Knowledge, Perception and Attitude of School Library Personnel Towards Makerspaces in Obio/Akpor Local Government Area, Rivers State

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ABSTRACT

The study investigated the knowledge, perception and attitude of school library personnel in private secondary schools in Obio/Akpor Local Government Area Rivers State towards makerspaces. The survey research design was adopted for the study while questionnaire was used as the instrument of data collection. The sample size for the study comprise 103 school library personnel in private secondary schools spread across the location of the study. Findings from the study showed that the school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State possess adequate knowledge about makerspaces especially as regards to choosing technologies that enhance student's teaching and learning process, selecting effective teaching approaches to guide students thinking and learning on markerspace, having prior knowledge on makerspace, having various ways and strategies of developing their understanding of the markerspace and using markerspace as a way of creating, tinkering and exploring new things just as they have positive perception about makerspaces. The study further revealed that school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State have positive attitude towards makerspaces. Positive relationships were established between knowledge and attitude, perception and attitude as well as knowledge and perception of school library personnel as regards makerspaces.

Keywords: Attitude, Knowledge, Makerspaces, Perception, School library, Personnel, Rivers State, Nigeria Private secondary schools, Obio/Akpor Local Governement Area,.

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1. BACKGROUND OF THE STUDY

The world is changing and libraries too. Several innovations are finding their way into libraries operations including service delivery as a result of these changes. The change in the educational landscape as a result of technological revolution has also made it mandatory with libraries to change in order to keep abreast of the current development. According to Moorefield-Lang (2015), library services needs to evolve with this change to become an ideal place for realising student's creativity. Beyond the provision of information resources, libraries have been seen as key educational institutions that facilitate the building of national wealth through the creation and sustaining of access to crucial information.

The library has been identified as the hub for knowledge creation, processing, dissemination and storage. According to Johnson (2017) information creation and sharing in the modern world subsist in the realm of multimedia and physical objects and to keep up with this trend, libraries must develop new ways of offering comprehensive and engaging information services. Plemmons (2014) asserts that as educational spaces, libraries should be much more than a place to consume information but also a place for generating ideas and innovations.

School libraries have played key roles in ensuring the development of societies and its citizens. These are done through the provision of information resources as well as mounting of innovative service such as makerspace. Consequently, Slatter and Howard (2013) refer to makerspace as transforming the library's image from that of a place where works are consumed to that of a place where works are created. Hence, in order to facilitate creativity in libraries, school libraries need to implement the use of makerspaces within the library environment for the use of schools and that of the community. Makerspaces can therefore, be defined as places where people come together to share information resources, and act creatively on their common interests (Brady, Salas, Nuriddin, Rodgers, and Subramaniam, 2014). The welcoming nature of the space and methods of learning through transformative work can have an appeal that goes beyond existing library users (Compton, Amy, Boese, Lewis, Teeri, and Yusko 2014).

Makerspaces are places designed to develop the mind of learners through creative thinking as it provides enabling resources that could help them bring their thoughts into reality. It is a place where people get together to make things, create things and learn together. Meanwhile, a library makerspace is a unique learning environment, within the library, that encourages tinkering, playing and open-ended exploration for all. According to Fleming (2015), makerspaces encourage thinking, learning, doing, creating, producing, and sharing and often associated with the science, technology, engineering, and mathematics (STEM) curriculum. Therefore, an effective makerspace environment engages students through playfulness just as it inspires students to think deeper and take ownership of their learning.

Within the context of the school library, makerspace is described as an area or service that offers pupils, students and teachers' opportunities to create intellectual and physical materials using resources such as computers, 3-D printers, audio and video capture, editing tools, and traditional arts and crafts supplies. Makerspaces are collaborative spaces where people gather to get creative with "do it yourself" (DIY) projects, invent new ones, and share ideas. Makerspaces environment also encourage individuals use of technologies to make physical artifacts within a community of fellow makers. Meanwhile, there has been growing interest in the educational potential of making activities which has resulted in many schools procuring tools and technologies to set up their makerspaces.

The maker movement is built upon the idea of constructivism, which is hands-on learning through building. Consequently, makerspaces allow students to take control of their own learning, often by demonstrating entrepreneurial behaviour (Bell, 2015). Also, making requires the student, rather than the teacher, to initiate learning, thus creating individuality in making. In addition, makers support each other, which helps build the sense of community. Thus, great makerspaces embrace collaboration of students with different learning styles to collaborate on projects and teach each other new concepts. Moreover, libraries have a history of being a free, open space for everyone, regardless of socioeconomic status. Today those same spaces are trending, but are both physical and virtual with more advanced offerings (Loertscher 2012). Thus, libraries are coming in full circle back to the idea of making which is a way to bridge gaps in technology for students of varying statuses.

Makerspaces in libraries provide these same opportunities to students while enhancing the experience and opportunities provided. Activities that involve making may already be happening in the school library to some degree, but are becoming more popular with a strong driving force from the school librarian and advocates (Martinez and Stager, 2013). However, the application of a maker learning space is still new to many school libraries. In order for these innovative programmes and spaces to be sustainable, O'Connell (2015) stated that it is essential that these learning spaces are staffed by qualified professionals and supporting staff. Makerspaces in school libraries may perish without well-trained personnel who would continue to manage, implement, and develop programs and facilities. No research studies however have been conducted to identify the necessary skills, knowledge, abilities, or attitudes required for the successful performance of school library personnel in makerspaces. There are existing lists of competencies for librarians, but they do not focus on these emerging and innovative places. Makerspaces can certainly lift the status and image of libraries if embraced appropriately, though there are many challenges in terms of how makerspaces are embraced and aligned to the role of school librarians in Nigeria.

The adoption of a new innovation is always welcome with numerous challenges. In Nigeria, the challenge of implementing a new idea is even greater when such idea involves the use of technological gadget. The introduction of makerspaces in Nigerian libraries has been faced with different challenges despite the numerous benefits derived from makerspaces in libraries. Aiyelehin, Onyam and Akpom (2018) explain that some of the challenges facing makerspaces in Nigerian libraries are perennial problems affecting all technology related projects in Nigerian libraries. These challenges include from negative perception of traditional librarians, poor funding of libraries, lack of librarians' willingness to adopt innovative strategies in library, and lack of trained personnel to handle the makerspaces, among others. In addition to poor level of awareness of the concept of makerspaces among librarians, the deployment of new technologies and libraries in Nigeria encounter unique challenges in the development of makerspaces. It is commonly accepted that people behave in accordance with their knowledge and beliefs. The more certain the knowledge or belief, the more likely, more rapid and more reliable is the response.

Perception has to do with understanding issues as well as the psychological ability to process or use the information received through the sense organs (Roush, 2009). Perception is the cognitive impression that formed reality which in turn influences the individual's actions and behaviour towards an object. The view of school librarian has a lot to do with student's development, but when such important personnel in a school library do not pay attention to details of library users or students' needs and interest, this negatively contributes to poor practices of makerspace. Perception of school librarian is an important indicator of a successful makerspaces' usage. Attitude on its part, is a tri-element concept embodying belief, emotions and behaviour which characterises human beings in intra-personal and social interaction (Sefertzi, 2000).

Knowledge, perception and right attitude of librarians have always been a key part of any makerspaces. Without having the right knowledge or skills to operate the makerspace effectively, the school librarian may be the cause of destroying the makerspace. Therefore, a school librarian must be able to explore what is needed specifically such as ability to learn, ability to adapt to changing situations, ability to serve diverse people and also acquire knowledge and skills in managing a makerspace area effectively. The school management has a very strategic role to play in ensuring that the creativity and learning of pupils and students are facilitated through the makerspaces. Kurti, Kurti and Fleming (2014) stated that no makerspace can survive and thrive without a supportive environment. In the primary schools, these individuals are called headmasters or headmistresses, while in the secondary schools they are the principals and the vice principals.

It is very important for these individuals after having a clear picture and having being convinced of the benefits of makerspace, to solidly support the arrangement for it to succeed. The management of government owned primary and secondary schools in Nigeria with functional school libraries have the responsibility of informing governmental authorities of the benefits associated with the creation of makerspace within the libraries. This is because, for makerspace to facilitate creativity, connectivity and learning, it has to be in existence and the need for government support is important in this.

The school librarian is an important stakeholder in ensuring that makerspace facilitates the creativity and learning of pupils. Bell (2015) who stated that school librarians are being overlooked when it comes to the issue of facilitating the creative ability in student, which was described as an important role of school librarian. The makerspace is a facility that could assist the school librarian to facilitate creativity in students. But this can only be done when school librarians lobby their managements and teachers on the importance of creating a makerspace that will exist side by side with the school libraries. The more school librarians effective table the case for the creation of makerspaces before other stakeholders, the more the likelihood of getting their support. The school librarian really needs to get the support of the management because there may be need for the school library to be redesigned or an extension made to the already existing structure.

Makerspaces is making in road in school library service delivery as a new innovation. However, the attitude of school librarians towards makerspaces seems not clear enough. Literature has established factors that can influence the attitude as lack of knowledge of librarians towards makerspaces which include non-challant attitude, insufficient exposure and environmental problems. Though, the creation of makerspaces in the secondary school library has the potential of transforming the mind-set of the students into one that favours creativity, it seems as if school librarians have not taken full advantage of makerspaces. This is because it is not a common sight in most secondary schools in Nigeria, especially those owned by government. On the other hand, perception of school librarians about makerspaces has the tendency to dictate their disposition to makerspaces. It is in the light of the foregoing that this study investigated knowledge and perception of school library personnel as determinants of their attitude towards makerspaces in private secondary schools in Obior/Apor LGA, Rivers State, Nigeria. The study covers only private secondary schools with semblance of functional school libraries in terms of organised learning resources and personnel which could be either purpose built or classroom collection.

1.1 Objectives of the Study

The specific objectives of this study are to:

xi. establish the level of knowledge of makerspaces possessed by school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State, Nigeria;
xii. determine the perception of school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State, Nigeria about makerspaces in Ibadan North LGA, Ibadan, Oyo State.
xiii. find out the attitude of school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State, Nigeria towards makerspaces; and
xiv. ascertain the relationship between knowledge, perception, and attitude of school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State, Nigeria.

1.2 Research Questions

The following research questions were answered in this study.

81. What is the level of knowledge of makerspace possessed by school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State?
82. What is the perception of school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State about makerspace?
83. What is the attitude of school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State towards makerspaces?

1.3 Hypotheses

The following hypothesis were tested 0.05 level of significance.

5 There is no significant relationship between knowledge and attitude of school library personnel towards makerspaces in private secondary schools in Obio/Akpor LGA, Rivers State.
6 There is no significant relationship between perception and attitude of attitude of school library personnel towards makerspaces in private secondary schools in Obio/Akpor LGA, Rivers State.
7 There is no significant relationship between knowledge and perception of school library personnel of makerspaces in private secondary schools in Obio/Akpor LGA, Rivers State.

2. LITERATURE REVIEW

2.1 Knowledge of School Librarians About Makerspaces

Knowledge is often defined as a belief that is true and justified. Scott (2012) defines knowledge as a capacity to act, this makes the important distinction between the behavioural potential, which cannot be directly observed, and the observable performance or behaviour. Therefore, as we look into the future of librarianship in Nigeria there is need for librarians to be prepared to take the future. The future, however, does not belong to traditional librarians who are not ready to adopt emerging technologies. This transformation influence what librarians do, how they work, where they work, how they are perceived, and what competencies they need to succeed in this new environment. This transformation can be viewed from two perspectives. The first perspective speaks to internal changes; the way the library and librarians work while the second perspective considers how changes in the external environment shift the role of librarians and information professionals. In makerspace settings, the degree of training the school media specialist receive could influence the level of knowledge possessed and degree of success or failure of the learners or users.

Moreover, to develop school librarian's capabilities to teach function effectively in engaging the students in the makerspaces' environment, their mind-set has to be developed. A strong focus on design thinking and problem-solving during school librarian's professional development can improve their knowledge and capabilities to manage students' or the library users. Research has identified the importance of teachers librarian, in this context, as playing the roles of both traditional instructor and facilitator and adapting to the role of facilitator rather than instructor, resounding a social constructivist approach and giving students flexibility for ideation (Ginsberg, 2015; Goerner, 2015; Lopez, Caspe and McWilliams, 2016). At the same time, they have to provide students with basic training in using the technology, keep them motivated and be able to shift the focus from conventional learning outcomes to reflective and transformative educational practices (Okpala, 2016). Scott (2012) recommended that librarians need to face the future boldly and fearlessly since the traditional library spaces and users, as well as what the librarians are familiar with are being altered.

This idea is not new to the principles of librarianship making users driven decisions, gearing library spaces and services to the client is part of basic training and education. Similar to Allwell (2016), while the library spaces and roles may change, foundational training would keep librarians in the field grounded.

The implementation of makerspaces in libraries takes planning and training since these are not library services that are commonplace and rarely do librarians enter with full knowledge or background in, hence the school librarian must be willing to acquire adequate and relevant knowledge about in order to work successfully within the makerspaces. The school librarian must be willing to be an innovator, problem solver, and a collaborator in other to find success employing a makerspace in his or her library.

2.2 Perception of School Librarians About Makerspaces

Perception may be defined as a process by which individuals organize and interpret their sensory impressions in order to give meaning to their environment. According to Ginsberg (2015), perception includes all those processes by which an individual receives information about his environment seeing, hearing, feeling, tasting and smelling and that the study of these perpetual processes shows that their functioning is affected by three classes of variables the objects or events being perceived, the environment in which perception occurs and the individual doing the perceiving. In other words, perception is the act of seeing what is there to be seen. But what is seen is influenced by the perceiver, the object and its environment.

Perception is determined by both physiological and psychological characteristics of the human being whereas sensation is conceived with only the physiological features (Ana and Kylie, 2018). Thus, perception is not just what one sees with the eyes but it is a much more complex process by which an individual selectively absorbs or assimilates the stimuli in the environment, cognitively organises the perceived information in a specific fashion and then interprets the information to make an assessment about what is going on in one's environment. Hence, perception could be seen as a subjective process which makes different people to perceive the same environment differently based on what particular aspects of the situation they choose to selectively absorb, how they organise this information and the manner in which they interpret it to obtain a grasp of the situation. Consequently, the creation of makerspaces in school libraries is expected to transform the librarians from been perceived as boring book stores where users hardly get what they want to information centres and creativity hubs.

As makerspaces have begun to move into classrooms and school libraries, there has been a growing need for school librarian professional development. Maker leaders have recommended that such training should include workshops and seminars with the goal of encouraging more maker-oriented practices in formal learning contexts (Okpala, 2016). School librarians have to be prepared to implement appropriate service delivery methods by using complex technologies, solving technical problems and adapting to new circumstances (Kachel, 2011; Honey and Kanter, 2013).

Therefore, to develop school librarians' capabilities to collaborate with teachers in teaching design literacy to children in the makerspace context, their mindset has to be developed. A strong focus on design thinking and complex problem-solving during school librarians professional development can improve their perception and capabilities to manage students' making processes in digital creation contexts. They need to build a collection of working with diverse materials, advanced technical equipment and software applications and be able to devise new educational practices (Ana and Kyle, 2018).

2.3 Attitude of School Librarians Towards Makerspace

Attitudes are a complex combination of things we tend to call personality, beliefs, values, behaviours, and motivations. Allport (1935) defined an attitude as a mental or neural state of readiness, organised through experience, exerting a directive or dynamic influence on the individual's response to all objects and situations to which it is related. Thus, attitudes can help individuals define how they see situations, as well as define how they behave toward the situation or object. School librarians, being key stakeholders in the development of school libraries, play a strategic role in application of makerspace in libraries because their attitudes are critical in determining the levels of makerspace application (Scott, 2012).

The foundation of a librarian's work lies in pursuit of his or her duties in accordance with the known expectations of society in general and the needs of the users of his library in particular. Schrock (2014) noted that when people are used to doing things in a certain way, they often do not change how they do things unless they have to and this attitude affects the way the school librarians perceive and reacts towards accepting makerspace in the library or in the school community.

Generally, observations revealed that school librarians seem to have a positive attitude towards makerspaces in school libraries because the interest in makerspaces is a growing trend (Runco and Jaeger, 2012). The librarians had a favourable attitude towards the makerspace in the library though a low level of usage or adoption was established probably due to lack of knowledge of makerspaces (Stager, 2017). Also, Bell (2015) noted that makerspaces are expected to be increasingly adopted by schools in order to cultivate environments where students take ownership of their education by doing and creating. This positive attitude is also identified by the school Library Association of New Zealand, (SLANZA) who identified one of the key ways libraries are responding to the needs of the next generations of educators and learners is that libraries are becoming learning commons which incorporate makerspaces and reinforces libraries role in the entire learning spectrum of recreational reading, research, production and sharing.

However, in spite of this positive attitude which have also been documented by studies of Anna and Kylie (2018) and Achterman (2008) that some librarians do have concerns about the makerspace in schools. Anna and Kylie (2018) went further that makerspaces creates an atmosphere where a maker connect with his or her inner self by probing and tasking the mind with others, by promoting cooperation, knowledge sharing, team work and collaborative learning provided the school librarians developed interest in new innovation which is usually the outcome of creativity enhanced by makerspaces.

Similar findings were reported in studies by Stager (2017) that school librarians must developed good attitudes towards the new innovations in the libraries of today because this makerspaces has three main types of creativity which involved different ways of generating the novel ideas which includes; the "combinations" creativity: such as new combinations of familiar ideas. the "exploratory" creativity: such as the generation of new ideas by the exploration of structured concepts, and the "transformation" creativity: which involves the transformation of some dimension of the structure, so that new structures can be generated.

It was stated by Antonites (2003) that positive attitudes towards new innovation by the school librarians will enhanced creativity in children. Not that alone, this will go a long way by improving their cognitive level, exposing them to social environment. Positive attitudes of school librarian have implication for the establishment of school libraries by allowing the introduction of new innovation like makerspaces. Invariably, it is only those schools whose librarians approve the new innovation that are likely to practice it with modern devices (Rouch, 2009). In view of this, finding indicated that there is new to involve school librarians in the new programme of makerspaces through training and skills acquisition. This makerspace is the engine room for creativity which is required for sustained development and in turn, creativity is central to making.

Furthermore, Rouch (2009) noted the other implication of librarians' attitudes towards the makerspaces in the libraries will gear up the role of makerspace in facilitating connectivity and learning by children. It was added that the makerspace movement is one that present an environment where children can connect and learn valuable skills mostly in the field of science, technology and mathematics. In addition, Feinstein, DeCillis and Harris (2016) noted that makerspace allows for learning that is participatory in nature. This becomes evident because as children connect together in working on an idea in the makerspace, in the course of their participation, they all learn from the process and the benefits spread to all. This aligns with the principles of participatory learning highlighted by Project New Media Literacies and outlined by Ginsberg (2015).

The principles include; heightened motivation and new forms of engagement through meaningful play and experimentation, learning that feels relevant to pupils' identities and interests and opportunities for creating using a variety of media, tools and practices. Others are; co-configured expertise where educators and students pool their skills and knowledge and share in the tasks of teaching and learning and lastly, an integrated system of learning where connections between home, school, community and world are enabled and encouraged.

The makerspace ensures that pupils connect and learn not just a particular discipline but different disciplines that are of interest to them. Since the principal focus of makerspace is to build the cognitive abilities of pupils in areas of science, engineering, mathematics and entrepreneurship, they need an all-round knowledge that will not be narrowed or stereotypic. The importance of this was echoed by Allwell (2015) who pointed out that ultimately, the interdisciplinary and empowering natures of these makerspaces can help prepare youth for a future we cannot yet imagine. This is of particular within the context of Nigeria as there is a need to start planning for the future now and this cannot be successful without technology.

Furthermore, makerspaces facilitate connectivity and learning through the opportunity provided for all pupils to access materials and resources. In a situation where pupils are not restricted to use the maker tools, they will have the opportunity of laying their hands on them, try making things of interest and in the process, even though they may not be successful at first, they would have learnt in the process. Fleming (2015,) asserted that every child has the right to invent, tinker, innovate, make and do. Thus, to ensure that pupils within the school library enjoy these rights to the full, it is very important for the personnel in charge of the makerspace to educate the pupils on this. With access to resources and materials in the makerspace, pupils will could be very active, innovative, creative, identify problems and discuss their thinking with the colleagues (Compton et. Al, 2014).

From the foregoing, it is clear that makerspace has the potential of turning passive pupils into a very active and innovative makers. Therefore, in order to support the idea of makerspace within Nigerian school libraries and as such create an environment where pupils can connect, learn and create, there is the need for the school librarians to create or develop positive attitudes towards the use of makerspace in the libraries and allow the relevant stakeholders to perform their roles. The stakeholders include the school management, subject teachers and school librarians.

2.4 Knowledge and Perception of school librarian about makerspace

Knowledge concerning the object, scene, or event in a conscious propositional form generally does not affect perception. By and large, perception is autonomous with respect to thought. That is because perception is stimulus bound and is based on mental contents, lawful principles and rules that are unconscious and, in a form, very different from such consciously represented propositional knowledge (Fleming, 2015). Exceptions to this generalisation can occur if the stimulus is ambiguous and can support a suggested interpretation or one in line with what is known to be present as well as the perception that occurs spontaneously.

How the representation of the given, consciously apprehended knowledge can enter into the unconscious events that govern perception is not known, but it is suggested that such knowledge accesses memories and it is these memories that can affect perception. In some instances, Oyewole and Anenene (2016) emphasised that knowledge leads to an intentional intervention in the process of achieving a percept, the mechanism of which is not known. However, this kind of effect may be based on a process of imagining or visualising of objects or events that dovetails with the proximal stimulus and it is the imagining that leads to the perception.

Knowledge provides an orderliness to our lives which allows us to conceptualise goals, to anticipate and perceive events, and to respond in accordance with the changing needs, purposes and desires (Oliver, 2016). Therefore, an individual's attitude and performance depend both on the knowledge that has been acquired through learning, practice and experience. This process of acquiring and retaining knowledge in memory can be described as learning and is a product of all the experiences of a person from the beginning of his or her life to the moment at hand. So therefore, the school media specialist needs to keep learning and keep themselves curious and inquisitive at all times.

Anna and Kyle (2018) pointed out that modern libraries face crises of survival and development due to advanced modem information management systems and competition from vendors, publishers, mass media, online services and Internet. Also, user's expectations have increased as a result of rapid development of advanced information technology, increasing generation of new knowledge and information availability from both printed as well online media. Consequently, DeSaez (2018) mentioned that there is greater need for school librarians to find ways of satisfying users wants and expectations. Also, efforts should be made to know-what the school library users, when they want it, and how they want it. The knowledge of makerspaces by the librarians is very germane to ensure that library users make maximum use of the potentials of the makerspace.

2.5 Theoretical Underpinnings

This study takes a constructionism and constructivism approaches. These theories were born out of research and life-long learning. The philosophy of constructivism say that learners will construct their own unique meanings for concepts while constructionism believes that students will be more deeply involved in their learning if they are constructing something that others will see, critique, and perhaps use will help them in problem solving and become more motivated by the construction. This is relevant to the study of makerspace design as it can explain how materials can be used for creativity, innovations and inventions that will continue to develop with people in ways that produce increasingly advanced learning opportunities.

2.5.1 Constructionism

Makerspaces and deep learning go hand-in-hand, as recognized by Papert (1980) of Massachusetts Institute of Technologies (MIT), who developed a theory of learning based upon Piaget's constructivism. Papert (1980) asserts that children build their own intellectual structures with materials drawn from the world around them. What is different from Piaget's theories, however, is that Papert (1980) maintains that learning occurs through making rather than overall cognitive potentials and thus, his approach constructionism helps to understand how ideas get formed. According to constructionist models, students learn best by making tangible objects through authentic, real life learning opportunities that allow for a guided, collaborative process which incorporates peer feedback. Constructionist views of learning focus on inherent properties of materials that mediate knowing. Learning happens in cooperation with materials as learners internalise formalised structures and discover how materials can drive future actions. Carey, 1983 and Papert 1980, theorised materials as objects to think with that allow learners to discover formal systems while designing personally meaningful projects.

Objects to think with exhibit three main characteristics including being part of children's socio-material environment, being used in disciplinary domains and allowing children to explore complex ideas through bodily engagement (Papert, 1980). This understanding of materials rests on the idea that seemingly abstract concepts, including disciplinary constructs, can become more concrete through design. It also means that objects to think with, from hand held construction tools to place based learning environments, can be intentionally designed.

2.5.2 Constructivism

Piaget's theories of constructivism were inspired by the belief that children are not empty vessels to be filled with knowledge, but instead are active builders of knowledge. In Piaget's theory of constructivism, knowledge is not about information to be delivered, memorized, retrieved; it is an experience that is acquired through interaction with the world, people and things (Achtermann, 2008). One of the common threads of constructivism that runs across all these definitions is the idea that development of understanding requires the learner to actively engage in meaning-making decisions. The real understanding is only constructed based on learners' previous experience and background knowledge. It maintains that individuals create or construct their own new understandings or knowledge through the interaction of what they already believe and the ideas, events, and activities with which they come into contact. (Ultanir, 2012). This is relevant to the study of makerspace design as it can explain how materials can continue to develop with people in ways that produce increasingly advanced learning opportunities.

3. RESEARCH METHODOLOGY

The target population for the study comprises all the one hundred and three (103) school library personnel in private secondary schools Obio/Akpor Local Government Area, Rivers State, Nigeria. The total enumeration method was adopted to include all the 103 school library personnel in private secondary schools in Obio/Akpor Local Government Area, Rivers State, Nigeria to constitute the sample for the study. Questionnaire was used as the main instrument used for the data collection and it comprises four separate sections A–D. Section A of the questionnaire is designed to capture the demographic variables of the respondents such as sex, age, profession, name of library marital status, highest educational qualification and designation of respondents. Section B of the questionnaire focussed on the knowledge of makerspaces possessed by the respondents. The questionnaire is made up of 10 items measured on a 4-point likert format of Strongly Agree (SA) = 4; Agree (A) = 3; Disagree (D) = 2; Strongly Disagree (SD) = 1.

The scale was adapted from Oseghale 2014 which has original reliability coefficient of 0.76.Section C of the questionnaire was used to gather data on perception of respondents and it comprise 15 items measured on a 4-point likert format of Strongly Agree (SA) = 4; Agree (A) = 3; Disagree (D) = 2; Strongly Disagree (SD) = 1. The scale was adapted from Luthans and Omotayo (2012) and has original reliability coefficient of 0.82. Section D of the questionnaire which was designed to measure the attitude towards makerspaces among the respondents has 10 items measured on 4-point likert format of Strongly Agree (SA) = 4; Agree (A) = 3; Disagree (D) = 2; Strongly Disagree (SD) = 1. The scale was adapted from Alison et al., (2012) which has its original reliability coefficient of 0.76. The questionnaire was subjected to trial testing using 20 school library personnel in private secondary schools in Ikwere Local Government Area of Rivers State.

The data collected from the trial test was subjected to reliability coefficient test using Cronbach Alpha method and the results yielded were as follows: Knowledge of makerspaces = 0.77, Perception about makerspaces = 0.71 and Attitude towards makerspaces = 0.76. Also, the overall reliability coefficient was 0.70. Data was collated and analysed using the Statistical Package for the Social Scientists (SPSS) software. Both descriptive statistics such as frequencies, percentages, mean and standard deviation and inferential statistics such multiple regression and Pearson product moment correlation were used to analysed the data collected for the study. Research questions 1 to 3 were answered using descriptive statistics while the three hypotheses were tested using Pearson product moment correlation at 0.05 level of significance.

4. DATA ANALYSIS AND DISCUSSION OF FINDINGS

A total of one hundred and ten (110) copies of questionnaire were administered to the respondents out of which only one hundred and there (103) were returned. However, only (One hundred) 100 copies of the returned questionnaire were found useful and usable for analysis for the study. The result of the demographic information of the respondents showed that majority of the respondents 48.0% are between 26 to 35 years while 41.0% were within the age range of 36 to 45 years which implies that majority of the respondents (89.0%) are within the age range of 26-45 years. In other words, it can be deduced that majority of the school library personnel in public secondary schools in Obior/Akpor LGA, Rivers State are within their active years of service. On the gender distribution of the respondents, the result of analysed data revealed that majority (60.0%) of the respondents are female while only 40.0% are male which implies that there are more female school library personnel in public secondary schools in Obior/Akpor LGA, Rivers State. The gender distribution of respondents for this study is at variance with the finding of Issa and Nwalo (2008) which found that there are slightly more male librarianship students than females in Nigerian schools

Research Question 1: What is the level of knowledge of makerspace possessed by school library personnel in private secondary schools in Obio/Akpor Local Government Area, Rivers State?

Table 1: Level of Knowledge of Makerspaces Possessed by the Respondents

S/N	Item Description	SA(%)	A(%)	D(%)	SD(%)	$\bar{\chi}$	SD	Decision
1	I can choose technologies that enhance student's teaching and learning process	27(27.0)	60(60.0)	10(10.0)	3(3.0)	3.11	.695	Agree
2	I know how to select effective teaching approaches to guide students thinking and learning on markerspace	18(18.0)	58(58.0)	23(23.0)	1(1.0)	2.93	.671	Agree
3	I have prior knowledge on makerspace	18(18.0)	52(52.0)	28(28.0)	2(2.0)	2.86	.725	Agree
4	I have various ways and strategies of developing my understanding of the markerspace	19(19.0)	50(50.0)	29(29.0)	2(2.0)	2.86	.739	Agree
5	I can use markerspace as a way of creating, tinkering and exploring new things	17(17.0)	50(50.0)	30(30.0)	3(3.0)	2.81	.748	Agree
6	I do not have enough knowledge on makerspace	23(23.0)	45(45.0)	19(19.0)	13(13.0)	2.78	.949	Agree
7	I know the purpose and objective of makerspace	20(20.0)	35(35.0)	42(42.0)	3(3.0)	2.72	.817	Agree
8	I don't know how to use technologies made available in creating activities in makerspace	14(14.0)	36(36.0)	42(42.0)	8(8.0)	2.56	.833	Agree
9	I can't evaluate and select new information resources and technological innovations based on their appropriateness to special task	11(11.0)	36(36.0)	45(45.0)	8(8.0)	2.50	.798	Agree
10	I can't use the resources available to facilitate higher order thinking skills, problems solving, critical thinking decision making and creative thinking	9(9.0)	30(30.0)	52(52.0)	9(9.0)	2.39	.777	Disagree
	Weighted Mean					2.75		

Strongly Agree (SA) Agree (A) Disagree (D) Strongly Disagree(SD) (n=100)
Decision Rule:0.1 to 1.0 = Not Knowledgeable; 1.1 to 2.0 = Fairly Knowledgeable; 2.1 to 3.0 = Knowledgeable; 3.1 to 4.0 = Highly Knowledgeable

Table 1 presented results on the level of knowledge of makerspaces possessed by school library personnel in private secondary schools in Obio/Akpor Local Government Area, Rivers State. The result of the analysed data revealed that most of the respondents agreed that they; can choose technologies that enhance student's teaching and learning process (87.0%), know how to select effective teaching approaches to guide students thinking and learning on markerspace (76.0%), have prior knowledge on makerspace (70.0%), have various ways and strategies of developing their understanding of the markerspace (69.0%) and can use markerspace as a way of creating, tinkering and exploring new things with response rates(67.0%).

On the other hand, few of the respondents affirmed that they cannot evaluate and select new information resources and technological innovations based on their appropriateness to special task (47.0%) just as 39.0% of the respondents affirmed that they cannot use the resources available to facilitate higher order thinking skills, problems solving, critical thinking decision making and creative thinking.

The implication to be drawn from this is that school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State possessed knowledge of, choosing technologies that enhance student's teaching and learning process, selecting effective teaching approaches to guide students thinking and learning on markerspace, having prior knowledge on makerspace, having various ways and strategies of developing their understanding of the markerspace and using markerspace as a way of creating, tinkering and exploring new things.

In determining the level of knowledge of makerspaces possessed by the respondents, decision rule set to was applied and since the weighted mean calculated was 2.75 and falls within the range of 2.1 to 3.0, it can be deduced that the respondents have knowledge about makerspaces. The implication to be drawn from this result is that school library personnel in private secondary schools in Obio/Akpor LGA have knowledge of makerspaces. This result corroborates Barniskis (2016) finding which reported that school library personnel in school libraries are beginning to get familiar with emerging innovations such as makerspaces and other creative places to meet the creative, social, educational, and innovation needs of the library users.

Research question 2: What is the perception of school library personnel in private secondary schools in Obio/Akpor Local Government Area about makerspace?

Table 2: The Perception of Respondents about Makerspaces

S/N	ITEM	SA(%)	A(%)	D(%)	SD(%)	$\bar{\chi}$	SD	Decision
1	It is a creative space for skill development	32(32.0)	66(66.0)	1(1.0)	1(1.0)	3.49	.942	Strongly Agree
2	The stakeholders (school librarians, subject teacher and school management) has a role to play	45(45.0)	52(52.0)	3(3.0)	0(0.0)	3.42	.554	Agree
3	Children activities can be improved through makerspaces	40(40.0)	53(53.0)	6(6.0)	1(1.0)	3.32	.634	Agree
4	Makerspaces are places where people can design and invent among group of makers	38(38.0)	56(56.0)	4(4.0)	2(2.0)	3.30	.644	Agree
5	Scrapbook paper, letter stickers, pipe cleaners' magnets, plus, coloured plastic, model magic, cardboard, wood, plastic Styrofoam, Beads/buttons, Pop side sticks, fisher technical	26(26.0)	64(64.0)	10(10.0)	0(0.0)	3.16	.581	Agree
6	Makerspace connects people from various disciplines	**24(24.0)**	68(68.0)	6(6.0)	2(2.0)	3.14	.603	Agree
7	Traditional library spaces incorporated makerspaces with the use of technology for learning and doing	27(270)	50(50.0)	19(19.0)	4(4.0)	**3.00**	.791	Agree
8	I understand how my work contributes to the development of makerspace	**20(20.0)**	59(59.0)	21(21.0)	0(0.0)	2.99	.643	Agree
9	The librarian in a well projected space informs the reader about the availability of makerspace	27(27.0)	50(50.0)	18(18.0)	5(5.0)	2.99	.810	Agree
10	Librarianship training does not educate me on how to use the makerspace materials effectively	19(19.0)	41(41.0)	31(31.0)	9(9.0)	2.70	.882	Agree
11	The library does not give maximum help to the user of makerspaces	15(15.0)	39(39.0)	32(32.0)	14(14.0)	2.55	.914	Agree
12	My job doesn't allow me to utilise my skills, knowledge and abilities	17(17.0)	23(23.0)	54(54.0)	6(6.0)	2.51	.847	Agree
13	Makerspace does not contribute to early literacy and lifelong learning	**11(11.0)**	38(38.0)	37(37.0)	14(14.0)	2.46	.869	Disagree
14	Makerspaces does not give room for students to use the right tools for making	15(15.0)	21(21.0)	53(53.0)	11(11.0)	2.40	.876	Disagree
15	Makerspace does not give space for continuous education, manpower and community development	12(10.0)	18(18.0)	53(53.0)	19(19.0)	2.19	.861	Disagree
	Weighted Mean					2.91		

Table 2 showed the result of the perception of the respondents about makerspace. It showed that majority of the respondents attested to the fact that; makerspace is a creative space for skill development (98.0%), the stakeholders (school librarians, subject teacher and school management) has a role to play in makerspace (97.0%), children activities can be improved through makerspaces (93.0%), makerspaces are places where people can design and invent among group of makers (94.0%), scrapbook paper, letter stickers, pipe cleaners magnets, plus, coloured plastic, model magic, cardboard, wood , plastic Styrofoam, Beads/buttons, Pop side sticks, fisher technical LEGO, K'NEX, 3D, milling machine and Lazer cutter are makerspaces materials (92.0%), Scrapbook paper, letter stickers, pipe cleaners magnets, plus, coloured plastic, model magic, cardboard, wood , plastic Styrofoam, Beads/buttons, Pop side sticks, fisher technical (90.0%),

Traditional library spaces incorporated makerspaces with the use of technology for learning and doing (77.0%), they understands how their work contributes to the development of makerspace (77.0%), and that the librarian in a well projected space informs the reader about the availability of makerspace (77.0%).

The implication to be drawn from the results above is that school library personnel in private secondary schools in Obio/Akpor Local Government Area perceived makerspace as a creative space for skill development and that the the stakeholders (school librarians, subject teacher and school management) has a role to play in makerspace. Also, the school library personnel perceived that, children activities can be improved through makerspaces, makerspaces are places where people can design and invent among group of makers, scrapbook paper, letter stickers, pipe cleaners magnets, plus, coloured plastic, model magic, cardboard, wood , plastic Styrofoam, Beads/buttons, Pop side sticks, fisher technical LEGO, K'NEX, 3D, milling machine and Lazer cutter are makerspaces materials.

Scrapbook paper, letter stickers, pipe cleaners magnets, plus, coloured plastic, model magic, cardboard, wood, plastic Styrofoam, Beads/buttons, Pop side sticks, fisher technical, Traditional library spaces incorporated makerspaces with the use of technology for learning and doing, they understands how their work contributes to the development of makerspace, and that the librarian in a well projected space informs the reader about the availability of makerspace.

In determining the perception of the respondents about makerspace, it can be decided that the school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State. have positive perception about makerspace since the weighted mean of 2.75 calculated is greater than the criterion mean of 2.50 set for positive perception of the respondents about makerspace.

This finding corroborates the result of Oliver (2016) study which reported that makerspaces have begun to move into classrooms and school libraries and that of Hira et. al (2014) which emphasised that school library staff and teachers should begin to get themselves prepared to implement appropriate teaching methods for a class by using complex technologies, solving technical problems and adapting to new circumstances provided by makerspaces.

Research question 3: What is the attitude of school library personnel in private secondary secondary schools in Obio/Akpor Local Government Area, Rivers State towards makerspaces?

Table 3: Attitude of School Library Personnel Towards Makerspaces

S/N	**Items**	**SA (%)**	**A (%)**	**D (%)**	**SD (%)**	$\bar{\chi}$	**SD**	**Decision**
1	Makerspaces in the library has given users added advantages	37(37.0)	55(55.0)	8(8.0)	0(0.0)	3.29	.608	Agree
2	I have confidence of having access to extensive innovations through the introduction of makerspaces	32(32.0)	58(58.0)	9(9.0)	1(1.0)	3.21	.640	Agree
3	Through makerspace the image of the library can be lifted because of wide availability and accessibility of technology	30(30.0)	53(53.0)	17(17.0)	0(0.0)	3.13	.677	Agree
4	Irregular supply of electricity pose problem to the use of makerspace in the library	19(19.0)	69(69.0)	11(11.0)	1(1.0)	3.06	.583	Agree
5	Unfriendly attitude of librarian due to the introduction of the new innovation	22(22.0)	55(55.0)	21(21.0)	2(2.0)	2.97	.717	Agree
6	lack of trained professional librarians to handle the makerspaces	20(20.0)	57(57.0)	19(19.0)	4(4.0)	2.93	.742	Agree
7	Open the library to other activities such as seminars, workshops and other activities for students can be stressful	23(23.0)	38(38.0)	30(30.0)	9(9.0)	2.75	.914	Agree
8	I dislike staying too long in the library due to noise and distractions coming from makerspace unit	19(19.0)	39(39.0)	33(33.0)	9(9.0)	2.68	.886	Agree
9	Foot traffic in the library due to the cause of using makerspaces makes me dislike it	15(15.0)	30(30.0)	51(51.0)	4(4.4)	2.56	.795	Agree
10	The mess and storage of materials used for various activities (e.g clay making construction, cardboard making, painting) makes me hate the makerspace in the library	13(13.0)	26(26.0)	53(53.0)	8(8.0)	2.44	.820	Disagree
	Weighted Mean					**2.90**		

Decision Rule: 0.01 to 2.0 = Negative Attitude; 2.1 to 4.0 = Positive Attitude

Table 3 showed the attitude of school librarians in private secondary schools in Obio/Akpor Local Government Area, Rivers State towards makerspaces. Using the weighted mean as benchmark, the results showed that majority of the respondents attested to the fact that; makerspaces in the library has given users added advantages (92.0%), they have confidence of having access to extensive innovations through the introduction of makerspaces (90.0%) and that through makerspace the image of the library can be lifted because of wide availability and accessibility of technology (83.0%). Also, most of the respondents affirmed irregular supply of electricity as problem to the use of makerspace in the library (88.0%), unfriendly attitude of librarian due to the introduction of the new innovation (77.0%), and lack of trained professional librarians to handle the makerspaces (77.0%).

In determining the kind of attitude which the respondents have towards makerspace, a positive attitude was established due to the fact that the weighted mean of 2.97 was greater than the criterion mean of 2.50 set for positive attitude of respondents towards makerspace. This implies that the school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State have positive attitude towards makerspace. This finding corroborates that of Burke (2014) study which noted that makerspaces are expected to be increasingly being adopted by school libraries to make use of mobile learning easy and cultivate environments where students take ownership of their education by doing and creating as well as the report of Oyewole and Anenene (2016) which emphasised that makerspaces creates an atmosphere where a maker connect with his or her inner self by probing and tasking the mind with others, by promoting cooperation, knowledge sharing, team work and collaborative learning provided the school librarians developed interest in new innovation which is usually the outcome of creativity enhanced by makerspaces. On the other hand, the study negates the view of Achterman (2008) that some librarians do have concerns about makerspaces in schools.

Hypothesis

There is no significant relationship between knowledge and attitude of school library personnel in private secondary schools in Obior/Akpor Local Government Area, Rivers State towards makerspaces.

Table 4.: Result of PPMC showing the significant relationship between knowledge and attitude of school library personnel in private secondary schools in Obior/Akpor Local Government Area, Rivers State

Variable	Mean	Std. Dev.	N	r	P	Remark
Knowledge	27.52	3.50	100	.317**	.001	Sig.
Attitude of school library personnel	29.02	4.26				

*Sig. at .05 level

Table 4 result shows that there was a positive significant relationship between knowledge and attitude of the respondents towards makerspace among the respondents (r = .317**, N= 100, p<.05) which implies that that knowledge of school library personnel about makerspace had positive relationship with their attitude towards makerspace. The implication to be drawn from this is that an increase in the knowledge of school library personnel in private secondary schools in in Obio/Akpor Local Government Area, Rivers State about makerspace would lead to an improvement in their attitude towards makerspaces.

There is no significant relationship between perception and attitude towards makerspace of school library personnel in private secondary schools in in Obio/Akpor Local Government Area, Rivers State.

Table 5: Result of PPMC showing the significant relationship between perception and attitude of school library personnel in private secondary schools in Obio/Akpor Local Government Area, Rivers State

Variable	Mean	Std. Dev.	N	r	P	Remark
Perception	43.62	5.36	100	.386**	.000	Sig.
Attitude of school library personnel	29.02	4.26				

*Sig. at .05 level

Result in Table 5 shows that there was a positive significant relationship between perception of the respondents and their attitude towards makerspaces (r = .386**, N= 100, p<.05). It can be deduced from this result that there was a positive relationship between perception of school library personnel and their attitude towards makerspaces. The implication to be drawn from this is that an improvement in the perception of school library personnel in private secondary schools in in Obio/Akpor Local Government Area, Rivers State about makerspace would lead to an improvement in their attitude towards makerspaces. This finding negates Adekola (2017) result which established availability and accessibility of makerspaces in libraries as major factors which determine the attitude towards makerspaces exhibited by librarians.

Hypothesis

There is no significant relationship between knowledge and perception of school library personnel in private secondary schools in in Obio/Akpor Local Government Area, Rivers State.

Table 6: Result of PPMC showing the significant relationship between knowledge and perception of school library personnel in public secondary schools in Obio/Akpor Local Government Area, Rivers State

Variable	Mean	Std. Dev.	N	r	P	Remark
Knowledge	27.52	3.50	100	.356**	.000	Sig.
Perception of school library personnel	43.62	5.36				

*Sig. at .05 level

Table 6 shows that there was a positive significant relationship between knowledge of the respondents and their perception of makerspaces (r = .386**, N= 100, p<.05). It can be deduced from this result that knowledge of makerspaces among school library personnel had positive relationship with their perception about makerspaces. The implication to be drawn from this is that an improvement in the level of knowledge of makerspaces possessed by school library personnel in private secondary schools in in Obio/Akpor Local Government Area, Rivers State would lead to an improvement in their perception about makerspaces.

5. SUMMARY AND CONCLUSION

This study was carried out to investigate knowledge and perception as determinants of attitude of school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State. The study established that school library personnel in private secondary schools in Obio/Akpor LGA, Rivers State are highly knowledgeable and had positive perception about makerspaces. The school library personnel indicated possession of knowledge about choosing technologies that enhance student's teaching and learning process as well as selecting effective teaching approaches to guide students thinking and learning on markerspaces.

The positive perception exhibited by the school library personnel revolves around the fact that the school library personnel perceived makerspaces as having the ability to improve children activities and as places where people can design and invent among group of makers. School library personnel in private secondary schools in Obio/Akpor LGA, Rivers State have positive attitude towards makerspaces since they consider makerspaces in the library as a space which gives users added advantages and that through makerspaces the image of the library can be lifted because of wide availability and accessibility of technology. Both knowledge and perception were found to have positive relationship with the attitude towards makerspaces among school library personnel in private secondary schools in Obio/Akpor LGA, Rivers Ibadan just as knowledge and perception of makerspaces were also found to be positively related.

6. RECOMMENDATIONS

Based on the finddings from the research, the following reccomendations are made:

1. The following recommendations were made based on the findings from the study:
2. Provision for makerspaces should be made in secondary schools by the management of the schools. This is to provide opportunities for the development of students' critical and creative thinking abilities and also helped in developing the knowledge of the school library personnel on makerspaces.
3. Training and retraining opportunities should be provided for school library personnel to enable them keep abreast of innovations and current trends such as makerspaces and its benefits in the practice of school librarianship.
4. The school management should make provision for facilities and resources that would make the school library personnel receptive and be positively disposed to makerspaces adoption in school libraries.
5. Stakeholders such as education authorities and parents and teachers association should ensure that the needed resources for effective and functional makerspaces are adequately provided
6. School management should create time for on the school time table when school library personnel should engage the students at the makerspaces section of the school library.

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