Gender Issue on the Factor Analysis of Internet Usage by Nigerian Senior Secondary School Students

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The paper gives an account of the factor analysis of internet usage by 336 (232 male students and 104 female students) Nigerian Senior Secondary School Students. The principal objective of the study was to determine and identify how many latent constructs actually influence internet usage and the underlying relationship between them according to students' gender. Data were collected from 336 senior secondary school students using a 31- item questionnaire based on different purposes of internet usage. The questionnaire was validated and also confirmed reliable. The findings of the study revealed that 20 factors were identified from male internet usage profile while 15 factors from that of females. The resultant twenty factors from male students' responses accounted for 87.26% of the total variance on the internet usage while the fifteen factors identified for female responses accounted for 87.16% of the total variance in the profile. Adequate attention needs to be paid on those factors that were identified according to gender.

Keywords: Gender, Factor analysis, Internet usage

Introduction

The Nigerian Internet initiative started with the effort of the Nigerian Internet Group by late 1994. During this period, the only access to the internet was provided by Nigerian Telecoms Ltd (Nitel) and it was very expensive. The pressure was therefore put on Nitel to build the infrastructure backbone, to make this service more accessible and relatively cheaper, making the effort and awareness drive worthwhile (FRN, 2001; ITU, 2001). This consideration, based on the economic viability and the peoples' need to be part of the global happening, made Nitel conclude all arrangements, and by the end of 1997 provided an internet backbone of 2 Mbps Bandwidth (Olayinka, 2000). Relatively little is known about the impact of ICT, internet in particular, on the education sector of the developing world; a category including Nigeria.

With a population of over 100 million people, Nigeria, unarguably, is the most populated country in the African continent. This large population makes the country a potential market for ICT. However, Nigeria lags behind such countries like South Africa, Egypt with reference to internet connections. For example, in 1998, Nigeria was rated 15th in Africa in internet host. Reasons that may be adduced for this state of low Internet connectivity include irregular or non-existence of electricity, poor state of the country's economy, poor telecommunication, political instability and obsolete equipment, among others. This is attested to by earlier studies in Africa and Asia (NUA, 2001; Xiaoming & Kay, 2004).

The need for greater usage of ICT, particularly the internet, has engendered several development policies in the area of telecommunication. This is because the Nigerian government recognises the innumerable benefits inherent in the use of ICT for social, political, economical and educational purposes. Aydin (2001) reported that students in primary and secondary schools are now allowed to use the internet to communicate with foreign peers or conduct searches for information related to their homework. Further, most of the focus is only on preparing students for the university entrance examination in Turkey. Sherman et al., (2000) investigated the internet gender gap among college students by comparing the usage patterns and attitudes of three cohorts of students in 1997, 1998 and 1999. Attitudes toward the technology also differed between men and women and these differences also did not change over time. The longitudinal data showed similar patterns. In general the investigation suggests that differences continue to exist between college men and women in how they experience Internet technology and assessments that the Internet will soon be gender neutral are perhaps premature. In view of the above, this study is focused on what senior secondary school students use ICT (Internet in particular) for according to gender.

Research Methodology

Research Question and Design

Specifically, a research question was posted: *What are the latent factors that can explain the observed relationships among the battery of tests on internet usage according to*

gender? An ex-post-facto survey was adopted for the study. It involves the collection of data on internet usage by Nigerian senior secondary schools students by an appropriate questionnaire. This design was used as there was no manipulation of the independent variables.

Sample

The study sample consisted of senior secondary school students in Ondo State, Nigeria. Some secondary schools were selected and from those schools all the senior secondary school year two students (SSII) were enumerated. However, those students who do not use internet were discarded. The sample consisted of 232 male students and 104 female students, making a total of 336 students.

Instrumentation

The instrument used in the study was a Likert type questionnaire adapted from Owoyemi (2003). The questionnaire was divided into two sections: section A sought for personal information of the students (locality, sex, class, age, and if the respondent is an internet user). Section B was made up of 31 statements on the usage of internet relevant to the senior secondary school students. The frequency of usage was based on 5-point Likert scale in which the students were to indicate the extent of their agreement or disagreement with each of the statements.

The instrument was pretested through a pilot survey using 20 students who were internet users in a school within the state. The result of the pilot survey was analysed and showed no ambiguity or misinterpretation of the concepts. The final draft of the instrument was prepared with reliability coefficient of 0.74 using Cronbach alpha method.

Data Collection

The data were collected through the administration of the questionnaire to the targeted students by the researcher. Names were not requested so that anonymity was maintained throughout the study and the questionnaires were collected back immediately from the respondents.

Data Analysis

Data collected were subjected to factor analysis utilizing principal components factor extraction and orthogonal rotation by the Varimax criterion (with Kaiser Normalization). Principal component method of factoring was used while Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy was applied to test whether the partial correlations among variables are small. Bartlett's Test of Sphericity was carried out to confirm multicolinearity between the variables. It examined whether the correlation matrix is an identity matrix. The principal components extracted were rotated to the terminal solution. Varimax criterion was applied so as to delineate the pattern of variation in the variables rather than among users. Absolute values of coefficients that are less than 0.300 were suppressed. Thus only factor loadings of 0.300 and above are assumed to be interpretable.

Results and Discussion

Table 1 shows the results of the extracted factors for female and male students respectively. Fifteen factors and twenty factors are extracted using principal component analysis from female and male profiles respectively. Apart from the fact that the numbers of extracted factors differ, new constructs emerged while some disappeared. The 15 factors in female usage profile explained 87.26% of the total variance while the 20 constructs in male usage profile explained 87.16% of the total variance. This shows that despite the difference in the number of factors almost the same total variance was explained for both sexes. Table 1 also shows the comparison of the total variance explained for female and male internet users and gives us a clear picture of the degree of usage of both females and males.

Latest Fashion Factor

This factor accounted for 10.82% of the total variance in the female profile and it has the highest influence on the female usage profile. The highly loaded variables on the factor are: *seeking information about the latest fashion in Vogue* (0.76) and *internet phoning* (0.76). The high correlation of *internet phoning* with the factor is quite understandable since women communicate with friends to know the current trend of event in the world of fashion. This finding is in agreement with Teo and Lim (1997) and Garbarino and Strahilevitz (2004) who reported that females spend more time on the internet for messaging activities and promotional campaigns than males. Interestingly this factor also came up as factor 9 in male profile and it accounted for 4.38% of the total variance in the variable

Admission Factor

In the female internet usage profile, this factor explained 7.97% variance and is the 2nd factor. However, in the male profile it is the 10th factor which explained 4.33% of the total variance. This shows that females are more interested in schooling than males. The finding is supported by Niemivirta (1997) who reported that there is a difference in academic interest between genders, he highlighted that males are more extrinsically motivated while females are more intrinsically motivated in terms of furthering their education.

Health/Religion Information Factor

All highly loaded variables on this factor are *health* (0.81) and *religion* (0.75). This factor ranked 3rd (7.57%) in the female profile but the two issues came out separately for males. The influence of *religion* ranked 13th (3.82%) while that of *health*

ranked 16th (3.74%) in the male profile. This finding is in agreement with Hupfer and Detlor (2006) who found that women search reference materials about medical information more than men.

Web Design/ File Transfer Factor

This is the 4th factor in female profile (7.16%) while it is 11th (3.98%) in male. This shows that females are becoming more interested in ICT which is a signal in the reduction of gender inequality in ICT. This finding is contrary to that of Alase**,** Owoyemi, and Ajayi (2005) who reported that males engage in web development more than females.

Hacking Factor

This latent factor explained 6.34% of the total variance amongst females. This factor has highest correlation with hacking for top secret information variable, while in males it explained 3.95% of the total variance. According to Owoyemi (2003), internet as a tool is not free from criminal usage. Inyiama and Nwodo (2002) also reported that internet is a very powerful tool of brainwashing, monitoring and organising effective attack against individuals or groups.

Tourism Factor

Tourism is the 6th among the 15 underlining factors identified in the female profile. This factor accounted for 6.21% of the total variance explained while it accounted for 3.70% variance among males and is the 17th factor.

E-Examination factor

This factor accounted for 6.21% of the total variance explained in the female profile while it is 3.40% in the male profile. This suggests that females students are more interested in E-examination than males as part of their struggle for equality in academic pursuit.

	Female			**Male**		
S/N	**Variables**	**Factors**	**% of variance explained by each factor**	**Variables**	**Factors**	**% of variance explained by each factor**
1	Latest Fashion	1	10.819	Entertainment	1	7.933
2	Admission	2	7.967	Current Affairs	2	5.317
3	Health/Religion Information	3	7.572	Scholarship	3	5.041
4	Web Design/File Transfer	4	7.157	Pornography	4	4.863
5	Hacking	5	6.345	Whether Forecast	5	4.668
6	Tourism	6	6.212	E-mail	6	4.578
7	E-Examination	7	6.208	Internet Phoning	7	4.487
8	E-Mail	8	5.730	Employment Opportunities	8	4.404
9	Hotel Booking	9	5.251	Latest Fashion	9	4.376
10	Current Affairs	10	5.207	Admission	10	4.328
11	Scholarships	11	4.782	Web Design/File Transfer	11	3.977
12	Online Purchase	12	4.671	Hacking	12	3.954
13	Knowledge Acquisition	13	3.386	Religion Information	13	3.824
14	Entertainment	14	3.310	Knowledge Acquisition	14	3.809
15	Pornography	15	2.637	On line purchase	15	3.799
16				Health Information	16	3.744
17				Tourism Information	17	3.700
18				Legal Consultation	18	3.579
19				E-Examination	19	3.404
20				E-Business	20	3.375
	Total Variance explained by the 15 factors		**87.255**	**Total Variance explained by the 20 factors**		**87.162**

Table 1: Comparison of internet usage by female and male Nigerian students

E-mail Factor

This is the 8th factor and it accounted for 5.73% of the total variance explained in female profile. While it ranked 6th in the male profile and it explained 4.58% of the total variance. Despite the fact that it is ranked as the 6th in male profile of internet usage, the total variance explained among females is higher, indicating that females are better users of internet for this purpose. This finding is in agreement with Hupfer and Detlor (2006) who found that women used internet for e-mail purpose more than men.

Hotel Booking Factor

This factor accounted for 5.25% of the total variance in the female profile but does not appear at all in male. This shows that females are more reserved than males when it comes to privacy during traveling.

Current Affairs Factor

In the female profile, this is the 10th factor and it accounted for 5.21% of the total variance explained. While it is the 2nd factor among males and accounted for 5.52% in the male profile. It is interesting to observe that this common factor has almost equal strength in both profiles.

Scholarships Factor

This factor explained 4.78% of total variance and ranked as 11th in the female profile while it accounted for 5.04% and ranked 3rd in the male profile. This finding is in agreement with Niemivirta (1997) who reported that there is a difference in academic interest between genders.

Online Purchase Factor

This factor is common to both gender profiles. It is the 12th orthogonal construct in female and 5th in male profile. It explained 4.67% of the total variance in female and 3.80% in male.

Knowledge Acquisition Factor

This factor is also common to both gender profiles. It accounted for 3.39% variance in females and 3.81% in males. This shows that both males and females use internet to tap knowledge to the same extent since knowledge is power.

Entertainment Factor

This is the 14th factor in the female profile but it is the 1st in the male profile. It accounted for 3.31% variance in females while it explained 7.93% variance in males. This finding confirms that males use internet for entertainment more than females. This is in agreement with Wolin and Korgaonkar (2003) who concluded that males are more likely to browse the internet for functional and entertainment purposes than females.

Pornography Factor

This is the 15th factor among females with 2.64% of the total variance explained while it is the 4th in males and it accounted for 4.87% of variance. This is one of the unwholesome aspects of internet use and is more rampart among males than females. It has been reported that sexual perverts use internet to hunt for victims, while pornographic materials are available on the internet (IME, 2002).

Conclusion

The study indicates that there are five specific factors in the male profile for internet usage which shows. These are w*eather forecast, internet phoning, employment opportunities, legal consultation and business*. The total variances explained are 4.67%, 4.49%, 4.40%, 3.58 and 3.37% respectively, while the only one specific factor in female profile is *hotel booking* (5.12%).

The study found that there are significant differences in internet usage according to gender. Fourteen factors are common to both sexes, though the degrees of comprehensiveness and strength are quite different. Internet has grown tremendously throughout all aspect of life in recent years. Thus, it has become a powerful tool for exchanging information and ideas as well as for learning and gaining knowledge. The fact is that all the participants are students, the usage of internet is very much significant to their lives because academic tasks are strongly associated with computer use nowadays. The Nigerian Government needs to put into effect a policy that will promote effective usage of the internet facility and discourage unwholesome usage of the internet among Nigerian students. Internet training needs to be organized at all levels of education especially at secondary level (where most of the students are likely to be adolescent) to create awareness of the importance of internet and to equip them with the necessary skills so that maximum and wholesome usage can be derived out of this evolving technology.

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