Interactive Computer-Aided Instructional Materials In Teaching Science 6

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Abstract : This study sought to propose Interactive Computer-Aided Instruction in teaching Science 6 in Cuyapo East District, Division of Nueva Ecija during the school year 2023-2024. It was delimited to the level of performance in Science of Grade 6 learners based on the third quarter grades; teacher-made Computer-Aided Instructional materials; level of performance of Grade 6 learners in Science after the implementation of the Computer-Aided Instructional materials. The researcher used the questionnaire as the main data-gathering tool. The data gathered were properly coded, recorded, tallied, tabulated and interpreted using the Statistical Package for Social Science. Frequency counts, percentages and weighted mean were used for descriptive analysis and t-test for significant differences. The study found out that majority of the Grade 6 learners in Science obtained a satisfactory performance. The Computer-Aided Instructional materials were based on the least learned skills of the Grade 6 learners in Science. Majority of the Grade 6 learners in Science obtained outstanding performance after the utilization of computer-aided materials. The performance of the Grade 6 learners in Science exposed to the computer aided materials is significantly different when compared to their performance before exposure to computer-aided instruction. The suggested computer-aided instructional materials will improve the performance of the Grade 6 learners in Science. The researcher recommended that teachers should be encouraged to use the Computer-Aided Instruction strategy in order to provide alternative challenging lessons in Science. Introducing the Computer-Aided Instruction is one way of orienting the students to our fast developing and advancing technological world. It is therefore recommended that the government should support the DepEd thrust of modernizing instruction by allocating national and local funds to public schools to purchase computer units and other computer paraphernalia. Computer education should be enhanced in schools to expose learners to computer-aided instruction. There should be in-service seminars and training of teachers on the use of computer in teaching their subjects specifically Science. More researches must be done to test the effectiveness of other Computer-Aided Instructional materials in other topics or in other subjects. The design and development of Computer-Aided Instructional materials/modules is encouraged. Filipino teachers know better than foreign teachers about the strengths and weaknesses of Filipino learners. Hence, we should not depend solely on the Computer-Aided products developed by foreigners.

Keywords: computer-aided, instruction, performance

INTRODUCTION

In the 21st century, the world is experiencing a significant shift towards technological advancement. This transition marks the evolution from the Industrial Age to the Information Age, a period characterized by the widespread integration of information technology into various aspects of our daily lives. The Information Age is akin to the air we breathe, essential for the functioning of modern society, businesses, educational institutions, and individual lifestyles.

The impact of the Information Age is profound and far-reaching. For instance, in the realm of society, the rise of social media platforms has revolutionized how people communicate and interact with one another. Individuals can now connect with friends and family across the globe instantaneously, transcending geographical boundaries. Moreover, businesses have embraced e-commerce, enabling customers to shop online conveniently and access a wide array of products and services with a simple click.

In the field of education, the Information Age has ushered in a new era of learning. Students have access to a wealth of online resources, such as digital libraries and educational websites, that enhance their knowledge and skills. Virtual classrooms and online courses have made education more accessible and flexible, catering to diverse learning needs and preferences.

Furthermore, the use of artificial intelligence (AI) in education can revolutionize the way students learn and teachers instruct. AI-powered tutoring systems can provide personalized learning paths based on individual strengths and weaknesses, offering tailored support to maximize student learning outcomes. By harnessing the power of AI, educators can streamline administrative tasks, allowing them to focus more on delivering quality instruction and mentorship to students.

Hence, the Department of Science and Technology (DOST), the Department of Education, the Commission on Higher Education (CHED), and the Technical Education and Skills Development Authority (TESDA) unanimously endorsed a new proposal on the use of more technologically oriented instruction in the government schools. This is contained in a document entitled, "Education Technology Master Plan."

Past Secretary Ricardo T. Gloria conceived the "Schools of the Future" to meet the needs of the modern times for the purpose of improving the quality of education particularly Science and Technology so as to produce graduates who are proficient in basic literacy, numeracy and critical thinking skills. This is to enable them to compete in the domestic and international labor market.

The schools of tomorrow shall be equipped with facilities, equipment, materials as well as new learning or delivery system like science laboratories, language laboratories and computer laboratories. It also aims to improve the quality of education to produce globally competitive graduates through its major features: the use of more instructional interventions using multi-media technology, redefinition of the role of the teacher from provider of knowledge to facilitator of learning and greater opportunities for individualized learning.

Deeman (2013) found out that Educational Technology has made a significant contribution to education by taking into consideration the individual differences of learners and catering to their needs. The emerging trend the world over is towards more individualized and flexible forms of learning with an emphasis on individualized methods of instruction. This paper is based on an experiment to study the effect of a new teaching methodology i.e. Computer Assisted Instruction Technique (CAI) in comparison to Conventional Teaching (CT) on the achievement of pupil teachers in methods of teaching English language. In this study, instructional material was developed for both methods of instructions i.e. CAI as well as for Conventional Teaching (CT). The instructional material for both the methods was developed and validated by the researcher. The experiment was carried out on the pupil teachers of B.Ed. class of a College of Education. Pretest- Posttest Control Group design was used. Results of the experiment showed that CAI was found effective in terms of the achievement of pupil teachers in methods of teaching English language at post-test stage. However, no significant difference was found to exist between the experimental group and control group at the pretest stage.

Schools are trying to determine what changes are needed to best meet the needs of this modern learner, and the U.S. Department of Education is encouraging professional development in the use of technology (Frye & Dornisch, 2008). Consequently, more and more teachers are implementing technology in all subject areas. Frye and Dornisch (2008) studied the consequences of increasing the use technology in high school classes. They discovered that students perceive teachers who use technology as part of their instruction as more competent and knowledgeable, especially in the areas of math and science. This again reflects the characteristics of this technologically geared generation because using technology involves more student interaction with the content and more active involvement. Recommendations for reaching this type of learner, therefore, 39 include more interactive learning, shorter instructional periods, and the incorporation of multi-media (McAndrew, 2010; Twenge, 2009). Both traditional classroom teaching and computer-aided instruction can accomplish this goal.

Access to effective educational technologies is crucial in improving the teaching and learning process. The national mission aims to address the challenge of Filipino students ranking second to bottom among 42 countries in the Third International Mathematics and Science Survey (TIMS) conducted in 2008 by Gonzales. This alarming statistic highlights the pressing need for advancements in science education.

To meet this demand, there has been a significant push towards the development of computer-related materials such as Computer-Aided Instruction (CAI). These materials are designed to modernize the educational system and enhance the overall learning experience for students. For example, interactive software programs and virtual laboratories are being implemented to supplement traditional teaching methods.

Computer-Aided Instruction, also known as CAI, represents a modernized approach to education that integrates technology into the learning process. It encompasses various forms such as computer-based instruction and computer-assisted learning, all aimed at enhancing the educational experience. In the realm of CAI, not only hardware like computers and tablets play a crucial role, but also software components like operating systems and specially designed programs. These softwares are tailored to provide interactive lessons, exercises, and assessments to students, thereby revolutionizing traditional teaching methodologies.

One example of CAI in action is the use of educational software that adapts to individual learning styles. For instance, a program may adjust its difficulty level based on a student's performance, providing personalized challenges to enhance learning outcomes. Moreover, CAI can also include virtual simulations and multimedia presentations to create immersive learning environments that engage students in a more dynamic way.

By incorporating CAI into classrooms, educators can leverage technology to facilitate student-centered learning experiences. This shift towards digital tools not only enhances the effectiveness of teaching but also prepares students for the technologically-driven world they will encounter in the future. Overall, Computer-Aided Instruction represents a significant advancement in the field of education, offering innovative ways to foster learning and enrich the classroom experience.

It does not only concern the state of the art instructional materials but it is also concerned in making the teachers modern in their outlook, thinking and behavior. Therefore, a modern teacher in science is the challenge of the 21st century, one who can integrate technology and information into teaching and learning, on e who can adapt modern ways and employ invigorating teaching and learning approaches that facilitate efficient science education, a teacher who can capture students desire to acquire and use targeted skills making them more pleasant and scientific in their attitudes.

Statement of the Problem

This study sought to propose Interactive Computer-Aided Instructional Materials in teaching Science 6 in Cuyapo East District, Division of Nueva Ecija during the school year 2023-2024.

Specifically, it sought to answer the following sub-problems:
1. What is the level of performance in Science of Grade 6 learners based on the third quarter grade?
2. What teacher-made Computer-Aided Instructional materials can be implemented to address the needs of Grade 6 learners in Science?
3. What is the level of performance of Grade 6 learners in Science after the implementation of the Computer- Aided Instructional materials?
4. Is there a significant difference between the performances of the Grade 6 learners in Science before and after exposure to Computer-Aided Instruction?
5. Based on the findings, what final form of Interactive Computer-Aided Instructional Materials can be proposed to improve the performance of the Grade 6 learners in Science?

METHODOLOGY

Research Design

The descriptive-developmental design was employed in this study. Descriptive research includes studies that purport to present facts concerning the nature and the status of anything. It gives meaning to the quality and standing of facts. This study will focus on the level of performance in Science for Grade 6 learners based on the third quarter grade; teacher-made Computer-Aided Instructional materials; level of performance of Grade 6 learners in Science after the implementation of the Computer-Aided Instructional materials; and significant difference between the performance of the Grade 6 learners in Science before and after exposure Computer-Aided Instructional materials.

Sources of Data

This study was conducted in Cuyapo East District, Division of Nueva Ecija during the school year 2023-2024.

Instrumentation and Data Collection

The instrument in gathering the data that was used in the study is a questionnaire-checklist designed by the researcher since there are no available standardized instruments pertinent to the problems of the study. The researcher-made questionnaire was presented to the adviser and then the members of the Research Committee for initial evaluation. Then the instrument was submitted for final evaluation and validation by experts on questionnaire construction and content.

A validation questionnaire was utilized in this regard. The product of this process was the questionnaire in its final form.

Approval and permission to conduct the study was obtained by the researcher from the Schools Division Superintendent of Nueva Ecija.

The questionnaire was personally administered by the researcher to the teacher-respondents to ensure fast and immediate response and 100% retrieval.

The gathered data were subjected to appropriate statistical treatment analysis and interpretation.

Tools for Data Analysis

To derive valid and accurate results, appropriate statistical measures were employed.

To answer sub-problem number 1, level of performance in Science of Grade 6 learners in Cuyapo East District, Division of Nueva Ecija was based on the third grading grades, frequency counts and percentages were used.

$$\text{Percentage} = \frac{F}{N} \times 100$$

Where: F = Frequency
N = total number of respondents

To answer sub-problem 2, the researcher utilized the developed Computer Aided Instructional materials in Science 6.

To answer sub-problem 3, level of performance of Grade 6 learners in Science after the implementation of the Computer-Aided Instructional materials, frequency counts and percentages were used.

$$\text{Percentage} = \frac{F}{N} \times 100$$

Where:
F = Frequency
N = total number of respondents

The performance of the students was classified in terms of the following:

Outstanding (90 and above)
Very Satisfactory (85-89)
Satisfactory (80-84)
Fair (75-79)
Did not meet expectations(74 and below)

To answer sub-problem 4, significant difference between the performance of the Grade 6 learners in Science before and after exposure to computer-aided instruction, t-test was used.

$$t = \frac{\bar{x_1} - \bar{x_2}}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

RESULTS AND DISCUSSION

1. Level of Performance in Science of Grade 6 Learners Based on theThird Quarter Grade

Table 1. Level of Performance in Science of Grade 6 Learners

Performance	Frequency	Percentage
Outstanding (90-100)	48	24.00
Very Satisfactory (85-89)	16	8.00
Satisfactory (80-84)	103	51.50
Fair (75-79)	33	16.50
Total	**200**	**100**

It can be seen in Table 1 that majority of the Grade 6 learners in Science obtained a satisfactory performance (80-84) with 103 or 51.50%. There are also 48 or 24% of learners who had an outstanding performance (90-100). It is further revealed by the table that there are 16 or 8% who had very satisfactory performance (85-89) while 33 or 16.50% got fair performance with 75-79 grades.

2. Teacher-Made Computer-Aided Instructional Materials to Address the Needs of Grade 6 Learners in Science

The computer aided instructional materials were based on the least learned skills of the Grade 6 learners in Science

3. Level of Performance of Grade 6 Learners in Science after the Utilization of the Computer-Aided Instructional Materials

Table 2. Level of Performance in Science of Grade 6 Learners after the Utilization of the Computer-Aided Instructional Materials

Performance	Frequency	Percentage
Outstanding (90-100)	122	61
Very Satisfactory (85-89)	46	23
Satisfactory (80-84)	32	16
Total	**200**	**100**

It can be seen in Table 2 that majority of the Grade 6 learners in Science obtained outstanding performance (90-100) with 122 or 61%. There are also 46 or 23% who had very satisfactory performance (85-89). It is further revealed by the table that there are 32 or 16% who had satisfactory performance (80-84).

The result shown that computer aided instructional materials are very helpful in improving the performance of the Grade 6 learners in Science. It is therefore suggested/recommended that teachers should continue doing Computer Aided Instructional materials for the benefit of the learners.

4. Significant Difference Between the Performance of the Grade 6 Learners in Science Before and After Exposure to Computer-Aided Instructional Materials

$$t = \frac{M_1 - M_2}{\sqrt{\dfrac{(SD)^2}{N} + \dfrac{(SD)^2}{N}}}$$

By substitution:

$$\frac{4.58 - 2.93}{\sqrt{\dfrac{(2.14)^2}{24} + \dfrac{(1.71)^2}{18}}}$$

1.65

$$\sqrt{}$$

$$0.19 + 0.16$$

$$1.65$$

$$\overline{.59}$$

T = 2.80

> at the .01 level

The computed t was 2.80 and such value was more than 2.58 at the .01 level of significance. Meaning there really was significant difference in the perception of both respondents.

This is true the findings of Newton (2005), who identified several problem issues which explain why educational technology is not used in teaching.

Research suggests that in any topic, including benefits of educational technology, it has been difficult to change teachers' beliefs about teaching and learning. Administrators sometimes fail to budget enough funds for hardware, software, maintenance, and professional development for teachers to provide support for incorporating technology in the curriculum. Careful planning is vital to build up a technology budget that provides for all these factors.

Recommendations

On the basis of the foregoing findings and conclusion, the following were recommended:

1. It is hereby recommended that teachers should be encouraged to use the Interactive Computer-Aided Instructional Materials in order to provide alternative challenging lessons in Science.

2. Introducing the Interactive Computer-Aided Instructional Materials is one way of orienting the students to our fast developing and advancing technological world. It is therefore recommended that the government should support the DepEd thrust of modernizing instruction by allocating national and local funds to public schools to purchase computer units and other computer paraphernalia.

3. Computer education should be enhanced in schools to expose students to interactive computer-aided instructional materials

4. There should be in-service seminars and training of teachers on the use of computer in teaching their subjects specifically Science.

5. More researches must be done to test the effectiveness of other Interactive Computer-Aided Instructional materials in other topics or in other subjects.

6. The design and development of Computer Aided Instructional materials/modules is encouraged. Filipino teachers know better than foreign teachers about the strengths and weaknesses of Filipino learners. Hence, we should not depend solely on the Interactive Computer-Aided products developed by foreigners.

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