Integrating Technology in Elementary Schools:

Second Grade Science Classes

Action Research

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**Introduction**

**Overview**

Many researchers and those interested in curriculum and teaching methods adopt ways to teach that impacts a student, and grab their attention. This paper explores the technology used to enhance the process of teaching science in elementary schools. Information technology has become an essential element of education. Furthermore, a comparison between the performance of the students of elementary schools that have integrated technology into the classroom and those do not. This comparison is meant to determine the effectiveness of technology such as PowerPoint, in enhancing education process in elementary schools. Contemporary teaching methods are growing more dependent on the technology assist in subjects that can be difficult to learn, such as science. Teaching science in elementary schools is effective when the content is delivered using presentations. The technology integrated in elementary schools includes devices, such as computers, digital cameras, Internet, student information systems, multimedia devices, and LCD projectors (Herrington, 2009). These devices are integrated together to enable good projections that are displayed using PowerPoint presentations. PowerPoint presentations make the visual displays for second-grade science lessons more clear and understandable. Learning materials are created, modified and stored in the systems for quicker retrieval. For this research paper, we focused on two-second grade science classes in an elementary school in Saudi Arabia. There were 16 students in each class. One teacher was asked to present a PowerPoint presentation in the classroom for a total of three days. The presentation consisted of explaining the biology of the plant. The other teacher was asked to teach the same subject without the PowerPoint presentation.  On the fourth day, the students in each classroom were given an exam consisting ten questions derived from the learned material.

**Statement of Problems**

Manual methods of teaching are not effective in delivering science content, which poses difficulties to elementary schools’ students because it has a large and complicated syllabus. Students find it hard to understand the complex contents of the subject. Using manual modes of teaching the science subject makes the lessons boring. Use of technology improves the diversity of the teaching process making lessons more interesting and making the delivery of contents vivid and understandable. PowerPoint presentations can be formatted into different looks and feel to make the lessons more captivating as well as educative. Teachers also want to deliver their content efficiently and effectively. Therefore, technology makes the teaching process interesting and educative. Many science teachers in elementary schools do not have the sufficient knowledge of using technology effectively. For example, some elementary schools teachers cannot make good PowerPoint presentations. Moreover, some schools do not have the technology hence teachers cannot improve their skills. Integration of technology in the elementary schools can improve the skills of teachers and improve the content delivered to learners.

**Goals**

This research seeks to determine the effectiveness of technology by exploring the technologies integrated with the classrooms of the elementary schools to enhance learning. For instance, it will determine whether science teachers in the elementary schools can create and make PowerPoint presentations effectively. It is aimed at comparing the schools that have integrated technology such as PowerPoint presentations and those that have not integrated technology. Due to the current developments in technology, elementary schools should also implement the technologies to move with time. The research will determine the essence of technology and recommend it to relevant authorities for implementations or further research. The research will also find out how much useful technology has been to the schools that have already integrated technology in their classrooms. The research is also meant to determine the different technologies integrated in the classrooms of elementary schools (Herrington, 2009)

**Significance**

The research will assist education management authorities of the elementary schools to identify the effect of technology on the performance of elementary school students. The paper will also provide explanations to the methodologies used to deliver content in elementary schools that have integrated technology in their classrooms. The information will also be beneficial to schools that have not implemented technologies such as PowerPoint presentations in their classrooms. These schools may use the information to plan the process of integrating technologies in their classrooms in the future. The research will expose the differences in schools that have integrated technologies in their classrooms and those that have not in terms of performance, content delivery, and ease of teaching.

**Literature review**

The literature showed that the technology is used for enhancing instruction and learning to facilitate for students understanding the concept of any subject. This is to support our idea of using technology, Power point particularly, in science class to explain the plant’s parts. So using Power point slides will facilitate for students to understand the plant’s parts and recognize them. Moreover, Baek, Jung and Kim (2008) mentioned that how It will be more interesting for students when adopting this technology in the classroom and using different methods of instructional strategies based on technology usage. This is to support our strategy when we integrate Power Point to a science class and provide different pictures to help students visualize what they are learning through Power point. According to Roschelle et al., (2001) that using technology in the classroom to improve education is not an easy matter. There are several kinds of technology and many methods that an attempted use probably fails. The challenge is to ensure this technology is used effectively to enhance how and what children will learn. This is related to our research when using PowerPoint as an effective method in the science class to explain for students the plant’s parts and help them to understand the subject content.

There is no doubt that technology assists students to change their ways in learning and give them a new approach that can help them to learn better.  For instance, E-book one of the new implications that many schools tend to use it in their education.  It has a variety of features that enhance students learning like make students more interactive and active in the classroom.  “E-books have the potential to change the way our students read and consume text because of their interactivity and convenience,” (Schugar, Smith, T.Schugar,2013,p.616). Hence, e-book is not only helped students for reading text, but also add to the class a combination of interactive and comfort. Furthermore, there is a study that has shown that Tablet can be a factor for student’s progress and improving teacher skills.  “Teachers reported that the intervention allowed the students to make progress toward learning goals and objectives that they had not yet been able to master using traditional instructional methods. Teachers expressed that their participation in the iPad ® study enhanced their teaching skills and improved students’ interest in the content,” (O’Malley, Lewis, and Donehower, 2013, p.15).

Funda (2014) promoted learning study that aimed to investigate how science teachers integrate technology in classrooms. The finding in his study showed that chemistry and biology teachers tend to use PowerPoint in their classes more than any technology. The reason is that PowerPoint can be more flexible and represent their content suitably. In his study, he corroborated that the use of educational technology is a significant key to the success of science education.  Teachers can increase students’ understanding of science when using technology. That what we want to examine in our study. Teachers should understand the power of incorporating technology tools in science instruction. However, according to Isman, Yaratan, and Caner (2007), technology effectiveness is different based on age, location of the school, and teachers’ experience. Thus, there is a need to provide science teachers more skills about using technology.

Learners in elementary schools should start using technology in their early years of education since technology is very vital in the contemporary education. Teachers also should work on delivering their content efficiently and effectively by using technology. Martin, Shaw, & Daughenbaugh (2014) mentioned that in this digital age we should integrate proper today's technology in elementary science classrooms which would be beneficial for students in their academic career and life. Martin et al. (2014) conducted a survey to evaluate the students and teachers experiences using technology such as SMART board, as well as manipulative for teaching science in these particular elementary classrooms. They evaluated preparedness of the teachers to use this technology, how often they used it, and the main reasons as to why they used it or not. As we did in this research paper, a survey has been conducted in Saudi Arabia, and 39 teachers participated in this survey. This survey aims to find out what technology teachers used, and whether they use PowerPoint or not.

The Technology became an essential and spread out the world. The research paper aims to highlight on the role technology plays on students’ performance, and it focused on how using PowerPoint presentations make science lessons clear and comprehensible for second-grade students. Cradler, McNabb, Freeman, & Burchett (2002) discussed the main goals of introducing technology into the classrooms. They mentioned that, this goals foster achievement in content area learning, to develop students’ higher order thinking and problem-solving skills, and to prepare the students to enter the workforce. According to the authors, technology integration has a tremendous positive impact on all these areas.

**Methodology**

This research project used a mixed method qualitative and quantitative study to clarify teachers’ perspectives about integrating technology in the classroom in elementary school. Integrating technology in elementary school is an effective method to increase students’ enthusiasm to learn more. There were teachers’ survey, and posttest for students to compare their performance in two classes one of them uses technology and the other one no.

**Research Questions**

1- is there a difference in the students’ performance between two groups in elementary school one of them uses technology in science class and the other group does not use technology?

2- What technology do you think is the best for teaching elementary school?

**Subjects**

People who are participated in this mixed methods study are two groups.  First one, there are 39 teachers who teaching students in elementary schools in different classes answered survey questions. Those teachers were asked about their opinion for using technology in the classroom compared with teachers who do not use technology when they teach their students. In Second group, there are two teachers who teach science in two different second-grade classes. Every class includes 16 students. One of those teachers had taught her class by using PowerPoint and another one taught her class without using PowerPoint or any technology.

**Design research**

In this research project, we provided two studies to clarify some points about the differences between those teachers who use technology and who do not use.  In addition, to know what technology is the best for teachers in elementary school? . In the first study, we used descriptive design.  The type that we implemented is a survey research questions that contained eight items to ask teachers.  The items concentrate on teacher’s opinion if they use technology or not.  Also, their answers clarified whether or not technology can be a helpful way to improve student’s motivation in learning. There are some kinds of technology that we put in the survey like tablet and PowerPoint to ask the teacher about students’ interactions with those technologies.  For qualitative question, we asked them about the kind of technology that they usually used. The options were a projector, PowerPoint, online coerce, and Smart board.  From their answers, we collected the most repetitive option to make an observational study with comparison group design in science class for second grade in elementary school.

 **Survey Link**

**https://docs.google.com/forms/d/14YnyG4aQYBtizAMh-RzB\_9GIjB3KhVMPWwFBYWuN5Ik/viewform?c=0&w=1**

In the second study, we have investigated if there is a difference in the students’ performance between two groups in elementary school one of them uses technology in science class and the other group does not use technology. Integration technology into an elementary school would impact students’ performance. Our goal was to integrate technology to an elementary classroom to see how students’ performance could improve fast in three day's period. One of the Science teachers was asked to use PowerPoint slides in her class to explain the plant parts for three days. Then, record the students’ grades after taking the quiz, which contained seven questions relevant to the subject that she explained. The same quiz will measure the other group in a different class, where their teacher did not use any technology in her lesson.

**Data collection**

In the first study, we asked some teachers who teach an elementary school in Saudi Arabia to participate in this survey.  After that they accepted to do this survey in 3 days.  We sent the survey link to them by email. The data was collected from 3 schools in Saudi Arabia by using Google drive. There were 39 teachers who participated and cooperated with us in order to do this survey.

After we had collected data, we looked at what the most technology that teacher used in order to do a second study. We asked two teachers to teach their students a science class and make a quiz. We collected data from two classes after the quiz. Every class has 16 students. Their grades were sent by Email.

**Data analysis**

In both studies, the data analysis was done with excel in survey question and students grades. We implemented the quantitative data analysis for the answers that have numbers by using mean-median-mode (chart 5).  Moreover, we analyzed qualitative data by using frequently- frequently distribution (Charts 1-2-3-4).

**Results**

Teacher-participants were asked in the survey whether they use the technology in their classrooms. Of the 35 teachers’ responses, 18 sometimes integrate the technology, 14 teachers always use technology in their classes, and only three teachers use it rarely. Thus, most of them had experienced with technology, and that was useful to get some of their knowledge about incorporating technology. (Chart-1)



Chart (1)

In addition, qualitative survey results showed that the most used and useful technology in the classrooms was PowerPoint. 18 of 35 participates use it in their classrooms. The second used technology was the Projector, and then the Smart Board.



Chart (2)

As a result, we decided to use the PowerPoint in one of the classes to show its effectiveness. Because we wanted to know how technology could be beneficial to improve students’ performance, we asked the teachers whether the students’ participation and understanding significantly increase when using technology. The results showed that, most of the teachers mentioned that their students always participate and understand much better when they use technology, and only one of 35 teachers opposed that. (Chart 3-4)

  

      Chart (3) Chart (4)

Moreover, many teachers-participates supported that technology may provide a lot of opportunities for teachers to make more variety in lessons and teaching style, and that can affect their students’ performance in a positive way.

After one of the teachers incorporates PowerPoint in her class for three days, the two teachers conducted a quiz for each group A and B in order compares the groups’ scours. Then we collected the data from the teachers. The results represented that there is a noticeable difference between the two groups’ grades. The group that has taught by techno Furthermore, the teachers were asked if the technology improves students’ skills, and they had to choose from one to five about their agreement. We examined the mode to identify how technology can impact students’ skills. The mode equal 3, which means most of them, chose 3.

Ology “A” obtained higher grades than another group “B”, with %14. (Chart-5)



Chart (5)

Also, we examined the means in the two groups to establish the differences. The results showed that, in class A, the mean for the scores equals 8.31, however in class B, the mean equal 6.25. Thus, when cooperate technology in the science class, it affected students’ performance positively. In addition, when comparing the moods between two groups, we found out that group A’s mode equals 8, and the mode for B equals 6. Consequently, integrating the PowerPoint into science class had a positive impact on the students’ scours.

**Discussion**

The results presented that technology contributes to improving students’ performance. There are some difficulties we have faced while doing this research. Because of the limitation of time, one important point we could not conduct is that to take a pre and post tests for one group. That would help us to compare their performance before and after, so we can discover if there is a significant improvement. Maybe the two groups differ in their performance and their knowledge, so this is one of the weaknesses in our research. Also, If we could do this study in one class with one teacher that would be more beneficial because we also didn’t know the differences between the teachers’ performance in science class. Moreover, one of the survey questions didn’t help us in answering our research questions. That when we asked the teachers if they use Laptop computer in class with their students, what kind of uses they use it. When we wrote this question, we didn’t know yet what is the best technology they prefer, so we wanted to know what kind of uses they use a computer in the class. When we asked them that what kind of technology they use, that gave us the best answer. In addition, when we collected the data from 38 teachers in the survey, we found out that there are some unacceptable data we could not analysis. We deleted three teachers’ responses because evidently they answered randomly. For example, one of the teachers stated that her students always participate in class when she used technology, and their understanding is excellent. In the same time, in the question whether technology helps the students develop their skills, she chose 1 of 5. However, we had a good number of teacher- participates, which are 53 teachers. Furthermore, The results of our study come out with a fundamental insight that is related to the literature review. After this experience we believe that, technology is a significant in developing learning process and students skills.

**Conclusion and Recommendation:**

To sum up, this project showed the results that prove technology is an important factor in learning processing when we made the study in two classes in elementary school. Hence, we can conclude that technology assists teacher and students to make learning more interactive and active more than traditional way in learning.

There is a need to raise teachers’ knowledge about using technology in science classes to improve students’ performance. Further research need to be conducted with more open-ended questions to understand better whether or not the technology is effective in increasing students’ grades.

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