European Journal of Physical Education and Sport Science
ISSN: 2501 - 1235
ISSN-L: 2501 - 1235
Available on-line at: www.oapub.org/edu

doi: 10.5281/zenodo.290301 Volume 3 | Issue 1 | 2017

EFFECT OF CLASS SIZE ON THE LEARNING OF MOTOR SKILL AMONG SELECTED SECONDARY SCHOOL STUDENTS IN IFE CENTRAL LOCAL GOVERNMENT AREA OF OSUN STATE, NIGERIA

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Abstract:
The effect of class size on the learning of motor skill among selected secondary school students of Ife Central Local Government of Area of Osun state, Nigeria was examined. The study was experimental in nature and it involved pre-test and post-test using a novel skill (push pass in hockey). Three secondary schools where the game of hockey was neither taught nor played were purposively selected for the study. Participants were selected using stratified random sampling method with sex as the stratum. Participants for the study comprised 56 male and female students age 11-15 years that were not familiar with the skill. Three classes were drawn from the three schools. A small class size was drawn from School A with eight participants. In school B, a medium class size of 16 participants was drawn. The large class size of 32 participants was drawn from School C. Each of the classes had equal number of male and female participants. Push pass in hockey was measured at pre-test and post-test. Skill training took place after the pre-test measures. Mean and standard deviation were the descriptive analysis while t-test was the inferential statistic used for the data. The results of the analysis show that participants in medium class performed significantly better than participants in the large ($t= 2.81$: 46 $p<0.05$) and small ($t= 3.44$: 22 $p< 0.05$) classes in the learning of motor skill. Females in medium class size also performed

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significantly better than those in large class size (t= 4.13: 22 $p<0.05$) and those in small class size (t= 4.15:10 $p<0.05$). Gender is a significant factor in such learning.

Keywords: class size, motor skill, motor skill learning

1. Introduction

Throughout life, a vast array of motor skills are learned and retained. While certain skills such as walking and talking are primarily dependent upon maturation, others such as playing the piano and swinging a squash racket are primarily learned in a formal setting. Miguel & Machar (2009) defined Motor skill as an act or task that has a goal to achieve and that requires voluntary body or limb movement to be properly performed. Oxendine (1985) described motor skills as those behaviors that are demonstrated through smooth, well controlled and coordinated muscular movement. Oxendine divided motor skills into three broad categories according to the purpose and manner for which they were learned. First are the skills that are developed early in life and are primarily dependent on maturation. These include activities such as crawling and walking. The second group of motor skills involves those that are essential for the further development of educational objectives. The group includes communication skills such as handwriting, reading and observation which are used as tools for more advanced learning. The third category of skills includes those that are taught for their own values, for benefits that are directly related to the activity. Generally, vocational and recreational activities are in this group.

Motor learning can be described as a persistent change in movement behaviour potentiality as a result of practice or experience (Oxendine, 1988). Only the reference to "movement" behaviour distinguishes this from definition of learning in general. The range of movement responses encompassed in motor learning varies widely. Schmidt and Wrisberg (2008) also define motor learning as "*the changes associated with practice or experience, in internal processes that determine a person's capability for producing a motor skill.*" These changes are relatively permanent, that is, stored in long-term memory, and are associated with exercise or repetition of motor skills.

Learning of motor skills could be on a one-on-one basis, that is between the teacher and a learner or it could be between the teacher and a group of learners. Thus, class size refers to the actual number of pupils taught by a teacher at a particular time (Ehrenberg, Brewer, Gamoran & Willians, 2001). Ehrenberg and his colleagues (2001) also suggested that the number of students in a class has the potential to affect how much is learned in a number of different ways. For example, it could affect how

students interact with one another—the level of social engagement. This may result, for example, in more or less noise and disruptive behavior, which in turn affect the kind of activities the teacher is able to promote. It could affect how much time the teacher is able to focus on individual students and their specific needs rather than on the group as a whole. Jack & Peter (1997) opined that it is easier to focus on one individual in a smaller group. The smaller the class size, the more likely individual attention can be given, and an increase in the class size has a negative effect on student achievement.

This study was carried out to determine the effect which various class sizes have on the learning of motor skills and the relative effect of class size on gender.

2. Methodology

A pretest – posttest design was used for the study. Three Secondary schools were purposively selected. The schools were those where the game of Hockey was not taught or played. Participants for the study comprised 56 male and female students age 11 – 15 years. They were selected using stratified random sampling method with sex as the stratum. Three class sizes were used in this study; they are Small Class Size (SCS), Medium Class Size (MCS) and Large Class Size (LCS). Each class consisted of equal number of male and female participants randomly selected. A SCS was drawn from school A. where eight participants were in the class. In school B, a MCS of 16 participants was drawn. The LCS of 32 participants was drawn in school C.

A novel motor skill which is the Push Pass in field hockey was the skill of interest in this study. A pre-test measurement of the skill was carried out on participants in the three different class sizes after which they were taught and trained in the same skill. The post-test was measured after training, all testing and training for the classes were done in a single day for each group.

2.1 Procedure

2.1.1 The pre-test

For the pre-test, participants were shown how to hold the hockey stick and instructed to execute a push pass to a target 4ft wide and at a distance of six meters. This was to test and measure the participants' ability to execute the skill before being taught. Three trials were allowed for each participant.

2.1.2 The Training

After the pre-test, each of the classes was taught the skill for 25 minutes using Descriptive and Demonstration methods, and a period of 10 minutes was allowed for each participant to practice the skill taught. Participants were allowed to make several execution of push pass to the target during practice. The researcher made corrections and emphasized necessary coaching points during practice session.

2.1.3 The post-test

The post-test was carried out after the skill was taught on the same day. This was done to measure the students learning of the skill. The students were allowed three attempts to execute a push pass to the same target that was used in the pre-test.

2.3 Measurement of Performance

Performance of the participants in the push pass skill on target was carried out at the pre-test and post-test stages. The performance score schedule used is listed as follows;

- Ball on target directed at either the left or right angle of the target…...….10 points
- Ball on target directed to centre of the target…..……..…5 points
- Ball outside the target…….……1 point

2.4. Data Analysis

Mean and standard deviation were the descriptive analysis used for the data. For inferential statistics, the *t-test* analysis using the mean different score **($\bar{x}$ *d*)** between the pre-test and post-test was used to determine if there are significant differences in the performances based on class sizes and gender.

3. Results

The summary of the comparison of performance between the three different class sizes and gender using the *t-test* analysis is presented Tables 1, 2 and 3.

Table 1: *t-test* analysis of $\bar{x}$ *d* score of male and female participants performances within the classes

Class Size	Male		Female		*t*-value		Probability Level	*df*
	$\bar{x}$ *d*	SD	$\bar{x}$ *d*	SD	Calc.	Crit.		
LCS	4.60	1.60	2.94	1.55	2.05	2.02	0.05	31
MCS	5.25	1.87	6.04	1.35	0.69	2.13	0.05	15
SCS	2.83	1.05	3.58	1.61	0.53	2.37	0.05	7

In Table 1, it is observed that the $\bar{x}_d$ ***score*** of male and female participants' performances were compared in their various classes and there is a significant difference in the performances of male and female participants in the LCS. This indicates that the performance of male and female participants in the LCS was significantly different with the male participants performing better. There were however no significant differences between male and female participants in the MCS and SCS. This indicates that the performance of male and female participants within the MCS and SCS are similar.

Table 2 presents the *t-test* of difference scores for male and female participants between class sizes and gender.

Table 2: *t-test* analysis of $\bar{x}_d$ score of male and female participants performances between the different class sizes

Class Size	Large		Medium		Small		*t*-value		Probability level	*df*
	$\bar{x}_d$	SD	$\bar{x}_d$	SD	$\bar{x}_d$	SD	Calc.	Crit.		
Male										
LCS & MCS	4.60	1.60	5.25	1.87			0.59	2.07	0.05	22
LCS & SCS	4.60	1.60			2.84	1.05	0.49	2.18	0.05	18
MCS & SCS			5.25	1.87	2.84	1.05	2.19	2.32	0.05	10
Female										
LCS & MCS	2.94	1.55	6.04	1.35			4.13	2.07	0.05	22
LCS & SCS	2.94	1.55			5.38	1.61	0.62	2.10	0.05	18
MCS & SCS			6.04	1.35	5.38	1.61	4.15	2.23	0.05	10

In Table 2, it is observed that the $\bar{x}_d$ score of male and female participants' performances between the different class sizes were compared. There is no significant difference in the comparison of performances of the male participants between all the class sizes. This also indicates that the performances of the male participants between the different class sizes are not statistically significant. However, in the comparison of the performances of the female participants between the various class sizes, only the comparison of the performances of the female participants in LCS and SCS was not statistically different. There was a significant difference in the comparison of the female participants' performances between LCS and MCS, and MCS and SCS, with the female participants in the MCS performing better than those in both LCS and SCS.

Table 3 presents the t-test analysis of the difference score performance of the three class sizes.

Table 3: *t-test* analysis of $\bar{x}_d$ score performance of the three class sizes

Class Size	Large		Medium		Small		*t*-value		Probability Level	*df*
	$\bar{x}_d$	SD	$\bar{x}_d$	SD	$\bar{x}_d$	SD	Calc.	Crit.		
LCS & MCS	3.77	1.49	5.65	1.66			2.81	2.00	0.05	46
LCS & SCS	3.77	1.49			3.21	1.41	0.64	2.02	0.05	38
MCS & SCS			5.65	1.66	3.21	1.41	3.44	2.07	0.05	22

In Table 3, all the various class performances were compared. The comparison of the LCS and SCS was not significantly different. This indicates that the performances of the participants in the LCS and SCS are not statistically significant. This however is not the case with the comparison of participants' performances in the LCS and MCS and in the MCS and SCS. There were significant differences in the comparison with the MCS performing better than the LCS and SCS.

4. Discussion

The purpose of this study was to determine the effect of class size on the learning of motor skill. Push pass in hockey was used for the study as a novel skill to participants in three different class sizes. It was hypothesized the there is no significance in the learning of motor skill based on class size and gender.

Results from the study show that participants in medium class performed better than participants in both large and small classes. This is in contrast to Bain and Achilles (1986) study. They reported that students in smaller classes performed better than students in larger classes. Bain and Achilles (1986) made their report on the Project Prime Time study in Indiana, U.S.A. Also, Alex, Philip, & John, (2000) reported that the Wisconsin, SAGE program (1999) concluded that the smaller the class size, the better the students' performance. Frederick (1995) also reported on the Tennessee study of class size conducted in 1985-1989 (STAR) that the minority group gained more than others when they are in small size classes.

Results from this study shows that the medium class performed better than the large and small classes. One would have expected the small class to perform better but this was not the case. The observed situation may be because the participants in the small class sizes had too much time for themselves and that may have resulted in distractions while participants in the medium class had just enough time for learning. Participants in the Small class size were rather more reserved to themselves than participants in the Medium class size.

In the Wisconsin study, SAGE (1999) made use of a small class size 15 students to one teacher. The medium class of this study had a class size of 16 students to one teacher. This means that class smaller than this range may be affected by some other factors which are not within the scope of this study. Factors such as learner's socioeconomic background, hereditary, learning environments, climate etc. may have influence on learning in small class settings.

Regarding the issue of gender, there was a significant difference in the performances of male and female participants in the LCS. In Table 1, the male and female participant performances were compared and in the LCS, there was a significant difference in their performance with the male participants performing better than the female participants. This supports the work of Venetsanou and Kambas (2007). They stated that gender has a significant effect on learning. However, Venetsanou and Kambas (2007) carried out their study on balance skill in preschool age children. This may have accounted for their result.

From this study, it could be seen that class size seems to be a significant factor that can affect the learning of motor skill such as push pass in hockey. However, learning is a multi-dimensional structure and as such, cannot be affected by only class size. And there is a significant effect of gender in the learning of push pass in hockey as a motor skill.

5. Conclusion

Within the scope of this study, it was concluded that the medium class size is more amenable to the learning of motor skill and that gender is a significant factor in such learning.

6. Recommendation

Based on the findings of this research, it will be recommended that Schools should adopt a class size of between 15-18 students to one teacher in motor skill classes as learning is more efficient at this class size

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