



Collaborative Flipped Learning in Monolingual and Bilingual Classrooms and Students' Learning Outcomes in Science in College of Education, Ekiti State. Nigeria

****Oladosu, Adebisi Toyosi & **Daramola, Mercy Adesola***

**Department of Biology, School of Science, College of Education, Ikere, Ekiti State, Nigeria. **Department of Integrated Science, School of Science, College of Education, Ikere, Ekiti State, Nigeria.*

Abstract

A flipped model of personalized learning was adopted using WhatsApp for monolingual and bilingual classrooms. A total of 90 purposive sampled biology students from College of Education, Ikere, Ekiti State, Nigeria were used for the study. The treatments and control groups consist of 30 students each. These treatments groups were flipped before each of the instruction using the students' WhatsApp application. Meanwhile, monolingual group was strictly restricted to the lingual franca as means of instructional delivery as well as when the students collaborate. In the other treatment group, students in the bilingual could speak the language of their immediate environment during collaboration in the classroom and they were encouraged to do so. Standardized Biology Achievement Tests were administered on the three groups. The findings from the study show that students in the bilingual collaborative classroom performed better than those in the monolingual; and those in the monolingual collaborative flipped classroom performed better than those in the traditional group but without statistical significance difference. It was therefore recommended among others that, language of the immediate environment should be

incorporated into instructional strategy when students are collaborating in flipped classrooms.

Keywords: *Collaborative, Flipped Learning, Monolingual, Bilingual, Students' Learning Outcomes*

Introduction

The emergent of new technologies has revolutionized the ways and manners information is being handled and processed. Its attendant effects on walks of life are so profound to the extent that the globe cannot assume completeness without recourse to its utilization. Education, which is an instrument per excellence (NPE, 2013); and the bedrock of national development is rapidly responding to the impacts of these new technologies. Mujibul (2007) had remarked that “adjusting education to societal needs of the future means that schools have to enable learners to be continuously active in the sense of lifelong learning”. The fact that, the products of education are consumed by the economy of the society, places needed necessity on the importance of these new technologies because of the influence they are having on the educational system.

Dexter and Riedel (2003) posited that “to prepare new teachers to use technology within their programmes of preparation, schools and colleges

and departments can develop the required course work in which students learn how to operate and teach with technology and set expectations that students demonstrate their integration abilities during student learning”. It was further reiterated that, setting these expectations for designing and delivering instruction using technology was effective in getting student teacher to use technology during clinical experiences (i.e. teaching practice.). The effective use of technology in education has changed the face of education and it has created more educational opportunities, Karenka (2013). In the words of Intel

‘technology is transforming education, changing how, when and where students learn and empowering them at every stage of their journey’ Intel (2016) pg1.

Lambodu (2019) posited that ‘two of the most popular and successful learning models currently used by educators and institutions are

collaborative learning and the flipped classroom', Earlier, Oladosu (2018) had submitted that flipped classroom using readily available technology like WhatsApp should be infused into the paradigm shift brought about in technology-enhanced classroom for improved learning of biology and science in general. Flipped classroom according to Bishop and Verleger (2013) is the opposite of traditional classroom, where the learners listen to the lecturer outside the class through the video and establish interactive group discussion in the classroom.

The academic achievement of Biology students at the secondary level of education has been poor in recent past (Ali, Torimen and Geison, 2014) with its attendant effect, with several factors responsible for the abnormal performance (Eremina and Regnald, 2016). Monolingualism according to Collins English Dictionary is "the state of understanding or having the knowledge to speak and write only one language". Bilingual education involves teaching academic content in two languages. It could be in a native and secondary language with varying amount of each language used in accordance with the programme model.

The use of mother tongue according to Fafunwa (1978) has greater surrender value and makes the child a better integrated and adjusted citizen in his community. The important of native language was emphasized in the instructional delivery in the work of Fishman, 2006; de Jong and Herper, 2011 and de Jong, 2013). It is highly instrumental to note that, the multi-cultural diversities of a Nigeria nation continues to place premium on the use of one unified official language to ensure uniformity of curriculum content, implementation and evaluation. However, this was not without its arrays of short comings with students losing identities of their immediate background. Worst still, these students are neither fluent in the use of the 'lingual franca' nor experts in the use of their mother tongues.

Fafunwa (1978) while advocating for the use of mother tongue submitted that "there is convincing evidence that teaching of the primary school level via mother tongue is a rewarding activity with lasting salutary effect". It is no gain saying that, despite the strategic importance of science in the overall development of any nation, Nigeria is still struggling to meet up with her contemporary's world over. It is instrumental to note that, this continuous dearth of technologically-inclined pool of citizens is fallout of the products of the education system. It is premised on the continuous need and necessity to

improve on the learning outcomes of students in science generally and Biology in particular, and also to engender the quest for technologically friendly environment by optimizing the available technology facilities that this study was undertaken.

It is noteworthy that, in this research, the challenges of observed by Schwarzer & Acosta (2014) in their work was technically surmounted because as students in tertiary institution, the bilingual classroom was entirely free to collaborate; with teacher only facilitating the teaching-learning process; same applied to monolingual collaborative group. As an emphasis, the bilingual groups were not restricted to the use of mother tongue but what the researchers called language of the 'immediate environment' which all the participating students speak and understand. The main objective of the research was to investigate the effects of collaborative flipped learning in monolingual and bilingual classrooms on students' learning outcomes in Biology. Hence for this purpose, the three research questions generated were answered using mean achievement scores, while the three hypotheses formulated were tested using t-test statistic at the 0.05 significance level.

Research Questions

1. What is the mean score of students taught in collaborative flipped model of monolingual classroom?
2. What is the mean score of students taught in collaborative flipped model of bilingual classroom?
3. What is the mean score of students taught in traditional method of instructional strategy?

Hypotheses

1. There is no significant difference in the mean scores of students taught in collaborative flipped model of monolingual and that of bilingual classrooms
2. There is no significant difference in the mean scores of students taught in collaborative flipped model of monolingual and those taught in the traditional classroom
3. There is no significant difference in the mean score of students taught in collaborative flipped model of bilingual and those taught in the traditional classroom

Results and Discussions of Findings

In this section, the results of data analysis and the interpretation are provided hereunder.

Question 1: What is the mean score of students taught using collaborative flipped model of monolingual classroom and those taught using traditional method?

Table 1: Analysis of Mean Achievement of Biology Students

| <i>Group</i> | <i>N</i> | <i>Mean</i> | <i>SD</i> |
|----------------------------------|----------|-------------|-----------|
| <i>Collaborative Monolingual</i> | 30 | 11.87 | 1.87 |
| <i>Traditional</i> | 30 | 11.20 | 2.24 |

Table 1 shows the analysis of mean achievement of Biology students when taught using collaborative flipped model of monolingual classroom and those taught using traditional method. The results showed that students taught using collaborative flipped model of monolingual classroom had a mean score of 11.87 while those taught using traditional method had a mean score of 11.20.

Question 2: What is the mean score of students taught using collaborative flipped model of bilingual classroom and those taught using traditional method?

Table 2: Analysis of Mean Achievement of Biology Students

| <i>Group</i> | <i>N</i> | <i>Mean</i> | <i>SD</i> |
|--------------------------------|----------|-------------|-----------|
| <i>Collaborative Bilingual</i> | 30 | 15.97 | 2.22 |
| <i>Traditional</i> | 30 | 11.20 | 2.24 |

Table 2 shows the analysis of mean achievement of Biology students when using collaborative flipped model of bilingual classroom and those taught using traditional method. The results showed that students taught using collaborative flipped model of bilingual classroom had a mean score of 15.97 while those taught using traditional method had a mean score of 11.20.

Question 3: What is the mean score of students taught using collaborative flipped model of monolingual classroom and those using collaborative flipped model of bilingual classroom?

Table 3: Analysis of Mean Achievement of Biology Students

| <i>Gender</i> | <i>N</i> | <i>Mean</i> | <i>SD</i> |
|----------------------------------|----------|-------------|-----------|
| <i>Collaborative Monolingual</i> | 30 | 11.87 | 1.87 |
| <i>Collaborative Bilingual</i> | 30 | 15.97 | 2.22 |

Table 3 shows the analysis of mean achievement of Biology students when taught collaborative flipped model of monolingual classroom and those using collaborative flipped model of bilingual classroom. The results showed that students taught using collaborative flipped model of monolingual classroom had a mean score of 11.87 while those in a collaborative flipped model of bilingual classroom had a mean score of 15.97.

Hypothesis 1: There is no significant difference in the mean scores of students taught in a collaborative flipped model of monolingual classroom and those taught using traditional method.

Table 4: t-test Analysis of Students' Achievement Scores

| <i>Variable</i> | <i>N</i> | <i>Mean</i> | <i>SD</i> | <i>df</i> | <i>t_{cal.}</i> | <i>t_{cal.}</i> | <i>Decision</i> |
|----------------------------------|----------|-------------|-----------|-----------|-------------------------|-------------------------|-----------------|
| <i>Collaborative Monolingual</i> | 30 | 11.87 | 1.87 | 58 | 1.25 | 1.96 | Significant |
| <i>Conventional</i> | 30 | 11.20 | 2.24 | | | | |

P < 0.05 significance level

Table 4 shows the result of analysis of performance of students in the Biology achievement test. The table revealed that mean score for students taught using traditional method (11.20) was less than the mean score for students taught using collaborative flipped model of monolingual classroom (11.87) with a mean difference of (0.67). The t-test revealed that t-calculated (1.25) was less than the critical t-value (1.96) at the 0.05 significance level. Hence, the null hypothesis was upheld. This means that there is no significant difference between the performance of students taught Biology using collaborative flipped model of monolingual classroom and those taught using traditional method.

Hypothesis 2: There is no significance difference in the mean scores of students taught in a collaborative flipped model of bilingual classroom and those taught with the traditional method.

Table 5: t-test Analysis of Students' Achievement Scores

| <i>Variable</i> | <i>N</i> | <i>Mean</i> | <i>SD</i> | <i>df</i> | <i>t_{cal.}</i> | <i>t_{cal.}</i> | <i>Decision</i> |
|--------------------------------|----------|-------------|-----------|-----------|-------------------------|-------------------------|-----------------|
| <i>Collaborative Bilingual</i> | 30 | 15.97 | 2.22 | 58 | 8.29 | 1.96 | Significant |
| <i>Traditional</i> | 30 | 11.20 | 2.24 | | | | |

P < 0.05 significance level

Table 5 shows the result of analysis of performance of students in the Biology achievement test. The table revealed that mean score for students taught using traditional method (11.20) was less than the mean score for students taught using collaborative flipped model of bilingual classroom (15.97) with a mean difference of (4.77). The t-test revealed that t-calculated (8.29) was greater than the critical t-value (1.96) at the 0.05 significance level. Hence, the null hypothesis was not upheld. This means that there is a significant difference between the performance of students taught Biology using collaborative flipped model of bilingual classroom and those taught using traditional method.

Hypothesis 3: There is no significance difference in the mean scores of students taught in a flipped learning of collaborative assessment and those taught in a collaborative flipped model of bilingual classroom.

Table 6: t-test Analysis of Students' Achievement Scores

| <i>Variable</i> | <i>N</i> | <i>Mean</i> | <i>SD</i> | <i>df</i> | <i>t_{cal.}</i> | <i>t_{cal.}</i> | <i>Decision</i> |
|----------------------------------|----------|-------------|-----------|-----------|-------------------------|-------------------------|-----------------|
| <i>Collaborative Monolingual</i> | 30 | 11.87 | 1.87 | 58 | 7.74 | 1.96 | Significant |
| <i>Collaborative Bilingual</i> | 30 | 15.97 | 2.22 | | | | |

P < 0.05 significance level

Table 6 shows the result of analysis of performance of students in the Biology achievement test. The table revealed that mean score for students taught using collaborative flipped model of monolingual classroom (11.87) was less than the mean score for students taught using collaborative flipped model of bilingual classroom (15.97) with a mean difference of (4.10). The t-test revealed that t -calculated (7.74) was less than the critical t -value (1.96) at the 0.05 significance level. Hence, the null hypothesis was not upheld. This means that there is a significant difference between the performance of students taught Biology using collaborative flipped model of monolingual classroom and those taught in a collaborative flipped model of bilingual classroom.

Discussions of findings

The fact that the bilingual classes were allowed to freely communicate in the language of their immediate environment among themselves while collaborating on flipped contents might have increased their in-depth knowledge of the course content.

Concepts that probably could not be internalized in the official language would have been made simple while engaging one another using the language of the environment. The above was supported in the study of Carolyn (2007) when it was put that “if a child developed the ability to guess the meaning of a word through its content or to infer meaning by reading between the lines, those skills are easily transferred when they begin study.

Further to this, Natalia and Christina (2019) found a strong link between mother tongue and the development of illiteracy. Rutu foundation (2013) expressly put that overwhelming evidence demonstrates that the best way to achieve the benefit from a multilingual education is by educating children in and through their mother tongues, alongside a second and/or third language. Cummins (2001) had earlier submitted that children with bilingual education had huge development of personal, social and cultural identity including their academic achievements. It was further reiterated that bilingual education’s popularity is on the increase. However, the non-significance difference between the traditional setting and collaborative monolingual flipped model opens up further study to ascertain rational behind the insignificance and by extension those factors that might be responsible for it.

Conclusion and Recommendations

The place and importance of integrating language of the immediate environment spoken and understood by students cannot be overemphasized. Students often and continuously engage one another in language of the immediate environment when out of the formal classroom settings. Flipped instructional strategy being a model that takes teaching and learning beyond the four walls of the classroom will favourably engender the fusion of language of the immediate environment. Needless to say is that, researches have shown that students flow freely among themselves when they engage in language other than the official language of instruction.

The quest for a balanced education that can shoulder the needed arrays of responsibilities with recourse to the multicultural facets of the Nigeria nation can be further enhanced with the integration of the language of the immediate environment in the instructional strategy.

A flipped classroom frees students; hence, such freedom in terms of collaboration within the formal setting is sacrosanct in order to improve on the achievements of students in biology and science subject in general. This study strongly recommends collaborative flipped classroom that integrates language of the immediate environment. Such integration should consider teacher's factor by ensuring training and re-training that will foster application as well as the utilization of this model of instructional delivery. The evolution of various technologies places on teachers the need to improve on their skills in order to fit into the paradigm shift brought about by these innovations in the teaching and learning.

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