COMMUNICATION OF RESEARCH FINDINGS AND THE LEARNING PREFERENCES OF END USERS

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Abstract

The importance of effective communication of researcher findings to the end users in advancing teaching, researcher and practice is well understood. However, there is an apparent gap between the methods used by researchers in reporting their findings and the learning preferences of the users of such findings. This is evident in the field of architecture, where there is a gap between researchers, the students and practitioners, who are the intended beneficiaries of the research findings. This study investigated the predominant learning preferences of postgraduate students and the methods used by the faculty in the Department of Architecture, Covenant University, Ota, Nigeria, in communicating their research findings. Questionnaire surveys of 55 postgraduate students and 20 research active faculty members in this department were conducted in the last quarter of 2016. The data were analysed using simple descriptive statistics. The result shows that the students, who are mainly kinesthetic and visual learners, preferred videos as opposed to text based formats used by researchers in presenting their research findings. Although both the students and faculty were found to have preference for the Internet and electronic media for the purpose of exchanging research findings, the students relied mostly on websites as the main source of information for their academic work, while the faculty disseminate their research findings mainly through journals. The paper concludes that a reconciliation between the modes of communication used by researchers and the learning preferences of students will result in a better communication of research findings and promote effective teaching and learning in architecture.

Keywords: Learning preferences, VARK, Architecture, Research Communication.

1 INTRODUCTION

Communication of science to the public is being increasingly recognized as the responsibility of scientists [1]. Hence, proper communication of research findings is essential for the successful implementation and application of the findings to the relevant aspects of our social, economic and political life. The lack of effective communication of scientific or research findings impairs the ability of the end users or consumers of research to understand and apply the ideas, concepts and results in practice [2].

The difference in communicative between researchers and end users of research findings has been identified as one of the gaps between research and practice [3]. Anecdotal evidence has shown that there is a difference between how researchers present and share their research findings and how the intended users of the findings (policy makers, practitioners & research students) prefer to receive and use them. It has also been observed that researchers are more concerned with the publication of their findings in academic journals, to gain academic credit, than ensuring that the findings are in a form and media easily understood and accessed by the end users of the information [3].

There is no doubt that various means are available for the effective communication of research findings. In a study conducted in 2014, The National Science Board discovered that 47% of Americans sought for information about science and technology using the internet. It is therefore essential that researchers and scientists venture into the use of the various online platforms for the communication of research findings [4]. This is because effective communication of research findings to the public increases the impact of such research in multiple dimensions [5].

Efficient communication of research findings requires that research findings be communicated using methods preferred by the end users. This helps to build support for scientific research as it promotes a better understanding of its relevance to society, makes it available to a wider audience thereby making it more encompassing and inclusive [5]. The use of alternative media forms, such as illustrations, documentaries [2], to communicate complex concepts and ideas will help science reach a wider audience and, in some cases, receive funding that will enable further research [7].

Learning style is an individual's preferred way to learn and the way the individual learns best. It may also be defined as an individual's unique way on interacting with the environment [6]. Learning style involves the various forms or media individuals prefer to seek and process information. It is argued that 'learning style mismatches are at the root of many learning difficulties'. The same is applicable to research findings and their use and application. The American Association for the Advancement of Science [4] asserted that even when the users of the research findings are of the same profession and so use the same or similar vocabulary, for example, when the research users are educated practitioners or students, other factors cause a communicative barrier. Among the factors noted were; the research audience may not have the time or priority to study the long and complex analyses in the research work even when the research subject is of interest to them and the research finding are not published on media that is usually accessed by the research audience. These factors indicate that the research findings should also be made available in distilled formats that are suited to the learning styles of the audience communicated through a media accessed by the research audience

The foregoing underscores the need to explore and understand the learning preferences of end users of research findings such as students in order to eliminate or reduce mismatches in the methods and strategies utilised by researchers in disseminating their research findings. It was on this premise that this study sought to examine the predominant learning preferences of the postgraduate students and the methods used by the faculty in the Department of Architecture, Covenant University, Ota, Nigeria, in communicating their research findings. The study was guided by two key research questions. These are:

1   What are the predominant learning style preferences among postgraduate students of Architecture in Covenant University, Ota, Nigeria?

2   What are the methods used by faculty in the Department of Architecture, Covenant University, Ota, Nigeria in communicating their research findings?

This study is based on a questionnaire survey research involving postgraduate students and faculty members in the Department of Architecture, Covenant University, Ota, Nigeria. It contributes to knowledge in identifying the ways postgraduate students of architecture prefer to receive or have research findings presented for optimum benefits. Therefore, findings of this study can be considered to have implication for teaching and research; and thus contributes to the current discourse on science and technology education in developing world context.

2   LITERATURE REVIEW

2.1   Learning Styles and Preferences

According to [8], learning style refers to an "individual's preferred method for receiving information in any learning environment". In the existing literature, learning style has defined, as the method individuals prefer to use for receiving information; the way individuals process information and the way individuals receive, organize and retain new information [8]. There have been attempts to classify learning styles by different theories [8 and 9]. One of the learning style theories mostly applied in architecture education is the Kolb's Experiential Learning Theory (ELT). This is probably because learning and teaching strategies in the architectural design studio in many schools of architecture adopts the Experiential Learning Theory [8, 9, 10]. The Kolb's ELT defined learning style as the preferred method of receiving and processing information. It also identified four types of learners to include the assimilators, the accommodators, the divergers and the convergers [8]. This study has adopted the definition of learning style as the way individuals prefer to receive or perceive new information. This is because the study seeks to investigate the relationship between the preferred methods of information perception and reception of architecture students and how researchers in their findings relay information. The definition of learning style adopted by this study focuses on learning style at the perception stage alone, a concept best analysed using the VARK (Visual, Aural, Read/Write and Kinesthetic sensory) survey rather than the Kolb' ELT which describes the entire learning process [10]. Further, learning styles is a term used to refer to the methods of gathering, processing, interpreting, organizing and thinking about information [11 and 12]. Students have different learning styles and as a result, acquire information in various ways. There have been various models used to explain different learning styles [11]. VARK, which is an instructional preference model, is one of such models which categorize students based on how they best acquire information.

VARK was developed in 1987 by Neil D. Fleming in an effort to enhance faculty development and enable students become better learners [11 and 12]. VARK is a questionnaire that determines one's sensory modality preferences i.e. learning styles or methods used to process information. VARK results are indicative, not diagnostic [6 and 13].

Although, initially based on Stirling's (1987) three categories of visual, aural and kinaesthetic, the VARK model identifies four modality preferences among learners or students [14]. They are:

1   Visual (V): This is a preference for graphical and symbolic ways of representing information. Visual learners prefer graphs, flow charts, pictures and graphical descriptions [11] [14].

2   Aural (A): Aural describes a preference for heard information. Aural learners learn by listening to lectures and prefer discussions and dialogues [14].

3   Read/Write (R): Preferences for information printed as words. Read/Write learners are note takers and prefer to read text. [12]

4   Kinesthetic (K): Kinesthetic involves preferences related to the use of experience and practice. Experience and practice may be expressed in using all senses – sight, touch, taste, smell and hearing [15]. The integrative and real nature of the information in this sense is what makes the experience kinesthetic, the medium used may be visual, aural or in text [15]. Kinesthetic learners learn best by doing [14] [6] as well as with practical examples [16].

The VARK theory identifies students as unimodal (using only one of the four modes) or multimodal (bimodal, trimodal or quadmodal) in their learning preferences [6].

2.2   Learning Styles amongst Architecture Students

Research has found that Architecture schools tend to train their students to be visual spatial and active learners through an experiential method of learning [8] [9] [10] [17] [18], this trend in architecture schools could influence the way learning style of the students. [18] noted that beyond just impacting knowledge, education also transfers some modes of operations and creates attitudinal preferences in students. Among these attitudinal preferences and modes of operation is a preferred learning style that the students tend to adopt from their learning experience, which is usually defined by the method of teaching a subject. Although individuals might have initial learning preferences or styles, it could be influenced by the learning style adopted by the school to be better suited to a subject [17 and 9].

In an attempt to confirm the assumptions made about architecture students being more of visual-spatial and active learners, Mostafa and Mostafa [17] conducted a study of architecture students in the first year and second year of their studies. That research revealed that indeed, architecture students are mostly visual-spatial learners and active learners as against reflective learners. In fact, that study recorded a 100% result of architecture students with both high spatial and visual learning abilities in some classes. Architecture schools believe that learning architecture requires students to possess a good level of visual and spatial intelligence and so test their prospective students for these skills before admitting them.

In Nigerian Schools of Architecture, all prospective students are required to have undergone some level of training in technical drawing or visual art. These skills are then developed in the course of the study. The findings of [17] also corroborate this as the study revealed a 30% increase in the number of visual learners in the first and second year of architectural training. This showed that architectural education develops the visual and spatial intelligence of its students making them better visual-spatial learners. These studies therefore show that architecture students are dominantly visual-spatial learners.

3   METHODOLOGY

3.1   Research Design

The research design followed the survey research strategy. Even though the literature has asserted that architecture students are predominantly visual learners with a high level of visual and spatial intelligence [17], a verification of this assertion was carried out on the student population sample of the study. A learning preference survey was carried out using the VARK Questionnaire Version 7 [19]. Additional questions were added to the questionnaire to investigate other factors that could cause a

gap in research communication between researchers and students. The additional questions in the questionnaire investigated what mode of communication is more appreciated by architecture students. The questionnaire used in the survey of the student population was also designed to investigate what media they considered more accessible for retrieving research findings.

A survey of research was also done using a questionnaire designed to investigate the modes of communication most frequently used in the presentation of information or research findings and what platforms where most frequently used for sharing research findings by students and faculty in the Department of Architecture, Covenant University, Ota, Nigeria.

3.2 Research Participants

There were two research populations in this research. The first population consists of the postgraduate students of the Department of Architecture in Covenant University, Nigeria, currently enrolled for a Master of Science degree in Architecture. The second population was the faculty of the same department who are active researchers in the field of Architecture.

The student population in this study was narrowed to the Postgraduate students of the department of Architecture. Based on the findings of previous studies [9 and 17] these students would have been trained over their years to be visual learners making them an ideal representatives of architecture students. There are 110 students currently enrolled in the Masters program of the Department of Architecture, Covenant University, Ota, Nigeria. Whereas 54 students are in their first year, 56 students are in their second year of study. A sample population of 50 students was surveyed randomly including 23 students from the first year and 27 students from the second year. Questionnaires were distributed randomly to the students until the desired sample size was achieved. 36 participants in the student population are male while the other 14 are female. 90% of the surveyed students were between the ages 19 to 23 years; the other 10% were above 23 years old.

The second population involved in this study consists of 17 members of faculty, all of whom have at least 5 years of active research and publication experience. This translated to 12 members of faculty (researchers) randomly sampled in the survey.

3.3 Data Analysis

In line with goal and research questions of the study, the data collected were mainly quantitative data. Simple descriptive statistics, mainly percentages were used in the analysis of the data, while Tables were used in the presentation of the results. The analysis enabled the comparison between the preferred learning styles of the students and the methods of presentation used by the researchers in the presentation of research findings. It also made it possible for the researchers to compare the various platforms accessed by students in search of research findings/ information to platforms used by the faculty in reporting/sharing their findings.

4   RESULTS/ FINDINGS

The VARK Questionnaire has 16 questions, each with 4 options. Each option represents one of the VARK modality preferences and the students were requested to fill as many options best explained their learning preference as regards each question [19]. The total number of options selected by a student on each modality indicates the student's strength in that modality. For example if a student selects 14 kinesthetic options out of the possible 16, he/she is a strong kinesthetic learner [20]. Across 50 students there are 800 total possible responses in each modality.

The learning preference survey showed total responses of 344(43.00%) for kinesthetic; 286(24.96%) for Visual; 268(33.50%) for Aural and 248(31.00%) for Reading/ writing learners. This result shows that the kinesthetic and visual learning preferences are the most frequent learning preferences amongst architecture students. This result is very consistent with the VARK online survey of individuals in the field of architecture between January and March 2016 [20].

Table 1. *VARK Learning Preference Results of the Architecture Students.*

VARK Modality	Mean Score /16	Total responses of 50 students /800	Students result (%)
Visual	5.72	286	35.75%
Aural	5.36	268	33.50%
Reading/ writing	4.96	248	31.00%
Kinesthetic	6.88	344	43.00%

Source: Authors' Field Survey (2016)

The student survey also revealed that the most preferred mode of communicating information and research findings by architecture students is by Videos. Findings showed that 78% preferred videos, physical demonstration and diagrams/pictures both had 34%, text supported by visuals had 22%, audio recordings and podcasts had 14%, while text only had 4% of the total responses being positive.

Table 2 shows a comparison of the students and researchers preference for the different modes of communication used in research.

Table 2. *Students' and Faculty Members' Preferences for Communication of Research Findings.*

Mode of Communication	Students with a positive response n(%)	Faculty Members with a positive response n(%).
Diagrams/ Pictures	17(34.0)	7(58.3)
Videos	39(78.0)	1(8.3)
Audio recordings/ podcasts	7(14.0)	0(0.0)
Text only	2(4.0)	5(42.0)
Text supported by visuals	11(22.0)	9(75.0)
Physical demonstration/ practice	17(34.0)	3(25.0)

Source: Authors' Field Survey (2016)

It is evident from Table 2 that whereas a majority (78%) of the students preferred the presentation of research findings using videos, most of the researchers sampled (75%) preferred using text supported visuals in the presentation of findings of their research. This result suggests that there is incongruity between the way students prefer to have research findings communicated to them and the way researchers actually present their research findings to the end users many of whom are postgraduate students

Regarding the different platforms on which students source information for their academic work, the result in Table 3 shows that around 92% of the students sampled obtained information for their academic work from electronic media and internet sources rather than hard copy sources like text books and journal. Similarly, almost the proportion (92%) of the faculty survey also indicated that they preferred disseminating findings of their research work through electronic means on the internet rather than on hard copies of books and journal.

Table 3. *Comparison of Media for Information Exchange by Students and Researchers.*

Academic Information Sourcing Media	Students with positive a response n(%).	Faculty Members with positive a response n(%)
Hard copies of Books and Journal	5(10.0)	4(33.3)
Electronic sources/ Internet	46(92.0)	11(91.7)

Source: Authors' Field Survey (2016)

This specific research clearly shows that both the students and researcher prefer using the same electronic media in sourcing for information and disseminating their research findings, respectively. This finding did not come as a surprise going by to the benefits of the Internet in terms of global visibility and the availability of ubiquitous, pervasive and mobile e-learning devices and platforms deployed in modern day teaching and learning endeavours

Table 4 is the presentation of the result on the different information sharing platforms used by both the students and researchers in the Department of Architecture, Covenant University, Ota, Nigeria. In gathering the data presented in Table 4, the respondents were asked to indicate which of these platforms they frequently use.

Table 4. *Information Sharing Platforms used by Students and Researchers.*

Information Sharing Platforms	Students n(%)	Faculty Members n(%)
Periodicals	9(18.0)	6(50.0)
Websites	48(96.0)	7(58.3)
Academia/ Research gate	28(56.0)	8(83.3)
Public lectures/ talk shows	23(46.0)	6(50.0)
YouTube/ video	42(84.0)	0(0.0)
Books	44(88.0)	6(50.0)
Journals	37(74.0)	12(100.0)
Animated presentations	39(78.0)	2(16.7)
Podcasts	15(30.0)	2(16.7)
Magazines	25(50.0)	1(8.3)
Newspapers	25(50.0)	3(25)
Reference documents	36(72.0)	5(41.7)
Government publications	15(30.0)	5(41.7)
Catalogues	20(40.0)	3(25.0)
Human sources	38(76.0)	8(66.7)
Dissertation/ Thesis	36(72.0)	9(75.0)
Art	29(58.0)	5(41.7)
Interviews	33(66.0)	8(72.7)
Pictures	47(94.0)	10(83.3)

Source: Authors' Field Survey (2016)

From Table 4 it is evident that the most frequently used platforms for sourcing information for academic work by postgraduate students in the Department of Architecture, Covenant University, Ota, Nigeria are websites as indicated by 96% of the respondents. This is followed by pictures (94%), books (88%) and YouTube/Videos (84%), respectively; while the less frequently used are periodicals. For the faculty members sampled, the most frequently used platform for sharing their research findings are journals as indicated by all the 20 (100%) of the faculty members who participated in this research. This is followed by Academia/Research gate (83.3%) and pictures (83.3%). It can be inferred from this result that there is a difference in the platforms through which the postgraduate students sampled source information for their work and those frequently used by faculty members in disseminating their findings of their research work.

5   CONCLUSIONS AND RECOMMENDATIONS

Results from the VARK survey show that most students are kinesthetic and visual learners. The students prefer videos and graphical representations as opposed to text/print used by the faculty in the presentation of their research findings. This confirms the findings of previous studies. However, none of the researchers in this study used videos in the publication and sharing of their research findings.

This suggests that researchers should endeavour to explore the use of alternative modes of communication in the dissemination of their research findings.

Based on the findings of this study as, there is a need for students to develop better research reading and writing skills in order to access research findings available in text/written modes of publication, such as journals and articles. These skills are also important for the world of practice as report writing is important in the role of the architect in construction management. It is also important that faculty members explore other modes of communication and information sharing platforms outside of the regular academic journals and publications current employed by researchers in the disseminating of their research findings. This will close up the existing gap between the modes of communication used by researchers and the learning preferences of students and enhance easy accessibility to research findings by the intended users.

The data used in this study was derived from one Department in a University in Nigeria. Therefore, it is suggested that future studies should be extended to other universities and the number of variables investigated should be increased.

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