The use of ICT between male and female teachers in Secondary Schools in Tanzania, a Case of Dodoma Municipality

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Abstract

This paper presents the results of the study of the use of ICT between male and female teachers of secondary schools in Tanzania, where Dodoma municipality was used as a case study. The main aim was to establish the differences between male and female teachers in awareness and using ICT and attending ICT short trainings. The data were collected using questionnaires in which 231teachers from 16 secondary schools were randomly sampled. Using Chi-square tests as measure of association with p-values, the study found there is a gender imbalance of the use of ICT tools and ICT course attendance in Tanzania. Results also revealed on the comparable awareness and use of ICT applications between the groups of teachers but with larger number of male teachers seems to use ICT tools than females in both science and non-science subjects. Teachers with more than 30 years of experience demonstrated higher usage of ICT tools but seemed to find difficulties in the use of ICT applications. Understanding gender distribution on ICT areas among secondary school teachers is very important in order to utilize the ICT properly. This knowledge provides with government and stakeholder an understanding on how to balance and promote gender issues in education sectors for the betterment of the general public.

Key Words: ICT, ICT applications, ICT Tools, ICT short training, Male and Female teachers, Secondary Schools.

1. INTRODUCTION

Information and Communication Technology (ICT) has been playing a key role in learning and teaching in all forms and levels of education for the last few decades. Teachers use ICT as a main teaching tool. They search, prepare and present teaching materials through different computer applications. Furthermore, teaching using ICT motivate and engage students through computer techniques like simulations. Different international and national initiatives have been implemented to integrate ICT in secondary schools. However, the achievements are more or less satisfactory due to lack of infrastructure that support use of ICT, and poor knowledge among teachers on using ICT (e.g. Malero et al., 2015).

The access and attraction of using ICT in learning and teaching has been reported to be determined by different groups like gender, ethnics, and locations. On gender basis, different studies have shown to mainly focus on pupils/students (e.g. Mahmood, 2012; Volman 2005). Volman (2005) shows differences on experience and attitude towards ICT with girls and pupils from an ethic minority background need special attention. In that study, girls seem to be less positive on ICT attitude than boys. In tertiary studies, females students are reported to have less confidence on using computer than males (Shashaani and Khalili, 2001; Mahmood, 2012). Females exhibited more negative views and perceptions towards the use of computers than males (Dambrot et al., 1985; Koohang, 1987). Thus, there is gender sensitive on attitude, perception and use of ICT for pupils and students in primary and secondary schools as well as tertiary education. Furthermore, this difference depending on the culture and perception of males and women in the location or country.

Up to date, little is known on the gender distribution of secondary school teachers on awareness and usage of ICT as a teaching tool. Basing on the culture of Tanzania comparing to other countries like in Europe and Asia, gender issues have been priority for the last few decades. The government and Non-Government Organizations (NGOs) have been playing critical roles on promoting gender awareness in different areas like marriage and education. The subject of the paper is to study awareness and use of ICT on teaching and learning among secondary school teachers in Dodoma municipality basing on gender. This objective is achieved by addressing the following specific questions:

a) To what extent does the gender distribution exist in secondary school teachers over the ICT awareness?
b) How does the gender distribution is determined on ICT literacy?
c) What types of ICT teaching and learning tools are used regarding the gender distribution?
d) In which subjects do the ICT teaching and learning tools are used the most with regards to gender distribution?

This introductory part will be followed by methodology section, and then results and discussion. The paper ends with conclusion and recommendations.

2. METHODOLOGY

This section presents the methodology that has been adopted to conduct this study. It includes the study design, sampling, data collection techniques, study variables and methods of analysis.

2.1 Study Design

A cross-sectional descriptive design was used in the study using both qualitative and quantitative approaches for data collection, analyses and reporting. This design was chosen because it is relatively quick and easy to conduct (no long periods of follow-up), data on all variables is only collected once, multiple outcomes and exposures can be studied. This design is also good for descriptive analyses and for generating hypotheses (Hennekens, 1987).

2.2 Sampling and Data Collection

Population in this study included all private and public secondary schools in Dodoma municipal. It consists of a total of 52 secondary schools (Dodoma regional report, 2014). Out of the 52 schools, a stratified random sampling was performed and sampled 16 secondary schools for the study. From each of the schools, data was collected from 231 teachers of secondary schools by filling in survey

questionnaires. The questions in the questionnaires focused on identifying teachers' education level, age, experience and the type of subject they teach. Furthermore, questions also captured the use of ICT applications (Word Processors, Spreadsheets, Databases, Publishers and Email), the use of ICT tools (Projectors, Computers and Internet). Teachers were also asked their attendances of ICT short courses or training.

Table 1 provides the summary of the characteristics of the respondents involved in the research. The study involves majority (above 50% of respondents with 74 males and 75 females) of teachers in age of 26-35. Furthermore, the profile of respondents show the majority of the participants were with education of university degree or above. The numbers of male and female teachers with teaching experiences of less than five years were 44 males and 47 females respectively, being followed by that between 5 and 10 years (47 males and 39 females). Majority of the participants appear to teach non-science subjects (80 males and 96 females).

Table 1: Demographic profile of Male and Female Secondary School Teachers

Variables	**Sub-division of variables**	**Frequency**	
		Male	**Female**
Age	18-25 years	6	10
	26-35 years	74	75
	36-45 years	29	14
	46 and above	11	12
Education Level	Advanced-Level	1	0
	Certificate	0	2
	Diploma	27	26
	Degree or above	92	83
Teaching Experience	< 5 years	44	47
	5-10 years	47	39
	11-20	20	4
	21-30	3	9
	>30	6	2
Type of Subject Teaching	Science	39	15
	Non-Science	80	96

2.3 Study variables

During the analysis, the outcome variable was taken to be the gender type (male and female) and the independent variables (covariates) were the use of ICT applications, ICT tools in content delivery and attendance of teachers to ICT trainings. Variables such as age, education level, type of subject and experience were also used.

2.4 Methods of Analysis

The data collected during the study were analyzed with a Pearson Chi-square using a statistical package IBM SPSS Version 22. This method compares the binary outcome and other independent variables.

3. RESULTS AND DISCUSSION

This section explains the results obtained during the study. Table 2 and Table 3 provide the bases of the results of the analyses in which the Chi-Square test results together with statistical p-values were calculated to answer research questions. Using the two tables, discussion of results is broken into categories described in the following paragraphs.

Table 2: Analysis of the covariates on the gender types of teachers and their corresponding P-values

Covariate	Response	Gender		*P-value*
		Male	Female	
In your teaching, do you use any ICT tool to help in delivering content?	Yes	65(55.1%)	39(35.1%)	**.002**
	No	53 (44.9%)	72 (64.9%)	
Which of the following ICT applications do you use in your teaching?	Spreadsheets	37(43.5%)	23(35.4%)	**.063**
	Word processors	18(21.2%)	16(24.6%)	
	Databases	5(5.9%)	0(0.0%)	
	Desktop Publishing	0(0.0%)	4(6.2%)	
	Internet and Email	23(27.1%)	19(29.2%)	
	Other	2(2.4%)	3(4.6%)	
Have you attended any ICT related course? OR Have you taken a course at the University /college in ICT?	Yes	75(80.6%)	66(66.7%)	**.028**
	No	18(19.4%)	33(33.3%)	

Table 3: Analysis of use of ICT (applications and tools) and ICT short course attendances between male and female teachers with respect to age, education level, years of experience in teaching and the types of subjects.

Covariate	Age group (in years)				Education Level		Experience (in years)					Type of Subjects	
	18-25	26-35	36-45	above 45	Diploma	University Degree or above	< 5	5-10	11-20	21-30	>30	Science	Non-Science
ICT course attendance	*.118*	*.017*	*.151*	*.486*	*.057*	*.093*	*.003*	*.065*	*.716*	*.658*	*.576*	*.766*	*.007*
Use of ICT tools for teaching	*.152*	*.001*	*.750*	*.292*	*.016*	*.028*	*.013*	*.009*	*.855*	*1.000*	*.346*	*.010*	*.031*
Use of ICT applications for teaching	*.324*	*.010*	*.204*	*.469*	*.192*	*.095*	*.156*	*.391*	*.626*	*.149*	*.083*	*.896*	*.079*

3.1 Use of ICT Tools for Teaching

From Table 2, it can be seen that majority of male teachers (55.1% of male teachers) responded to use one or more ICT tools during their teaching processes compared to their counterpart (female with 35.1%). A chi-square test reveals a significant difference in the use of ICT tools between male and females in delivering content, with $X^2(1, N=229) = 9.81$, $p=.002$. This result agrees with most research which have been done in this area of gender differences against ICT (e.g. Beentjes et al., 1995; Rozell and Gardner, 2000; Shashaani, 1993,1994a,1994b). The reasons gender difference on ICT use between males and females have been provided by Shashaani (1993), (1994a), Brosnan (1998) and Kadijevich, (2000).

Moreover, when a much deeper analysis was done with regards to age, experience, level of education and type of subject and findings presented in Table 3, it could be seen the *p-values* in age group 26-35 and experience between 5-10 are .001 ($X^2(1, N=229) = 11.43$) and .009 ($X^2(1, N=229) = 6.88$), respectively. Such values represent very high significant differences between male and female teachers in the use of ICT tools. These differences are also attested by Figure 1. Interestingly, this is the group which constitutes a greater percentage of teachers with university education or above and were therefore expected to demonstrate strong use of ICT tools.

The measure of association performed to determine the use of ICT tools in delivering contents in classroom teaching reported also the very significant difference between male and female teachers in science and non-science subjects with a *p-value* of .10 ($X^2(1, N=228) = 6.6$)) shown in Table 3. Results presented by Table 3 also indicates significant differences in the use of ICT tools by teachers of non-science subjects justified with *p-value* of .031, this is also proved by Figure 1.

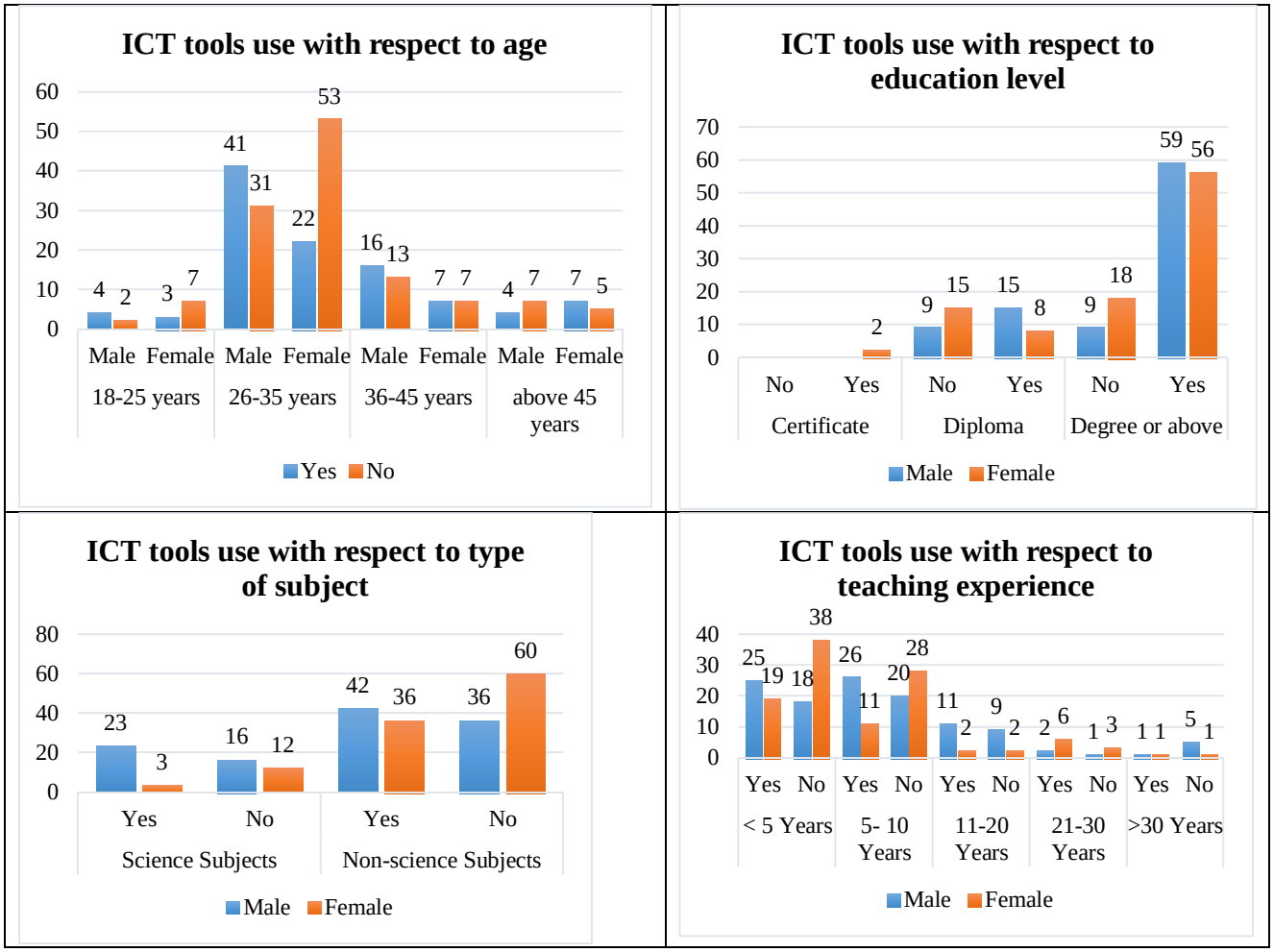

Figure 1: The use of ICT tools in delivering contents between male and female teachers

The use of ICT tools for teaching appears to be gender sensitive among secondary school teachers in Tanzania. Although the total number of males and females are comparable, males seem to use more ICT than females. The types of application used more by male and female in teaching are discussed in the next section.

3.2 Use of ICT applications for Teaching

From Table 2, results of the analyses show that there is almost comparable use of ICT applications with X^2 (1, N=150) = 10.84), *p=0.063* between male and female teachers which is insignificant at level of 0.05. Spreadsheet seems to be used more by both female and male teachers being followed by Internet and Email then word processors. Databases and desktop publishing are only used by males and females, respectively.

However, during further analysis, with results shown in Table 3, it can be revealed that there are significant differences in the use of ICT applications between male and female teachers who are found in age group of 26-35 with X 2(1, N=150) = 15.1), p=.010.

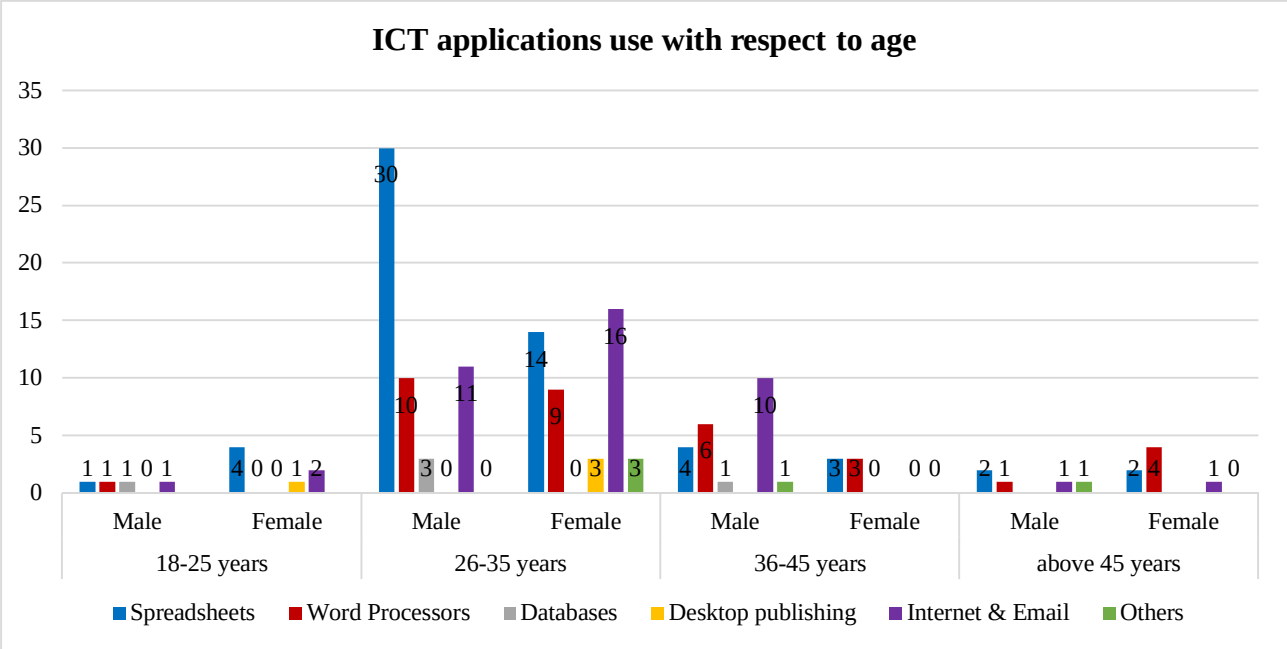

Figure 2a: ICT applications use among male and female teachers with respect to their age

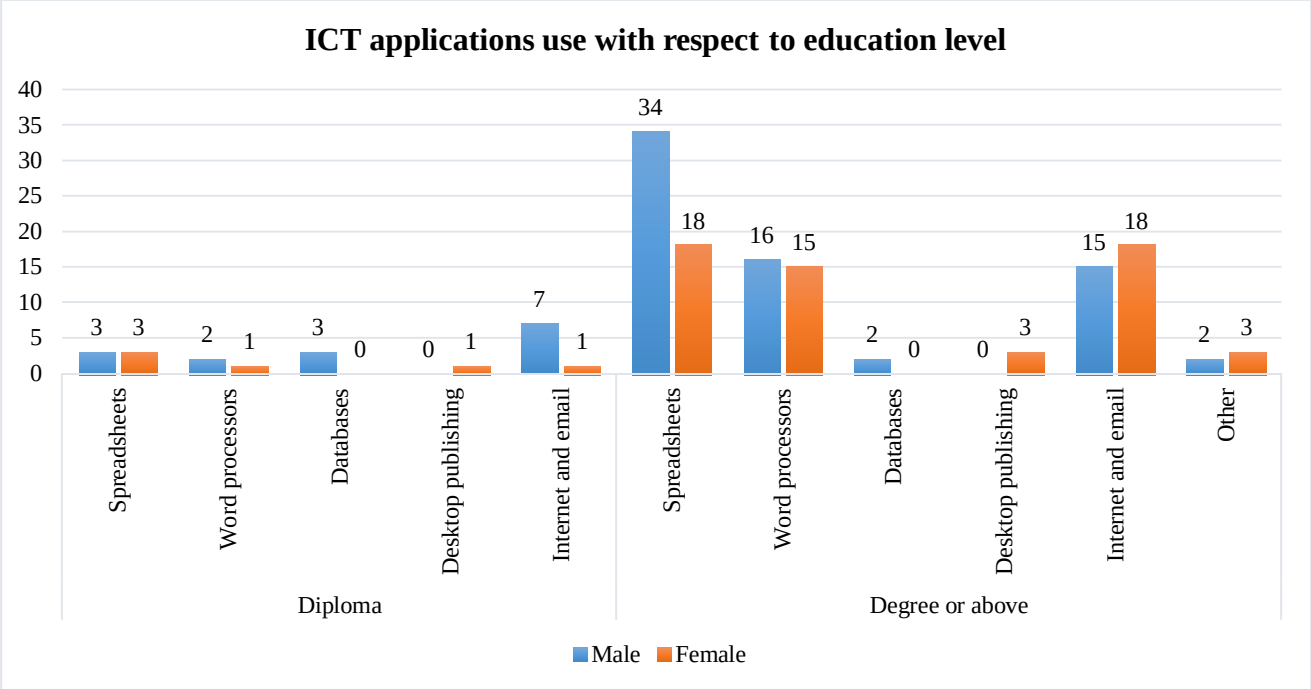

Figure 2b: ICT applications use among male and female teachers with respect to education level

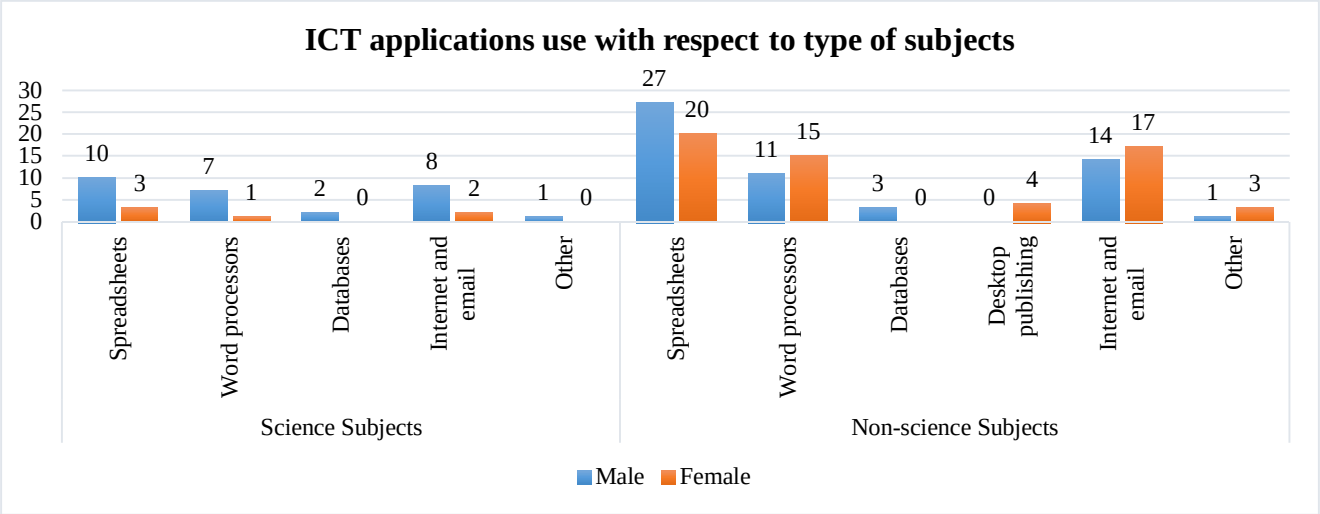

Figure 2c: ICT applications use among male and female teachers with respect to subject type

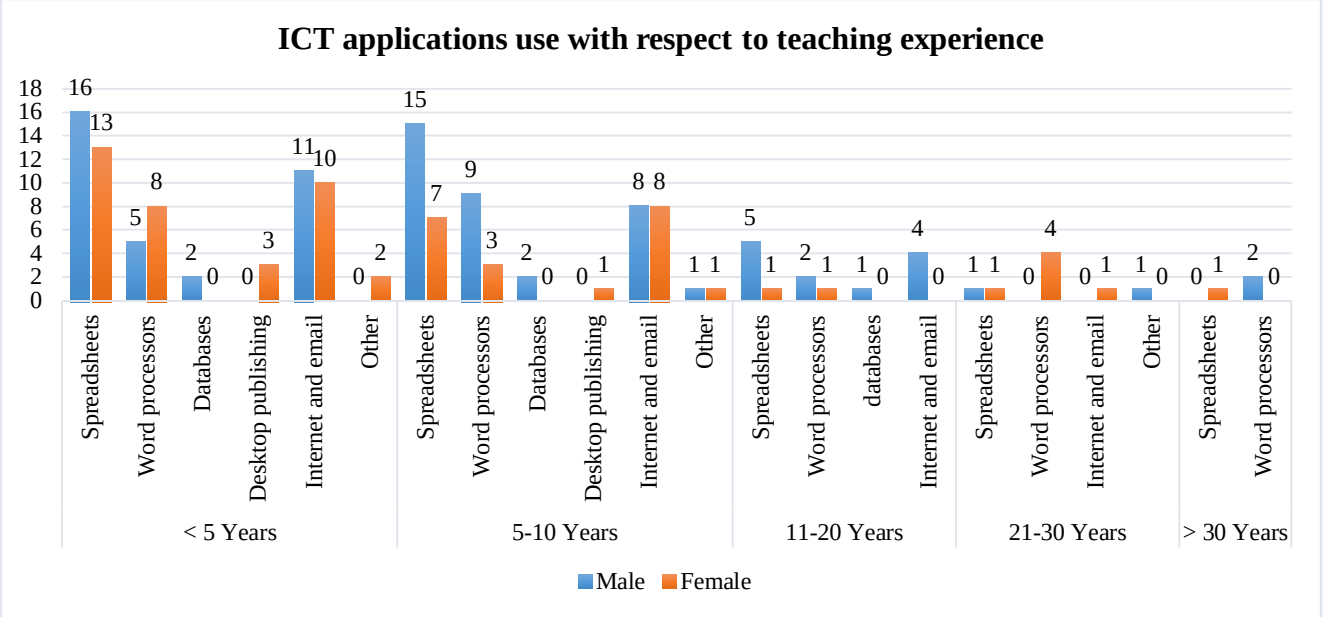

Figure 2d: ICT applications use among male and female teachers with respect to experience

Furthermore, Chi-tests performed to establish the extent of use of ICT applications among teachers of science and non-science subjects with regards to gender types revealed that, science subject teachers have similar use of ICT applications as reported in Table 3 with *P-values* of .896(X^2(1, N=191) =0.088). From the same table, non-science subject teachers were also found to have similar uses of ICT applications with *P-value* of .079. This signifies that most teachers are familiar with these applications as shown in Figure 2 (a, b,c and d), which also shows that teachers with experiences of more than 21 years tend to not make use of these ICT applications.

3.3 ICT short courses/training attendance

In analyzing the responses of teachers who attended any ICT course during their study or teaching career, in Table 2. A Chi-square test depicts significant differences in attendances between male and

female teachers, with X^2 (1, N=192) = 4.81, p=.028. The results suggest that the attendance to courses or training is above 65 for both male (80.6% of males) and females (66.7% of females). Such results indicate efforts on training ICT courses for teachers.

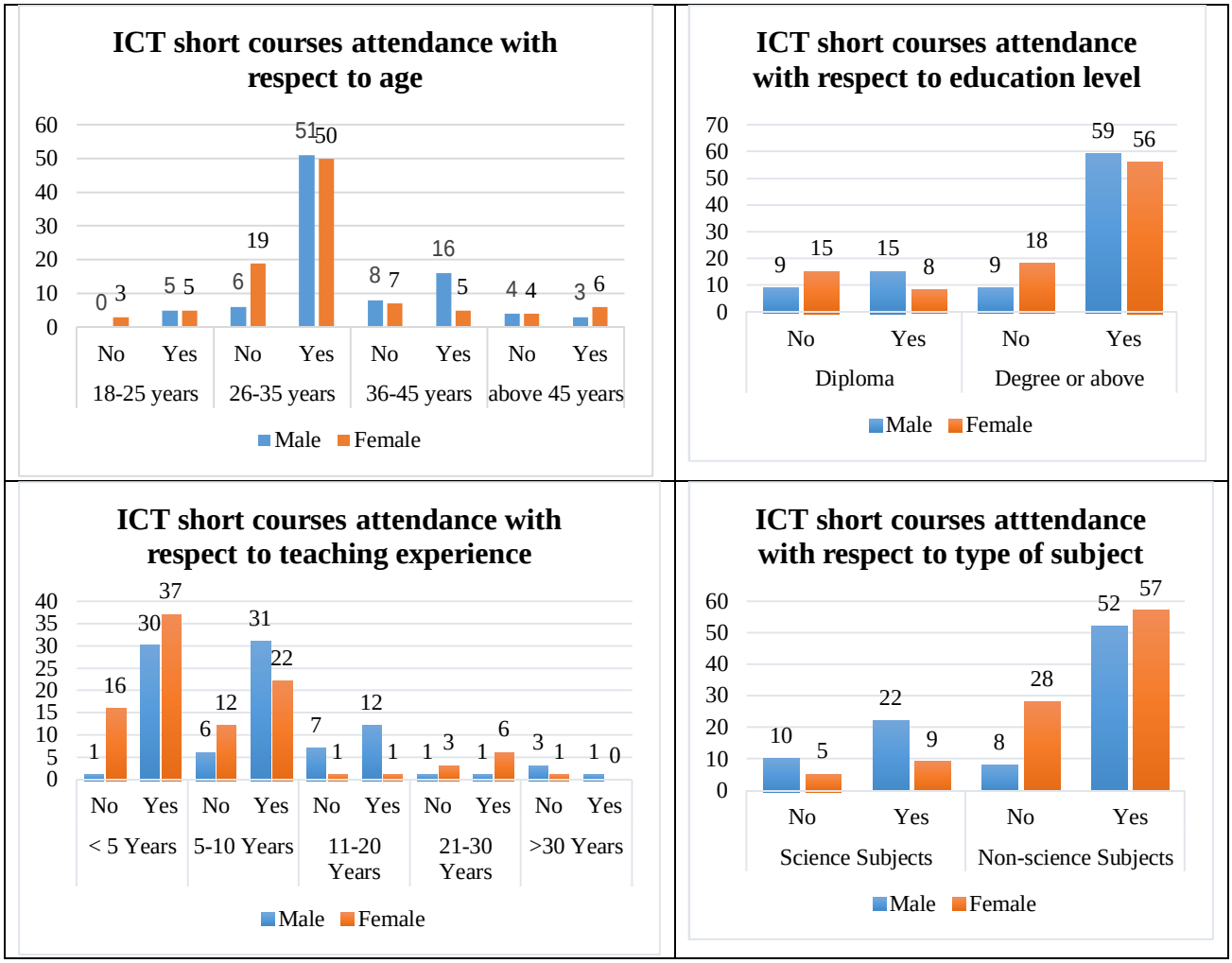

Figure 3: ICT short course attendance between male and female teachers

Further analysis, in Table 3, also shows that male and female teachers within age group of 26-35 and with less than 5 years of teaching experience have significant differences in ICT training participation. Chi-square tests performed within these variables indicate X^2 (1, N=192) = 5.69, p=.017 for age group of 26-35, and X^2 (1, N=192) = 8.81, p=.003 for teachers with experience of less than 5 years.

Also, shown in Table 3, there is significant difference in short course attendances between teachers of non-science subjects with P-value of .007 (X^2(1, N=191) =7.24), respectively. It can also be revealed in Figure 3, that female teachers who are teaching non-science subjects have yet to attend any ICT courses.

4. CONCLUSION

ICT plays a critical role on improving teaching and learning in different forms and levels. Understanding gender distribution of secondary school teachers on awareness and usage of ICT as a teaching tool can lead to better use of this technology in education. This study addresses the ICT basing on genders distribution in Tanzania.

The study reveals that there is gender imbalance of the ICT tools and applications in teaching with comparable results on ICT course attendance. A larger number of male teachers seems to use ICT tools than females. This number is reflected on their applications on spreadsheets, internet and email, word processor. However, none of their uses were on power point for presentations. Thus, they might be using spreadsheets for prepare examination results and internet and email for searching materials. Furthermore, the internet and email can be used through mobile devices like mobile phones and iPad which are owned individually by teachers. The reasons for male teachers to be at top on the use and application of ICT tools can be linked by their attendance to ICT courses. Majority of male teachers have attended one or more ICT courses comparing to female teachers.

Understanding gender distribution on ICT areas among secondary school teachers is very important in order to utilize the ICT properly. This knowledge provides with government and stakeholder understanding on how to balance and promote gender issues in education sectors for the betterment of the country. Therefore, further research should be geared to explore the reasons and causes for female teachers to lag behind in the use of ICT.

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