Computers in learning: narrowing the gender gap?

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Abstract
Various efforts have been made in many educational systems in the world to minimize or eliminate gender differences in teaching and learning. One of these efforts has been the use of technology in classrooms instruction because of the nature of qualities this facility possess. This article presents findings of the study that analyzed students' attitudes towards learning by using computers in Botswana junior and senior secondary schools in 2006. Reported findings are only on usefulness and enjoyment of using computers in learning. The findings showed that girls and boys differed on the usefulness of using computers in learning and girls had less enjoyment in learning using computers than boys. Various reasons could have caused these differences and from this study it was concluded that the nature of computer studies curricula offered at both junior and senior secondary schools levels, and the way the subject was taught could have an impact on students' views on usefulness and enjoyment of learning using computers. At the end, some recommendations are made centering on the nature of curriculum used in these sampled schools.

Introduction

When ICT was introduced in schools many years ago, it was perceived as a male domain facility and boys were considered people with technological know- how, where girls were "guests" and boys "hosts" (Elkjaer, 1992 in Jones and Smart, 1993). The interactive nature of ICT materials was believed to provide the opportunity for students to analyze the process, assimilate and work independently. Such an opportunity was also believed to be useful to especially girls where some classroom practices were found to create an undesirable learning environment for girls (Kaino and Mazibuko, 2001). Calculators and computers are instruments where students could interact independently in classroom instruction. Compared to traditional classroom learning, it was assumed, calculators, computers and other forms of ICTs could offer neutral environments for both sexes in learning process.

Earlier studies on the use of ICT in instruction did not consider a computer to be a neutral value, and attitudes towards information technology were claimed to be even more extreme than those towards other educational media (Anderson, 1985). If gender-related differences in attitudes toward the computer had to follow similar patterns to those established for science or math, as girls tended to associate computers with math and technology (Levine, 2006), then there would be little hope for improved attitudes toward learning among girls when computers are integrated in instruction. Some studies had already indicated that boys' attitudes towards computers were generally more positive than those of girls (Clariana & Schultz, 1993; Levine & Gordon, 1989; Sutton 1991). Also other studies had indicated that boys and girls differed in their perception of the role of computers in learning, and in their preference for different types of computer-based activities (Hall & Cooper, 1991; Sanders 1984). The above findings however, were obtained between fifteen and about twenty years ago, and school learning environments, instruction, practices and others might have changed gender attitudes.

Aim of the study

The study analyzed students' attitudes in classroom instruction using computers in Botswana Junior and Senior secondary schools by gender, and was guided by the following research questions: (i) What were the students' views on the usefulness of computers in learning?, (ii) How was the students' enjoyment of using computers in learning?

Methodology

The study used both qualitative and quantitative techniques to analyze the collected data. Structured interviews with closed and open-ended questions were used to get information from students. The quantitative data involving closed-ended questions was analyzed using the Statistical Package for Social Sciences (SPSS). Responses were analyzed using a 4-point Likert scale and frequencies. Total score of responses were computed and average scores determined. The average values indicated levels of usefulness and agreement; and significances were tested at 0.01 and 0.05 levels. From the qualitative data, involving open-ended responses, individual responses were recorded. The t-test method was used to determine any differences that existed between boys' and girls' responses. The t-test analysis was also done on a combined sample between two sexes to detect any differences.

Findings and Analysis

Students were asked to state on the usefulness of using computers in learning by indicating the four levels of usefulness. More girls (about 61%) than boys (about 52%) said computers were very useful. About 42% of boys and 39% of girls said computers were useful. Only about 6% of the boys said using computers were averagely useful (Table 1). Likert scale averages (boys-3.46 and girls-3.6) also indicated that students of both sexes considered computers to be useful in learning though girls' average was

higher than those of boys. While more girls than boys indicated that computers were useful, the differences were not significant at 0.05.

Table 1: Students' views on computer usefulness by gender
Do you find learning using computers in class to be useful to you?

		Boys No.	Girls No.
	Very useful	17 (51.5%)	22 (61.1%)
	Useful	14 (42.4%)	14 (38.9%)
	Average useful	2 (6.1%)	0 (0%)
	Not useful	0 (0%)	0 (0%)
	Total	33	36
Missing		3	0
Total		36	36

Averages on Likert scale: Boys-3.46, Girls-3.61.
T-test: not significant at 0.05 (0.650>0.05)

Students' reasons why computers were useful

Students who indicated that using computers in learning was useful were asked to state their reasons why they agreed. The views, which were open-ended, were analyzed and categorized into six types for boys and into seven for girls as shown in Table 2 below.

Many boys (about 36%) said computers were useful in searching for jobs while about 31% of girls said were useful for internet access. About 28% of girls also said computers were useful in searching for jobs. The t-test on similar views did not show any significance difference between boys and girls at 0.05 (0.50<0.59). Dominant views from both girls and boys indicated that computers were useful in search for jobs, Internet, access to information and knowledge.

Table 2: Students' reasons why computers were useful
Boys

		Number	Percent	Valid Percent	Cumulative Percent
	Helpful in job search	11	30.6	35.5	35.5
	Provide accurate information	6	16.7	19.4	54.9
	Fast in communication	5	13.9	16.1	71.0

	Helpful in doing assignments and research	3	8.3	9.7	80.7
	Using computers is added knowledge	3	8.3	9.7	90.4
	Provide access to Internet	3	8.3	9.7	100
	Total	31	86.1	100	
Missing		5	13.9		
Total		36	100.0		

Girls

		Number	Percent	Valid Percent	Cumulative Percent
	Provide access to Internet	10	27.8	31.3	31.3
	Helpful in job search	9	25.0	28.1	59.4
	Using computers is added knowledge	6	16.7	18.8	78.2
	Provide accurate information	2	5.6	6.3	84.5
	Fast in communication	2	5.6	6.3	90.8
	Useful for typing and printing pictures	2	5.6	6.3	97.3
	Provide accurate answers	1	2.8	3.1	100
	Total	32	88.9	100	
Missing		4	11.1		
Total		36	100.0		

Students' enjoyment of using computers in learning

Students were asked to indicate the level of enjoyment in learning when using computers. The 4-point Likert scale was used and responses were recorded in frequencies and then computed into percentages. Most students indicated that they enjoyed using computers in learning (Table 3).

About 42% of girls and 38% of boys indicated highly their enjoyment of using computers. On the average, many students of both sexes enjoyed computers and girls had

a higher average score on the Likert scale than boys. Though many girls than boys enjoyed using computers, about 11% of the girls (compared to 0% of boys) did not enjoy at all using computers. The analysis showed no significant differences of enjoyment among sexes at 0.05 levels.

Table 3: Student s' enjoyment of using computers in class
Do you enjoy using a computer in class?

		Boys Number	Girls Number
	Very Much	13 (38.2%)	15 (41.7%)
	Much	16 (47.1%)	15 (41.7%)
	Average	5 (14.7%)	2 (5.6%)
	Not at all	0 (0%)	4 (11.1%)
	Total	34	36
Missing		2	0
Total		36	36

Average on Likert scale: Boys-2.94, Girls-3.12
T-test: not significant at 0.05 (0.77>0.05)

Some reasons were sought from girls who said did not at all enjoy learning using computers. The reasons were given as " I hate computer classes (2), "I do not know much about computers (1), and "The teacher is the one who does almost everything (1).

Discussion

The general view by many students that they found learning using computers to be useful was a positive sign towards the use of technology in instruction. However, more girls than boys found computers to be more useful. Gender differences on usefulness of computers in learning were noted among students where many boys found computers to be useful in searching for jobs, whereas many girls found them useful in internet access. Students of both sexes did not indicate the usefulness in particular contents of the study and few of them stated usefulness in accuracy of answers and information. At the time of conducting the study, students (in form two) were expected to have covered knowledge in basic computer skills that involved keyboard skills, creating new documents and editing; word process and spreadsheet. The syllabus used at this level looked more general in design and reflected the responses of students who could not specify the usefulness in particular content areas of study. However, students' views that computers were useful could be considered as an appreciation of the use of technology in learning. An earlier

study in a number of schools in Botswana showed that students did not consider the use of calculators to be useful in learning (Kaino and Salani, 2004). Such a finding could be regarded as a setback at the time when traditional ways of instruction were to be innovated and improved to cope with current developments in technology. Studies on students' perceptions on usefulness have been linked to participation in the subject studied. In mathematics for example, students' perceptions on usefulness were associated with activities and tasks performed in class (Meyer and Koehler, 1990).

The findings also indicated that both boys and girls enjoyed working on computers in class. Enjoyment in using computers could also have been influenced by students' perceptions on the usefulness of computers. Enjoyment in learning has been associated with the value students attributed to the subject studied. The study by Kulm (1990) indicated that students enjoyed subjects they valued. Value was associated with the subject that students performed well (Wigfield and Meece, 1998). It was beyond the scope of this study to establish whether value attributed to computer studies contributed to gender differences in enjoyment.

Concluding Remarks

The finding that views on usefulness of computers differed by gender was consistent with other studies elsewhere on gender disparities. However, the nature of the computer curriculum used at this level of schooling, might had an influence on the usefulness of computers in learning. Boys' more enjoyment in learning using computers than girls was also consistent with findings by other researchers. Though gender differences were noted in usefulness, there were indications that students had the opportunity to work independently to explore and discover knowledge. At the same time, students had the opportunity to work together, in a classroom environment they were comfortable with. While the findings of this study could not be generalized to reflect gender attitudes in all schools in the country, it was felt that attention should be drawn to the following for further study: (i) the nature of computer studies curriculum that targeted particular content areas where learners could identify as useful, and (ii) teaching using computers that involved particular activities and exercises (from identified content areas) that could motivate students especially girls to feel comfortable in learning and enjoy computer lessons.

Acknowledgement: The author acknowledges the Organization for Social Science Research in Eastern and Southern Africa (OSSREA) for funding the study. Reported findings are for junior level, being part of findings from a larger study funded by OSSREA.

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