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The Effect of Animation as a Teaching Tool on Students' Learning – an Experimental Study

ABSTRACT

This study aims to explore the effect of animation on students' learning process and compare the learning outcomes between animation-based and traditional teaching methods. The research questions hypothesize that animation enhances the learning process, attention, retention, reproduction and motivation in students. This study employed quantitative methodology by using an experiment involving two separate groups: the experimental group, which received instruction with animated videos, and the control group, which received a traditional teaching method. The sample size consisted of 170 students, with an equal distribution of male and female participants from grade levels 3 to 6, with 85 students in each group. The analysis of the data reveals that animation has a significant effect on the learning process. Students exposed to animation-based teaching methods exhibit higher levels of attention retention, better reproduction of learned material, and increased motivation compared to those following traditional teaching methods. These findings support the created research questions that animation positively influences students' learning outcomes.

KEY WORDS

Animation. Attention. Experiment. Learning. Observational Method. Social Learning Theory. Quantitative Research.

1 Introduction

In this day and age, the students of this generation rely on gadgets and the Internet for all activities and communication (Liu, 2020). In the digital age, educational strategies establish an environment conducive to technology-based learning (Saputra & Febriyanto 2019). To achieve this, teachers utilize technology to enhance students' learning experience by creating a comfortable, collaborative space. The incorporation of multimedia in instructional delivery engages students in the learning process through the use of videos, podcasts, and other mediated tools to explain concepts and illustrate key ideas. Wickramasinghe and Wickramasinghe (2021) suggested that teachers should continuously evolve to engage students in their learning process. Teachers should consistently adapt and explore new activities and ideas to encourage students' participation in acquiring knowledge and understanding.

Technology has profoundly transformed societies, embedding its use and necessity into the daily activities of individuals. With the emergence of new technologies, students increasingly prefer to acquire information or knowledge through pictures and illustrations, often opting for animated videos on relevant subjects (Fernandes Brigas & Ramos Fernandez, 2016; Islamoglu et al., 2015). "Students with different abilities can benefit from integrating appealing and engaging animated videos in the classroom, which gives an advantage to both students' understanding and teachers' workload" (Birbaumer & Schmidt, 2006, p. 567).

Students of this generation are growing up in a multimedia-rich environment, where they frequently switch their attention between various sources of information and entertainment. This constant shifting contributes to a decreased tolerance for boredom, requiring high levels of stimulation to maintain focus (Roehling et al., 2010). The traditional method of teaching knowledge is not sufficient to keep pace with the changes of our time. Therefore, teachers are required to incorporate new pedagogical tools that are more engaging, effective, and relevant to the present era (Nwosu & Onwuka, 2022).

A technology-mediated tool, animation, advances the understanding and engages the focus of the student by providing implicit information through non-textual, attention-grabbing gestures, tone of the content, sound and background music in an enjoyable learning environment which generates learning engagement for a longer time and offers motivation (Ünal Çolak & Ozan, 2012).

This study aims to evaluate the efficacy of animated videos in facilitating the learning process and enhancing academic performance among primary students. It also seeks to compare the outcomes of traditional teaching methods with those using animated videos by using the four steps of the observational model from Albert Bandura's Social Learning Theory.

The effectiveness of using illustrations and dynamic visuals in learning programs enhances accurate knowledge gaining, improves comprehension and faccilitates problem-solving (Lewalter, 2003). The impact of learning strategies on the learning process with illustrations depicts the cognitive process contributing to the supportive function of visuals. This notion was also supported by Abdo and Al-Awabdeh (2017), whose study suggested that students may need additional support through moving images to use suitable learning strategies to learn more effectively with moving visuals, which creates a significant impact on students' achievements.

Alrwele (2007) fixated on the moving image and its impact on student's success, which displays that incorporating moving images and infographics into educational settings has proven to be a potent tool for enhancing students' academic performance and comprehension of course material, which benefits in improved learning outcomes, these dynamic visual aids possess the potential to enhance students' cognitive abilities and intellect.

The use of animation in teaching proved effective in enhancing students' achievements, retention, and interest. The incorporation of animation provided students with a richer learning experience and students can effectively process information within their cognitive structures (Aiyedun, 2020). When evaluation between visual and textual communication has been done, it can be claimed that visual communication seems to consume a greater impact

than verbal or textual communication, which leaves a more enduring and permanent impression on the mind (Dur, 2014).

1.1 Effects of Animation on Learning

The illusion of movement by the rapid display of a sequence of static images that slightly differ from each other creates the continuous motion and shape change illusion (Bétrancourt & Tversky 2000). Discoveries say that children love animations, so they observe their activities and they learn their behavior. Animated videos have an inordinate impact on students' minds as all children like to watch different genres of animation. By watching animation, the brain processes graphics, imageries and, specifically, educational content. The impact of media animation on children's behavior has grown significantly and holds power over them. Captivating visuals are designed to capture and retain their attention to influence their memory and behavior (Ruchi & Mishra, 2014). Innovative approaches are being developed to enhance student learning outcomes; animation facilitates comprehension of various subjects by accommodating individual learning preferences regarding time, location, and pace. It offers clear explanations of intricate concepts and fosters students' freedom in learning (Mou, 2023).

Using computer simulation and animation in the classroom has proven to enhance students' understanding and significantly impact their discussions on related subjects and problem-solving exercises. The strategy of regularly showing animated videos on the related subject can resolve the unsatisfactory performance of the student in the classroom and also decrease the menace and demotivation aspect in students (Falode & Mohammed 2022).

RQ$_1$: What are the effects of students' learning through traditional teaching methods and teaching through animated videos?

1.2 Animation Towards Attention

Ünal Çolak and Ozan (2012) evaluate that using animated instructive agents through the latest technology and multimedia positively impact on student attitude. Students often find these mediators to be engaging and entertaining, which can make learning, understanding, motivating and attention-grabbing more effective and make the subject matter more satisfying. Achievement and satisfaction in learning attitudes are more effectively fostered through animated videos, compared to traditional learning methods. This approach to teaching provides students with a beneficial means to improve their performance and enhance their retention of acquired knowledge (Orie, 2022). Around the world, schools are utilizing some of this cutting-edge technology to boost students' attention, comprehension and performance (Fernandez Rivas et al., 2020). This led us to create the following:

RQ$_2$: How does students' attention vary between teaching through traditional teaching methods and teaching through animated videos?

1.3 Animation-Based Retention

The move towards active, interactive, and learner-centered teaching methods has revolutionized traditional classrooms, inspiring students and creating more conducive learning environments. Animations aid students' cognitive processes, simplify intricate concepts, and enhance motivation, which improves attitudes and academic performance in courses (Anekwe & Opara, 2021). According to Khanum's et al. (2015) research, animations profoundly and constructively impact on memory retention, comprehension, entertainment, and even advertising.

Animations also outperformed video commercials in terms of their ability to enhance recall. In a multimedia learning environment, learner can benefit from animations rather than textual graphics, which aid in knowledge construction by visually representing complex concepts (Lin & Atkinson, 2011). Visual learners benefit from animated videos, which lead to improved students' learning achievements and retaining information (Puspaningtyas & Ulfa, 2020).

RQ$_3$: How does students' retention vary between traditional teaching methods and teaching through animated videos?

1.4 Recalling and Reproducing Information

Abdo and Al-Awabdeh's (2017) study revealed that participants' achievements significantly improved when they used animations, demonstrating the valuable enhancement of teaching various subjects. The study indicated that participants displayed increased confidence and made fewer mistakes when recalling and reproducing information. Authors also concluded that animations were more effective in facilitating understanding and perception of lessons than traditional methods. Additionally, using animations positively influenced overall student achievement by stimulating memory recall.

According to Mastiah et al. (2023), using animated media with students in teaching has several benefits in education. It helps learners understand complex subjects, particularly science, aids teachers in explaining educational materials, which boosts students' success and satisfaction, improves learning outcomes, and encourages students to reproduce learned behaviors effectively.

RQ$_4$: How does students' lesson reproducing ability vary between traditional teaching methods and teaching through animated videos?

1.5 Motivation for Learning

Motivation is an important factor in triggering and driving effects on individual behavior and facilitating the completion of the learning process. Students' motivation increases with incorporating any engaging animation compared to traditional learning methods (Cevahir et al., 2022). The findings of Rosen (2009) showed a significant effect of an animation-based learning environment on the transfer of knowledge, which shapes motivation. Animation-based teaching improves students' perception of challenging subjects, boosts interest in education, and promotes technology integration and activity-based learning. Education through animated video is a captivating and dynamic field that requires students to be engaged and motivated to succeed. Using animation in instruction can positively impact students' motivation by facilitating the development of concepts (Zheng et al., 2020).

Our proposition on motivation is **RQ$_5$:** How does students' motivation vary between teaching through traditional teaching methods and teaching through animated videos?

1.6 Theoretical Framework

This study adopted the observational model of Social Learning Theory by Albert Bandura (1977), as the theoretical framework. According to Bandura's Social Learning Theory, learning is influenced by our interactions with others in a social setting. By observing the behaviors of others, individuals tend to adopt similar behaviors. When people observe the behaviors of others, they acquire and imitate those behaviors, particularly when their observations are positive or associated with rewards (Bandura, 1977, in Nabavi, 2012).

Educators have successfully applied the theory of social learning in the learning process. Social learning theory is a bridge between behaviorism and the cognitive approach. Teaching and learning thoroughly integrate with social learning theory. Within this theoretical framework, three distinct models are introduced to explicate the learning process: traditional teaching methods align with the live model category, while animated instruction corresponds to the symbolic model category.

The effect of animated video influences student learning by using the Social learning theory observational learning model, which focuses on attention retention, reproduction, and motivation. The social learning theory emphasizes that learning results from both the social interaction of people and their environments. Tu (2000) discussed that through computer-mediated learning social learning also takes place, learners need to recognize and escalate the social presence. Technology-based activities can create an optimal social learning environment, which is facilitated by the appropriate level of social presence.

The observational model is a key component of the Social Learning Theory that deals with new behavior by observing other skills, ideas and behaviors. Attention, retention, reproduction, and motivation are the steps that are required for the learning process.

Attention: In order to learn from observation, an individual needs to stay attentive to the performance being executed. This involves focusing on the relevant aspects of the model's actions, such as their behavior, characteristics, and the consequences of their actions. Factors that can influence attention include the perceived meaning of action, the model's attractiveness or credibility and the level of distinctiveness.

Retention: Once individuals have paid attention to the observed behavior or action, they need to retain or remember the information to replicate it in the future. This entails understanding the material in memory and creating mental representations of the behavior. Cognitive processes can enhance retention through rehearsal, association, and elaboration, as well as various strategies and computer-mediated activities.

Reproduction: After the behavior has been observed and retained, individuals attempt to reproduce or imitate it. This involves translating the mental representations of the behavior into real actions. Individuals recall the physical and cognitive memory to perform the behavior and make decisions according to their capabilities with the observed model.

Motivation: Individuals need to be motivated to reproduce the behavior they have observed. Bandura also emphasized the role of self-efficacy, which refers to individuals' beliefs in their own capabilities to perform under their internal satisfaction successfully. Higher self-efficacy leads to greater intrinsic motivation to imitate the observed behavior.

Through the use of observational learning, the study explored how animated videos can be used to enhance student learning and engagement. It also examined whether animated videos can create a more engaging learning environment for students and how these models influence their attitudes, behaviors, and knowledge attainment. The study also examined if there are any differences in learning outcomes between students who watched animated videos and those who were taught without the use of animated videos.

2　Methodology

This research study used a quantitative approach to examine the effects of utilizing animated videos as a teaching tool on students' learning. The experiment conducted in this study involved two groups: the experimental group, which received animated videos as an instructional tool, and the control group, which used traditional teaching methods. Cevahir et al. (2022) also examined the effects of animation-based instructional materials using both a control group and an experimental group.

2.1 Procedure

A series of experiments were conducted to collect data. The participants were initially sorted based on their grade levels; which are grades 3, 4, 5 & 6, resulting in four distinct groups. Subsequently, each of these groups was subdivided into two smaller groups, the control group and the experimental group, through a randomization process that ensured a balanced representation of students across various demographic and academic backgrounds, enhancing the validity of the study's findings.

The assessment encompassed measuring the participants' scores, aiming to gauge their level of comprehension and understanding of the material, it aimed to calculate the individuals' attention, retention, reproduction, and motivation. It evaluates the influence of the instructional content presented through animated videos and through traditional teaching methods on students' learning and behaviors.

2.2 Measures

2.2.1 Attention

Attention is the cognitive process of selectively concentrating on particular information. It is a state of heightened alertness in which only a specific stimulus is responded to, while other stimuli are temporarily ignored. Attention is gained through observation when behavior is being observed by actively paying attention and accurately perceiving the important aspect (Bandura, 1977, in Nabavi, 2012).

Attention is a covert mental activity occurring within the person, its measurement poses a major challenge to methodological inventiveness. The focus of attention was assessed using behavioral observation, whereby participants' movements were recorded while they were observed and witnessed in both, teaching with animated videos and traditional teaching methods (Bechtel et al., 1971).

To measure attention, students were observed by filming through cameras with assigned seat numbers to ensure accurate data collection. Attention was measured through 3 dimensions: (I) facial expressions (Ekman et al., 1972), (II) children's eye gaze (III) and aversion during experimental presentations (Alwitt et al., 1980; Anderson & Levin, 1976; Krull & Husson, 1979). To measure attention, the participants were evaluated using anti-attention criteria and later reverse coded. Participants were repeatedly measured on the above mention criteria in which each student was marked from 0 to 60, where the score (0) shows no attention and the mamixum score (60) shows complete attention.

2.2.2 Retention

Retention relies on remembering observed information and can be influenced by observation. Achieving retention involves visual imagery models or verbal descriptions (Bandura, 1977, in Nabavi 2012). Retention is the capacity to remember, the act or power of remembering things. Retention is the ability to recognize or hold onto information that is given. It is an integral part of learning, as it allows the learner to access information or objects that have been previously encountered.

Five items were used to measure retention. These items likely encompassed tasks or questions related to the content presented (Chiou et al., 2015). This same set of items was administered to both the experimental and controlled groups. The items were designed to inquire about the processes and stages of the topic presented via the animation. A scoring system was implemented to gauge the accuracy of students' replies. Each correctly answered item established a score of 1. The maximum score of 5 indicated the highest level of retention, while a score of 0 represented no retention of the material.

2.2.3 Reproduction

Individuals can translate observed skills into practical behavior. Reproduction is a fundamental concept, it is the act to duplicate or reproduce a behavior or response previously learned or experienced (Bandura, 1977, in Nabavi, 2012).

To measure the reproduction of lessons in the study, the researchers utilized a set of items that were specifically designed to assess the participants' ability to replicate or reproduce the observed behavior. These items likely encompassed tasks or questions related to the content presented (Chiou et al., 2015) through animated videos and the traditional lecture delivered by the teacher. The scoring system was implemented to assess the level of precision in the participants' responses to these items. Each correctly answered item was assigned a score of 1 out of 5, the maximum score (5) shows the highest reproduction and the lowest score (0) shows no reproduction of the observed area, reflecting the participants' accurate understanding and reproduction of the content. This scoring methodology allowed for quantitative evaluation of the student's performance in reproducing the observed behavior or information.

2.2.4 Motivation

For observational learning to be effective, individuals need to identify a motivation or rationale for imitating specific targets (Bandura, 1977). Motivation is a key factor in any learning process, and it can help keep people motivated to continue learning and to try and replicate the behavior they are observing.

Self-determination theory suggests that human behavior is driven by different types of motivation, each varying in the level of self-determination. These motivations include intrinsic motivation, extrinsic motivation and amotivation (Deci & Ryan, 1985). Motivation in this experimental research was gathered through intrinsic motivation. Motivation refers to actions that are engaged in for their own sake, driven by the enjoyment and fulfillment that the target brings.

Guay et al. (2000) constructed a tool to achieve intrinsic motivation, which is replicated in this study. Students' motivation was measured through a set of 5 statements. Each statement is scored through the scale: 1 corresponds to *not at all*; and 7 corresponds to *exactly*, where the highest score shows a high amount of motivation in the control group and experiment group.

3 Results

In the quantitative study, the reliability analysis of the internal consistency and accuracy of the scale, to see the item consistently, has the same results. The internal consistency and accuracy of attention and motivation of students between both groups are analyzed. The value of the measurement scale of Attention = 0.88 and Motivation = 0.85, is higher than 0.7, indicating that the items within the Attention and Motivation scale are reliable.

The study consisted of 170 respondents, with 85 individuals assigned in each group. The percentages of males and females in each grade (3, 4, 5 and 6) are relatively similar with small variations. The differences in percentages between males and females indicated linear distribution that is essential for analyses and drawing accurate conclusions from the study's results.

Age, grade, and gender provide an overview of the central tendency, variability, and range of the data for each variable. Table 1 indicates that the sample consisted of 170 respondents, with ages ranging from 7 to 13. The average age of the respondents is 10.35, with a standard deviation of 1.26, which shows the distribution of ages in the sample.

	Min	Max	M	SD
Age	7	13	10.35	1.27
Class	3	6	4.89	0.98
Gender	1	2	1.43	0.50

*Note: N = 170

TABLE 1: *Descriptive statistics of age, class and gender*
Source: own processing, 2024

The grade seems to represent different groups or levels within the study. The sample minimum and maximum values indicate four different grades 3, 4, 5 and 6. The standard deviation of 0.98 shows the spread of the class distribution. As for the two categories of gender, male and female respondents in the study the mean value of 1.43 suggests that the sample has a slightly higher representation of the male gender category.

3.1 Testing Research Questions

The purpose of the study was to see the effects of teaching through animated videos on students' learning. In line with this objective, a research question was formulated, focusing on the learning of the student.

In assessing learning outcomes, comprehensive approach was adopted by adding scores of retention, attention, reproduction, and motivation. This multifaceted evaluation allowed for a comparison between the controlled group and the experimental group by applying simple linear regression. Through this method, the change in results was observed that is influencing the learning process. Table 2 shows the impact of animated videos on learning. The R2 value of 0.51 revealed that the predictor variable explained 51% variance in the outcome variable with $F_{(1,168)} = 175.301$ $p<0.001$. The findings revealed that group changes from traditional to animation teaching and learning in students increased (Beta – 0.72, $p<0.001$).

Variable	B	β	SE
(Constant)	0.15		2.25
Group	18.81	0.72	1.42
R^2 Change	51%***		

*Note: Traditional Group = 1, Experiment Group = 2, ***p<0.001

TABLE 2: *Regression of learning on groups (N=170)*
Source: own processing, 2024

The R_2 value of 0.51 indicates the use of animation in the outcome variable, learning. The use of animated videos has a 51% of variance in learning outcomes. F-statistic $F_{(1,168)}$ value of 175.301 indicates that the ratio of both variances is significant. This indicates that the relationship between the experimental group and the outcome variable learning is based on analysis. The p-value of less than 0.001 (p<0.001) also directs the significance of the findings. The beta coefficient is 0.72 with the p-value<0.001 declaring that the relationship is positive, which means that when groups are increasing the outcome variable, learning is also increasing as shown in the graph.
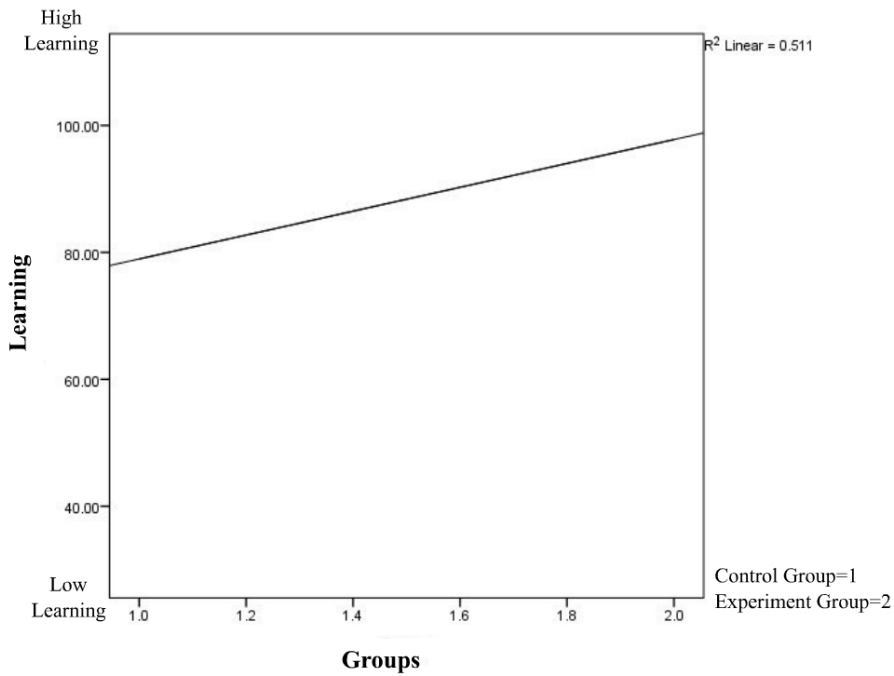
Note: Experiment group = Teaching through animated video, control group = traditional teaching method

FIGURE 1: *Change in group* Learning*

Source: own processing, 2024

This implies that the experimental group, which received learning through animated videos, statistically has higher values and a significant impact on learning compared to the control group in the study. These statistics support the research question "What are the effects of students' learning through traditional teaching methods and teaching through animated videos?"

The purpose of the study was to see the effects of animated videos on attention, retention, reproduction and motivation on students' learning. In line with this objective, four hypotheses were formulated, focusing on the variables of attention, retention, reproduction, and motivation.

To test the variables in research question two, which are attention, retention, reproduction and motivation, an independent t-test was applied on the gathered scores to see the difference between the use of animated videos and traditional teaching methods by comparing mean, standard deviation and standard error mean. The experimental group consistently outperformed the control group, with less variability in their scores.

	Group	Mean	Std. Deviation	Std. Error Mean
Attention	Experiment	56.80	4.34	0.47
	Control	45.41	8.42	0.91
Retention	Experiment	3.98	0.80	0.09
	Control	3.31	1.10	0.12
Reproduction	Experiment	4.40	0.85	0.09
	Control	3.66	1.32	0.014
Motivation	Experiment	32.60	3.0	0.32
	Control	26.59	5.11	0.55

Note: N = 170, where Control Group = 85 and Experiment Group = 85

TABLE 3: Group statistics of Attention, Retention, Reproduction and Motivation

Source: own processing, 2024

From the t-test results, first, the Levine test was observed to check whether it is above 0.05 or below to decide whether either of the variances in any groups were assumed or not. In this case, the equal variance was not assumed (as p>0.001) in all the variables. An independent-samples t-test was conducted to compare the attention, retention, reproduction and motivation of the control and experimental group. There was a significant difference in the scores between the traditional teaching methods and teaching through animated videos.

Equal variances were not assumed.

	t-test for Equality of Means						
	t	**df**	**p**	**Mean Difference**	**SE Difference**	**95% Confidence Interval of the Difference**	
Equal variances not assumed						Lower	Upper
Attention	11.08	125.6	0.00	11.4	1.03	9.35	13.42
Retention	4.54	153.42	0.00	0.67	0.15	0.38	0.96
Reproduction	4.35	143.03	0.00	0.74	0.170	0.40	1.08
Motivation	9.36	135.54	0.00	6.012	0.64	4.74	7.28

*Note: Levene's Test for Equality of Variances is 0.001, Sig. (2-tailed) = p

TABLE 4: Independence sample test of Attention, Retention, Reproduction and Motivation

Source: own processing, 2024

Based on the results of the attention mean and standard deviation, the scores suggest that there is a significant difference in both the variances and means between the groups being compared. The t-value measures the magnitude of the difference between the groups, which was 11.08. This directs the substantial difference between the means of the two groups. The probability $p<0.001$ means the difference between the groups is visible. These statistics answer the research question RQ_2 "How does students' attention vary between teaching through traditional teaching methods and teaching through animated videos?"

The t-value of retention is 4.54, which indicates a significant difference. The probability or the p-value for Equality of Means $p<0.001$ indicates the difference between the groups is visible. These statistics respond to the research question RQ_3 "How does students' retention vary between teaching through traditional teaching methods and teaching through animated videos?"

Moreover, to test the research question on whether teaching through animated videos will affect the lesson reproducing ability more than the traditional teaching methods, the table showed that the t-value indicates the significance of the difference between the groups, the t-value here is 4.35, which indicates a difference. The probability here is also $p<0.001$, which means the difference between the control group and the experiment group is visible. These statistics support the research question RQ_4 on the lesson reproducing ability.

To calculate motivation, the t-test was also applied, based on the scores gathered during experimentation. T-value is 9.36, indicating the noteworthy difference between the groups when probability, or the p-value, is $p<0.001$, which means the difference between the control group and the experiment group is visible. Within the 95% confidence interval of the difference, the lower interval is 4.74, and the upper interval is 7.28, which also indicates that both groups contain true difference in motivation. These statistics answer the research question RQ_5 "How does students' motivation vary between teaching through traditional teaching methods and teaching through animated videos?"

4 Findings and Discussion

The current study explored the effects of the use of animated videos on students' learning in the classroom. The observational model steps of Bandura (Bandura, 1977, in Nabavi, 2012) were explored through a control group and an experimental group (intervention as animated video) on the students of grades 3, 4, 5, and 6 to see the "learning" outcomes and evaluate "attention", "retention reproduction" and "motivation" in the control group and experiment group, that is through traditional teaching methods and animated videos respectively.

Based on observations in the learning process, it can be seen that in students' activities during the learning process, students seem to pay less attention to the explanation from the teacher when learning takes place. They were seen to play and talk with friends, do their activities, and lack concentration on the teacher's explanation (Ramadhan et al., 2021). When explored learning as a variable in detail, it was found that integrating animation or animated videos in the classroom is highly effective in students' learning in the classroom. These results indicate that animations prove to be impactful in enhancing students' educational achievements. Aiyedun (2020) attained similar findings when investigating the impact of utilizing animation in teaching strategies on secondary school students' achievement, retention, and interest.

Using animation or moving images by the teacher in the classroom, regarding the topic, has considerable potential in education to enhance students' aptitude, functional skills, and affective development in the learning process (Alrwele, 2017).

Every four steps of the observational model in the learning process, attention, retention, reproduction and motivation were methodically examined by researching the intricate details

First, attention was the variable that analyzed the use of animated videos for learning to attract more attention than the traditional teaching method. According to the analysis, the attention levels detected in the group where teaching through animation was given were significantly higher compared to the group with traditional teaching methods. This indicates that students who were exposed to learning through animation exhibited a greater degree of engagement and attention. Higher levels of focus suggest that students are actively engaged in their education while watching animation, which can enhance the processing and comprehension of new knowledge. The result of the study supported the existing literature (Jeetha & Prasad, 2021) stating that incorporating animated teaching videos can help alleviate boredom during the learning process and address the limited attention span. The benefits of animation are well established in education and it is scientifically proven that dynamic illustrations can be captivating and can be retained in memory for a longer time.

Retention was another step of the observational Social Learning Theory model which was the study variable. The analysis and results revealed that animated videos for learning had a greater impact on retention compared to traditional teaching methods. This finding suggests that implementing animation enhanced the students' ability to retain information over long time. The result can be verified through previous literature, as by Mayer (1997; 2001) who established in several experimental studies that learning and retention with animations can be more effective when they are blended with vocals rather than textual (Ploetzner & Lowe, 2004). The results of the study also aligned with the literature by Khanum et al. (2015) stating that learners exhibit enhanced learning and retention exhibits enhanced learning skills when the learning material is presented in an animated form. The use of animation captures the attention of learners and retains the information.

Further, this study also found the relationship between animated videos for learning and their effects on reproducing the skills from the learned behavior. The finding indicates that during the study students reproduced or imitated the learned behavior after watching an animated video, which is more notable than within the traditional method. The observation of the group which was exposed to animation videos as an intervention showed that this type of intervention had a more pronounced influence on the student's aptitude to reproduce the learned work or copy

behavior. Similarly, Ruchi and Mishra (2014) also found that animation helps the student to reproduce their work effectively. The influence of cartoon animations has pointedly increased, particularly on children who are regularly open to various forms of media and in that animated films are mainly influential. The impact of these animations on behavior is evident in several actions, as they tend to imitate and reproduce from the learned actions.

The finding revealed that the use of animated videos for learning improves motivation more than traditional teaching methods. The current study showed signs of a high level of motivation when watching animated videos related to their coursework (Cevahir et al., 2022), particularly during the mid-day break at school when interest in learning tends to fade. This specifies that the use of animated videos as a teaching tool can effectively engage students and keep their motivation active to learn, even during times when students' attention spans decrease. There is a notable difference in motivation levels in the experimental group, which was exposed to animated videos that had a significant effect. The control group in this study, relying on conventional teaching approaches, experienced considerably lower levels of motivation compared to the experimental group. This suggests that animated videos have a unique ability to captivate students' interest and maintain their enthusiasm for the subject matter. Rosen (2009) validates these findings, his study showed a drastic shift in student perception of science learning. He said that the change due to animation in the classroom created an environment in which students were enthusiastic and motivated to learn and participate more. He also explained that students with learning disabilities also benefitted from the new technology learning and animation.

The results of the study that show high learning attention, comprehension, and attitude towards understanding through moving graphics or animation are consistent with the previous studies (Gallicano et al., 2014; Gareau et al., 2015; Alotiabi, 2016; Al Hosni, 2016) and also direct that animation positively and significantly impacts students when used properly and effectively. These studies validate that using animations as a teaching tool can enhance students' learning process.

5 Conclusion

The study aimed to explore the use of animated videos as a teaching tool for students by using the steps of the observational model of Social Learning Theory. The variable used varies by the group, which was made among students.

The findings of this study validate that animation has a significant impact on the various aspects of students' learning. Animation grasps and captures students' attention more effectively than traditional static teaching methods or textual resources. The dynamic nature of animation engages students' senses, motivates their interest, and makes the learning experience more immersive. Moreover, animation improves the retention of information with visual images, storytelling techniques, and simplified visual representations, which facilitates better comprehension and long-term memory retention. In reproducing the learned behavior by students, animation increases the active involvement of students and leads to improved learning outcomes. The vibrant nature of animation compels students' curiosity, interest and involvement in taught content, which leads to improving academic performance and achievements.

By conducting an experimental study, the paper may contribute to understanding of how animation affects students' learning outcomes, memory retention, and engagement, which will potentially add to existing theoretical knowledge. This study provides insights into the effectiveness of incorporating animation into educational practices. It could provide practical guidance for educators on how to design and implement animated learning materials effectively, optimize instructional strategies, and enhance students' engagement and learning outcomes. In Pakistan, the paper's findings may help in curriculum development for schools, to develop the curriculum using animation and technology as teaching tools, which will pave the way for a transformative impact and positive change.

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