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DIFFERENCE IN LITERARY SKILLS BY SEX AMONG PRIMARY SCHOOL PUPILS

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ABSTRACT: This study used a multivariate analysis design to investigate sex difference in the performance on literary skills among 473 pupils in primary schools in Tanzania. The study inquired whether there would be sex difference in the total performance on literary skills; and whether the difference in the three contents of literary skills (writing, reading, and numeracy) would be significant when age, type of pre-school attended, and duration of stay at pre-primary school are controlled. Results indicated mean differences between males and females with females being favored. Further analysis led to interpretation that the nature of such observed sex differences in the performance on literary skills among the pupils across grades one, two, and three do not emanate from sex (being a male or female) itself, but probably from the skills obtained in the type of pre-primary school one attended. Practical and theoretical implications are thoroughly discussed.

KEYWORDS: Literary skills, difference in literary skills by sex, performance on literary skills

INTRODUCTION

This study intended to investigate sex difference in the performance on literary skills among primary school pupils. The investigation was specifically done by addressing two research questions: first, whether there is sex difference in the total performance on literary skills and whether there is a significant sex difference in the three contents of literary skills (writing, reading, and numeracy) when age, type of pre-school attended, and duration of stay at pre-primary school are entered in the multivariate test equation. The term preprimary school in Tanzania refers to the education provided to children at the ages between 0-6 years prior to attending primary school education (URT, 1995). The pre-primary cycle is followed by another cycle of education known as primary school, which comprises grades one through seven. These clarifications apply throughout this manuscript whenever the terms are used. The transition from pre-primary to primary school education might positively or negatively affect pupils' academic performance. Other factors than the transition itself such as the content one learns in pre-primary level, sex, home and school environment and teachers are all mentioned to have an influence on the future academic performance of the pupil. This research was motivated by presence of literatures putting emphasis on sex difference in academic performance especially in lower levels of schooling.

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LITERATURE REVIEW

Though developmental studies and their implications on sex differences in academic achievement were very popular in 1980's (Arap-Maritim, 1986), in recent years, the magnitude, consistency, and stability across time of cognitive sex differences have been questioned (Voyer and Bryden, 1995). In western cultures, Maccoby (1966) and Maccoby and Jacklin (1974) indicates that girls perform better than boys on school tasks during the first four or five years of elementary school. In Kenya, Arap-Martim (1986) explored sex differences in class rank among 2,300 in Grades 1, 2, 3, 4, 5, 6, 7, and 8; and found that while more girls than boys were in the first top five class positions in Grades 1, 2, and 3, there were no sex differences in grades 4 and 5. On the other hand he found that more boys than girls were in the top five positions in Grades 6, 7 and 8. The study in Kenya by Arap-Maritim (1986) was based on the class rank, thus, could not specify specific content areas where girls performed better than boys, suggesting a need to investigate the specific abilities in the curriculum content and their relation to sex differences in performance. In addition, the fact that the differences are not permanent, changing with time, and in early primary schools, might raise curiosity because other variables than sex might be explaining these sex differences. For example, had sex been the only and sufficient factor to explain academic performance one could expect to sea such differences being consistent throughout the pre-primary and primary cycles of education levels. In response to this need the present study sought to investigate sex difference in literary skills. Throughout this manuscript, the term literary skills will refer to the three abilities, namely: writing, reading, and numeracy skills.

Duckworth, and Seligman, (2006) argue that throughout elementary, middle, and high school, while girls earn higher grades than boys in all major subjects, girls do not outperform boys on achievement or IQ tests. The authors put forward explanations for the under prediction of girls' GPAs by standardized tests being first, gender differences favoring boys on such tests and second, girls being self disciplined, become advantaged as it is more relevant to report card grades than to achievement or aptitude tests. As opposed to this view, in a meta-analysis study of 286 effect sizes from a variety of spatial ability measures Voyer and Bryden (1995) found Partial support for the notion that the magnitude of sex differences in cognitive abilities has decreased in recent years. Similarly, having located 165 studies that reported data on gender differences in verbal ability, Hyde and Linn (1988) found that the weighted mean effect size was +0.11, indicating a slight female superiority in performance. They argued that given such small difference, gender differences in verbal ability no longer exist. Their analysis of tests requiring different cognitive processes involved in verbal ability further yielded no evidence of substantial gender differences in any aspect of processing.

Lytton and Romney (1991) made a meta-analysis of 172 studies to resolve the conflict between previous narrative reviews on whether parents make systematic differences in their rearing of boys and girls, leading to sex differences in academic achievement. Most

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effect sizes were found to be non-significant and small. The authors have suggested that because little differential socialization for social behavior or abilities can be found, other factors that may explain the genesis of documented sex differences need to be investigated. The inconsistent results with regard to sex differences and their developmental explanations called for the need to investigate whether sex differences in academic achievement really exist in Tanzania, and the content areas in which such differences exist. Second, a need for a multivariate than univariate analysis deemed important for a better prediction of academic achievement from sex. Third, the interpretations of sex differences based on social theory do not explain behavioral variation existing between boys and girls that may account for their differences in academic achievement (Arap-Martim, 1986). Thus, a more relevant theory accounting for variation in school learning rather than socialization accounts had to be put in test for better outcomes regarding sex differences in school performance.

The theory of school learning as expounded in Bloom (1976) is an approach that proposes some variables that account for much of the variations in school learning. Two basic assumptions underlying this theory are first, the history of the learner is at the core of school learning; and second, it is possible to modify the characteristics of the learner during the instruction. The theory of school learning deals with three major variables. These are students' characteristics, instruction, and learning outcomes. According to Bloom, two major levels of student's characteristics that determine student learning are cognitive entry behaviors and affective entry characteristics. Cognitive entry behaviors refer to the prerequisite learning required for the learning tasks on which instruction is to be provided. Affective characteristics refer to the student's motivation to learn the new learning tasks. The instruction variables are defined in the theory as the quality of instruction. This is the extent to which the cues, practice, and reinforcements of the learning process are appropriate to the needs of the learner. The theory states that the cognitive entry behaviors, affective entry characteristics, and the quality of instruction determine the nature of learning outcomes, which are the level and type of achievement, rate of learning, and affective outcomes. This means that, given favorable learner's entry characteristics and quality of instruction, the learning outcomes are likely to be at a high or positive level, and little variation in the learning outcomes can be experienced.

Despite these theoretical explicit explanations, research seem to point out sex as another learner's characteristic to be considered in the research addressing variables explaining leaning outcomes. For example, Lietz (2006) reports that in 139 studies done in USA and Australia, adolescent girls perform better in reading than adolescent boys. In addition, Brozo (2011) reports that female students consistently read more than male students from primary education to higher education; and proposes gender as being a determinant of students' reading choices. Could sex sufficiently explain literary skills among primary school pupils? If yes, what could be the reason? It is for these curious questions, the present study intended to investigate sex difference in the performance on literary skills among primary school pupils. The investigation was specifically done by addressing two research questions: first, whether there is sex difference in the total performance on literary

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skills and whether there is a significant sex difference in the three contents of literary skills (writing, reading, and numeracy) when age, type of pre-school attended, and duration of stay at pre-primary school are entered in the multivariate test equation. Age, type of pre-school attended, and duration of stay at pre-primary school were taken as analogue to the history of the learner as one of the constructs of the theory of school learning. These were studied against literary skills as a dependent variable of the study.

METHODOLOGY

Characteristics of the Subjects

The participants in this study varied between a minimum of 6 and a maximum of 14 years with a Mean age of 8.80. Participants reported duration of their stay in pre-primary school being between 0 and 3 years. Other characteristics of the respondents are indicated in Table 1.

Variable	Level	Frequency	Percent
Location	Rural district	234	49.5
	Urban district	239	50.5
Sex	Male	234	49.5
	Female	239	50.5
Type of preschool attended	Did not attend	21	4.4
	Government	231	48.8
	Non-government	221	46.7
Grade of study	Grade one	157	33.2
	Grade two	162	34.2
	Grade three	154	32.6

Table 1: Characteristics of the Respondents

Measures

While independent variables were sex and the type of pre-primary school attended, age and duration of stay in pre-primary school were mediating variables. An outcome variable for the study was performance on literary skills test, based on Tanzanian grade one syllabus. The reliability of the test was checked by calculating the Cronbach's alpha. The Cronbach's alpha was found to be very good and preferable for internal consistency, $\alpha = .89$. The test scripts comprised sections testing reading, writing and numeracy skills.

Respondents were tested to check whether they could demonstrate ability to read and write in Kiswahili as well as numeracy abilities. The test comprised of three sections. Section one measured pupils' ability to listen and write. Some selected words were read to respondents by the researcher in a dictation form; and respondents were expected to write the appropriate words. In section two respondents' ability to identify and write the missing

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Kiswahili syllables was tested. The third section of the test checked the respondents' ability to write the words in capital letters. Lastly, respondents' numeracy skills were tested by checking early simple operations of subtraction and addition. Respondents were thus, compared in their performance in the three content areas that were writing, reading, and numeracy skills. Personal information such as age, sex, type of pre-primary school attended, were inquired from the respondents in the test scripts.

Sample Schools and Sample Size

In this study, the sample was obtained purposefully from the targeted population basing on some characteristics such as inclusion of pupils with and without pre-primary school experience, sex, and pupils with pre-primary school education experience from Government and those from non-Government schools. To achieve this, primary schools were selected from both Government and non-government school type. From five districts available in Dodoma region, two districts; one urban and one rural district were selected. From each district, two government and two non-government schools were included; making a total of eight sample schools. From the selected schools, and with assistance from academic masters, pupils were selected basing on the set characteristics such as sex, pre-primary education experience, type of pre-primary school attended (whether Government or non-Government). Lastly, the sample of 473 pupils in Grades one, two and three was drawn to include high versus low achievers in the class. The process was done in eight primary schools, four from urban district and four from rural district in Dodoma, a capital region of Tanzania.

RESULTS

Table 2: Descriptive Statistics on Literary skills Performance by Sex across Grades of Study

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Sex	Grade of study	Mean	SD	Ν
Male	Grade one	26.22	19.89	77
	Grade two	38.14	22.29	86
	Grade three	45.54	22.64	71
	Total	36.46	22.92	234
Female	Grade one	36.15	20.42	80
	Grade two	44.25	20.85	76
	Grade three	47.42	22.93	83
	Total	42.64	21.90	239
Total	Grade one	31.28	20.71	157
	Grade two	41.01	21.77	162
	Grade three	46.55	22.74	154
	Total	39.58	22.60	473

Is there sex difference in the performance on literary skills?

Dependent Variable: Total performance in Literary skills

Table 2 indicates that descriptively, there was sex difference in literary skills performance across grades of study. Generally, female pupils performed better (M=42.64; SD=21.71) than male pupils (M=36.46; SD=22.92) at all grades of study. The performances also

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increased with the increase in grade of study, whereby as expected, Grade One performance (M=31.28, SD=20.70) was lower than Grade Two performance (M=41.01, SD=21.77), which was also lower than Grade Three performance (M=46.55, SD=22.74).

4.2 Is there a significant sex difference in the three contents of literary skills (writing, reading, and numeracy) when age, type of pre-school attended, and duration of stay at pre-primary school are entered in the multivariate test equation?

A multivariate analysis of covariance (MANCOVA) was performed to investigate sex differences in the development of literary skills. Three dependent variables were used: performance on writing skills, performance on reading skills and performance on numeracy skills. The independent variables were sex and type of pre-primary school attended. As shown in Table 3, Using Pillai's trace, there was no statistically significant difference between males and females on the combined dependent variables, V = 0.01, F(3, 473) = 1.76, p > .05. On the other hand the combined dependent variables significantly correlated with Age [V = 0.02, F(3, 473) = 3.18, p < .05], Type of pre-primary school attended [V = 0.04, F(3, 473) = 11.27, p < .05], and duration of stay at pre-primary school [V = 0.06, F(3, 473) = 2.91, p < .05]. Lastly, there was an interaction effect between sex and type of pre-primary school attended, Roy's Largest Root [V = 0.02, F(3, 473) = 3.19, p < .05].

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.013	2.083 ^b	3.000	463.000	.102
	Wilks' Lambda	.987	2.083 ^b	3.000	463.000	.102
	Hotelling's Trace	.013	2.083 ^b	3.000	463.000	.102
	Roy's Largest Root	.013	2.083 ^b	3.000	463.000	.102
Age	Pillai's Trace	.020	3.183 ^b	3.000	463.000	.024
	Wilks' Lambda	.980	3.183 ^b	3.000	463.000	.024
	Hotelling's Trace	.021	3.183 ^b	3.000	463.000	.024
	Roy's Largest Root	.021	3.183 ^b	3.000	463.000	.024
Preduration	Pillai's Trace	.068	11.272 ^b	3.000	463.000	.000
	Wilks' Lambda	.932	11.272 ^b	3.000	463.000	.000
	Hotelling's Trace	.073	11.272 ^b	3.000	463.000	.000
	Roy's Largest Root	.073	11.272 ^b	3.000	463.000	.000
Sex	Pillai's Trace	.011	1.761 ^b	3.000	463.000	.154
	Wilks' Lambda	.989	1.761 ^b	3.000	463.000	.154
	Hotelling's Trace	.011	1.761 ^b	3.000	463.000	.154
	Roy's Largest Root	.011	1.761 ^b	3.000	463.000	.154
Pretype	Pillai's Trace	.037	2.914	6.000	928.000	.008
	Wilks' Lambda	.963	2.935 ^b	6.000	926.000	.008
	Hotelling's Trace	.038	2.956	6.000	924.000	.007
	Roy's Largest Root	.038	5.928°	3.000	464.000	.001
Sex * Pretype	Pillai's Trace	.021	1.618	6.000	928.000	.139
	Wilks' Lambda	.979	1.622 ^b	6.000	926.000	.138
	Hotelling's Trace	.021	1.626	6.000	924.000	.137
	Roy's Largest Root	.021	3.189°	3.000	464.000	.024

Table 3: Multivariate Tests

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The MANCOVA was followed up with discriminant analysis, which revealed one discriminant function, which explained 100% of the variance, canonical $R^2 = .02$. In totality, the discriminant function significantly differentiated the treatment groups, $\Lambda = .98$, χ^2 (3) = 9.14, p < .05. The correlations between outcomes and the discriminant function revealed that reading skills loaded the highest (r = 0.97); followed by numeracy skills (r = 0.90); and the writing skills (r = 0.90). The discriminant function plot showed that the function discriminated the male group from the female group.

The follow up discriminant analysis between the dependent variables and the type of preprimary school attended revealed two discriminant functions. The first explained 99.7% of the variance, canonical $R^2 = .036$, whereas the second explained only 0.3%, canonical $R^2 =$.000. In combination, these discriminant functions significantly differentiated the treatment groups, $\Lambda = .97$, χ^2 (6) = 16.59, p < .05, but removing the second function indicated that the second function did not significantly differentiate the treatment group, $\Lambda = 1.00$, χ^2 (2) = .05, p > .05. The correlations between outcomes and the discriminant functions revealed that reading skills loaded highly onto the first function (r = .93) and lower (r = .32) for the second. While writing skills loaded more highly on the first function (r = .85) than the second function (r = .30), numeracy skills loaded highly on the second function (r = .81) than on the first function (r = .58). The discriminant function plot showed that the first function discriminated both the 'Not attended' and the 'Government' groups from the 'Non-government' group, and the second function differentiated the 'Government' groups from the two groups.

DISCUSSION

In descriptive statistics a comparison of mean scores seemed to indicate sex differences in the performance on literary skills among the pupils across the grades. However, when a multivariate analysis which included age and pre-primary school attended was performed, sex difference in the performance on literary skills was not significant. Both MANCOVA and the follow up discriminant analysis indicated that the observed sex difference in the performance on literary skills favored females than males but with a very small effect size, suggesting very little practical significance. The analyses further revealed an interaction effect between sex and the type of pre-primary school one attended suggesting that the nature of such observed sex differences in the performance on literary skills among the pupils across grades do not emanate from sex (being a male or female) itself, but rather from the skills one obtained in the pre-primary school, which seems to differ with the type of pre-primary school one attended. This is because regardless of one's sex, pupils who attended non-government pre-primary schools performed significantly better than their counterparts who attended government pre-primary schools and those who did not attend pre-primary schools.

These findings are in line with other past studies (Hyde and Linn, 1988; Lytton and Romney 1991; Voyer and Bryden, 1995). All these authors concluded that the most effect

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sizes found in the studies about sex differences in academic achievement were very small and non-significant in practical applications. Though there were no any similar studies in the country to make comparison with, the findings of this study have shown a mutual agreement with many similar studies elsewhere outside Tanzania. On the other hand the present findings deviate from Maccoby (1966), Maccoby and Jacklin (1974) and Arap-Maritim (1986) all who indicate that girls perform better than boys on school tasks during the first four or five years of elementary school. Given the developmental changes across time following changes in technology, perhaps the most important point to discuss is the nature of such observed differences and whether such differences are still significant today. Recent studies (Lietz (2006; Brozo, 2011) in USA and Australia have also indicated that female students consistently read more than male students from primary education to higher education. Perhaps inconsistency in findings may originate from the tests biases and context of the studies (Brozo, 2011).

Implication to Research and Practice

Practical implications of these findings are threefold. First, there are some ethnical cultures in Tanzania where girls are still marginalized in terms of education access. It is thought, in these communities that girls are doing poorly in school tasks, thus, resources should not be wasted for their education. The findings of this study have indicated that where girls have been sent early to good pre-primary schools, they enter primary schools with necessary skills to enable them perform at the expected standards at the subsequent learning tasks in grades one, two, and three just like or even better than boys.

Second, pupils who attended non-government pre-primary schools performed better in literary skills development across all three grades, implying the discriminatory role of socioeconomic status in the education system in Tanzania. The fact that the number of Tanzanians who are able to afford education in the non-government pre-primary schools is relatively small, predicts that the gap between the 'community schools citizens' (pupils who does not attended pre-primary schools and those attending government pre-primary schools) and the 'non-government citizens' (pupils attending private and religious preprimary schools) groups will inevitably increase. This is because in Tanzania, relatively higher academic performance implies wider chances of employment and access to decision making bodies. Third, the fact that no difference was observed between pupils who did not attend pre-primary schools from those who attended government pre-primary schools in their subsequent performance on literary skills brings into sight the need for further investigation as to what is actually happening in the government pre-primary schools, which make no difference between the pupils who attended these schools and those who did not attend pre-primary schools at all! On the other hand, I believe that it is not just attending a particular type of pre-primary school that makes difference, but rather, in nongovernment pre-primary schools there must be some specific ways applied in fostering the necessary skills required in the subsequent learning, which are not applied in government pre – primary schools.

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The discussion on the theoretical implications of these findings is of paramount here. As suggested in the theory of school learning expounded in Bloom (1976), the history of the learner is at the core of school learning; and second, it is possible to modify the characteristics of the learner during the instruction. The theory of school learning deals with three major variables. These are students' characteristics, instruction, and learning outcomes. As the findings of this study suggests, there was some variations in the development of literary skills among pupils mainly attributed to their history. It is probably that the differences between those who attended non-government pre-primary schools and those who attended government or did not attend pre-primary schools was mainly due to the content learned and how that content was fostered. Such history of the learner is very important variable to consider before one attributes learning variation to mere sex variable. The applicability of the theory of school learning in an attempt to explain differences in the development of literary skills among pupils in Tanzania has therefore been supported.

Conclusions

This study intended to investigate sex difference in the performance on literary skills among primary school pupils. Two specific questions guiding the study were: Is there sex difference in the total performance on literary skills? Is there a significant sex difference in the three contents of literary skills (writing, reading, and numeracy) when age, type of preprimary school attended, and duration of stay at pre-primary school are entered in the multivariate test equation? In the light of the findings of this study, two conclusions can be made: First, the observed sex differences in the performance on literary skills in the descriptive analyses do not emanate from sex itself but rather from the cognitive history of the pupil such as in the type of pre-primary school attended. Second, given the finding that no difference was observed between the not attended group and the government group, it is, therefore, important to note that the type of pre-primary school one attended makes difference on the subsequent learning depending on the quality of instruction one obtained in that school.

Future Research

This study was not exhaustive enough to cover the discussion on the differences between the contents provided in the various types of pre-primary schools. Future research in the country might increase our knowledge by exploring the nature of the observed differences in the performance on literary skills between these types of pre-primary schools. The theory of school learning seems to apply in an attempt to explain school performance and literary skills inclusive. Future research in Tanzania might investigate all of its constructs to see the extent of its applicability in the country. Future research might also study the variables of the theory longitudinally to see how the independent variables predict subsequent learning in the country.

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