

*Full Length Research*

# Effect of Fixed and Floating Facilitator Problem Based Models on Students Psychomotor Process Skill Acquisition in Dart Manipulation

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Accepted 26 October 2017

This study investigated the effect of fixed and floating facilitator models of problem-based-learning (PBL) on students psychomotor process skills acquisition in dart manipulation. 2 research questions and null hypotheses guided the study. The study adopted a quasi-experimental design. The sample size was 208 Home Ecomics students. Two instruments; Dart manipulation psycho-productive process skill test (DMPPST) and a rating scale were used to collect data. Data obtained were analysed using mean and standard deviation, while the null hypotheses were tested at .05 level of significance using analysis of covariance (ANCOVA). Students taught using floating facilitator model had higher psycho-productive process skills (PPPS) achievement score than their counterparts. Male students taught Dart Manipulation using floating facilitator (PBL) had higher (PPPS) achievement score than their female counterparts. There was no statistically significant main effect ( $p > 0.05$ ) of gender on students (PPPS) acquisition in Dart Manipulation. There is need for clothing and textile teachers to adopt floating facilitator model of (PBL) in teaching psychomotor skills in Dart manipulation at higher institutions in North Central. Based on the findings of this study, recommendations were made.

**Key word:** Skill-acquisition, fixed and floating facilitator, problem-based learning, psychomotor.

**Cite This Article As:** Nwadi CL, Igbo CA (2017). Effect of Fixed and Floating Facilitator Problem Based Models on Students Psychomotor Process Skill Acquisition in Dart Manipulation. *Inter. J. Acad. Res. Educ. Rev.* 5(5): 148-153

## INTRODUCTION

Darts are forms of lines (design element) used for style production. They are formed by arrangement of lines in different directions. Darts may change in size, number and direction and are at times placed in a seam to accommodate a style that may sometimes be made invisible. This process of changing dart from one position to any other is known as dart manipulation (Igbo and lloeje 2013). Darts may sometimes be changed to gathers, tuck or soft pleats, thus used to create new fashion depending on the prevailing style. Darts can be moved around the block in different directions to form styles. These movements include: moving waist dart to

shoulder, bust dart to neckline, waist to under arm, bust dart to armhole and movement of dart to form the princess line. These movements produce different designs which solve figure problems. The use of darts in garment is one of the effective areas of process skills acquisition in garment making. Effective process skills acquisition in Dart manipulation concept may be in the area of psychomotor domain which will lead to the production of self-reliant individuals that could enter into garment making industry. Darts manipulation process which involves this present study is concerned with performed actions that are neuromuscular in nature and

involves imitation, manipulation, precision, articulation and naturalization (Borich, 1996 and Simpson, 1972). Psychomotor ability is primarily associated with low complexity and high speed of processing (Ackerman 1990). The psychomotor process domain is hierarchical with higher levels being more complex and depending upon mastery of the lower levels. With movement to more complexity in acquisition of psychomotor process skill one becomes more involved, committed and self-reliant. In spite of the importance and benefits of dart manipulation concept in garment making to individuals, teachers and students, there is inadequate acquisition of psychomotor process skills by the students.

A close examination of factors responsible for the acquisition of this inadequate process skill on dart manipulation maybe because of utilization of inappropriate teaching approaches.

For the teaching of psychomotor process skills in dart manipulation which is psychomotor in nature to be effective, it requires a fair knowledge of pattern drafting, which involves drawing and sketching. This combination no doubt makes some concepts in the subject sound so abstract in nature that most teachers of clothing and textile are faced with difficult task of explaining the abstract concepts to the students. Since students that offer the clothing and textiles come from different academic and professional backgrounds, there is need to identify the best teaching approach to cater for these observed differences. Specifically, Pandey (2012) advocated for problem based learning approach of teaching.

Problem-based learning (PBL) is a method of instruction that uses ill-structured problem as a context for students to acquire problem solving skills and basic knowledge. PBL may be a solution to messy problem which help students' process skills acquisition in dart manipulation which is a process skill. In addition, PBL has models or examples to copy. The models are: (1) fixed or peer facilitator (2) Floating facilitator and (3) hybrid facilitating models. The present study is based on fixed and floating facilitator models. In fixed facilitator models, the teacher (facilitator) guides the students through their discussions of the problem. The work is done by the students in their groups and with the facilitator guiding every step of the group activity.

In the floating facilitator model, the teacher (facilitator) allows the students to work on their own, but moves around at intervals, from group to group listening to the students and probing their understanding. These two models were chosen because the processes of their applications are in line with the problem-solving skills needed for effective learning of dart manipulation.

Process skill acquisition indicates what students irrespective of their gender have acquired during the process of manipulations. Gender involves ascribed attributes that differentiates feminine from masculine

socially. In order to ascertain observable skill acquisition in dart manipulation, there is need to measure their process skills by using well-constructed and validated Psycho-productive skills test, after teaching with the fixed and floating problem solving facilitator models.

This study therefore was designed to investigate the effect of two models of problem based learning approaches (fixed and floating) on students' process skills acquisition in Dart manipulation.

## PURPOSE OF THE STUDY

The major purpose of the study was to investigate the effect of fixed and floating models of problem-based learning approaches on students' process skills acquisition in dart manipulation. Specifically, the study determined the:

1. Effect of fixed and floating facilitator models of (PBL) on the mean psychomotor process skills acquisition in dart manipulation.
2. Influence of gender on the mean process psychomotor skills acquisition in dart manipulation.

## RESEARCH QUESTIONS

The following research questions guided the study:

1. What is the effect of fixed and floating facilitator models of (PBL) on the mean psychomotor process skills acquisition in dart manipulation?
2. What is the influence of gender on the mean psychomotor process skills acquisition in dart manipulation?

## HYPOTHESES

The following Null hypotheses guided the study

**Ho<sub>1</sub>:** There is no significant difference in the psychomotor process skill acquisition of students taught dart manipulation with fixed facilitating model and those taught with floating facilitating model.

**Ho<sub>2</sub>:** Gender has no significant influence on the psychomotor process skill acquisition of students taught dart manipulation with fixed facilitating model and those taught with floating facilitating model.

## METHODOLOGY

### Area of study

This study was carried out in the North central states of Nigeria. The North central state of Nigeria is made up of

seven states. These include; Kogi, Benue, Nassarawa, Niger, Plateau, Kwara and FCT Abuja. All the accredited Government Federal and State Colleges of Education that enroll students for Home Economics in the Nigeria Certificate in Education (NCE) Examinations were used for the study. The zone was chosen because they have reasonable number of male and female regular Home-Economics students allowed for effective comparison of process skill acquisition.

### Design of the Study

The study adopted a quasi-experimental design.

### Population for the Study

The population for the study consisted of all the 426 NCE III Home Economics students in the 14 Federal and State Government Colleges of Education in North central states of Nigeria in 2010-2013 academic session where Home-Economics was offered as compulsory vocational subject.

### Sample and Sampling Techniques

The sample size was 208 Home Economic students comprising 151 females and 57 males. Purposive sampling techniques were used to draw four Government colleges of education. The four colleges were drawn because they had reasonable number of males and females students that will allow for effective comparison of acquisition of process skills. Other colleges were dropped because the numbers of females and males students of Home-Economics were grossly inadequate for effective comparisons. Two schools were assigned to one experimental model while the other two were assigned to another experimental group. All information about the group were obtained from the personnel department of the various colleges of education 2010-2013.

### Instrument for Data Collection

The instruments for data collection were Dart manipulation psycho-productive process skill test (DMPPST) a rating scale and two instructional problems based learning lesson plans fixed and floating. The reliability of the instrument DMPPST was determined using Kuder – Richardson formula 20 ( $k - R 20$ ).

### Method of data collection

At the beginning of the experiment the researcher, with the regular Clothing and textile teacher in the Colleges of Education administered the pre-test of the (DMPPST) to the treatment groups. At the end of the experiment, the

DMPPST was administered to the two groups as posttest. For each of the groups data for the pre-test and posttest were recorded separately.

### Method of Data Analysis

Standard mean was used to answer all the research questions. Standard deviation was used to determine the degree of deviation from the mean, while analysis of covariance (ANCOVA) was used to test null hypothesis at '0.05' level of significance. The analysis was carried out using the statistical package for the social sciences (SPSS).

### Findings of the Study

The findings of this study are presented as follows:

1. Students taught Dart Manipulation using floating facilitator PBL approach had higher mean psycho productive process skills achievement scores ( $34.33 \pm 5.02$ ) than their counterparts taught using fixed facilitator PBL ( $33.16 \pm 4.24$ ). There was statistically significant mean psycho productive process skills achievement scores ( $p < 0.05$ ) of students taught Dart Manipulation. See table 1
2. Male students taught Dart Manipulation using floating facilitator PBL had lower mean psycho productive process skills achievement scores of ( $34.17 \pm 5.74$ ) than their female counterparts ( $34.39 \pm 4.73$ ). The result revealed that there was no statistically significant main effect ( $p > 0.05$ ) of gender on students' psycho productive process skills achievement in Dart Manipulation. See table 2

## RESULTS

Data presented in Table 1 shows the pretest and posttest dart manipulation mean psychomotor scores of students in experimental group A and B.

The students who were taught using fixed facilitator model of problem based learning approach (model A) had a pretest psychomotor process skill mean score of 16.36 and a posttest mean score of 33.16. This gives the pre/post mean gain score of 16.80. The students who were exposed to the floating facilitator model of problem based learning approach (model B) had a pretest mean psychomotor process skill score of 15.41. Their posttest mean score was 34.33. This gives a pre/post mean psychomotor gain score of 18.92. This shows that although students who were exposed to fixed facilitating model performed in pretest, those who were exposed to

**Table 1.** Mean response on effect of fixed facilitator and floating facilitator model on mean psychomotor process skill scores in dart manipulation.

GROUPS				N	PRETEST $\bar{X}$	POSTEST $\bar{X}$	MEAN GAIN $\bar{X}$
A	psychomotor model	fixed	facilitating	100	16.36	33.16	16.80
B	Psychomotor model	floating	facilitating	100	15.41	34.33	18.92

**Table 2.** Mean response of influence of gender on psychomotor process skill scores of students in dart manipulation.

	Gender Fixed Facilitating Model				Floating facilitating Model			
	N	Pretest $(\bar{X})$	Posttest $(\bar{X})$	Mean Gain $(\bar{X})$	N	pretest $(\bar{X})$	Posttest $(\bar{X})$	Mean Gain $(\bar{X})$
Male	25	17.24	32.76	15.52	30	15.10	34.17	19.07
Female	75	16.36	33.16	16.80	70	15.54	34.39	18.85

floating facilitating model of problem – based learning environment did better in posttest dart manipulation psychomotor skill. This suggest that the group exposed to the floating facilitator model enjoyed problem based learning approach especially during posttest / after teaching, better than their counter parts who were exposed to the fixed facilitating model.

Data in Table 2 revealed the psychomotor pre and posttest mean score of students based on their gender. The males in the fixed facilitating model groups had a pretest mean score of 17.24 in dart manipulation test; their posttest maen score was 32.78. This resulted to a pre/post mean gain score of 15.10. The males in the floating facilitating model groups had a pretest mean score of 15.10; their posttest mean score was 34.17. This resulted to a post/pretest mean gain score of 19.07. While females in the fixed facilitating model groups had pretests mean score of 16.36 in dart manipulation test; their posttest mean score was 33.16. This resulted to a pre/posttests mean gain score of 16.80. The females in floating facilitating model group had a pretest mean score of 15.54; their posttest mean score was 34.39. This resulted to a pretest/posttest mean gain score of 18.85. This implies also that gender had no influence on students' acquisition of psychomotor process skills in dart manipulation.

**Ho<sub>5</sub>:** Gender has no significant influence on the psychomotor process skill acquisition of students taught dart manipulation with fixed facilitating model and those taught with floating facilitating model.

The result presented in table 3 showed no significant difference of .52 on gender. This significant of F is higher than the probability level of .05. This means that there is

no significant difference. The null hypothesis of no significant difference in male and female students (gender) taught with fixed or floating facilitating models in psychomotor skills in dart manipulation therefore is upheld.

**Ho<sub>6</sub>:** There is no significant interaction effect of treatments given to students and their gender with respect to their psychomotor process skill acquisition in dart manipulation.

**DISCUSSION**

Result of data analysis in table 1 has shown that students taught dart manipulation using floating facilitator model, performed significantly better with the floating facilitator model during posttest. Table 1 shows that while the floating facilitator group had high process skill acquisition, the fixed had low mean process skill acquisition score. The result shows that the floating group differed from the fixed facilitator group in the acquisition of psychomotor process skill acquisition by the students. The relative superiority of floating facilitator approach over the fixed facilitating approach in enhancing student's psychomotor skills is attributed to the fact that as instructional approaches, the floating facilitator approach ensured more active participation of students yet under the guide and facilitation of the teacher in the teaching learning process. The students do more on their own than the fixed facilitator approach. The floating facilitator approach often subjects the learners to the position of self-participation and doing. This result differs from Omeje (2013) who found that fixed facilitator approach had the relative superiority over the floating approach in

**Table 3.** ANCOVA analysis on psychomotor process skills of students taught with fixed facilitating model and those taught with floating facilitating model.  
Tests of Between-Subjects Effects

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	151.554 <sup>a</sup>	4	37.888	1.760	.138
Intercept	3365.165	1	3365.165	156.33	.000
Pretest	77.285	1	77.285	3.590	.060
Treatment	97.105	1	97.105	4.511	.035
Gender	9.076	1	9.076	.422	.517
Treatment * Gender	5.435	1	5.435	.253	.616
Error	4197.435	195	21.525		
Total	232060.250	200			
Corrected Total	4348.989	199			

<sup>a</sup>Significant at Sig of  $F < .05$ . Dependent Variable: Posttest

enhancing students' achievement in elementary structural design. However, the significant psychomotor skill acquisition of students in dart manipulation in floating facilitator model group could be explained by the fact that this approach of problem based learning creates a learning environment in which students are given the opportunity to participate actively in the learning situation and learning to find by themselves solutions to their dart manipulation problems.

The result of this study as revealed in table 2 showed that gender has no influence on students' psychomotor process skill acquisition in dart manipulation, however there was slight different in process skill acquisition of those exposed to the two models of PBL in favour of floating facilitator model. The result of this study support the finding of Nzewi and Osisioma (1994) who has it that there is no significant difference in influence of gender on mean achievement score in science and other related science subjects. The result of this study is in variance with the finding of Daluba and Audu (2010) when they both found that male students had higher scores than their female counterparts in agricultural science.

Research findings have showed that students psychomotor ability do not depend on their gender but that students may acquire differently the learned skills being presented to them due to the type of learning environment they are exposed to. It is therefore possible that exposure to the models of problem based learning environment which made students to benefit equally in dart manipulation psychomotor process skill acquisition irrespective of their gender also could have been responsible to the non-significance in the influence of gender in psychomotor process skill acquisition.

Table 3 indicated that there is no significant interaction effect of treatment and gender on students' psychomotor process skill in dart manipulation. This finding

contradicted the findings of Ibitoye (2005) who found a higher achievement in favour of females in agricultural science practicals even though one may be expecting that the performance of males could be higher. Similarly, Musa (2007) posited that gender by method interaction is significantly and positively associated with learning outcomes in physics and professional skills. This is an indication that there is inconsistency in research result concerning the effect of treatment and gender on students' psychomotor process skills acquisition. The difference in responses may be as a result of the difference in the subject area and location.

## CONCLUSION

Given that the acquisition of psychomotor skill and competencies in clothing and textile concept likedart manipulation is a prerequisite for entry into clothing construction related occupations, the need to find out the best approach of teaching to assist NCE students to learn and improve their psychomotor skills is paramount. This study found out that the use of floating facilitator model of PBL approaches is more effective in improving student's psychomotor process skill acquisition in dart manipulation than the fixed facilitator approach. The study revealed that, there was no influence attributable to gender on students' process skill acquisition in dart manipulation. Also, the study found out no interaction effects of the two approaches (fixed and floating) and gender on psychomotor process skill acquisition in dart manipulation. This simply means that the effectiveness of floating facilitator model of PBL approach on student's process skill acquisition in dart manipulation does not depend on gender. Hence, irrespective of sex, learners will record improved psychomotor process skill

acquisition when the floating facilitator approach is employed for teaching dart manipulation in clothing and textile. These results therefore showed that the floating facilitator model is a viable teaching approach for dart manipulation concept in clothing and textile.

Furthermore, the structured collaborative format employed in the floating facilitator model gives clothing and textile teachers' opportunity to engage students in real world problem-based learning approach. It also gives students the opportunity to develop valuable thinking skills in dart manipulation concept. Since, the use of floating facilitator approach is clearly an approach that reflects the construction practices and provides students with learnable materials for creative thinking; if the floating facilitator approach is used for teaching dart manipulation to NCE students, the students trained will graduate with skills and competencies in designing and construction needed in the field of clothing and textile.

## RECOMMENDATIONS

In view of the afore-mentionable implications of the result of this study, the following recommendations were made:

1. Given that the efficacy of floating facilitator instructional model in fostering students' acquisition of psychomotor process skill in dart manipulation, it is instructive that Nigerian clothing and textile teachers should adopt floating approach in teaching dart manipulation and other practical concepts in clothing and textile in colleges of Education

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