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Flipped classroom learning model: It's effect on the academic performance of science students in the distance learning

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Abstract

This action research aims to assess the effect in the academic performance level of the SHS learners through the utilization of Flipped Classroom Learning Model in teaching earth and Life Science. Specifically, this inquiry aimed to: (1.) determine the competency-based performance levels of SHS learners in Earth and Life Science for the first quarter in the Learning Distance Modality; (2.) find out the extent of acceptability of Flipped Classroom Learning Model interventions, innovation, and strategies to the improvement of learning outcomes in ELS in Distance Learning Delivery Modality and ;(3.) ascertain the effect of the implemented interventions, innovations, and strategies on the improvement of the learners' academic performance in ELS. This study adopted the Descriptive-Evaluative method of research. It utilized descriptive survey questionnaire, and informal Interview. Purposive sampling design was used to determine the three hundred nineteen (319) students (males and females) from six Grade 11 classes of Don Servillano Platon Memorial National High School in Tinambac, Camarines Sur, Philippines. The data were analyzed and interpreted using mean, and frequency count. The data revealed that the competency-based performance levels of SHS learners in Earth and Life Science for the first quarter in the Distance Learning Delivery Modality was improved. The data for was generated from SF 9 and or SF10 of learners in for the first quarter. In line with the extent of acceptability of Flipped Classroom Learning Model interventions, innovations, and strategies to the improvement of learning outcomes in ELS in Distance Learning Delivery Modality gathered from the questionnaire in five-point Likert Scale have brought into varied rate. Most of the FCL interventions, innovations and strategies were highly accepted. However, the utilization of e- aklatan and e-assessment tool were accepted. These was accounted to the unstable internet signal in some remote areas.

Keywords: Flipped Classroom Learning Model; Science; Distance Learning; Academic Performance

1. Introduction

Philippines was placed under a state of nation emergency when the first COVID-19 case was recorded in March 2020. COVID-19 led in a new normal. To prevent the further spread of infection among the populace, various measures were put in place such as a ban on mass gatherings, restrictions on movement, social distancing, and preventive practices like hand washing and wearing of masks, among others.

In line with this continuing health threat, the Department of Education (DepEd-Philippines) formulated the Basic Education Learning Continuity Plan (LCP) to put into motion the marching orders of the Secretary: ensure that learning continues while guaranteeing the health, safety, and wellbeing of all learners, teachers, and other DepEd employees. The LCP recognizes that DepEd must adopt alternative modes of delivering learning if it is to reach all learners regardless of who and where they are. While school-based, Face-to-Face Learning is not possible, the LCP identifies three learning delivery modalities (LDMs) that schools may implement: Distance Learning, Blended Learning, and Homeschooling.

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Pursuance to the directive of the Office of the President that no face to face shall be held until vaccine for COVID 19 becomes available, the Distance Learning Delivery Modality was implemented this SY 2020-2021. This issuance covers the considerations for each Distance. Learning Delivery Modality adopted by the school. The main learning resources that shall be used is the Self Learning Modules developed by the Region for the Implementation of Alternative Delivery Mode. DSPMNHS adopted the Modular Distance learning where learners may opt to use digital or printed Modular Distance learning Modality.

Currently, there is an increasing number of COVID cases in the province. It is a great challenge to the teachers to monitor the learning progress and setting up feedback mechanism to help learners meet the Most Essential Learning Competencies (MELCs) while seeing the connections of one lesson to the next. In line with this, we develop a project that would cater the needs of the students especially in new normal setting.

Flipped Classroom Learning (FCL) Model pedagogy is a type of blended learning where learners are introduces to content at home and practice working through it at school. Utilizing FCL Model pedagogy as basic tools and strategies are more potent in relation to improving academic performance of the learners in Earth and Life Science. Learners will perform and accomplish assignments, written works, performance tasks and projects independently at home but guided by teachers thru recorded instructions.

Nouri, J. 2016 on The Flipped classroom: for active, effective, and increased learning especially for low achievers proved that to some extent the learners appeared to agree that it is easier and more effective to learn with flipped classroom approach. In addition, many learners perceived that they have to take more responsibility for their learning in Flipped Classroom Learning. The learners strongly agreed that FCL was useful for their learning to be able to pause, rewind, and fast forward video.

According to Tarik Talan, Sevinc Gulsecen (2019) on their study: The effect of Flipped classroom on Students' achievements, academic Engagement and satisfaction Levels, it was revealed that students in experimental group obtained higher academic engagement and achievements as compared to the students in controlled group. Moreover, it was found out that the students were generally satisfied with the flipped classroom.

Hester De Boer, Anouk S. Donker, Margaretha P.C. van der Werf, (2014), Effects of the attributes of Educational Interventions on Students' Academic Performance: A Meta-Analysis. It shows learning strategies are most effective in enhancing student performance.

In utilizing of FCL model in teaching, learning of learners can be self-paced to help them learn at their own pace and their own time which could be effective for challenge learners. Moreover, parents have more access to the learning materials and performance, thus, parents can help if there are any issues with the learners' understanding. Teachers has more freedom to spend with the learners needing more support or assistance and remediation.

Flipped Classroom Learning Model is the reverse of the more common practice of introducing new content at school, then assigning homework and projects to be completed by learners independently at home with utmost guidance of the Learning facilitator. Under this model are the following interventions, innovations, and strategies:

- Project 3Es (E- Library, E-Assess and E-portfolio)
  - E-Library/E-Aklatan. This is an innovation that includes of the Self learning Modules (SLMs) that can be downloaded or freely accessed by learners.
  - E- Assess. This is a program which facilitates a computer-based assessment where students can automatically generate results of their performance, while the teachers can decide who among learners need to remediate or enhance learning in Earth and Life Science. This includes compilation of assessments to be used in assessing learning. The questions included in this e-assessment is base from the revised Bloom's Taxonomy.
  - E-portfolio – This is the compilation of learners' reflections and best outputs showcasing learnings in ELS. It also features varieties of performances, such as musical, dance, play, oration, movie-making, and other related-arts activities such as collage, posters, painting, infographics etc. They showcase an outcome which indicates mastery and lifelong learning. exhibit of projects, portfolios, and other concrete outputs of students in the subject.
- Pictionary (Pictoword Dictionary). This consist of the learners' outputs per LC which provides the learners an opportunity to make their own compilation of Pictionary based on the learned concepts in Earth and Life

Science (ELS). It also aims to develop creativity and resourcefulness of learners and promote sense of ownership of learners.

- Visita Eskwela. The teacher conducted a village hopping for those identified learners needing remediation.
- Project CoVID (Collaborative Virtual Instructional Design). This virtual instructional design will be prepared collaboratively by ICT Teachers and Science teachers. This will be done both online and offline using I-spring app.
- Project LOBE (Leaving no One BEhind)- This is a Remedial and Enrichment Class Program for SHS Learners in Earth & Life Science at risk of failing.
- Project VicTor (Victory Tower) – This is a visual management which features learners' scholastic standing in line with the attainment of the final rating for them to be motivated to reach at least 85% or higher. Learners' picture, in caricature, is placed on a tower. The higher their place in the tower, the higher their final rating achieved. Learners who were able to get into the top will be awarded.

This action research was conducted to assess the effect in the academic performance level of the SHS learners of Don Servillano Platon Memorial National High School through the utilization of Flipped Classroom Learning Model in teaching earth and Life Science,

Specifically, this study sought to answer the following questions:

- What is the competency-based performance levels of SHS learners in Earth and Life Science for the first quarter in the Learning Distance Modality?
- What is the extent of acceptability of Flipped Classroom Learning Model interventions, innovation, and strategies to the improvement of learning outcomes in ELS in Distance Learning Delivery Modality?
- What is the effect of the implemented interventions, innovations, and strategies on the improvement of the learners' academic performance in ELS?

2. Methods

This action research descriptive research method in satisfying the responses for the three action research questions: 1.) What is the competency-based performance levels of SHS learners in Earth and Life Science for the first quarter in the Learning Distance Modality? 2.) What is the extent of acceptability of Flipped Classroom Learning Model interventions, innovation, and strategies to the improvement of learning outcomes in ELS in Distance Learning Delivery Modality? 3.) What is the effect of the implemented interventions, innovations, and strategies on the improvement of the learners' academic performance in ELS?

Other components of this research are the research participants and other sources of data and information, data gathering method and data analysis plan per research question.

2.1. Participants and/or Other Sources of Data and Information

participants to this action research were the 319 SHS learners in Earth and Life Science.

2.2. Data Gathering Methods

The data gathering varies from one question to another. A combination of documentary analysis and survey data gathering methods were employed in this study.

2.3. Data Analysis Plan/Application

This study utilized basic descriptive statistical tools such as the percentage, arithmetic mean and weighted average in analyzing the data gathered for the purpose of this research.

3. Results and Discussion

For research question no.1, Determine the competency-based performance levels of SHS learners in Earth and Life Science for the first quarter in the Distance Learning Delivery Modality. The data for this were generated from SF 9 and or SF10 of learners in for the first quarter. Data will be presented in a table 2:

The tabulation clearly reflects that there was a remarkable increase in the average of performance level of participants after the implementation of Flipped Classroom Model under Project EASE. This is an apparent indication that the Flipped Classroom Model under Project EASE is an effective and potent instructional intervention in increasing the performance level of learners in Earth Science learning area.

Along Question No.2, determine the extent of acceptability of Flipped Classroom Learning Model interventions, innovations, and strategies to the improvement of learning outcomes in ELS in Distance Learning Delivery Modality gathered from the questionnaire in five-point Likert Scale.

Table 1 Competency-based performance levels of SHS learners in Earth and Life Science for the first quarter in the DLDM

Learning Group	Final Rating	Remarks
	Quarter 1	
G11 CSS	79.58	Moderately High
G11 BPP	79.25	Low
G11 HORTI/TECH. DRAFT	78.84	Low
G11 EIM-B	77.10	Low
G11 GAS-B	84.80	High
G11 GAS-C	80.73	Moderately High

Legend: 90 and above Very High; 85-89 High; 80-84 Moderately High; 75-79 Low; Less 75 Very Low

Table 2 Extent of acceptability of FCL Model Innovations, interventions and strategies implemented

Interventions Implemented	Level of Acceptance		
	Relevance	Accessibility	Usefulness
E-library/E- aklatan	4.1	4.1	4.2
E-assess	3.2	2.5	3.4
E-portfolio	3.1	2.7	3.1
Victory Tower	3.1	2.6	3.2
Project SEA	4.3	4.4	4.1
Pictoword Dictionary	3.1	2.6	3.2
Oplan Visita Eskwela	4.4	4.6	4.6
Project CoVID	4.2	4.1	4.2
Project LOBE	3.2	2.8	3.2

Legend: 5 – Highly Accepted; 4 – Accepted; 3 – Moderately Accepted; 2 – Less Accepted; 1 – Not Accepted

The data show that the all the composite interventions of the Flipped Classroom Model through Project EASE are acceptable to the participants of this research.

In line with the question no. 3, on the effect of the implemented interventions, innovations, and strategies on the improvement of the learners' academic performance in Earth and Life Science at the end of the first semester. Data tabulation of the necessary information will be done obtaining the difference between the current-2nd grading academic performance level of students in ELS to their academic performance level for the 1st quarter.

The tabulation clearly reflects that there was a remarkable increase in the average of performance level of participants after the implementation of Flipped Classroom Model under Project EASE. This is an apparent intimation that the

Flipped Classroom Model under Project EASE is an effective and potent instructional intervention in increasing the performance level of learners in Earth Science learning area.

Table 3 Effect of the implemented interventions, innovations, and strategies on the improvement of the learners' academic performance in Earth and Life Science

Grade & Section	MPL (1st Quarter)	MPL (2nd Quarter)	Difference in MPL (Quarter 2 – Quarter 1)	% INCREASE/ DECREASE	Description
G11 CSS	79.58	83.98	4.40	5.50	Highly Effective
G11 BPP	79.25	83.27	4.02	5.07	Highly Effective
G11 HORTI/TECH. DRAFT	78.84	85.61	6.77	8.58	Highly Effective
G11 EIM-B	77.10	84.00	6.90	8.90	Highly Effective
G11 GAS-B	84.80	88.00	3.20	3.80	Moderately Effective
G11 GAS-C	80.73	85.23	4.50	5.57	Effective

Legend: 5 % increase & above – Highly effective; 4.00 – 4.99 % – Effective; 3.00 – 3.99 %– Moderately Effective; 2.00 – 2.99 – Less Effective; Below 2% increase – Not Effective

The following are the recommended actions to be undertaken based on the result and implications of the study:

- The researcher needs to repackage the composite interventions of the Flipped Classroom Model through Project to suit other learning groups and subject areas.
- The proponent/researcher should make a proposal to the district office for a demonstration teaching as one of the requirements to utilize the the Flipped Classroom Model through Project EASE at the district level.
- The school may institutionalize the adoption of the Flipped Classroom Model through Project in preparation for the implementation of the in-person learning modality.

The implementation of the Flipped Classroom Model through Project EASE may be considered in the preparation and adjustment of the school's Annual Implementation Plan.

4. Conclusion

The results and findings of this study showed that the Flipped Classroom Model under Project EASE is an effective and potent instructional intervention in increasing the performance level of learners in Earth Science learning area. It is recommended that the results of this study be used as benchmarks in institutionalizing the adoption of flipped classroom learning model in teaching science.

Compliance with ethical standards

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Statement of informed consent

The author would like to inform that all participating learners in this inquiry are aware of their extent of involvement for the purpose of data gathering. The consent of parents or guardians of learners was also sought before the participation of learners in the action research study.

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