IMPACT OF DIGITAL CONTENT BASED UDL COMPLIANT LESSON PLAN ON STUDENTS LEARNING AND ENGAGEMENT

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Abstract

In the past few years teachers try to teach the students by introducing the textbooks along with some verbal instructions, which is also known as the traditional way of teaching. That way of teaching was not effective, and students get bored and lose their intention easily.

After some time, due to the tremendous changings in the world, new technology evolved a lot and humans are getting the benefits from it. Visual (Animations) can be easier to understand and also help in the learning phase. In special education animations have a great impact. The students with special needs learn quickly through animation and enjoy, which is a big achievement in this modern era.

Education should be accessible to everyone, where everyone reaps the benefits it offers. However, we have been educating our generations the wrong or we can say in the most ineffective ways and this has led to the large differences in the results of learners. No doubt, there are physical limitations of an individual when it comes to learning and these limitations can vary. Nevertheless, we can still try and succeed in forming an approach, which offers enough flexibility and support for each type of learner.

The purpose of our study is to measure the impact of digital elements such as animations and games on students learning in Universal Design for Learning (UDL) compliant lesson plan. To conduct this study, we taught two topics of 5th grade Science to the students of the 5th grade. Two groups of students were formed namely control group and treatment group. The control group was treated with the traditional lesson plan while the treatment group was treated with the digital content based UDL compliant lesson plan. Moreover, the content prepared was piloted in high-tech classrooms to measure the level of effectiveness. After the intervention, both groups were assessed using same methodology and the scores will be compared to perform the comparative between both approaches.

Our project has aimed to focus on the challenges faced by learners in Pakistan and the materials prepared were in local language to make the understanding barrier minimal. Focusing on local challenges will helped us prepare the materials, which catered the needs and problems faced by our native people.

The findings will aid the educators and practitioners to further discover the UDL principles and guidelines and use of inclusive videos and animations in educational settings.

Keywords: UDL Compliant Lesson Plan, EdTech Lesson Plan, Lesson Plan.

1 INTRODUCTION

Disengagement is a major reason for dropping out of schools and it also affects the academic performance of the students [1]. To engage the student in studies the context must be according to individual needs and classroom instructions and tasks must be designed in a way that would help in student engagement [2]. Universal Design for Learning (UDL) is an effective tool to boost the engagement of the students because it helps in reshaping teaching and learning in a way which is flexible and cater students with different interests [3].

Universal Design for Learning is a framework which guides how teaching should be done and improved and how learning of all the students can take place effectively regardless of the individual differences [4]. It has three main principles i.e. Multiple Means of Representation, Multiple Means of Action and Expressions and Multiple Means of engagement. These principles guide to make teaching more inclusive [4].

Lesson Plan is a tool which helps teachers to organize and plan a lesson before delivering it to the students. Using UDL in lesson plans means helping students with different learning styles to learn
well. It actually helps to address all the students in a class and it creates an inclusive environment so that all the students can benefit [5].

Universal Design for Learning means creating an inclusive environment and applying universal design principles to make a lesson effective and all students can benefit from it. UDL does not really require technology to be effective but technology helps a lot in addressing variability and it makes UDL compliant lesson plan more powerful and flexible [6]. Digital Content Based UDL compliant lesson plan is one in which digital content is embedded in UDL compliant lesson plan to make learning effective in all possible ways.

In this work, the main emphasis is kept on the comparative study of UDL based digital lesson plan and traditional practices that are being used in the academia. UDL has proven its many advantages in engaging students to learning and practicing new things with the help of technology advancements.

2 RELATED WORK

Universal Design for Learning (UDL) illustrates that learners can enhance their learning outcome if teachers may provide the learners with different ways of the representation of an information, opportunities of expression and means of engagement [11]. Universal Design for Learning is an effective and inclusive framework which serves best for all. People from diversified culture, educational backgrounds and abilities can benefit from it and all of them would get an equal chance to learn and play their part. Moreover, digital curriculum and technology are introducing a new perspective to how students can be kept engaged and have more control on differentiated learning [12].

Universal Design for Learning is a very effective way to engage all the students in learning process as the author in [12] says that when universal design are used by the designers they collaborate the requirements of people with multiple characteristics and the main purpose of Universal Design for Learning is to fetch the best learning output from students by applying UD principles to all aspects of instruction. Moreover, this framework helps in providing an environment of supportive learning and permitting multiple methods to meet the goals of learning [13]. The author says that he has observed positive responses of students towards UDL and all educators can achieve this goal who are willing to place the needs of students at the forefront of delivering the course [13].

In addition to incorporating UDL, technology rich environments are being used in classrooms and are being used as intellectual partners so that students can construct their knowledge actively [14]. If Digital content such as, digital game based learning and digital storytelling is introduced in classrooms then students will be engaged in the learning process and that is why academics, writers, game designers, foundation, companies like Microsoft are working to create an awareness among educators and parents about the enormous potential for learning through gaming medium [15]. Moreover, digital content has proven to provide an equitable access to education and use of technology has increased the efficiency of delivery of knowledge. Personalization of learning experience is also an added benefit in digital content-based learning. For the students of today’s age, technology has become a way of living life and is no more an outer ingredient which can be added to and subtracted from a lifestyle when needed and One important thing to consider here is that technology alone cannot play the role of transformation of educational process. [16].

In digital content there lies digital storytelling which is being considered a very powerful tool for both students and teachers. Digital storytelling can be used to facilitate instructions and helps students to create their own digital stories improving multiple literacy skills and also it helps students to understand, remember and recall the concepts [17]. Digital content elicited deep learning than the other one that is entertainment, without creating a negative impact on motivation and in case when students are provided with regular feedback on how well they performed, the entertainment instruction results in deeper learning so, the digital content can encourage motivation and learning, provided it prompts learners to actively process the educational material [18]. As far as use of laptops in the classroom and outside of classroom is concerned, studies have suggested that this helps to achieve the goal of individualized education and complements the student learning process [19].

Therefore, the research question is, what is the impact of the digital lesson plan using UDL framework on student engagement and learning outcomes of secondary school or 5th grade Science in a high-tech school of Pakistan as compared to those students who received traditional teaching?
3 METHODOLOGY

Our focus was to measure the impact of digital elements such as animations and games on students learning in Universal Design for Learning (UDL) compliant lesson plan. We picked two science units, Water Cycle and Light. Lessons consisted of digital content such as videos, animations, and games. We targeted 5th grade learners and recorded their engagement and learning. To serve this purpose, participants were divided into two groups namely control group and treatment group. During intervention, control group received traditional teaching while treatment group was treated with digital content based UDL compliant lesson plan. Moreover, the content prepared was piloted in high-tech classrooms to measure the level of effectiveness.

The participants of this study were 70 primary school students of Pakistan. First, 35 students were included in the control group. Male participants comprised 61.5% of the sample, while females comprised 38.5%. The distribution by age was 72.5% for 7-9 years old, 27.5% for 9-11 years old. Subsequently, the remaining 35 students were grouped into treatment group. Male participants comprised 66.5% of the sample, while females comprised 33.5%. The distribution by age was 72.5% for 8-10 years old, 27.5% for 10-12 years old.

To measure students learning and engagement and form a comparative analysis the control group was treated with traditional lesson plans for the two science topics selected. The class setting was pretty much conventional with teacher delivering the content using zero to few means of representation and the use of digital tools was non-existent. And, in the same manner the treatment group was made to learn through digital content based UDL compliant lesson plan for the same two topics. In this setting, multiple means of representation were made part of the lesson plan and knowledge delivery and learning process was augmented with interactive and engaging digital content. The same assessment was used to evaluate the conceptual understanding of the students of the both groups.

Although, treatment group was treated with UDL rich lesson plan but they were not evaluated using the UDL compliant assessment techniques which offer flexibility to learner to measure the progress. The identical assessment technique was used for both groups to keep them at the same level of challenge during evaluation. The assessments contained 10 questions related to each topic and the scope of assessment was to measure the conceptual understanding of the students as engagement is directly linked to increased academic performance.

4 RESULTS

The experiment was performed using control and treatment groups after the exposure to traditional and digital content based UDL lesson plan respectively. The participants are assessed using two different quizzes one for each topic. The scores are entered into SPSS for further data analysis. The confidence interval was 95%.

4.1 Analysis

Since the data for all the variables was not skewed therefore, the parametric test i.e. Independent-Samples t-test is conducted to compare the Quiz-1 on Water Cycle topic and Quiz-2 on Light topic between control and experimental groups.

<table>
<thead>
<tr>
<th>Table 1: Group Statistics</th>
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<tr>
<td>Group</td>
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<td>Treatment</td>
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The above results show that the mean of Quiz-1 scores of control group is less than treatment group by is 1.77. Similarly, the Quiz-2 scores mean of treatment is greater than that of control group by 2.09.
These differences imply a healthy improvement in the learning gains of the students when they received the digital content based UDL compliant learning.

Furthermore, as shown in Table 2 the values of standard deviation of treatment group for Quiz-1 and Quiz-2 are 0.797 and 0.648 respectively which proves that majority of the participants performed well in the assessments thus depicting improved learning gains.

Table 2: Independent Samples Test

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<tr>
<th></th>
<th>Levene’s Test for Equality of Variances</th>
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<td>F</td>
<td>Sig.</td>
<td>t</td>
<td>df</td>
<td>Sig. (2-tailed)</td>
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<td>Quiz1</td>
<td>equal variances assumed</td>
<td>7.372</td>
<td>.008</td>
<td>-6.284</td>
<td>68</td>
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<tr>
<td></td>
<td>equal variances not assumed</td>
<td>-6.284</td>
<td>52.507</td>
<td>.000</td>
<td>-1.771</td>
</tr>
<tr>
<td>Quiz2</td>
<td>equal variances assumed</td>
<td>.003</td>
<td>.957</td>
<td>-13.988</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>equal variances not assumed</td>
<td>-13.988</td>
<td>67.568</td>
<td>.000</td>
<td>-2.086</td>
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</table>

The results suggest that the students in treatment group performed significantly higher in Quiz-1 (t(68) = -6.284 , p-value = 0.000 < 0.05) and Quiz-2 (t(68) = -13.988 , p-value = 0.000 < 0.05) as compared to the students in control group.

### 4.2 Discussion

This study is designed to perform the comparative analysis between two approaches of delivering educational content to students. Moreover, the effectiveness of using digital content based UDL lesson plan has been established through results in Table 2. The results show that the students performed better in quizzes when they were treated with digital content based UDL lesson plan.

Although, the experiments were performed in high tech setting (i.e., students were digital natives), but the class teacher was not familiar with the UDL based lecture deliverance and overcoming this barrier, which can produce improved results. Furthermore, UDL offers flexibility to learners but managing this autonomy takes time as our treatment group participants were not familiar with the UDL based classroom practices so their learning gains can improve further if exposed to this type of setting for a longer period of time.

The role of high-tech classroom in making this experiment a success cannot be ignored. So, if the same study is conducted in some low-tech setting then results might be different as the students might not be already familiar with the digital content-based learning approach. This lack in familiarity can produce results which does not show a significant improvement as the learning content was highly digital.

### 5 CONCLUSIONS

The purpose of the study is to examine the impact of digital content based UDL compliant lesson plan on students’ learning and engagement. UDL based lesson plans has been proven to improve the learning gains and digital content increases the engagement level. However, this study examines the combined impact of UDL and digital content-based lesson plans. A high-tech school setting is chosen to conduct the experiment with 70 students from 5th grade. The treatment group of 35 students, which receives learning through digital content based UDL compliant lesson, performs better on assessments as compared to the control group of other 35 students that get treated with traditional lesson plans. This study doesn’t perform a separate survey to measure the engagement level of
students rather the academic performance is considered as a yardstick to measure the engagement level because the increased academic performance is partly linked to higher engagement level.

This work is an addition to the research domain having scope of measuring the UDL and digital content based educational content on learning. In this particular study, the research setting is around primary 5th grade but researchers can explore further the impact of UDL and digital content in higher grades and other disciplines.

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REFERENCES