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The Impact Of Animated Educational Videos On University Students' Understanding And Recalling In Egypt

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Abstract

The study aims to measure the impact of animated educational video on university students' understanding and recalling of educational content and to help professors facilitate the understanding and recalling of educational content. The sample included 20 university students from the Faculty of mass communication at Ahrum Canadian University. The results showed that there was a positive impact in the process of understanding and recalling, and males outperformed females in the process of understanding content, while females outperformed males in the process of recalling content. Animated videos are an effective tool in the learning environment.

Key words: Experimental study, animated educational videos, recall, understanding.

Introduction

In recent years, the use of animated videos as a learning tool has become increasingly popular. The use of animated videos on the learning process has been shown to concretize complex subjects and create an enjoyable learning experience without causing anxieties regarding time. Material presented in such a visually distinct manner is thought to increase students' motivation in connection with their interest in advanced technology (Barut, 2021). The use of animated videos has become more common due to their various advantages, such as providing memorable examples, increasing student interest, and helping with learning efficiency and understanding. Videos as a medium for learning have unique characteristics in using both audio / verbal and visual / pictorial channels to convey educational ideas, which can improve student retention and engagement. Despite the challenges in teaching with animations, such as time and resource constraints, teachers have reported using animated cartoons as an alternative or supplement to traditional teaching methods in various disciplines (Shiu et al., 2019).

Learning is influenced by many factors. Factors that help students from achieving high or low GPAs can be divided into two directions: environmental and learner-related. Improving learning efficiency should focus on cognitive factors that affect academic achievement. Memory is crucial to learning and plays a role in reading, writing, and listening. Poor memory performance leads to difficulties in learning and impairs the ability to perform well. This is likely one of the main reasons for learning inefficiency. Memory factors are abilities related to memory, such as visual memory and memory span. Visual memory is important for learning letters, vocabulary and language skills. Deficiencies in visual memory can lead to poor academic performance. Memory span is the ability to recall a sequence of elements and can predict academic success (Harby & Ali, 2015).

However, there is a lack of evidence comparing the effectiveness of animated videos with more traditional materials (Non-animated videos) on student learning. The use of animated educational videos in scientific colleges is more than in theoretical colleges. There are also few studies of the impact of animated educational videos on university students. Therefore, the study aims to measure the impact of animated educational videos on university students and help professors and students to facilitate understanding and recall of instructional content through an experimental study.

Problem Statement

The impact of animated educational videos on recalling and understanding of university students in Egypt, applied to the 2023 freshman year of the Faculty of Mass Communication at Ahram Canadian University, through the experimental study.

The Importance of the research

The research has great importance in the theoretical part, as the number of studies related to animated educational videos and their use with university students, especially in theoretical faculties, is limited. Therefore, it is important to know the effects of these videos, whether negative or positive.

There is also great practical importance because in recent years, the Faculty of Mass Communication has begun to use animation in education. Thus, the researcher wants to know whether it is useful or not. Additionally, if any professors needs to introduce animation in their educational content, they can depend on this research.

Therefore, the study aims to measure the impact of animated educational videos on university students and help professors and students to facilitate the understanding and recalling of educational content.

Research Objectives

1. Measure the impact of animated educational videos on university students' understanding.
2. Measure the impact of animated educational videos on university students' ability to recall information.
3. Compare the effectiveness of animated educational videos and non-animated educational videos in enhancing university students' understanding.
4. Compare the effectiveness of animated educational videos and non-animated educational videos in improving university students' ability to recall information.

Literature Review

• The effectiveness of animated educational videos

In this axis, we will look at studies that have measured the impact of educational animated videos in different educational levels.

• Impact on university students

Studies by (Uual, 2012), (Barut & Ozgur, 2021), and (Puspaningtyas & Ulfa, 2020) agreed that there are positive impact on university students after using animated educational videos. Each study measured a different variable. (Uual, 2012) study measured the effect of educational animated videos on students' achievement and attitudes. (Barut & Ozgur, 2021) study measured the effect of educational animated videos on motivation, cognitive load, and openness to new resources for students. (Puspaningtyas & Ulfa, 2020) study measured the effect of educational animated videos on students' outcomes.

(Uual, 2012), this study talks about the importance of multimedia in education and how animated pedagogical agents can be used to help students learn. These agents use gestures, facial

expressions, and voice tone to engage students and provide guidance and motivation. The study aims to analyze the impact of animated agents on student achievement and attitudes. The study also discusses Mayer's Cognitive Theory of Multimedia Learning, which suggests that animated pedagogical agents improve learning. The research used an experimental design with a pre-test-posttest control group and involved 90 undergraduate students from Anadolu University. The participants were assigned to four groups, including three experiment groups and one control group. The study used the topic of "Stem Cells". The study found that using multimedia software with animated pedagogical agents positively affects student achievement and attitude, and that the attitudes towards "bearing human features" were more positive for software with a real person's body shot. The interviews conducted during and after the experiment also showed that students had positive attitudes towards the use of animated pedagogical agents. The study suggests that using animated pedagogical agents in distance learning environments has the potential to improve learner performance.

(Barut & Ozgur, 2021), the study aimed to see how animated and interactive videos used in distance education affect motivation, cognitive load, openness to new materials, and willingness to recommend the material. The study used a posttest control group design to investigate the relationships between two types of materials (animated and interactive) in terms of motivation and cognitive load. The participants included 2587 individuals who were randomly assigned to the experimental and control groups. The data collection tools included the cognitive load instrument and the Instructional Material Motivation Scale for Single-Use, as well as survey questions about the participants' openness to new materials and their willingness to recommend the materials to others. The results showed that both types of videos were recommended and well-liked, but the animated video group was more motivated. The interactive video group had a higher cognitive load and this load increased with viewing time. The study also found that those who were more open to new materials had different motivation and cognitive load levels than those who were less open.

(Puspaningtyas & Ulfa, 2020), the study aimed to determine the effectiveness of using animated videos in blended learning for business mathematics courses. The research question was whether there is a significant increase in student learning outcomes before and after implementing blended learning through the use of animated videos. The study was a quantitative experimental study conducted at Universitas Teknokrat Indonesia. The study used a model proposed by Creswell (2017) and had 35 students from the Management Study Program. The study used pre-test and post-test data to determine the subject's learning achievement after implementing blended learning using animated videos. The data was statistically tested using SPSS software. The results showed that using animated videos can improve student learning achievement. The post-test score was significantly higher than the pre-test score.

- **Impact on school students**

Studies by (Ardiansyah, et al. 2022), (Kusuma, et al. 2021), (Pertiwi, et al., 2023), (Pelani, 2018), (Abdo, et al., 2017) and (Olii, & Nurwati, 2022) also agreed that there are positive impact on school students after using educational animated videos. (Ardiansyah, et al. 2022) study found that educational animated videos helped students increase their interest in learning Arabic language. (Kusuma, et al. 2021) study measured students' perceptions of using animated videos in education and the results showed that both genders had positive perceptions. (Pertiwi, et al., 2023) study found educational animated videos suitable for the learning process. (Pelani, 2018), (Abdo, et al., 2017) and (Olii, & Nurwati, 2022), this studies have demonstrated the effectiveness of educational animated videos in improving students' understanding of readers and the rules and concepts of English.

(Ardiansyah et al. 2022), the study found that not all students at MTs Daarul Uluum PUI Majalengka had an interest in learning Arabic. Previous studies suggest that animated videos can increase interest in learning, so the researchers used the Plotagon application to create animated videos for students to learn Arabic. The study aims to determine the effectiveness of animated videos in increasing student interest in learning Arabic. This study used a mixed-method with data collection techniques such as observations, interviews, questionnaires, and documentation to explore how animated videos can support learning Arabic among Class VIII students. The population chosen in this study was Class VIII MTs Daarul Uluum PUI Majalengka, which were 25 people, consisting of 10 females and 15 males. The study found that animated videos increased student interest in learning Arabic, as well as attention to the material presented and active participation in teaching and learning activities.

(Kusuma, 2021), the study aimed to measure the perceptions of Mechanical Engineering Vocational School students about using animated videos for developing skills to operate a lathe in distance learning. The researchers surveyed 73 students and used statistical analysis to compare the perceptions of male and female students. The results showed that both genders had similar positive perceptions about using animated video media for distance learning. It also show that the use of animated video media has a positive impact on teachers and students in vocational high schools for developing skills in operating lathes through distance learning.

(Pertiwi, et al., 2023), this study aimed to develop and analyze the feasibility and effectiveness of animated video learning media using Powtoon application for teaching caring for living beings to 4th-grade students. The study used the Research and Development (R&D) 4-D approach to develop and test animated video learning media using the Powtoon application for 4th-grade students at a public elementary school in Cibeber District. The effectiveness trials showed a significant increase in learning outcomes, with an average score of 79.37 in the post-test compared to 55.68 in the pre-test. So, the animated video learning media using Powtoon is suitable for the learning process.

(Pelani, 2018), the study focuses on the challenges of teaching English in Indonesia and explores the effectiveness of subtitled animated cartoon videos in improving students' reading com-

prehension. The study was conducted on sixth-grade students at SDIT Al Hasanah Kota Bengkulu, with a sample of 52 students taken from two classes. The study found that using subtitled animated cartoon videos with bimodal subtitles significantly improved students' reading comprehension scores compared to using videos without subtitles. (Abdo, et al., 2017), the study aimed to investigate the effectiveness of using animated videos in teaching English grammar to 9 fourth-grade EFL students in a Jordanian public school. The students were divided into three groups based on their achievement level, and a pre- and post-test were conducted to assess their learning progress. The study found that using animated videos was more effective in helping students understand and memorize new grammar concepts. Both male and female students showed interest in learning through animations, and the videos helped engage their emotions in the learning process. So, the using animations can be a helpful tool for teaching English grammar to EFL students and can enhance their learning experience. (Olii, & Nurwati, 2022), study aimed to find the use of animated videos in English learning by a teacher at SMPN 1 Tabongo. The study used observation, interviews, and documentation to collect data. The results showed that using animated videos in English learning supports a two-way learning process and helps students understand the material. The teacher's strategy with the videos stimulates creativity, interest, and motivation.

- **Studies related to recall and understanding**

In this axis, we will look at studies of dependent variables (recall and understanding). We will know what factors help to understand and recall.

- **Recall**

Studies (Khanum et al., 2015), (Bennett et al., 2018), (Allen et al., 2018), and (Barakat et al., 2015) have provided factors that help improve recall. Studies (Dang et al., 2020) and (Al-Harbi & Marawan, 2015) provided important recall information.

(Khanum et al., 2015), the study discusses the use of animations in television advertising, which has become increasingly popular in recent years due to their attention-grabbing appeal, low cost, and ability to show amazing effects. The study highlights the lack of empirical research on the topic in Pakistan and introduces a study that examines the effects of animation on recalling and its relationship with audiences of different ages. 300 participants of different ages were shown 12 commercials, with 4 being fully animated, 4 being semi-animated, and 4 being video. Participants then filled out a questionnaire to evaluate their recall of the commercials. Results showed that partially animated commercials had the most positive effect on recall, followed by fully animated commercials and then video commercials. Adults had better recall of fully animated commercials than children, while partially animated commercials had higher recall in adults than in children. Other variables, such as age, gender, and education level, also had an impact on recall.

(Bennett et al., 2018), this study aimed to investigate the relationship between mindfulness and academic performance, with a focus on the influence of trait mindfulness and resiliency on a brief mindfulness meditation to improve information recall. The study involved 69 undergraduate

students from a university in the West Midlands of the UK, the sample included 55 females and 14 males, with an age range of 18-25, who were randomly assigned to a control group or a mindfulness group. The results showed that participants in the mindfulness group performed better in the recall test than those in the control group, even when controlling for traits such as resiliency and mindfulness.

(Allen et al., 2018), immediate serial recall is a way to measure how humans remember information in order. Studies have looked at how collect information together affects recall, and how language knowledge can also affect recall. One study found that sentences are easier to remember than lists of words, and that this advantage is due to the way our brains are structured. The next set of experiments will test if this sentence advantage still holds true when people are asked to recognize information instead of recalling it from memory. The study used four experiments to see if sentences are still easier to remember than lists of words. The study also looked at whether this effect was different for hearing or seeing the information. They used different types of sentences and lists for both recall and recognition tasks and presented them both visually and audibly to compare people's performance. This study found that people find it easier to remember sentences than lists of unconnected words, whether they hear or see them. This advantage is stronger when people are asked to recall the information rather than recognize it. The study suggests that this could be because of how our brains process sentences, including how they are structured and the use of long-term memory to store them temporarily. These findings suggest that sentence structure helps with remembering information in our working memory.

(Barakat et al., 2015), the study examines the impact of newspaper images and digital processing on reader attention and recall, using a sample survey method to collect data from 400 newspaper readers in Minya governorate. The study found that including images in news articles can make them easier to read and help readers guess the content before reading. Square images placed above the article's title are the most attention-grabbing, while placing them next to the content is most beneficial for memory retention. Relevant images are the most helpful for aiding in memory retention. The study also explains the Information Representation Theory, which explores how humans process and remember information.

(Dang et al., 2020), false memory is when people remember things that did not happen. There are two types: suggestive false memory, caused by being exposed to wrong information, and spontaneous false memory, caused by memory distortion. Misinformation decreases as people grow older until young adulthood but then increases again in older adulthood. Spontaneous false memory is studied using paradigms like the Deese-Roediger-McDermott (DRM) and visual scenes paradigms. The current study used the visual scenes paradigm to examine age differences and the effect of prior recall on false recognition. The study involved 80 children, 74 adolescents, 92 young adults, and 82 older adults from China. Each age group was randomly assigned to one of two conditions, where they either had to recall information immediately before recognition or complete a filler task before recognition. Education level was measured by self-report and there

were no differences between the two conditions for each age group. All participants had normal vision and did not have neurological or psychiatric diseases. The study found that false memories decline as people grow older until young adulthood but then remain stable in older adulthood. Remembering information before seeing pictures reduced false memories in children but increased them in older adults. Adolescents made more mistakes, and children made fewer mistakes than other age groups. Remembering information before seeing pictures helped older adults remember things better.

(Al-Harbi & Ali, 2015), the study looked at how different factors affect high school students' learning efficiency, including visual memory, reasoning, meta-memory, and mental flexibility. They tested 202 students and found statistically significant differences in these factors between students with different levels of learning efficiency. The best predictors of learning efficiency were visual memory, memory capacity, reasoning, and mental flexibility. These factors can explain about 99.6% of the variance in high school students' learning efficiency. However, meta-memory components were not found to be a significant predictor.

- **Understanding**

Studies (Shiu et al., 2019), (Berg et al., 2023), (Akmalia et al., 2021), and (Rosdiana & Ulya, 2021) show that animated videos has a great impact on understanding. And study (Waleed, 2022) has found the best way to present information to make it easier to understand.

(Shiu et al., 2019), the study compared how well students learned micro-economics using written text versus animated videos. The study used Cognitive load theory as guidance and a questionnaire to measure students' perception. >>> The experiment involved 105 students in an Australian university and found that using animated videos had a comparable educational impact to traditional written text for teaching undergraduate economics. Both groups showed a positive change in score, and students reported a positive perception of the videos and found them helpful for understanding, motivational, and easy to follow. The study suggests that animated videos can be used as effective instructional tools in higher education.

(Berg et al., 2023), the study looked at a website called Watchyourmeds, which has thousands of animated videos to explain medication information in an easy-to-understand way. The study wanted to see how people were using the website, what they thought of it, and if it helped them understand their medications better. The study looked at how people used Watchyourmeds by analyzing data from 1815 pharmacies, asking users to fill out questionnaires about their experiences (4926 people), and testing their medication knowledge with a questionnaire (67 people). The study found that a web-based library with animated videos increased user understanding and accessibility of medication information. Over 1.8 million videos were distributed by pharmacies and most users indicated they fully understood the information presented. Users with lower educational levels were more likely to feel they did not miss any information. The majority of users stated they would like to use the library more often and would recommend it to others. Additionally, 73.8% of users answered medication knowledge questions correctly.

(Akmalia et al., 2021), the study created an animated Powtoon learning media to help junior high school students learn flat-sided geometry. The study followed a development model (AD-DIE) that included analysis, design, development, implementation, and evaluation. Media and material experts, as well as small groups of students, were involved in assessing the product's feasibility. The study also involved 30 students to evaluate the effectiveness of the product, and data was collected through validation questionnaires, test scores, and interviews using Powtoon animation media assessment sheets, tests, and interviews. The results showed that the Powtoon animation learning media was very feasible and effective in improving students' understanding of mathematical concepts, as evidenced by the increase in posttest scores compared to pretest scores.

(Rosdiana & Ulya, 2021), the study aimed to analyze the effectiveness of instructional video animation media on the earth's layers subject in terms of junior high school students' understanding of the concepts. The study used a research design "One group pretest-posttest design" with 28 students of class VII-D SMP Negeri 3 Sidoarjo as subjects. The data collection technique used was the test method, and the results showed that the animated video media was very effective in increasing students' understanding of concepts.

(Abdul Hamid, 2022), the research aimed to find out which type of summary information view style (scrolling ticker or update ticker) is better for an e-learning environment based on virtual studio technology and see which type can influence on development of deep understanding. The research uses the experimental design with the two experimental groups. The research sample consisted of (60) students from the 3rd Division of the Department of Education Technology at the Faculty of Specific Education - Ain Shams University, divided into two experimental groups. The results showed that the update ticker style was more effective in developing deep understanding, but there was no significant difference in technological acceptance. The study recommended using summary information view styles in educational video programs and e-learning environments.

- **Recall and Understanding**

(Ibrahim, 2022) The study aimed to see if using infographics related to digital transformation initiatives on news sites improves understanding and remembering of the content by the public. The study used scales to measure respondents' understanding, remembering, experience and skill in using the internet, and attitudes towards website design. The sample consisted of 60 deliberate respondents from the Media Department at Sohag University, divided into two groups - one exposed to news without infographics and the other exposed to news with infographics. Results showed that the second group, which was exposed to news with infographics, had a better understanding and remembering of the content than the first group. The study emphasized the positive impact of using infographics on readers' understanding and remembering of the content.

(Adel, 2021) The study aimed to investigate whether using augmented reality technology and 3D graphic designs in news reports enhances understanding and remembering of the content presented on TV news channels. The study used an experimental design with two groups - an experimental and a control group - consisting of 140 fourth-year students from the Department of

Media at Helwan University. Results showed that the experimental group, which was exposed to news reports with augmented reality technology, had a better understanding and remembering of the content than the control group, which was exposed to news reports presented in a simple news studio without 3D graphic techniques. The study also found statistically significant differences in understanding and remembering rates according to gender, with males performing better than females. However, there were no differences in understanding and remembering rates according to the economic and social level of the sample respondents.

(Foad, 2020) The study aimed to investigate the effect of infographics on cognitive processes of users, specifically understanding and remembering. The study also sought to determine whether adding infographics to electronic and printed public relations publications improves understanding and remembering among users. The experimental method was used on a deliberate sample of 150 students from Tanta University. The study found several important results, including a positive effect of infographics on cognitive processes, with text accompanied by infographics having a greater impact than text alone. Animated infographics were found to have a greater impact on cognitive processes compared to static infographics. Additionally, static infographics were found to be more effective in terms of understanding and remembering compared to text.

(Tharwat, 2019) The study aimed to test the effect of employing creative features in television advertisements on the audience's understanding and recall of the content. The study assumed that using creative features in television advertisements affects the audience's understanding and recall of the content. The study relied on two main scales: the creative features scale and the understanding and recall scale. The study used both experimental and survey methods, employing content analysis tools and a questionnaire. The analytical study community was represented by television advertisements, and the study was applied to a sample of 80 television advertisements broadcasted on the first channel of Egyptian television. The experimental study was conducted on a sample of 75 students from the Canadian University of Dubai's media college, with 25 individuals in each of the three groups. The results confirmed the impact of employing creative features in television advertisements on the audience's understanding and recall of the content. The more creative features were used and better employed in media, the more the audience understood and remembered the content, whether in terms of the main idea or overall understanding, as well as recall, whether free recall or aided recall. This is what advertising makers always seek to achieve their goal.

(Shehawy, 2016) The study aims to see how interactive infographics affect how well people understand and remember information compared to static infographics and text. The study also looks at other factors like math skills, attention level, and internet usage. University students were used for the experiment because they are an accessible and suitable group, and having similar age and education levels makes the results more consistent. The study concluded by testing a group of second-year students at the Faculty of Media, Cairo University. The study compared how well people remember and understand information presented in interactive infographics, static infographics, and text. The study found that interactive infographics had a positive effect on recall and understanding because they allow users to actively engage with the content. However,

reading text was better for memory and understanding compared to static infographics with a lot of information. People with better math skills were better at remembering information with lots of numbers. Attention levels were similar for people who saw interactive infographics and those who saw static ones, which is different from other studies. The study did not find a connection between internet and infographic usage and memory/understanding, possibly because most participants used the internet and news websites a lot.

• **Comment on literature review**

The topics of previous studies were diverse, as there were topics on the impact of animated educational videos in more than one field and on more than one target audience. There were also studies on dependent variables (Recall and understanding), topics on factors that help increase and improve recall and understanding, topics on the importance of recall information, topics on the impact of animated educational videos on understanding, and studies on the appropriate way to present information so that it is easy to understand.

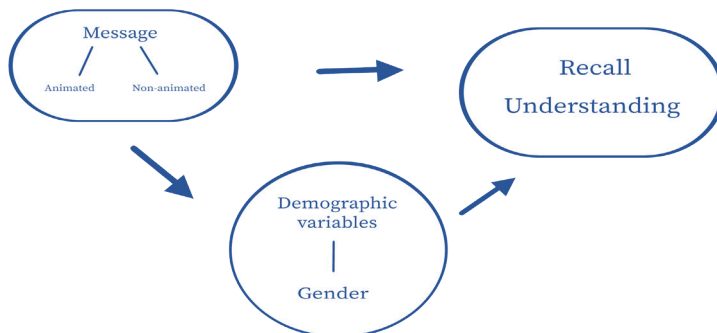
The researcher observed that few studies were based on a theory or model. Most of the previous studies were experimental studies that relied on observations, interviews and questionnaires, to conduct a pre- and post-test.

In the end, it was found that there are rare studies on animated educational videos and its use to facilitate content for students of theoretical faculties.

Theoretical Framework

• **Operational Model**

The researcher collected all the variables appropriate for the research problem of this study, and through examining and analyzing previous studies, she saw that it is better to design an operational model that includes the variables of the study's issue.



The model shows that animated and non-animated videos are the independent variables that influence on dependent variables. Intermediate variables, gender, help determine the type of influence.

First: Independent variables (Animated and non-animated)

The independent variable was controlled by exposing the participants in the experiment to two types of videos (Animated and non-animated) that contains the same information and differs only in view, the two groups:

- 1- The first group was exposed to animated videos; it contains animated characters with animated elements.
- 2- The second group was exposed to non-animated videos consisting of slide show.

Information contained in the videos:

- 1- The first information is that the elements of the marketing mix consist of; Product, place, price, promotion.
- 2- The definitions of; Product, place, price, promotion.
- 3- A successful product either fills a void in the marketplace, or offers a unique experience that spikes demand.
- 4- Price should not be too high for the customer or too low for the business to profit and should reflect current market trends.
- 5- The location where the product can be purchased. This could be online small shops or global producers. Not every place is suitable for every product. For instance, a product targeted to seniors should probably not be marketed on TikTok.
- 6- Sending the right message at the right time is the most important aspect of marketing, such as pizza delivery ads during football games.

Second: The mediator variable (Gender)

The mediator variable is gender only, because the sample is a freshman year (2023-2024) of the Faculty of mass communication at Ahram Canadian University. They are the same age, faculty and social level.

Third: The dependent variables (Recalling and understanding)

Understanding:

For the measurement of understanding, five questions were used, four of which were multiple choice and one open-ended question (here are the questions; which element of the marketing mix refers to the methods used to communicate with customers? / Which element of the marketing mix refers to where a product or service is sold? / If you wanted to market a product targeting the elderly, what platform would you use? / Which of the following choices should characterize a price. The open question; which element of the marketing mix do you think is the most important? Why?

The researcher has developed a scale of understanding, and the following table shows the scale of understanding:

Understanding Scale	Score
High	4-5
Medium	3-4
Low	1-2

Recalling:

The measurement of the information that the participant remembers from the experiment shows the degree of impact of the videos, so the recalling was measured through five questions, three multiple choice questions and two open-ended questions; the first question is the element that must meet the customer’s need or desire, this is the definition of: / It could be where the purchase takes place: / How can businesses ensure that their products meet the needs and desires of their target customers?. Open questions; Sending the right message at the right time is the most important aspect of marketing. Give me an example from the video / How would you explain the elements of the marketing mix to someone.

The researcher made a scale includes three categories of high recall and includes remembering all information, average recall includes remembering some information and low recall and includes very little remembering. This scale consists of three degrees:

Recall Scale	Levels
Remember one piece of information	1
Remember more than one piece of information	2
Remember all five pieces of information	3

Methodology

• **Research Questions**

- Q1. What is the impact of animated educational videos on university students’ understanding?
- Q2. To what extent do animated educational videos improve university students’ ability to recall information?
- Q3. Does animated educational videos make content easier to understand?
- Q4. Does animated educational videos make content easier to recall?
- Q5. Is there a difference in the impact of animated educational videos and non-animated educational videos on university students’ understanding of content?
- Q6. Is there a difference in the impact of animated educational videos and non-animated educational videos on improving university students’ recall of content?

• **Hypotheses**

- H1. The animated educational videos have positive impact on recalling than non-animated videos.

H2. The animated educational videos have positive impact on understanding than non-animated videos.

H3. Females who were exposed to animated educational videos are more able to recall the content than males.

H4. Females who were exposed to animated educational videos are more able to understand the content than males.

- **Society and Sample**

University students are considered one of the most suitable groups for the apple of the experimental study, for their easy access and the suitability of the university halls to conduct the experiment, and the presence of similarities in age, education and social level between students, ensures the stability of demographic factors.

First-year students at the university were also selected to participate in the experiment to obtain accurate results, because the study determine the impact of these videos on students, so it was better to choose students who don't know much about the content of the college or about animated educational videos. This study was applied to a group of first-year (2023-2024) students at the Faculty of Mass Communication at Ahram Canadian University.

The research sample consists of 20 university students from the Faculty of Mass Communication at Ahram Canadian University, the first year of the academic year 2023-2024.

Participants	
10 students watch an animated educational video	10 students watch an non-animated educational video
5 males and 5 females	5 males and 5 females

- **Method and Data Collection Tool**

This study belongs to the category of research that aims to study the causal relationships between the independent variable and the dependent variables, and the experimental method is one of the most appropriate research methods to achieve this purpose. **This study is based on the quantitative and experimental approach by using the questionnaire.**

A pre- and post-test will be performed. Pre-test to find out if there is a background in the content of videos among students, the post-test to measure the level of understanding and recalling the content of students.

In order to determine the impact of animated and non-animated educational videos on students' recalling and understanding of educational content, the video content was chosen from their educational content, but they were not aware of it; the content was the "marketing mix (4Ps)". The educational videos used in the study were created by the researcher.

• **Concepts and Operational Definition**

Variables	Theoretical definition	Operational definition (How to measure)								
Animated Educational Videos	<p>Animated video is a medium that combines audio and visual media for students' attention and is able to present things in detail, and can help students understand difficult lessons. It also helps students learn and retain material better and longer. (Olii & Nurwati, 2022)</p>	<p>1. The researcher will create animated and non-animated educational videos.</p> <p>2. The researcher will use Adobe software to design the videos (Adobe Illustrator, Adobe After Effects, Adobe Media Encoder, and Adobe Premier Pro).</p> <p>4. The duration of the animated and non-animated educational video will be one minute and 25 seconds.</p>								
Recalling	<p>To bring back to mind. The aptitude to retain information. (Khanum et al., 2015)</p> <p>Is a complex cognitive process involving attention, storage, retrieval, and other processes. It is the ability to retain information, skills, and knowledge for later use. (Ibrahem 2022)</p> <p>Is the cognitive function of storing and retrieving past information and experiences. (Barakat et al., 2015)</p>	<p>The measurement of the information that the participant remembers from the experiment shows the degree of impact of the videos, so the recalling was measured through five questions, three multiple choice questions and two open-ended questions</p> <p>The researcher made a scale includes three categories of high recall and includes remembering all information, average recall includes remembering some information and low recall and includes very little remembering. This scale consists of three degrees:</p> <table border="1"> <thead> <tr> <th>Recall Scale</th> <th></th> </tr> </thead> <tbody> <tr> <td>Remember one piece of information</td> <td>1</td> </tr> <tr> <td>Remember more than one piece of information</td> <td>2</td> </tr> <tr> <td>Remember all five pieces of information</td> <td>3</td> </tr> </tbody> </table>	Recall Scale		Remember one piece of information	1	Remember more than one piece of information	2	Remember all five pieces of information	3
Recall Scale										
Remember one piece of information	1									
Remember more than one piece of information	2									
Remember all five pieces of information	3									
Understanding	<p>The process of integrating new information with stored memory involves making inferences about the new information. While memory depends on simple storage, comprehension requires complex storage of information based on knowledge inference. (Barakat et al., 2015)</p> <p>Understanding is a psychological process of grasping abstract or sensory concepts and using them to interact with the object appropriately. (Ibrahem 2022)</p>	<p>For the measurement of understanding, five questions were used, four of which were multiple choice and one open-ended question.</p> <p>The researcher has developed a scale of understanding, and the following table shows the scale of understanding:</p> <table border="1"> <thead> <tr> <th>Understanding Scale</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>4-5</td> </tr> <tr> <td>Medium</td> <td>3-4</td> </tr> <tr> <td>Low</td> <td>1-2</td> </tr> </tbody> </table>	Understanding Scale	Score	High	4-5	Medium	3-4	Low	1-2
Understanding Scale	Score									
High	4-5									
Medium	3-4									
Low	1-2									

- **Experiment procedure**

In the beginning, a pre-questionnaire was distributed to 50 university students in the first year, to choose the appropriate sample. After that, the experiment was conducted in two computer laboratories for the Faculty of Mass Communication at Ahran Canadian University, where each group of participants in the experiment was exposed to the content for a period of one minute and 25 seconds; the exposure time was same in the two groups. After completing the exposure, participants answered the Recalling and understanding test questionnaire.

Results

In this part, the researcher presents the results of the experimental study, identifying the characteristics of the participants in the experiment, and analysing the metrics used to test the dependent variables, test the study hypotheses and questions.

During two experimental groups, 20 people participated in this experiment, all of them first-year students at the Faculty of Mass Communication, Ahran Canadian University, males represent 50% (10 individuals) and females 50% (10 individuals).

- **Results of research questions**

Results of research questions related to the dependent variable recall will be discussed. Three research questions were asked about recalling:-

Q1. To what extent do animated educational videos improve university students' ability to recall information?

Q2. Does animated educational videos make content easier to recall?

Q3. Is there a difference in the impact of animated educational videos and non-animated educational videos on improving university students' recall of content?

The results of survey questions that measure recall:

First video: Non-animated video

Questions (Non-animated video)	Answers	Male	Females	Total
1. The element that must meet the customer's need or desire, this is the definition of:	Product	5	5	10
2. It could be where the purchase takes place:	Online	1	0	10
	All of this	4	5	
3. How can businesses ensure that their products meet the needs and desires of their target customers?	Depends on the company's opinion	1	0	10
	Fills the void in the marketplace.	2	4	
	Assuming that all customers have the same needs and desires	2	1	
4. How would you explain the elements of the marketing mix to someone?	Explain Four Elements	1	2	10
	Explain more than one element	1	0	
	Explain one element	0	1	
	No element was explained	3	2	
5. Sending the right message at the right time is the most important aspect of marketing. Give me an example from the video:	Remember another example and the one in the video	0	1	10
	Remember the example in the video only	3	4	
	He did not remember any example	2	0	

The results of non-animated video indicate differences in recalling content between males and females. In Q1, both genders responded correctly, with all 5 males and 5 females correctly defining the element of a product meeting customer needs or desires. This shows a 100% accuracy rate for both.

In Q2, females' outperformed males in this question, with 5 females answering correctly compared to 4 males. The accuracy rate for females is 100%, while for males, it is 80%.

In Q3, females showed a higher level of recall compared to males, with 4 females answering correctly and only 2 males. The accuracy rate for females is 80% and for males is 40%. Similarly, in Q4, females recalled the question better than males, as 3 females' recall it compared to 2 males. The recall rate for females is 60%, while for males, it is 40%. Finally, in Q5, females displayed a higher level of retention and recall, with 4 females both remembering and explaining the question correctly, while 3 males. The recall and explanation rate for females is 80%, while for males, it is 60%.

These results indicate that females in general had a greater ability to recall the video content compared to males.

Scale question to measure recalling and understanding		
Questions	Answers	Total
The video was effective in explaining the marketing mix concept	Agree	2
	Neutral	8
	Disagree	0
The video was effective in remembering what you watched.	Agree	6
	Neutral	4
	Disagree	0
I would recommend these videos to others who are interested in learning about the marketing mix concept.	Agree	7
	Neutral	3
	Disagree	0

The results of the scale questions in the non-animated video provide the 10 participants’ opinions about the effectiveness of the video and their inclination to recommend it to others. Statement 1 “The video was effective in explaining the marketing mix concept” 20% of the participants agreed, indicating that a small minority found the video successful in explaining and understanding the concept. The majority of participants 80% were neutral, indicating that they neither strongly agreed nor disagreed with the effectiveness of the video in explaining and understanding the marketing mix concept.

Statement 2 “The video was effective in remembering what you watched” A larger percentage of participants, 60% agreed that the video was effective in recalling. This indicates that a majority of the participants found the video successful in facilitating their memory of the content. Four participants (40%), provided a neutral response, indicating a lack of strong agreement or disagreement.

Statement 3: When asked about recommending the video to others interested in learning about the marketing mix concept, the majority of participants, 70% agreed that they would recommend the videos. This indicates a positive effect of the video among the majority of participants. Three participants 30%, provided a neutral response, indicating a lack of strong agreement or disagreement.

These results suggest that although video may have limited effect in explaining and understanding the concept of a marketing mix, a larger proportion of participants found it effective in helping them remember the content and were willing to recommend it to others. Neutral responses indicate a degree of contradiction or uncertainty among some participants.

Second video: Animated video

Questions (Animated video)	Answers	Male	Females	Total
1. The element that must meet the customer's need or desire, this is the definition of:	Product	4	5	10
	Price	1	0	
2. It could be where the purchase takes place:	All of this	5	5	10
3. How can businesses ensure that their products meet the needs and desires of their target customers?	Depends on the company's opinion	1	0	10
	.Fills the void in the marketplace	3	5	
	Assuming that all customers have the same needs and desires	1	0	
4. How would you explain the elements of the marketing mix to someone?	Explain Four Elements	5	5	10
5. Sending the right message at the right time is the most important aspect of marketing. Give me an example from the video:	Remember another example and the one in the video	1	2	10
	Remember the example in the video only	4	3	
	He did not remember any example	0	0	

The results of the animated video show that both males and females had a high level of recall the content. In Q1, 4 males and all 5 females correctly defined the element of a product meeting customer needs or desires. The accuracy rate for males is 80%, while for females, it is 100%. Similarly, in Q2, both genders achieved a high score, with all 5 males and 5 females correctly identifying where the purchase takes place. This indicates a 100% accuracy rate for both.

Moving to Q3, females outperformed males, with 5 females answering correctly compared to 3 males. The accuracy rate for females is 100%, while for males, it is 60%.

In Q4 and Q5, both males and females showed a high score, with all 10 individuals remembered and explained the questions correctly. This leads to a 100% recall and explanation rate for both genders.

Overall, these results indicate a strong level of content retention in both males and females.

Scale question to measure recalling and understanding		
Questions	Answers	Total
The video was effective in explaining the marketing mix concept.	Agree	10
	Neutral	0
	Disagree	0
The video was effective in remembering what you watched.	Agree	8
	Neutral	2
	Disagree	0
I would recommend these videos to others who are interested in learning about the marketing mix concept.	Agree	10
	Neutral	0
	Disagree	0

The results of the scale questions in the animated video provide the 10 participants’ opinions about the effectiveness of the video and their inclination to recommend it to others.

Statement 1 “The video was effective at explaining and understanding the concept of a marketing mix” all participants agreed 100% that the video was successful in explaining the concept. Statement 3 when asked to recommend videos to others interested in learning about the concept of the marketing mix, all participants agreed 100%. This indicates a unanimous agreement among participants that the video will be useful to others interested in the concept of a marketing mix, and that the video effectively explained the concept of a marketing mix.

Statement 2 “The video was effective in remembering what you saw,” most participants (80%) agreed that the video was effective in making it easier for them to remember. This suggests that a large percentage of participants found the video successful in facilitating their memory of content. Two of the respondents, 20%, a neutral answer, indicated no agreement or strong disagreement.

These results suggest that the animated video had a high impact in explaining and understanding the marketing mix concept, as indicated by the unanimous agreement among participants 100%. The majority of participants found the video effective in facilitating their memory and they want to recommend it to others.

From these results, three research questions related to recall are answered.

Q1. To what extent do animated educational videos improve university students’ ability to recall information?

The results indicate that animated videos are effective in improving university students’ ability to recall information. It had the ability to improve results more than non-animated videos.

In the animated video, 7 students (2 males and 5 females) answered the questions correctly, while 3 students (3 males) answered one question incorrectly out of the five. This means that 70% of the students remembered all the questions. As for the non-animated video, only 3 students (3 males) answered all the questions correctly, while 7 students did not answer all the questions

correctly (their scores ranged from 3 to 4 out of 5). This means that only 30% of the students remembered all the questions.

A well-designed animated video that presents information in a visually attractive way can contribute positively to students' recall abilities.

Q2. Does animated educational videos make content easier to recall?

Animated videos facilitate content recall compared to non-animated traditional methods. This is evident from the scale question, where it was found that all students agreed that animated videos were effective in explaining the marketing mix concept and that they would recommend it to anyone interested in understanding the marketing mix concept (Agree 10). Additionally, most students agreed that the video was effective in recalling what they watched (agree 8).

But the non-animated video, only 2 of 10 students agreed that the video was effective in explaining the concept of the marketing mix, 6 of 10 students agreed that the video helped them remember the content, and 7 that they would recommend the video to anyone who wanted to learn more about the concept of the marketing mix.

Q3. Is there a difference in the impact of animated educational videos and non-animated educational videos on improving university students' recall of content?

Research suggests that animated videos may have a greater impact on improving content recall compared to non-animated videos. The use of animations helps in presenting abstract concepts and clarifying the overall understanding of complex topics. This is evident from the results, where it was found that the impact of animated videos on content recall was better than that of non-animated videos.

Results of research questions related to the dependent variable understanding will be discussed. Three research questions were asked about understanding:-

Q1. What is the impact of animated educational videos on university students' understanding?

Q2. Does animated educational videos make content easier to understand?

Q3. Is there a difference in the impact of animated educational videos and non-animated educational videos on university students' understanding of content?

The results of survey questions that measure understanding:

First video: Non-animated video

(Questions (Non-animated video	Answers	Male	Females	Total
1. Which element of the marketing mix refers to the methods used to communicate with customers?	Promotion	4	5	10
	Product	1	0	
2. Which element of the marketing mix refers to where a product or service is sold?	Place	5	5	10
3. If you wanted to market a product targeting the elderly, what platform would you use?	Threads	2	1	10
	Facebook	3	4	
4. Which of the following choices should characterize a price:	Should reflect current market trends	5	5	10
5. Which element of the marketing mix do you think is the most important? Why?	Mentioned one element and explained it	5	5	10

The results of the non-animated video indicate the extent to which both males and females understand the content related to the marketing mix concept. In Q1, 80% of the males 4 answered correctly, while all of the 5 females (100%) answered the question correctly.

Q2, both males and females had correctly responded to the question with 100%. This indicates a strong understanding the element of the marketing mix related to the location of product or service sales.

In Q3, females’ outperformed males, with 4 (80%) females answered the question correctly, while 3 (60%) males provided the correct response.

Q4 reveals that all participants correctly answered the question. All 5 males and 5 females understood the characteristics that should be associated with price. This results in a 100% accuracy rate for both males and females, indicating a strong grasp of the topic. Similarly, in Q5, all participants, both males and females, understood and explained the question correctly. This leads to a 100% understanding and explanation rate for both genders.

In general, these results indicate a strong understanding of the marketing mix concept among both males and females. While females showed a slightly higher rate on some questions.

Scale question to measure recalling and understanding		
Questions	Answers	Total
The video was effective in explaining the marketing mix concept.	Agree	2
	Neutral	8
	Disagree	0
The video was effective in remembering what you watched.	Agree	6
	Neutral	4
	Disagree	0
I would recommend these videos to others who are interested in learning about the marketing mix concept.	Agree	7
	Neutral	3
	Disagree	0

The results of the scale question were previously explained in the recalling section.

Second video: Animated video

(Questions (Animated video	Answers	Male	Females	Total
1. Which element of the marketing mix refers to the methods used to communicate with customers?	Promotion	5	4	10
	Product	0	1	
2. Which element of the marketing mix refers to where a product or service is sold?	Place	5	4	10
	Product	0	1	
3. If you wanted to market a product targeting the elderly, what platform would you use?	TikTok	0	1	10
	Facebook	5	4	
4. Which of the following choices should characterize a price:	Should reflect current market trends	5	5	10
5. Which element of the marketing mix do you think is the most important? Why?	Mention and explain the four elements	1	2	10
	Mentioned and explained more than one element	2	0	
	Mentioned one element and explained it	2	3	

The results of the animated video indicate the extent to which both males and females understand the content related to the marketing mix concept. In Q1, Q2, and Q3 all 5 males answered the question correctly, while 4 females provided the correct response. This leads to a 100% rate for males and an 80% rate for females.

In Q4 and Q5 all participants answered correctly the questions. All 5 males and 5 females showed an understanding of the characteristics that should be associated with price and explained their answer, indicating that they clearly understood the content. This results in a 100% rate for both males and females.

Overall, these results indicate a strong understanding of the marketing mix concept among both males and females. Both genders achieved a high rate of 100% in three out of the five questions. In the two questions, males achieved a 100% rate, while females achieved an 80%

rate. These results indicate that both males and females have a good understanding of the content presented in the animated video.

Scale question to measure recalling and understanding		
Questions	Answers	Total
The video was effective in explaining the marketing mix concept.	Agree	10
	Neutral	0
	Disagree	0
The video was effective in remembering what you watched.	Agree	8
	Neutral	2
	Disagree	0
I would recommend these videos to others who are interested in learning about the marketing mix concept.	Agree	10
	Neutral	0
	Disagree	0

The results of the scale question were previously explained in the recalling section.

From these results, three research questions related to understanding are answered.

Q1. What is the impact of animated educational videos on university students' understanding?

Q2. Is there a difference in the impact of animated educational videos and non-animated educational videos on university students' understanding of content?

Animated videos were found to be more helpful in enhancing understanding of the content compared to non-animated videos, although the effect in this part was not great.

In the animated video, 8 students (5 males and 3 females) answered the questions correctly, and 2 female students answered one question incorrectly out of the five. This means that 80% of the students understood all the questions. As for the non-animated video, 6 students (3 males and 3 females) answered the questions correctly, while 4 students (2 males and 2 females) did not answer all the questions correctly (their scores ranged from 3 to 4 out of 5). This means that 60% of the students understood all the questions.

Q3. Does animated educational videos make content easier to understand?

The students' opinion was that all of them agreed that the animated video was effective in explaining and understanding the marketing mix concept, and they would recommend it to anyone interested in understanding the marketing mix concept (Agree 10). Also, most students agreed that the video was effective in understanding what they watched (Agree 8).

But the non-animated video, only 2 of 10 students agreed that the video was effective in explaining the concept of the marketing mix, 6 of 10 students agreed that the video helped them understanding the content, and 7 that they would recommend the video to anyone who wanted to learn more about the concept of the marketing mix.

- **Measuring the validity of hypotheses**
- **The first two hypotheses were proven:**

H1 The animated educational videos have positive impact on recalling than non-animated videos)

H2 Females who were exposed to animated educational videos are more able to recall the content than males).

A scale has been applied to measure levels of recall:

Recall Scale	Levels
Remember one piece of information	(Low) 1
Remember more than one piece of information	(Medium) 2
Remember all five pieces of information	(High) 3

A table showing the results of the recall scale (Non-animated video):-

The levels of information recall	Male	Female	%
Low	0	0	0
Medium	Degrees: 3/5 – 2/5 – 4/5) 5 (– 3/5 – 4/5	(Degrees:3/5 – 4/5) 2	70%
High	0	(Degrees: 5/5) 3	30%
Total	5	5	100%

A table showing the results of the recall scale (Animated video):-

The degree of information recall	Male	Female	%
Low	0	0	0
Medium	(Degrees: 4/5) 3	0	30%
High	(Degrees: 5/5) 2	(Degrees: 5/5) 5	70%
Total	5	5	100%

From the results, it was shown that animated video (High=70%) had a greater effect on recall information than non-animated video (Medium=70%). Also, it show that the females who were exposed to the videos (Medium= 2/ High= 8), had higher recall information than the males (Medium= 8/ High=2). **And here’s where the first two hypotheses were proven (H1 The animated educational videos have positive impact on recalling than non-animated videos) and (H2 Females who were exposed to animated educational videos are more able to recall the content than males).**

- **The second two hypotheses:**

(H3 The animated educational videos have positive impact on understanding than non-animated videos) was proved.

(H4 Females who were exposed to animated educational videos are more able to understand the content than males) was disproved.

A scale has been applied to measure levels of understanding:-

Understanding Scale	Score
High	4-5
Medium	3-4
Low	1-2

A table showing the results of the recall scale (Non-animated video):-

The degree of understanding	Male	Female	%
Low	0	0	0
Medium	(Degrees: 3/5 – 4/5) 2	(Degrees: 4/5) 2	40%
High	(Degrees: 5/5) 3	(Degrees: 5/5) 3	60%
Total	5	5	100%

A table showing the results of the recall scale (Non-animated video):-

The degree of understanding	Male	Female	%
Low	0	0	0
Medium	0	(Degrees: 4/5) 2	20%
High	(Degrees: 5/5) 5	(Degrees: 5/5) 3	80%
Total	5	5	100%

From the results, it was shown that animated video (High= 80%) had an effect on students' understanding of content than non-animated video (High= 60%), But the difference in impact was not as great as the difference in video recall. It also show that males (High= 8 /Medium= 2) understood the content more than females (High= 6 /Medium= 4). **Here the hypotheses' that (H3 The animated educational videos have positive impact on understanding than non-animated videos) was proved, and the hypotheses' that (H4 Females who were exposed to animated educational videos are more able to understand the content than males) was disproved.**

- **Conclusion**

- By conducting an experimental study using two groups to identify the effect of animated educational video on university students' recalling and understanding of the content and compare it with non-animated video, the results showed a positive effect of the animated educational video on the processes of recalling and understanding. The second group, which was exposed to the animated educational video, outperformed the first group that exposed to non-animated educational video.

- These results are consistent with previous studies, as studies conducted by Uual (2012), Barut and Ozgur (2021), and Puspaningtyas and Ulfa (2020) continued that animated educational video has a positive effect on university students' recall and understanding of the content. This aligns with the studies by Ardiansyah et al. (2022), Kusuma et al. (2021), Pertiwi et al. (2023), Pelani (2018), Abdo et al. (2017), and Olii and Nurwati (2022), which have also emphasized the effectiveness of animated videos in enhancing learning outcomes.

- Also, Barut and Ozgur's (2021) study indicated that animated videos increased student motivation. The results of studies by Khanum et al. (2015), Bennett et al. (2018), Allen et al. (2018), Barakat et al. (2015), Dang et al. (2020), and Al-Harbi & Ali (2015), were similar as it highlight the positive effects of animated videos on student motivation.

- Furthermore, Puspaningtyas and Ulfa (2020) investigated the effectiveness of animated videos in blended learning and found a significant improvement in student learning achievement. This is consistent with the findings of Shiu et al. (2019), Berg et al. (2023), Akmalia et al. (2021), Rosdiana & Ulya (2021), and Abdul Hamid (2022), which also highlighted the benefits of animated videos in enhancing learning outcomes in diverse educational contexts.

- The results show that the differences in the impact on recalling was large (from 30% to 70%), while the differences in the impact on understanding was smaller (from 60% to 80%). It also show that females excel in recalling, while males excel in understanding.

- The scale's question show that students were more satisfied with the animated video than the non-animated. These results confirm that animated videos are an effective tool to stimulate interest and interaction in the learning environment. The researcher also noticed a difference in the interest and enthusiasm of students exposed to animated video, compared to students exposed to non-animated video.

- Based on these results, the researcher advises the use of animated educational videos, as they contribute to reducing boredom, increasing students' interest and enthusiasm, and making them more alert and attentive.

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