cutters and traditional hand tools. Accordingto Canessa, Fonda and Zennaro (2013), as the price of the technology associated with"making" such as the cost of 3D printers declined, it allowed for greater development of makerspaces, and the spaces began to spread into more locations. Burke (2014) opines that maker spaces have existed in various forms as long as people have been making items and have needed places to work with tools and equipment. He explains that while certain aspects of the maker movement such as lobbyists, arts and crafts groups, shop classes, practical education and science fairs have existed for years, it was the launch of "*Make*" magazine in 2005, and its published information about maker-related projects that gave the maker movement its impetus. The maker spaces also have its root in the MIT"s Fab Labs. Fab Labs are laboratories designed to fabricate things, and consist of digital equipment for designing products and the digitally driven tools to create them (Martinez and Stager, 2015).

Makerspaces of all types are growing at an exponential rate (Davee, Regalla and Chang, 2015). One driver of the increased interest in makerspaces within the U.S was President Obama"s 2009 "Educate to Innovate" campaign, in which he promoted the value ofmaking experiences (Sheridan et al, 2014). Subsequently, the White House hosted its first Maker Fair in June 2014, after which, followed the commitments of numerous large companies to support community-based making activities (Bevan, Gutwill, Petrich and Wilkinson, 2014).

Application of Makerspaces in Academic Libraries

The birth of makerspaces is traced outside the university. Much of the growing body of literature relating to makerspaces refers to permanent spaces located in public libraries, school libraries and some other institutions. Academic libraries are ideally placed to offer inter-disciplinary extracurricular makerspaces, but with increasing pressure on space, resources and expenditure, the NMC Horison Report (2015) queries its feasibility.

Maker spaces within the university are attractive avenues for answering the need for more practice-based programmes/courses that compliment the theoretical class structure already in place (Canessa, Fonda and Zennaro, 2013). Those addressing the applicability of maker spaces in academic libraries point out that they create opportunity for hands-on learning, co-working, STEM activities, prototyping, tinkering and experiencing and open culture (Colgrove, 2017). Sheridan et al, (2014) report that makerspaces and the collaborativedesign and making activities they support have generated interest in diverse educational realms. They note that many museums, libraries and schools have firmly embraced maker spaces and make learning as part of their educational programming. In a 2013 survey of library makerspaces by John Burke, 109 librarians responded to a web-based survey, indicating that their libraries either currently hosted maker spaces or were close to launching it (Altman, Benhardt, Horowitz, Lu and Shapiro, 2015). Wong and Patridge (2016) investigated the experience of Australian universities with maker spaces. Of the 43 Australianuniversity websites studied during this research, 12 had reported makerspaces with 3 universities referring to makerspaces on 2 campuses. The adoption of makerspaces in higher education viz-a-viz libraries is expected to increase in the successive years (Johnson et al, 2015) and this will require universities to consider the mission of their makerspaces and map out services requirements accordingly.

In a study on why makerspaces matter in academic libraries, Ginsberg (2016) notes that though most of the community makerspaces exist in public or school libraries, university makerspaces in academic libraries have been on the rise and for good reasons, being that as academic libraries exist to encourage and support campus scholarship, makerspaces exist to encourage creative learning, using available spaces and can easily co-exist in the library. The top 4 reasons given by Ginsberg for academic libraries hosting makerspaces include:

i. **Maker spaces offer access** and access is an important aspect of the mission of libraries whether it refers to books, journals, databases, wifi, printers or even information in general.

ii. **Libraries teach literacy; making teaches creative literacy:** Teaching information literacy is critical to academic librarians, as they guide students towards becoming well-informed researchers and scholars.

iii. **Maker spaces bring unexpected partnership for the library:** Though maker spaces benefit the rest of the campus, it can benefit the library itself too. Creating a library maker space can actually result in partnerships with some unexpected departments and units, as wellas external industry based institutions.

iv. **Maker spaces contribute to the well-being of the university community campus:** In higher education, it is easy to get focused on the library‟s scholarly mission, and of course, this is the primary mission of colleges as a whole.

Burke (2015) conducted a survey of 34 academic librarians and the following four responses were the most highly ranked replies given by librarians when they were asked why the library has a makerspace: supporting learning; providing access; encouraging collaboration and following the library‟s mission. As maker spaces continue to be hosted by universities and academic libraries across the world, many benefits are derivable from their establishment. Weinmann (2014) identifies such benefits as increased motivation of students, enhanced learning and more possibilities for interdisciplinary team work and the development of an entrepreneurial spirit. The American Society for Engineering Education (ASEE) (2015) contends that the benefits of makerspaces are primarily focused around two major concepts- the benefits of building physical models and the benefits of informal learningenvironments and community. While the focus is often on technology, makerspaces more generally concentrate on creation (Slater and Howard, 2013).

Framework for Domestication of Maker spaces in Academic Libraries

Makerspaces are cropping up in libraries everywhere, but the process for creating them in academic libraries can often be layered and confusing. ACRL (2016) identifies basic issues in creating maker space in an academic library, namely: space consideration, creating maker space theme or lack of, equipment and budget and developing curriculum. Wilczynski (2015) opines that the mission of the makerspace must be clearly articulated from the startand once conceptualized; the space should then be created around that mission.

The hosting of makerspaces in academic, public and school libraries has been primarily guided by the environments in which these three types of libraries operate. While there are common elements to every makerspace, those in academic libraries do exhibit some differences. When academic libraries were isolated in a survey, they illustrated different focuses. There were more focus for creative activities resulting in digital products such as websites, digital photos, programmes, apps and games. Arts and crafts, tinkering and the well-presented category of “others” have dropped from the list entirely. The contents of that “others” list tended to include more physical making activities (such as button making, hand tools collections, and LEGOs), and many further point to an academic library makerspaces tilting towards digital creation (Burke, 2017). Ginsberg (2016) argues that no matter the environment, the operators must get started. He proposed a guideline on how to get started. They include:

i. Get Information about your User Community
ii. Set Goals and Objectives
iii. Start small and do not worry about trends

He maintains that in all, the purpose of any maker space needs to be communicated by those advocating for its creation.

Research Methodology

The study examined Maker space as an emerging trend in academic libraries globally. The descriptive survey research design was adopted for the study. Four objectives and four research questions were formulated to guide the study. The population of the study comprised university librarians in the 165 universities in Nigeria approved by NUC, made up of 43 federal universities, 75 private universities and 43 state universities (Campusbiz Journal, 2018). Purposive sampling technique was used to derive a sample size of 35 university librarians (see Appendix for sampled university libraries). A thematic interview schedule

which addressed the 4 research questions of the study was used for data collection. 35 copies of the interview schedule were administered to the university librarians through email, telephone and face to face conversations and yielded a returned rate of 35(100%). Simple percentage was used for data analysis. Data collected in respect of the research questions were collated and presented in tables 1- 4 respectively. The research questions formed the basis for data analysis.

Data Presentation and Results

Research question one: Are university librarians aware of the concept of maker space and their domestication by university libraries?

Table 1: Responses on University Librarians' Awareness of the Concept and Domestication of MakerSpace in Academic Libraries in Nigeria.

University Librarians' Awareness of the Concept	**Aware F (%)**	**Not Aware F (%)**	**Total F (%)**
Awareness and domestication of the Makerspaces concept in Nigerian academic libraries	28(80%)	7(20%)	35(100%)
Total	28 80	7 20	35 (100%)

Finding from Table 1 shows that 28(80%) respondents were aware of the concept of Makerspaces and their adoption in academic libraries, while 7(20%) were unaware of the concept and their domestication in academic libraries.

Research Question 2: Are there any university libraries in Nigeria that have hosted Maker space?

Table 2: Responses on Availability of Makerspaces in University Libraries in Nigeria

S/N	**Availability of Makerspaces in University Libraries**	**Yes (%)**	**No (%)**
1	Federal Universities	2	11
2	State Universities	0	10
3	Private Universities	0	12
	Total	2 **(6%)**	**33(94%)**

Table 2 shows that 2 or 6% of the university libraries in Nigeria have Makerspaces in their libraries while 33 (94%) do not have. The two universities are University of Ibadan and University of Nigeria, Nsukka.

Research Question 3: Which university libraries have plans to create maker spaces in the near future?

Table 3: University Libraries with Plans to Create MakerSpaces
(Key P - Plans, NP -No Plans)

University Libraries	**P %**	**NP %**	**Total %**
Proposed plans to create Makerspaces	19	14	33
Total	**19(58%)**	**14 (42%)**	**33 (100%)**

Result from Table 3 reveals that out of the 33 university libraries that were yet to provide makerspaces 19(58%) have plans to introduce or host Makerspaces in their libraries. However, 14(42%) of the university libraries have no plans yet for the adoption or domestication of Makerspaces in their libraries.

Research Question 4: What is the perception of university librarians on the adoption of maker space in academic libraries in Nigeria?

Table 4: Responses on University Librarians' Perception of the Adoption and Domestication of Makerspaces in Nigerian Academic Libraries

Perceptions of University Librarians	**NO**	**NP**	**PP**	**Total**
University Librarians' perception of the adoption and domestication of MS in academic libraries in Nigeria	7 (21.2%)	1 (3.0%)	25 (76%)	33 (100%)
Total	**7 (21%)**	**1 (3.0%)**	**25 (76%)**	**33 (100%)**

(Key- No Opinion (NO), Positive Perception (PP), Negative Perception (NP)

Result from Table 4 indicates that 7 respondents, representing 21% of the university librarians had no opinion on the issue, another 1(3%) had negative opinion, while 25 respondents, representing 76% had positive opinion on the adoption and domestication of Makerspaces in academic libraries in Nigeri**a.**

Discussion of Findings

From the data obtained and presented in respect of Research Question 1, as presented on Table 1, 28(80%) of the respondents were aware of the Maker spaces concept as an emerging learning space in academic libraries, while 7 (20%) was not. The result goes a long way to show that university librarians in Nigeria are conversant with innovations and major emerging trends in the profession like the makerspaces revolution. Results of data analysis in respect of research question 2 yielded a 2(6%) hosting of makerspaces in the 35 libraries covered in the study. The result shows that despite the awareness of university librarians on this emerging concept, the rate of domestication or establishment is still very low in the libraries. This may not be unconnected with the observation of ACRLOg (2016) on the basic issues to be considered before creating makerspaces in an academic library, namely: space consideration, creating maker space theme or lack of, equipment and budget and developing curriculum. It is heart-warming however, the results of analysis from research question three indicated that 19 or (58%) had futuristic proposal for creating a maker space. Responses fromthe interview further indicated that many of the libraries have provided spaces, but were yetto equip it. Regarding the responses from research question four, university librarians had positive perspective on it. The 76% positive perception reported the makerspaces concept as awelcome development which could become an adoptable reality in Nigerian academic libraries in the near future, even though they recognized that it is capital intensive in terms of space, finance and infrastructure. They also raised doubt that it may amount to duplication of resources and value due to the existence of workshops, laboratories etc.

Conclusion and Recommendations

The paper examined makerspaces as emerging trend in academic libraries: advocacy for its adoption in academic libraries in Nigeria. It has revealed that university librarians in Nigeria are aware of the makerspaces concept as an emerging learning space in academic libraries globally; there is evidence that only two out of the 35 academic libraries in Nigeria studied have established or hosts a makerspace; majority (76%) of university libraries in Nigeria have plans to establish or host makerspaces. The paper further revealed that university librarians have positive perception of the adoptability and domestication of the maker spaces concept in academic libraries in Nigeria.

In line with the results of the study, the researchers therefore recommend as follows:

1. Academic libraries should go beyond the mere academic knowledge of the makerspaces concept as an emerging learning space in libraries, and actively embrace, initiate as well as explore and exploit strategies and facilities to create same in academic libraries in Nigeria;

2. Advocates for the adoption and domestication of makerspaces because as academic libraries exist to support and compliment the teaching, learning and community service, which are tripartite objectives of universities. In like manner, the central objective of markerspaces, is to engender and facilitate creative and practical experiences of teaching and learning by providing and synergizing practicable, hands-on creative experiences for library users as well as other authorized members of the library community;

3. As a stop-gap measure, academic libraries should use available spaces or create space by weeding and decongesting available space in the libraries to enable the creation of makerspaces (perhaps on a micro scale) to co-exist and collaborate with other learning spacesand operations, such as library workrooms and work stations, to achieve a better and more creative, lasting and productive learning experience for users;

4. Universities should consider the mission of their makerspaces and map out services requirements accordingly. Moreover, there is the need for libraries to develop guidelines and framework for their operation

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APPENDIX OF SAMPLED UNIVERSITY LIBRARIES

S/N	NAME OF FEDERAL UNIVERSITIES
1	Ahmadu Bello University, Zaria
2	Alex Ekwueme University, Ndufu, Alike
3	Federal University, Birnin-Kebbi
4	Federal University, of Technology, Owerri
5	Michael Opkara University of Agriculture, Umudike
6	University of Benin, Benin-City
7	University of Ibadan
8	University of Lagos, Akoka
9	University of Nigeria, Nsukka

10	University of Port-Harcourt
	STATE UNIVERSITIES
11	Abia State University, Uturu
12	Akwa-Ibom State University, Ikot-Akpan
13	Benue State University, Makurdi
14	Caritas University, Enugu
15	Chukwuemeka Odimegwu University, Uli
16	Ebonyi State University, Abakaliki
17	Ekiti State University
18	Enugu State University of Science and technology, Enugu
19	Imo State University, Owerri
20	Kano State University of Science and Technology
21	Lagos State University, Ojo
	PRIVATE UNIVERSITIES
22	Afe Babalola University, Ado-Ekiti
23	Ajayi Crowther University, Ibadan
24	Babcock University, Illishan-Remo
25	Benson Idahosa University, Benin-City
26	Bowen University, Iwo
27	Caleb University, Lagos
28	Clifford University, Owerrinta
29	Elizade University, Illima-Mokun
30	Gregory University, Uturu
31	Igbinedon University, Okada
32	Madona University, Okija
33	Redeemer‟s University, Ede
34	Rhema University, Obeama-Asa
35	Spiritan University, Nneochi