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Relationship Between Gender and Cognitive Factors that Influence Information Seeking Amongst Postgraduate Students: a case of Kenyatta University Post-modern Library in Nairobi, Kenya

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Abstract

This article discusses salient features of a study carried out at Kenyatta University. The study was aimed at investigating the relationship between gender and the cognitive factors that drove postgraduate students to approach Post-modern library for seeking information. To attain this objective, this study developed a theoretical framework which can be used by academic libraries as a basis for implementing both digital and reference desk services that would meet dynamic user needs. The study also investigated whether there were any gender differences through correlation coefficient in the context of Expectancy Theory. The motivational process amongst the male and female respondents was then examined to establish whether gender had any role to play in information-seeking process. No gender differences were found by the study in the light of the variables used such as interaction service quality, outcome (need satisfaction), service satisfaction, users' performance of service, past experience, expectancy, and effort. The major takeaway from the study is—there is no need for libraries to develop/implement information services and systems on the basis of users' gender. Gender has no role to play in cognitive factors.

Keywords: Gender, Cognitive factors, Postgraduate students, Information seeking

Introduction

Information-seeking behaviour is a process which involves a set of actions that an individual performs to express information needs, seek information, evaluate and select information, and finally utilization this information in some form. It occurs when an individual senses a problem situation which internal knowledge fails to satisfy, normally referred to as the mental state called Anomalous State of Knowledge (ASK) (Edwards 2005). Nahl asserted that "information seeking is a natural and necessary mechanism of human existence. It is a basic activity of all people and is manifested through a particular way of behaviour" (Nahl 2010).

At the root of information seeking exits personal cognitions which are known as cognitive needs. Savolainen argued that there are three categories of cognitive needs: (i) need for new information, (ii) need to elucidate the information held, and (iii) need to confirm information held (Savolainen 2013). The motives which give rise to cognitive needs, triggering the process of information seeking are physiological, affective, and cognitive (Ozoemelem 2012). Cognitive approaches examine the individual user attributes as the main driving force behind information-seeking behaviour. Such approaches can considerably help libraries to answer basic questions such as "why do students approach, stop, or avoid using university libraries?"

Gender has been identified as a variable-shaping, information-seeking behaviour. Some studies reveal multiple physical, mental, and social differences in seeking information between men and women. However, the study of gender as a factor influencing human behaviour may be helpful to have a better understanding about the cognitive and social bases of human-information processing and which may also have significant implications for designing information services and systems (Halder, Ray, and Chakrabarty 2010).

According to Hsieh and Wu, information seeking may vary according to the gender of the user, making it a variable in information-seeking process. While investigating the influence of gender difference on the information-seeking behaviours of users, Hsieh and Wu developed a graphical interface that users would find friendlier (Hsieh and Wu 2015). In an evaluation of the proposed interface, girls presented a significantly higher success rate, compared to that of boys. It was therefore concluded that gender differences do have an affect on the efficiency and effectiveness of the proposed interface (Hsieh and Wu 2015). In addition, qualitative observations also favoured gender differences in information-seeking behaviour, some principles of which were outlined in their study. Based on these findings and previous assertions made by different studies such as that of Halder, Ray, and Chakrabarty (Halder, Ray, and Chakrabarty 2010), this study investigated the relationship between gender and the cognitive factors that could drive postgraduate students to seek information.

Literature Review

Information-seeking behaviour is a broad term, encompassing the ways individuals articulate their information needs, seek, evaluate, select, and use information. According to Wu, Tang, and Tsai information-seeking behaviour is a purposive seeking for information as a consequence of a need to satisfy some goal (Wu, Tang, and Tsai 2014). In the course of seeking, the individual may interact with people, manual information systems, or with computer-based information systems. Information use is a behaviour that leads an individual to the use of information in order to meet his or her information needs. Information use is an indicator of information needs, but they are not identical. Heinström while investigating the relationship between personality and information seeking found that information-seeking behaviour is closely related to the unique combination of personality traits that distinguish each individual (Heinström 2000).

Brindesi, Monopoli, and Kapidakis also investigated the influence of gender on information-seeking behaviour and patterns (Brindesi, Monopoli, and Kapidakis 2013). Denison and Montgomery argued that gender is an essential variable in information-seeking behaviour (Denison and Montgomery 2012) while Doris and Ndubumna alleged that satisfaction with a service may vary according to the gender of the user (Doris, and Ndubumna 2013). Greenberg and Bar-llan observed that girls and boys differ in their search patterns when using library services to find answers to specific questions (Greenberg and Bar-llan 2013). According to Norbert and Lwoga, boys tend to use horizontal search methods when searching the web in which they iteratively submit searches and then scan the document snippets returned as search results. In contrast, Girls tend to employ vertical search methods in which they tend to open and browse the web pages returned by the search engine without reviewing the list or filtering out irrelevant results. In the end, the strategy adopted by most boys tends to provide superior search performance. In a study of cancer information service it was observed that use of the service was mainly 80% (Norbert and Lwoga 2012).

In a study carried out by Tambala it was found that high-school students' attitudes towards computers and their use varied by gender (Tambala 2010). Gender was also considered as a major predictor of Internet use and attitudes. Males seemed to enjoy browsing for enjoyment while females tend to use it for work-related purposes (Selemani 2010). In addition, it was found that females experienced more difficulties in finding information online, felt less competent and uncomfortable using the Internet as compared to the male counterpart. In a separate study, however, it was established that there is no link between the gender and low self-efficacy, meaning it is not the gender variable that determines self-efficacy (Selemani 2010). While this study alluded to the fact that

gender studies in general had been done, it tried to ground gender as a variable within the motivational (process) theory in the context of academic libraries.

Brindesi, Monopoli, and Kapidakis while investigating the factors that affect international students' information-seeking behaviour found out that female immigrants had higher social-cultural and psychological adaptation scores than male immigrants (Brindesi, Monopoli, and Kapidakis 2013). It was also observed that in comparison to males, females had lower competencies in using computerized library resources and technologies. According to Brindesi, Monopoli, and Kapidakis most database searching requires extensive computer use and familiarity, this largely affected users' ability in information search. Therefore, in this area, males were more satisfied and confident and had fewer difficulties than females (Brindesi, Monopoli, and Kapidakis 2013).

Results of these studies revealed that the information needs as well as the information-seeking behaviour, in general, among the males and females, do not show any uniform and consistent pattern. The findings have also confirmed that there are variations of needs and behaviour for seeking information amongst an individual man and woman. In this context, the study carried out at Kenyatta University was aimed at investigating the relationship between gender and the cognitive factors that affect information seeking among postgraduate students.

Purpose of the Study

The purpose of the study being discussed was to investigate the relationship between gender and the cognitive factors that drive postgraduate students at Kenyatta University to seek information.

Significance of the Study

University library users are consumers of information from a wide variety of sources

including people, web services and libraries. Information-seeking behaviour of users is primarily driven by cognitive, affective or physiological needs. This study investigated the relationship between gender and cognitive variables that drive users' information-seeking behaviour to better understand users' information-seeking process. The findings can be used to design a library service to meet users' information needs.

Conceptual Framework

The conceptual model in this study is based on Expectancy Value Theory as introduced by Vroom (Vroom 1964) and imported by Porter, Lawler, and Campbell, and others (Porter and Lawler 1968; Campbell, Dunnette, Lawler, *et al.* 1970). The common factors utilized by the study include valence, expectancy, instrumentality, value of outcome, and effort. These perceptions are largely influenced by service personnel's interaction service quality and users' past experiences. Expectancy Theory suggests that people are better motivated when valence, instrumentality, and expectancy are present. The variable investigated in the context of the above theory is gender. The gender refers to a person's biology which is culturally valued and interpreted into locally accepted ideas. The study assumed an awareness of cultural and biological identities amongst the respondents. It is significant that this research developed a theoretical framework or model (Figure 1) which can be used by academic libraries as a basis for developing both digital and reference desk service that would meet users dynamic needs. To do that, gender differences, if any, were investigated through correlation coefficient in the context of Expectancy Theory. The motivational process amongst male and female respondents was examined to establish the difference, if any.
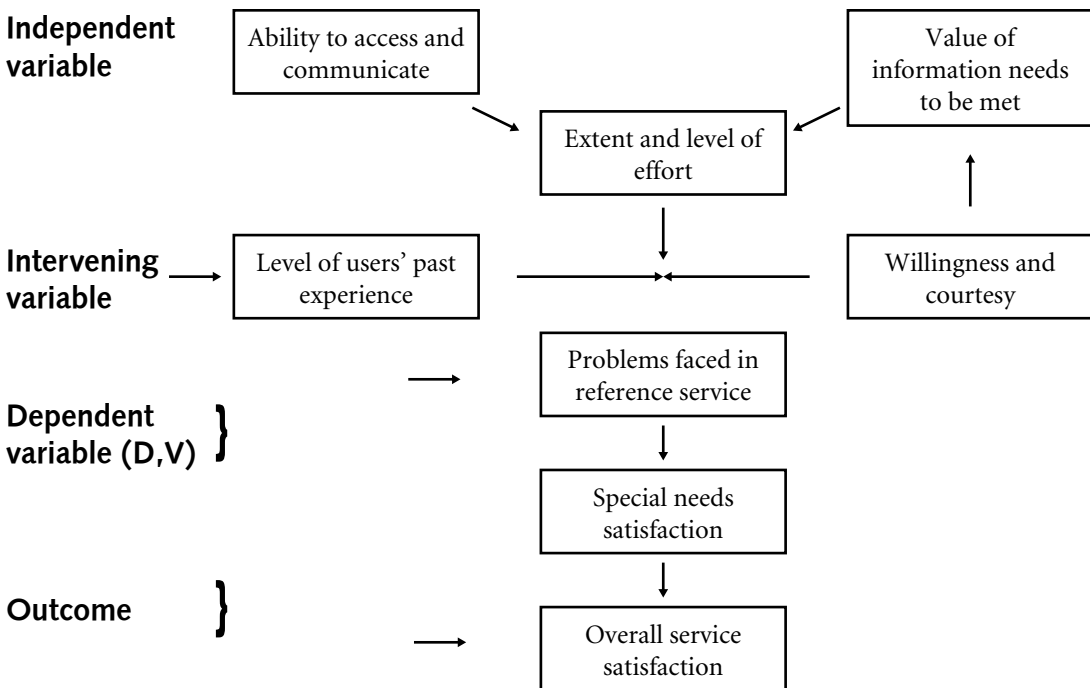

Figure 1: Conceptual framework

Methodology

The purpose of this study was to investigate whether there is a relationship between gender and cognitive determinants of library users' information-seeking motivational process. The determinants were based on Vroom's Expectancy Theory of Motivation (Vroom 1964). The Theory suggests that individuals are highly motivated when the following three factors are present:

1. **Valence**: They must value the outcome.
2. **Expectancy:** They should expect from themselves that they are capable of performing the behaviour that is instrumental to the outcome.
3. **Instrumentality:** They must believe that the desired behaviour is instrumental in achieving the valent outcome.

To achieve the intended overall objective, this study focused on gender as one of the influencing factors of the cognitive factors that influence information seeking.

Research Design

The present study used survey design as a framework for the collection of data. The survey research was cross-sectional and the data collection was organized using a questionnaire and focus group interview guide. The data, quantitative in nature, was collected from the Department of Library and Information Science. The research examined the relationship between gender and the cognitive factors that affect the information-seeking process of users.

Variables

A variable is an attribute on which cases vary.

Value of Outcomes

According to Vroom, value of outcome is the valence. The valence is an individual's subjective judgment about possible outcomes (Vroom 1964).

Effort to Performance Expectancy

It is the library users' estimated probability about efforts expended in accomplishing a given task.

Effort by the Users

This is the amount of energy library users exert in the information-seeking process (Porter and Lawler 1968).

Service Performance/ Accomplishment

This variable focused on users' role in service delivery, access issues, and challenges faced by them while performing different tasks. This formed the basis for assessing and scoring their performance.

Users' Perception of Interaction Service Quality

This refers to the interpersonal interactions that take place during the service delivery between the reference librarian and the user.

Users' Past Experience

This relates to the users' previous experiences with the service.

Library Users' Service Satisfaction

It is the subjective judgment of the service by the user. It is based on service features, attribution of service (success or failure), and perceptions of equity and fairness.

Location of the Study

The study was carried out in Kenyatta University Post-modern Library. This library plays an important role to support teaching, learning, and research. Post-modern Library was selected because it hosts favourable postgraduate facilities with a sitting capacity of around 6000 students. In addition, new information technology-based services are also being offered by the library.

Target Population

In 2017, number of registered postgraduate students in Kenyatta University was 13,193, the target population for the study.

Sampling Technique and Sample Size

To select the participants, non-probability sampling was used. The study targeted to collect data from a sample of 384 out of a total of 13,193 postgraduate students. The design demanded that the data be collected at one point in time from a specified population, mainly because the data collected was subjected to correlation analysis (Ary 2010). Postgraduate library users were intercepted in the postgraduate floor of the postmodern library. The purpose of the research was explained to them and then they were requested to spare a few minutes to fill in the questionnaire.

Quota sampling approach was applied. The purpose of this was to produce a sample that would reflect the total postgraduate students' population. Out of a census of 13,193 students it was expected that at least 384 students would be in the sample. For the study to conclude authentic remarks, 95% confidence level was expected. This corresponded to a Z score of 1.96 with a 5% margin for error (Saunders 2009).

Calculation of Sample Size

Sample size for infinite population Cochrun (1977):

$S = Z^2 \times P \times (1-P) / M^2$

S= Sample size for the infinite population

Z= Z score

P= Population proportion (assumed to be 50% = 0.5)

M= Margin of error

Z score determined based on confidence level

Confidence level = 95%

Z = 1.96

M = 0.05

Substitution of formula $[S = (Z^2) \times P \times (1-P)/ (M^2)]$

$S = (1.96)^2 \times 0.5 \times (1-0.5)/ (0.05^2)$

$S = 3.8416 \times 0.25/ 0.0025$

$S = 384.16$

Adjustment of the sample to the required population

Population of Kenyatta University postgraduate students = 13193

Formula for adjusted sample size = $(S)/ 1+ [(S – 1)/ population]$

Adjusted sample size = $384.16/1+ [(384.16 – 1)/ 13193]$

Adjusted sample size for Kenyatta University postgraduate students

= 373

Research Instruments

The study used a questionnaire which was developed on the basis of the objectives and the variables. The variables were, Interaction service quality, Effort to performance expectancy, User needs satisfaction, Service performance (service satisfaction), Effort by the user, Outcome, Value of outcomes, Users' past experience, and Gender relationship with cognitive variables.

Pretesting/Pilot Study

A pilot study was carried out in the library of Methodist University, Nairobi campus. The primary reason for selection of this venue was that university's well-funded library utilizes both digital and traditional system services. About 20 participants were selected. The questionnaire was handed over to them and collected later.

Validity

Validity measures the extent to which an instrument taps the underlying concept that it purports to measure. To some extent, it measures the integrity of the conclusion generated. The validity of the questionnaire was assessed by carrying out pretesting. To collect data, the researchers ensured that the questionnaire was appropriate and unambiguous. This was done by testing internal

reliability of the questionnaire. Reliability refers to the consistency of a measure of a concept. It entails asking whether the measures taken during a study were stable so that the study can put forward the results/conclusions with confidence (supplemented with reliable evidences). Cronbach's alpha coefficient was used to test reliability. The figure 0.70 alpha levels were employed as a rule of thumb to denote an acceptable level of reliability. The instrument already developed for this study was a multiple-item measure for each concept. This was done to avoid the potential problems associated with overreliance on a single indicative measure. The study used Cronbach's alpha coefficient to test consistency of the questions. Each variable achieved a coefficient greater than 7.

Data Collection Techniques

Survey research asked questions about people's gender, beliefs, opinions, characteristics, and behaviour. Survey questionnaire was used as a source of data. The data collected described the distribution of the different variables as factors that influence information seeking amongst the students. Tenopir (2003) argued that the types of conclusions that can be drawn vary by the type of questions asked and the method used. The types of questions asked can be categorized as:

a. **Preference questions** which focused on the gender of the participants and what do they think about a library service.

b. **Questions based on reported behaviour and likely behaviour**, focusing on what people say they do in terms of making choices to use or avoid using a library based on gender.

Data Analysis Techniques

The data collected was quantitatively analysed. The following steps were followed:

1. Organizing and analysing the data.

2. Summarizing the findings using averages and presenting in the form of tables.

3. A correlation analysis was done to examine how closely the variables were connected. These variables were identified to have some bearing on information seeking. Correlation research helped in understanding the relationship between gender and the factors likely to drive information seeking amongst postgraduate students. The correlation coefficient ranges from +1 to –1. '+1' signifies a perfect positive correlation while '–1' reflects a negative correlation.

4. The connections between variables were explored through finding out associations of two variables to a significant level using chi-square as a statistical test. It was tested as $P< 0.05$ (1 in every 20). The study also used multiple regression analysis to interpret the results. This allowed exploration of interrelationship between the variables.

Logistical and Ethical Considerations

All studies need to abide by some ethical principles. This study took great care with the issues that could arise in relations between the research and research participants. This included harm, confidentiality, informed consent, and invasion of privacy.

Findings, Interpretation, and Discussion

The purpose of this study was to determine the relationship between gender and the cognitive factors that affect the information-seeking process of postgraduate students at Kenyatta University. The study was based on the Expectancy Theory of Motivation. The findings show that the level of experience with face-to-face reference service was more or less similar in both male and female respondents, as given in the Table 1.

Table 1: Level of experience by face-to-face interaction

	Low (in %)	Medium (in %)	Neutral (in %)	High (in %)	Very high (in %)
Male	27.5	43.2	9.6	16.6	3.1
Female	27.8	45.7	9.79	11.3	7.3

The experience with digital reference service in both male and female ranged in low and medium levels (male 54.2% and female 53.3%) and the others in both high and very high (male 37.6% and female 37.5%). The experience behaviour (satisfaction level) was similar in both male and female respondents. Table 2 gives shows the level of experience with digital reference service.

On the relationship between cognitive factors and gender, nearly three-quarters of male students (72.6%) reported that librarians gave helpful information. An almost equal proportion (71.2%) of female students were also of the same opinion. There seemed to be no difference between male and female students on the helpfulness of information given to them. On the relationship between gender and helpfulness of information given to them, a correlation coefficient of '−0.003' was found. The two variables are related negatively. The score on the issue of satisfaction did not show significant differences among male and female students (Table 3). A very small number of respondents were dissatisfied with the information acquired through face-to-face reference service. About one-fifth (24%) of both male and female students were indecisive about their satisfaction levels.

Out of the total respondents, about 70.6% (male) and 66.4% (female) respondents agreed that information given to them by reference librarians was useful. Further analysis showed that less than one-fifth of female (17.1%) and male (14.5%) respondents strongly disagreed that the information given by face-to-face reference librarians was useful.

There was a difference of opinion (12%) between male and female on satisfaction with information acquired though digital reference. The male seemed to be more satisfied than female on this. Percentages of male and female respondents on satisfaction levels from information acquired though digital reference are 62% and 50.3%, respectively.

On 'value of outcome' variable, the male students (63.3%) agreed that it was very valuable for their information needs to be met through face-to-face reference service, however, one-

Table 2: Level of experience with digital reference service

	Low (in %)	Medium (in %)	High (in %)	Very high (in %)
Male	21.4	32.8	27.1	10.5
Female	19.7	33.6	22.4	15.1

Table 3: Satisfaction and gender

Gender	Satisfaction (in %)	Dissatisfaction (in %)
Male	64.5	15.7
Female	56.7	19.3

fifth (18.4%) disagreed with this. About 68.4% of female students agreed that information needs when met through face-to-face reference service was very valuable whereas 16.5% were not agreement with this. Majority of both male (63.3%) and female (68.4%) students did find face-to-face reference service to be very valuable in information seeking. Those who felt that it was not valuable for their information needs to be met through face to face reference service ranged between 16% (female) and 18% (male). There did not seem to be significant differences between the gender perceptions on the value of outcome variable. A similar finding was obtained on the importance of information needs when met through face-to-face reference service (62.6% male and 68% female). On whether it was desirable for their information needs to be met through face-to-face reference service, 67.6% of the male and 70.3% of female respondents agreed with the statement that "it was important for them to have their information needs met through face-to-face reference service". An equal percentage of male and female (14.5%) respondents disagreed with the statement.

Considering gender and value of outcome there seemed to be no gender difference on the issues of desirability (68.7%), importance (64.7%), and value (65.3%) of needs to be met through face-to-face reference service. The gender variable showed a '–0.52' correlation to value of outcome. This is a medium negative correlation between the two variables and was considered significant at 0.05 level of significance. Those who did not think it was valuable, important, and desirable for the information needs to be met through face-to-face were comparatively fewer.

On the aspect of willingness of the library personnel (in face-to-face reference service), over half (53.1%) of the male students were of the opinion that the service personnel had a high or very high willingness to help. The percentage of female respondents who rated the service personnel's willingness to help as high and very high is 36.1%. It can be noted, difference of rating between male and female is of 17%. Of the students who rated personnel's willingness to help as low or very low, the situation is as given in Table 4.

On courteousness, the female students considered service personnel courteousness to be below average (38.9%). Overall one-third (30.9%) of female respondents considered service personnel's courteousness to be low or very low whereas one-fifth (21%) of male respondents rated the service personnel's courtesy to be either low or very low. Overall interaction service quality and gender showed a negative relationship (– 0.156). This meant that gender and interaction service quality were found to be negatively correlated

Table 4 Willingness of face-to-face reference service personnel

Gender of respondent	Rating willingness of face-to-face reference service personnel to help										Total	
	Very low		Low		Neutral		High		Very high			
	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Male	18	8.3	34	15.4	51	23.2	96	44.3	19	8.8	218	100
Female	22	15.1	34	23	37	25.7	42	28.9	11	7.2	146	100
Total	**40**	**11.1**	**68**	**18.4**	**88**	**24.2**	**138**	**38.2**	**30**	**8.2**	**364**	**100**

with each other. The level of overall satisfaction of male (63.3%) and female (56.3%) students was comparatively close to the overall group satisfaction (68%). A correlation of '–0.100' was found between overall satisfaction and gender. On the likelihood of using face-to-face reference service in the future, male students (68.6%) were more likely to do so than the female students (61.6 %). It can be concluded from the stats; both male and female students were likely to avail the service in the future and even recommending it to their friends and colleagues. Overall library user satisfaction with the service was negatively correlated with gender. The decision of recommending or not recommending face-to-face reference service to friends and colleagues was not likely to be influenced by gender.

On efforts made by the users of the reference service, majority (69.6%) of male respondents considered the extent of use to be either low (21.3%) or medium (48.3 %). In the case of female respondents, 73% assessed the extent of their effort to be either low (27.6%) or medium (45.4%). To conclude, both male and female respondents scored the extent of use of face-to-face reference to be either low or medium. One-fifth of the male assessed their extent of effort to be high (20%), it was 16.4% in the case of female. There seemed to be an insignificant difference between male and female. On relationship between gender and extent of use of face-to-face reference service there was a negative correlation of '–0.054'.

The level of effort spent using face-to-face reference service was reported to be mainly low (24%) or medium (48.8%) for male. The female had a combined level of 70.4%, clustered around low and medium effort. The levels of the efforts made by both male (72.8%) and female (70.4%) respondents were very close. On relationship between gender and extent of use of face-to-face reference service, a negative correlation of '–0.054' was found. Gender did not seem to influence the efforts made by both male and female respondents.

On whether there was a difference between male and female on the extent of use of face-to-face reference service, majority (69.6%) of male considered the extent of use to be either low (21.3%) or medium (48.3%). The female (73%) assessed the extent of their effort to be either low (27.6%) or medium (45.4%). Overall both male and female assessed the extent of use of face-to-face reference to be either low or medium. There seemed to be an insignificant difference between male and female in the use of face-to-face reference service.

On the aspect of the performance of the service, about 58.6% of male and 54.9% of female students reported that they faced problems while utilizing digital reference service. About 12.3% of male and 12.6% of female respondents were neutral on this. This implied that in both male and female respondents over 60% had problems with digital reference service. Only about one-third (28.9%) of male and a similar proportion of female (32.5%) reported that they did not have problems with digital reference service. Performance/accomplishment of service by users was found to be negatively correlated to gender by '–0.47'.

In the category of 'communication with reference librarians', 49.4% (male) and 40.8% (female) reported that they did not have problems in establishing communication with the reference library. At the same time, 31.6% (male) and 34.2% (female) acknowledged that they had problems with communication with reference librarians, hence about half of the respondents (both male and female) could communicate with reference librarians without problems. A negative correlation coefficient of '–0.02' was found between gender and ability to communicate with reference librarians.

Users' past experiences with face-to-face reference service was rated under low (27.6%) and medium (44.2%) categories. This meant that about 71.8% of the total respondents (both male and female) rated their experience to be either medium or low. Only about 8.9%

were neutral on this. About one-fifth (19.2%) reported that they had high or very high experience with face-to-face reference service. These rating scores were comparatively close for both male (70.7%) and female (73.5%) respondents. A similar pattern was observed on those respondents who considered their experience to be high (19.7%) and female (73.5%). The experience scored by both male and female respondents was similar on the face-to-face reference service. A negative correlation coefficient of '–.010' was found. Gender and level of experience were negatively correlated. The level of experience with digital reference service was mainly low (20.7%) or medium (33.1%). This meant that about half of the male (54.2%) and female (53.3%) had low or medium experience. Apparently, 37.6% of male and 37.5% of the female respondents considered their experience with digital reference service to be high. Analysis of the level of experience shared by both male and female respondents showed a negligible difference. A negative correlation of '–.026' was found between level of experience with digital reference service and gender.

Summary of Findings, Conclusions, and Recommendations

Most of the earlier studies on 'gender and library services' came out with two main conclusions. Some found that gender difference has a role to play in the use of library services (Norbert, Lwoga 2012; Greenberg and Bar-llan 2013). On the contrary, studies executed separately by Ozoemelem (Ozoemelem 2012) and Rahman, Mahmud, and Jamaludin were of the opinion that gender difference has no effect on the use of library services, especially digital services (Rahman, Mahmud, and Jamaludin 2013). The study carried out at Kenyatta University has clearly validated that gender difference has no effect on utilization of library services. The results are based on the analysis of the variables such as interaction service quality, outcome (need satisfaction), service satisfaction,

users' performance of service, past experience, expectancy, and effort. The implication of these findings is: there is no need for mainstreaming gender in service programming in the library service.

The study also examined whether there is a relationship between gender and the cognitive factors. The study found that cognitive factors are independent of gender of the users. Information seeking was not affected by gender as no gender-based difference could be found during the analysis. In fact, more similarities were found between male and female respondents on the aspect of cognitive information seeking. Hence, it can be concluded that the libraries need not to develop/implement any gender-based services.

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