

Social Media and Sludge Content's Correlation With Lectures

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ABSTRACT

Attention span in students has declined at an alarming rate, which is partly due to social media applications like TikTok. One current trend on TikTok that maintains attention is sludge content, which consists of two visual pieces of stimuli and contextual audio. This led me to question whether social media's methods of maintaining attention could counteract the negative effects of social media.

I hypothesized that implementing sludge content into lectures would increase attention span and academic performance in high school students. I conducted a survey, which gathered preliminary information, and an experiment, which compared the implementation of sludge content in the classroom to a regular lecture.

The experiment showed that sludge content in the classroom increases attention span, but does not impact academic performance. Despite limitations in sample size, I concluded that the sludge content should be implemented in classrooms at other schools to address the current attention crisis.

Applying the results of this study would lead to a more engaged classroom of students and fewer hardships for teachers.

INTRODUCTION

The Merriam-Webster Dictionary defines attention as “a condition of readiness...involving especially a selective narrowing or focusing of consciousness and receptivity” (*Definition of Attention*, 2019). In a classroom setting, an elongated attention span is of utmost importance. Despite this, Darla Rothman, PhD, states, “In the classroom, the average student's attention span is seven to ten minutes” (Rothman, 2016). This finding is extremely impractical for learning, and Herr Fillmore, a graduate of the Hochschule Mittweida at the University of Applied Sciences, points to increased usage of technology by the youth as the cause for this attention deficit (Fillmore, 2015). Fillmore explains, “Through a high daily usage of the internet, there is more potential for distraction through the constantly changing focus of attention. This is indicative of short attention span” (Fillmore, 2015). Furthermore, students are impacted by the

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detrimental effects of social media (SM), as evidenced by Mehmet Cicekci, physics teacher, and Fatma Sadik, Associate Professor in the Department of Educational Sciences at Cukurova University. They quote a student who suffers due to SM use, who says, “I can’t do anything, I can’t get over it. That’s why I get low grades. I do not know how to remove distractibility” (Cicekci and Sadik, 2019). In turn, the addictive nature of SM causes students to fail in academic pursuits due to their short attention spans (Fillmore, 2015). This attention crisis prompts teachers to pursue remedies to address students’ declining academic performances. This literature review will analyze the factors that contribute to maintaining attention through different lecturing methods, and how SM as a whole interacts with high school students, their cognitive functioning, and retention.

LITERATURE REVIEW

Active and Passive Learning

There are two widely recognized methods of educating within schools: active and passive learning. These methods are often studied to determine which is more effective in education. Peter Lenz et al., Pulmonary and Critical Care Director at the University of Cincinnati, affirms, “Active learning requires engagement and/or interaction with the audience and promotes a bidirectional flow of ideas and content” (Lenz et al., 2015). Lerma Cueto, Master of Arts in Education, explains that examples of such learning are “frequent movement breaks, hands-on activities, and student-centered discussions” (Cueto, 2025). On the other hand, passive learning is “information [that] flows unidirectionally from the speaker to the audience” (Lenz et al., 2015). Examples of passive learning include PowerPoint presentations and audio narration. Roopa Ankad et al., MD in Physiology, conducted a study in which they tested students’ academic performance before and after implementing PowerPoints into their lectures. Ankad et al. affirm, “[The study] showed a positive impact of the PowerPoint presentation on students' immediate performance and learning” (Ankad et al., 2015). Combining a PowerPoint with audio also has positive results. According to Chih-Ming Chen et al., Chair and Director of the Research Center for Chinese Cultural Metaverse in Taiwan, “sustained attention induced by the voice-over type [of teaching] is markedly higher than that with the picture-in-picture type” (Chen et al., 2015). Alternatively, multimedia instructional messaging, an active teaching technique, is described by Richard Mayer, Distinguished Professor of Psychology at the University of California, as “instructional material consisting of words...and graphics...intended to foster new knowledge or skills in a learner” (Mayer, 2024). Cueto elaborates on the success of this technique through “Mayer’s Multimedia Learning Theory...[which] emphasizes the effectiveness of interactive and multimedia-based instruction in enhancing student engagement” (Cueto, 2025). This theory allows people to associate information with images in their deep memory, also known as pair-type memorization, as sourced by William Aue et al., Cognitive Neuroscientist at Wright State University (Aue et al., 2012). Kristin Sherman, Master of Education from the University of North Carolina at Charlotte, describes a form of learning that is similar to multimedia learning: multimodal learning. Multimodal learning is “teaching that combines visual, auditory, and kinesthetic input. [It] is the most effective way to stimulate classes of students with various learning styles” (Sherman, 2013). When comparing efficacy, Sherman expounds that the most productive method of learning mixes both active and passive learning, although neither method consistently maintains attention (Sherman, 2013).

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Social Media

SM is capable of playing a role in education. In fact, Weiyi Sun and Miao Chao, professors in the Faculty of Psychology at Tianjin Normal University, explain that SM can be used for good by increasing cognitive function and educating (Sun and Chao, 2024). According to Merriam-Webster, SM is defined as “forms of electronic communication...through which users create online communities to share information, ideas, personal messages, and other content” (*Definition of Social Media*, 2025). One of the most popular SM applications is TikTok. Andrea Appolloni et al., associate professor in the Department of Management and Law at the University of Rome Tor Vergata, describe TikTok as “distinguished by its unique format of short, engaging video content” (Appolloni et al., 2024). They explain that TikTok is tailored to the younger generation due to its “bite-size content” and “rapid-communication” techniques (Appolloni et al., 2024). Further, they affirm that “in the United States, data reveals that 32.5% of TikTok users are aged between 10 and 19, highlighting the platform's popularity among a demographic that is notoriously difficult to engage with” (Appolloni et al., 2024).

Sludge Content

A TikTok feed is made up of several trends that change over time. A current trend on TikTok is the usage of sludge content. According to Rahaf Fares, Clinic Assistant at California State University, sludge content is defined as “video clips that typically combine multiple visual stimuli and a contextual audio to pair with one of the visuals” (Fares, 2025). Specifically, sludge content must include at least two distinct sources of visual stimuli, and a contextual audio to pair with one of the two stimuli. The other visual stimuli should be irrelevant to the topic at hand. For example, a common format of sludge content generally contains some sort of gameplay, which is stimulus number one, subtitles, which is stimulus number two, and an audio with a story that pairs with the subtitles, which is the contextual audio (Fares, 2025). This contrasts with the typical lecture, which contains a singular, related visual stimulus, the slideshow, and a contextual audio, that being the teacher speaking (Lenz et al., 2015). Ellenrose Firth, PhD in Communication and Social Research, and Alberto Marinelli, professor in Communication and Social Research at Sapienza University of Rome, discuss examples of what visual clips are used within sludge content: TV content, subway surfer matches, slime videos, soap being cut, and ‘oddly satisfying’ videos (Firth & Marinelli, 2025). Muhammad Dermawan, Faculty of Cultural Science at Universitas Padjajaran, surmises that sludge content holds attention because of “strategic modal dissonance, deliberately breaking away from traditional relations between modes [to] forge further new significations” (Dermawan, 2025). In all, sludge content captures attention through forced juxtaposition of audio, visuals, and text. One example of a visual stimulus used in sludge content is the autonomous sensory meridian response (ASMR). According to Chiara Pedrini et al., professors in the Department of Psychology at the University of Florence, “ASMR is a sensory phenomenon typically characterized by tingling across the scalp, following the line of the spine downward” that is triggered by “whispers, crispy sounds, personal care, and slow or repetitive movements” (Pedrini et al., 2021). ASMR is often associated with cognitive functions, including “increased activity in brain regions typically related to reward activation, emotional arousal, and social engagement” (Pedrini et al., 2021). Therefore, utilizing this content is proven to increase engagement and recall, despite the stigma associated with TikTok and attention span.

GAP

A gap in research lies in the absence of a study analyzing the use of SM's methods of maintaining attention, such as using sludge content, in the classroom. By using the often stigmatized SM as something that may increase attention span, the study conducted in this paper will potentially help to reverse the negative effects of SM and TikTok, allowing individuals to analyze the full scope of TikTok's attributes. Finding a way to help the growing problem of shortened attention span is especially important for the younger generation, as most high schoolers have some form of SM that damages their academic performance (Appolloni et al., 2024). By examining these factors, this study aims to determine whether the attention span of teenagers in the classroom can be increased by combining TikTok's trends with lecturing, thereby increasing academic performance and achievement.

HYPOTHESIS

I hypothesize that using sludge content as a form of multimodal learning within the classroom, rather than regular methods of lecturing, in the format of Subway Surfers being combined with a PowerPoint and lecture, will help to increase attention span and academic performance of high school students. I also hypothesize that this content will reduce the negative effects that SM has produced on attention span, as well as increase the amount of information retained in a lecture as opposed to a regular lecture.

METHODS

First, I discovered that the most common, current TikTok trend was sludge content. By studying the components that qualify a video as sludge content, I developed my methodology for implementing sludge content within a lecture. I decided to distribute a preliminary survey. This preliminary survey was taken by a primarily white population of high school students located in Florida. The demographics of the survey consisted of 34 males and 109 females. This survey aimed to discover current teenage opinions on the factors that contribute to a lack of attention span in the classroom, correlations between student screen time and attentiveness in the classroom, and how sludge content is perceived by viewers. Questions asked to gauge these answers include, but are not limited to:

- How often do you find yourself having difficulty paying attention in the classroom?
- What teaching methods/strategies do you find least effective in maintaining your attention?
- In your opinion, to what extent do you agree that [sludge content] is entertaining or attention-catching?

After conducting this survey, I organized a study intending to measure how this type of content affects academic performance and attention span within the classroom. The study was conducted within the span of a day. I first connected with a high school psychology teacher. Since the teacher taught three classes, one of her classes, consisting of 17 students, was placed in the control group, and two of her classes, consisting of 27 students, were placed in the experimental group. The same psychologically-based lecture

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was delivered to all three classes, but the content displayed on a singular touchscreen monitor behind the teacher differed between the control and experimental groups. The control group's monitor displayed only a slideshow that correlated with the lecture. The experimental group's monitor displayed the same slideshow on the bottom half of the screen, and also displayed a continuous gameplay of the application Subway Surfer on the top half of the screen. By creating two sources of visual stimuli, which are the slideshow along with the gameplay, and one source of an auditory stimulus, which is the teacher's voice, I effectively created an educational form of sludge content. After the thirty-five-minute lecture, each student in each group received a survey and an assessment.

The survey was intended to measure the attention of the students during their respective lectures. Examples of questions used to measure this were:

- Throughout the lecture, how many times do you feel as if you lost focus?
- What was the longest period of time that you felt attentive during the lecture?

If either group had results such as a consistently higher or lower attention span than the other group, the results would be considered statistically significant in relation to attention span. Next, an identical 10-question academic assessment was given to all classes, assessing the knowledge that was taught during the professor's lecture. If the grades of either group were consistently higher or lower than those of the other group, the results were considered statistically significant in relation to academic performance. All students in the experiment and survey went through the process of informed consent and consented to have their responses anonymously used in a research paper. The students in the experiment were also debriefed and told that their assessments were being used for an experiment, not for their actual grade.

DISCUSSIONS/ANALYSIS

Figure 1

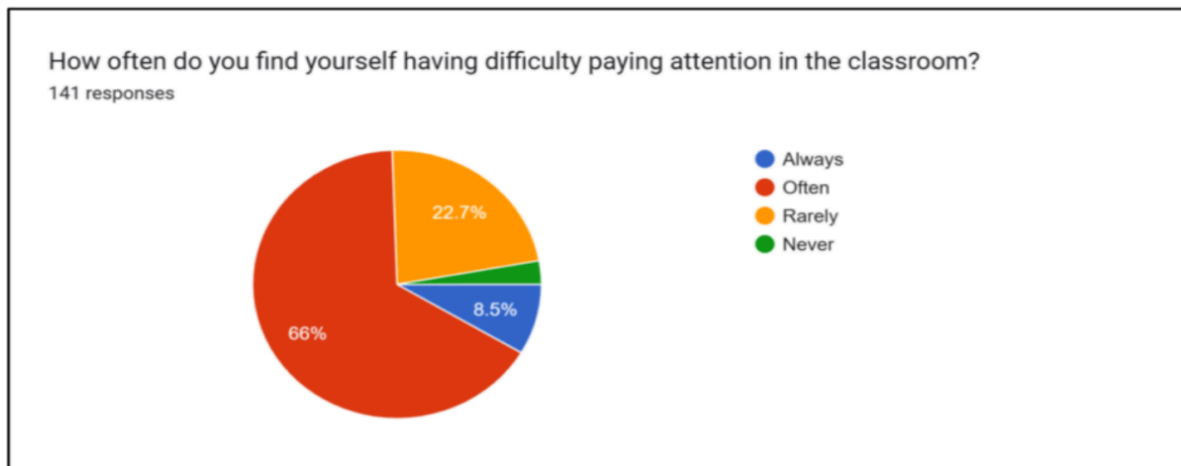


Figure 1: Student survey responses are separated by how attentive they are in the classroom, with “always” and “often” responses being placed together, and “rarely” and “never” responses being placed together.

Preliminary Survey: Attention Span

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Figure 2 - Less Attentive Students

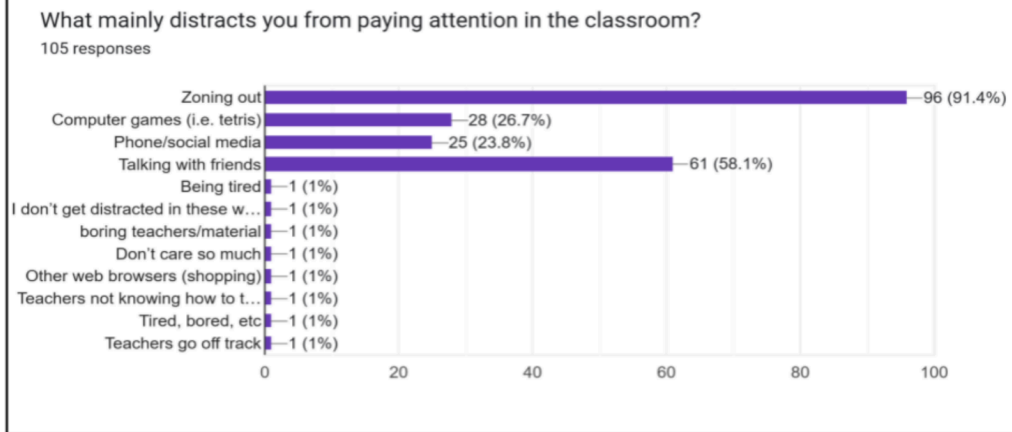


Figure 3 - More Attentive Students

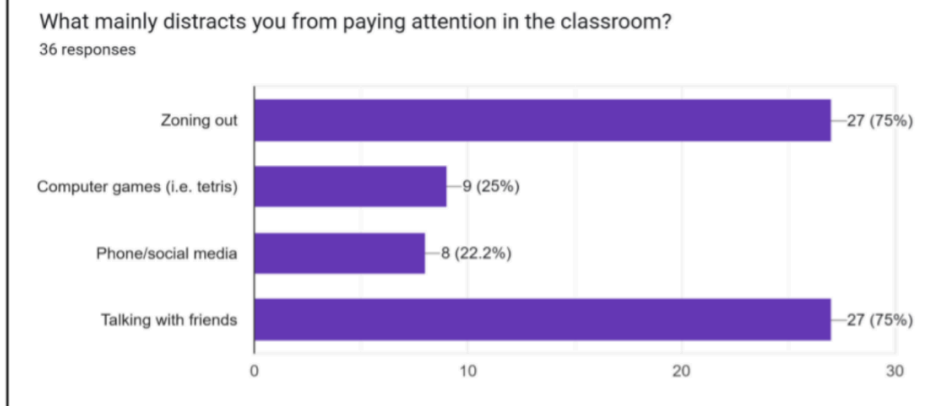


Figure 4 - Less Attentive Students

To what extent do you agree with the statement that the style of teaching that a teacher enacts can help or harm a student's ability to remain attentive?

105 responses

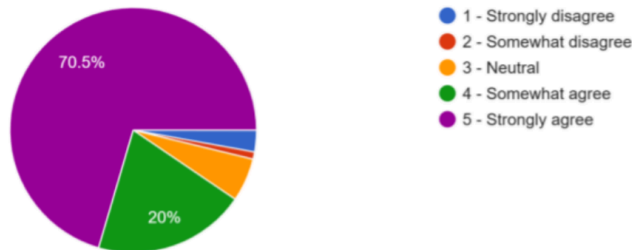
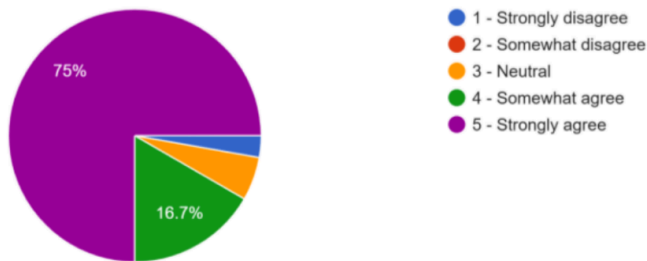


Figure 5 - More Attentive Students

To what extent do you agree with the statement that the style of teaching that a teacher enacts can help or harm a student's ability to remain attentive?

36 responses

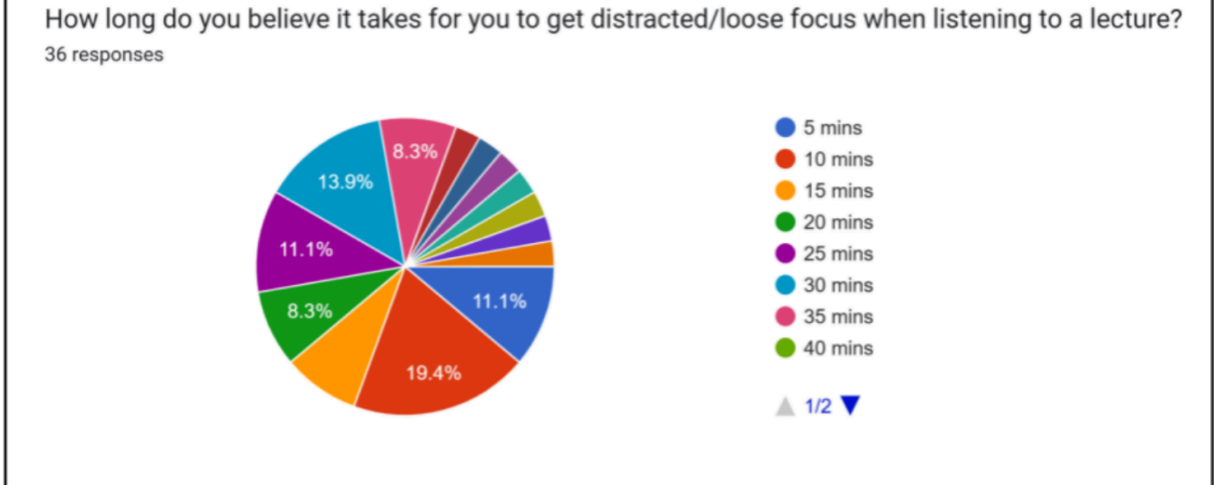


Figures 2, 3, 4, and 5: Both sets of results agree that the main distraction within the classroom is zoning out, which often results from boring lecture styles and an innate inability to focus. Only the more attentive students, though, believe that talking with friends is equally as distracting, which is less innate and more voluntary. This demonstrates that students with lower attention spans are mostly involuntarily unable to focus and that the problem with attention span may reside in teaching style rather than intrinsic motivation. In accordance, in Figures 4 and 5, 90% of students agree that teaching style impacts a student's ability to pay attention, demonstrating that the current teaching styles may be problematic in maintaining attention.

Figure 6 - Less Attentive Students



Figure 7 - More Attentive Students



Figures 6 and 7: The average attention span is asked of both groups of respondents to gather a general baseline. In both groups, focus is lost for the majority of students before half of the lecture occurs, indicating room for improvement and a prevalent problem in high school classrooms.

Figure 8 - Less Attentive Students

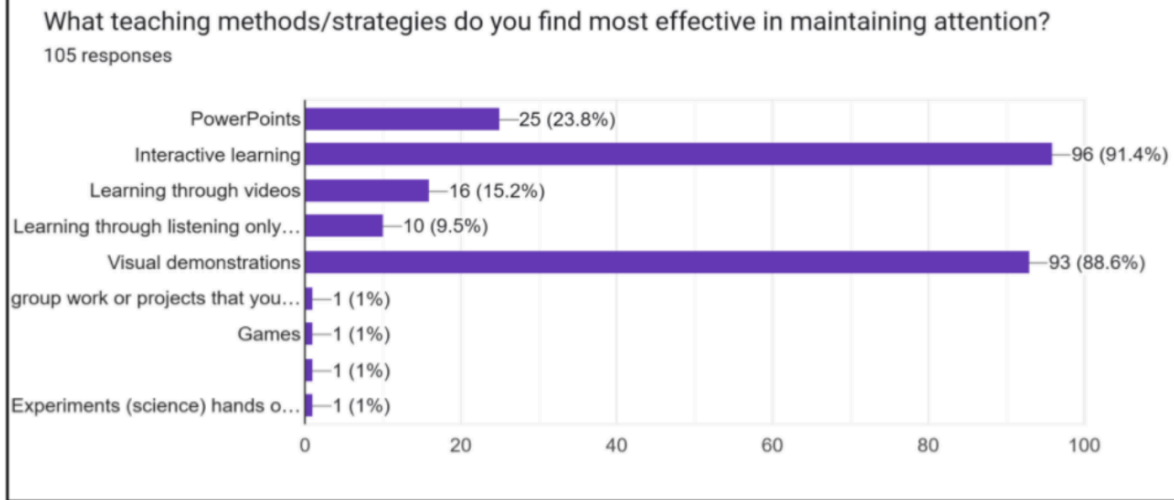
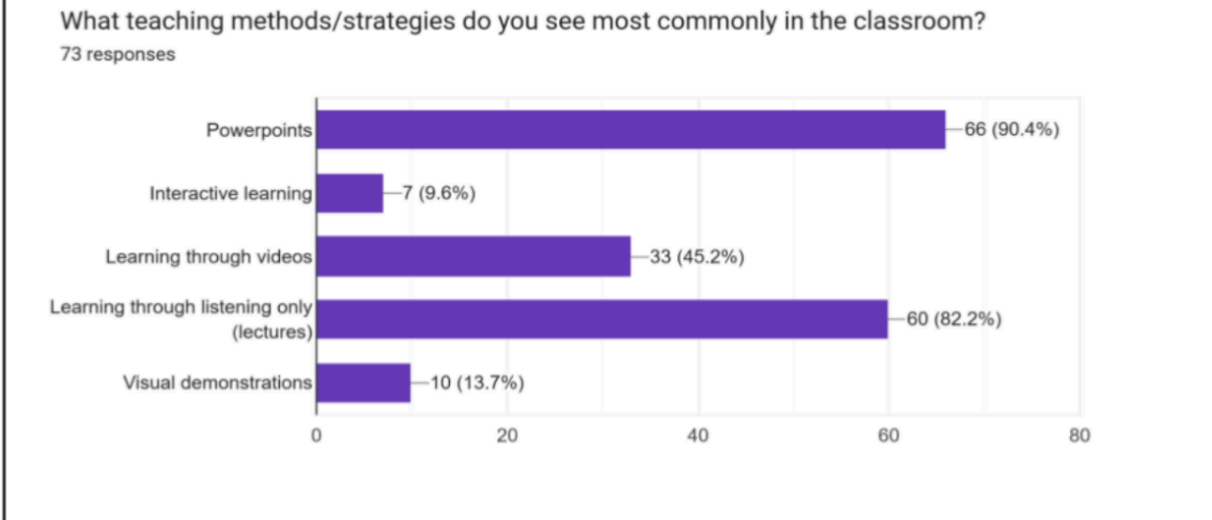
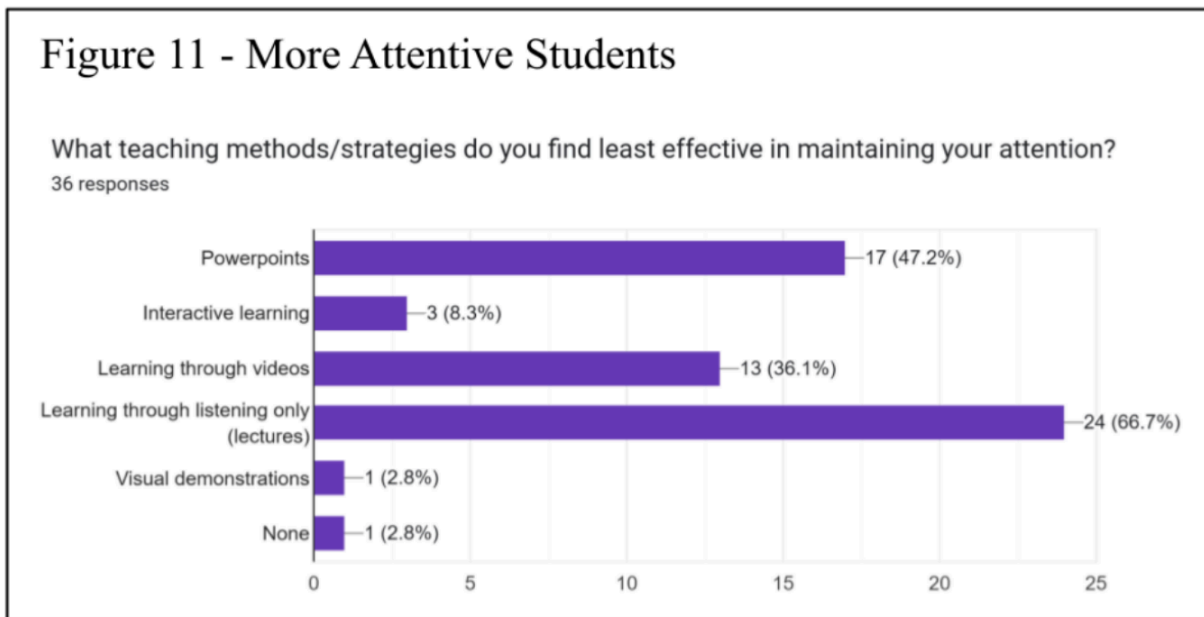
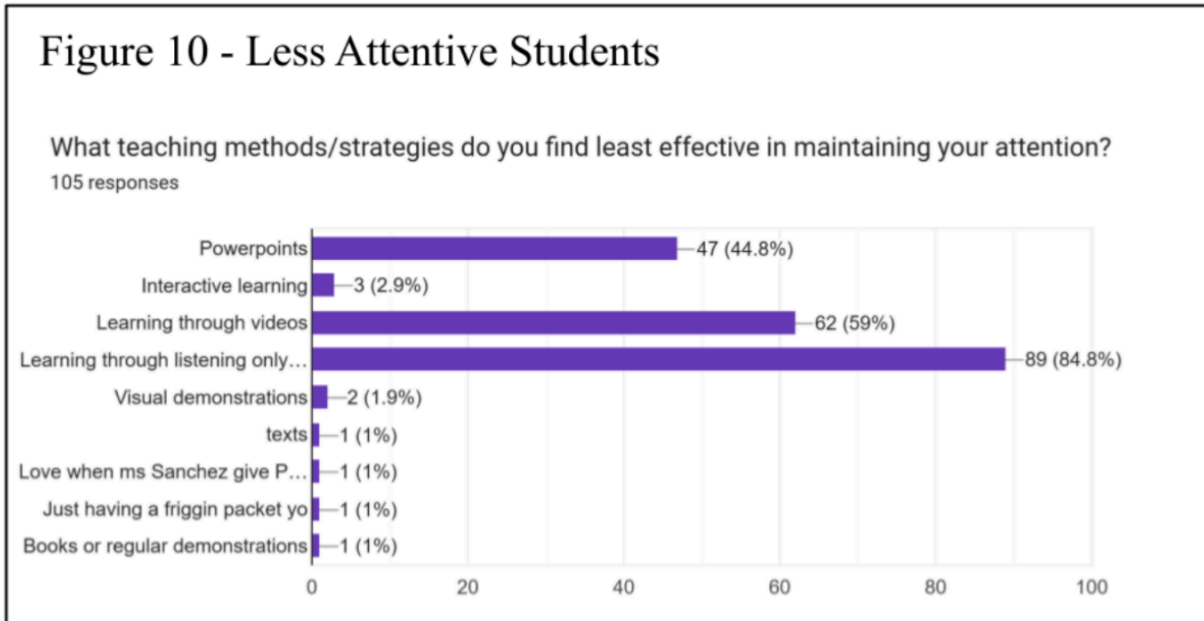


Figure 9 - Less Attentive Students





Figures 8, 9, 10, and 11: Overall, for less attentive kids, interactive learning and visual demonstrations are most effective in maintaining attention, with over 88% of students attesting to their effectiveness. By contrast, the most common teaching strategies in the classroom are PowerPoints and learning through listening only, with over 82% of students attesting to their frequency in the classroom. When compared, the preferred methods of teaching by students are the ones least frequently used by teachers. Results of students with high attention spans remained consistent with these. As seen in Figures 10 and 11, the least effective method positively correlates with the most commonly used methods in the classroom. This

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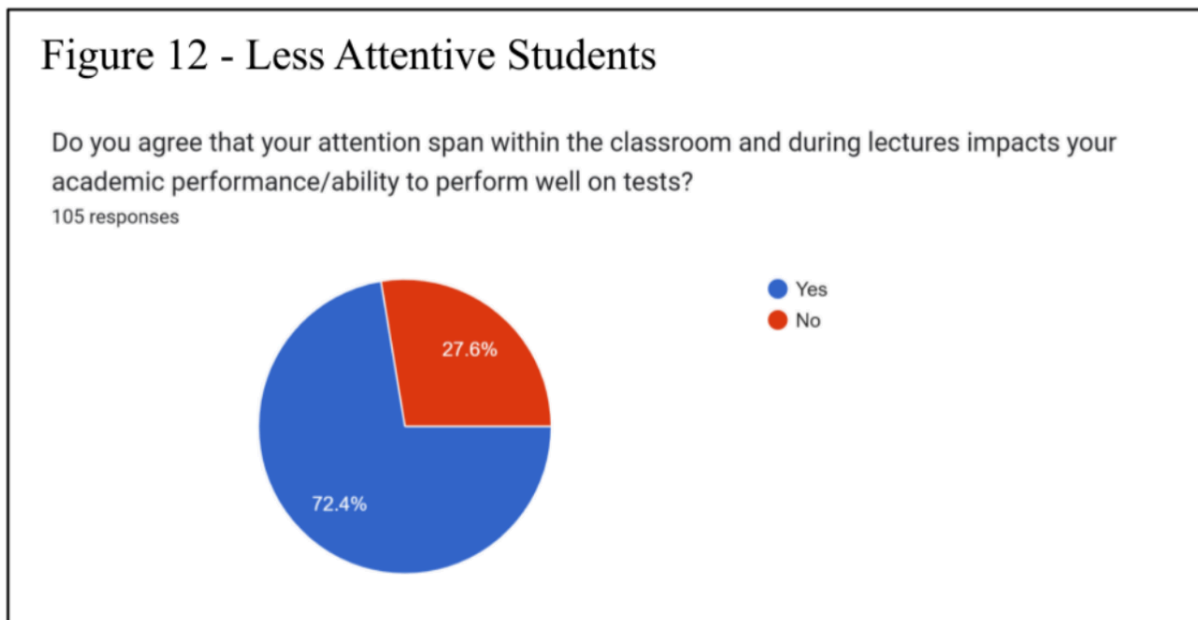
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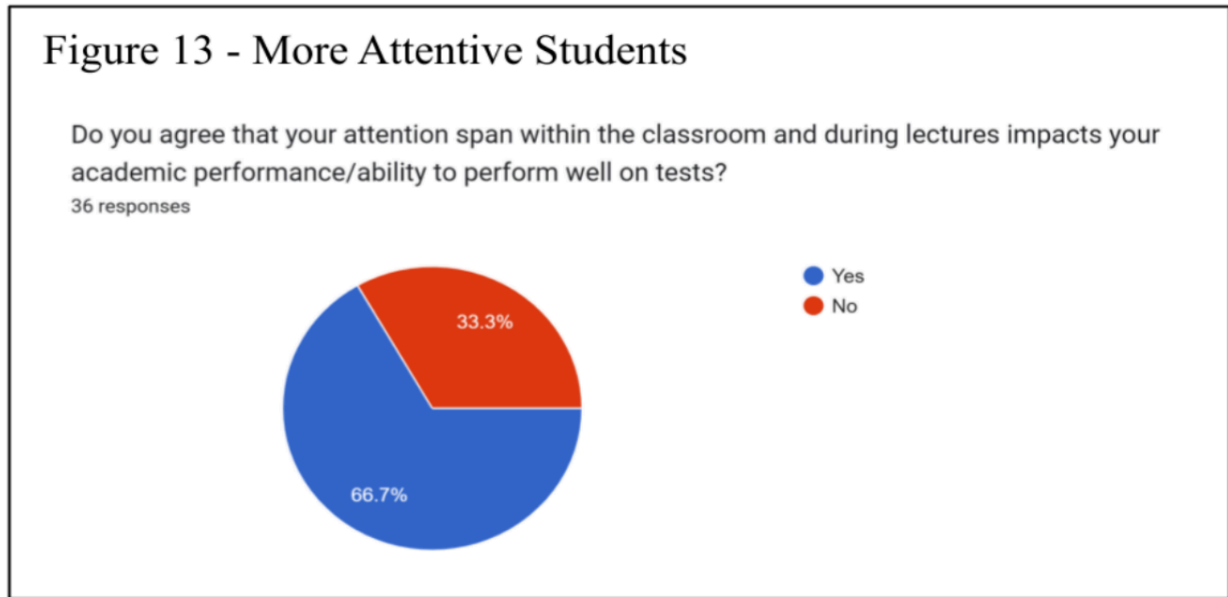
presents a clear problem in the teaching styles of the modern-day high school classroom. Later, I used the information that students and teachers prefer opposite styles of teaching and learning to methodically formulate the method of teaching used in the experiment.

Before finalizing the method of experimentation, the survey included this open-ended question: In what ways do you think that teachers can be more engaging/entertaining when teaching? Some notable answers include:

- “I think they can be more entertaining and engaging by allowing for class discussion.”
- “Use more of the generation’s language, and also learning what works and what doesn’t work for Gen Z.”
- “Provide visual demonstrations, also not being scared to veer off topic for a little bit—can give students a small brain break before returning to the lesson.”

These answers allude to a need for improvement in entertainment quality geared towards Generation Z.





Figures 12 and 13: Students who answered ‘yes’ to this question were asked to elaborate on their answer. Some responses include:

- “I don’t pick up what the teacher is teaching after I get bored and stop paying attention.”
- “With less [of an] attention span, I will absorb less content and will struggle more on tests.”
- “In my AP World class, I [pass] with flying colors (95+) because my teacher teaches with my preferred methods. I never zone out because her [teaching] is engaging and never a dull experience. In honors Chemistry, I heavily struggle (75 or below) due to her lack of teaching efforts.”

This demonstrates a positive correlation between attention span and academic achievement. Due to the low attention spans recorded earlier in the survey, this correlation creates a major problem for current students, as the general lack of attention span can cause them to get lower grades.

To confirm this correlation, the two groups were questioned about their current unweighted Grade Point Average (GPA). The average GPA of the less attentive students is 3.799, while the average GPA of the more attentive students is 3.925. This confirms the correlation between attention span and academic performance due to a 0.126 point jump in average GPA from less to more attentive students.

Preliminary Survey: Social Media

The next part of this preliminary survey asks questions about SM to form correlations between SM and attention span. Results show that the average SM usage per day amongst the high school students was 2 hours and 14 minutes, demonstrating its ability to captivate the attention of students far more than a lecture can.

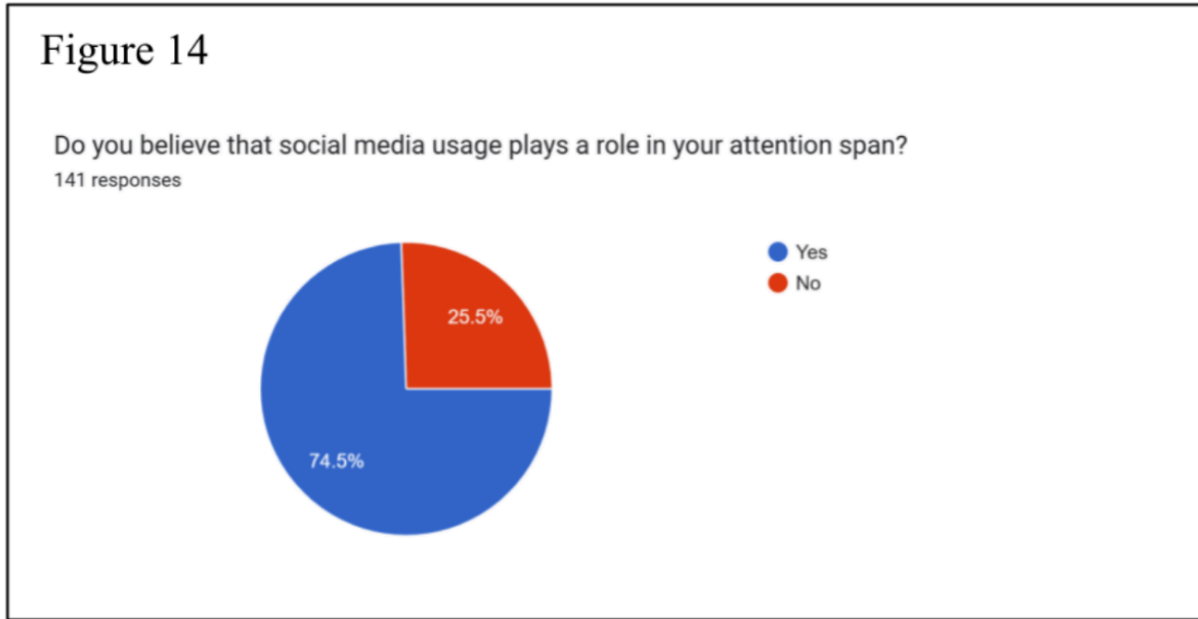


Figure 14: 74.5% of the respondents believe that SM does play a role in attention span. The follow-up question “If yes, PLEASE specify in what way SM impacts attention span?” is asked for elaboration purposes. Some responses include:

- “Scrolling makes you expect things that immediately make you happy, which makes it harder to adjust to more boring, slower-paced environments.”
- “Social media makes me more inclined to be used to a distinct algorithm of scrolling, training my attention span to weaken and worsen my ability to follow long lectures.”
- “It pulls my attention and time away from [academics]. I watch too much subway surfers reddit stories to care about my task at hand.”

These responses indicate that SM use negatively correlates with attention span.

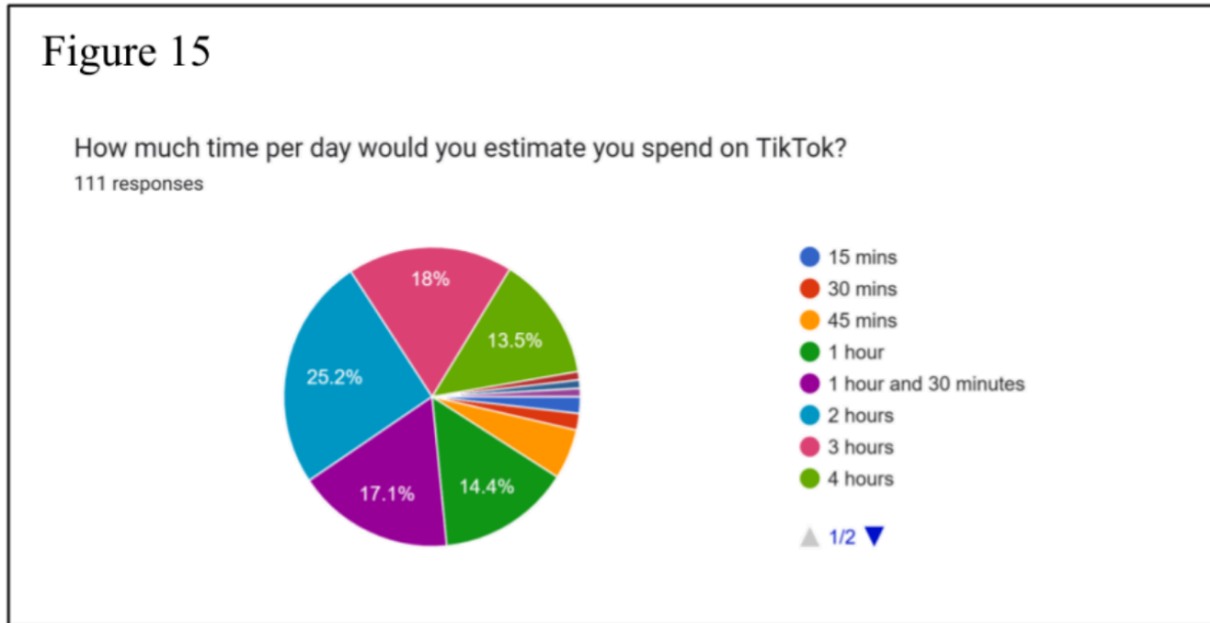


Figure 15: This figure presents the statistic that 73.8% of high school students spend over an hour and a half on TikTok daily. This demonstrates its relevance and capability to influence teenage life.

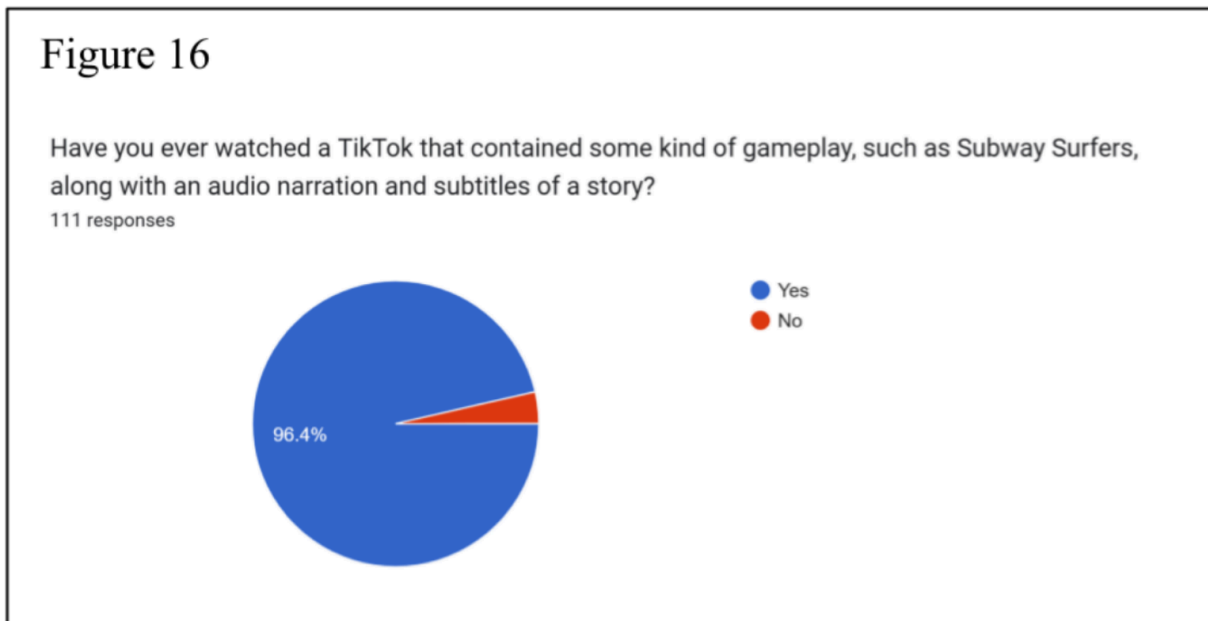
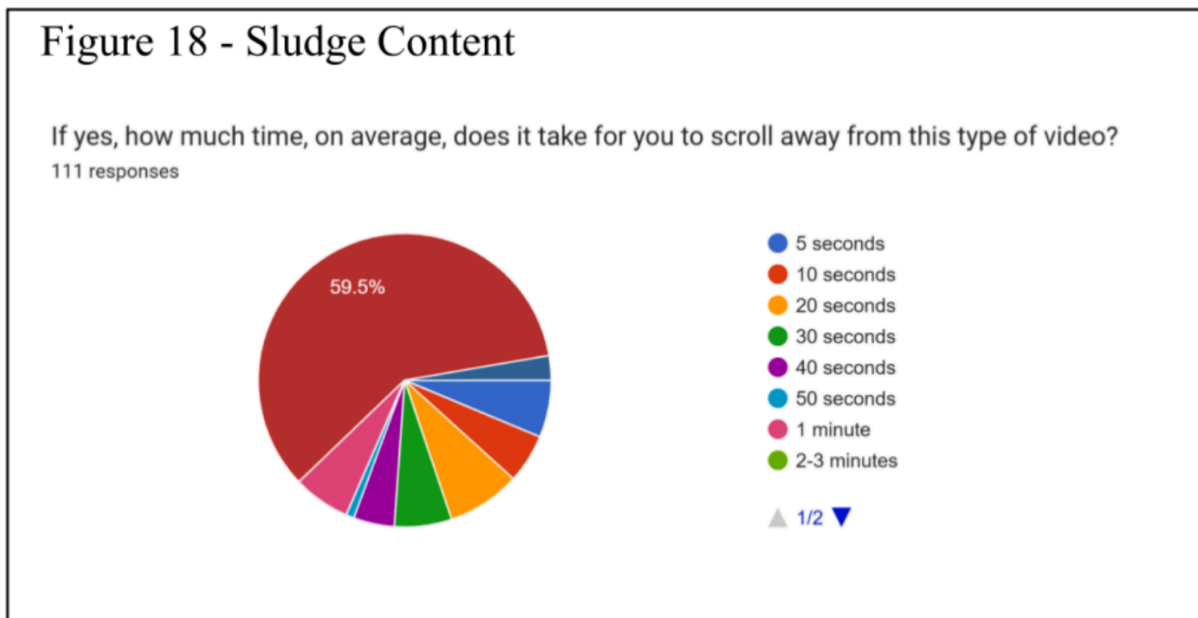
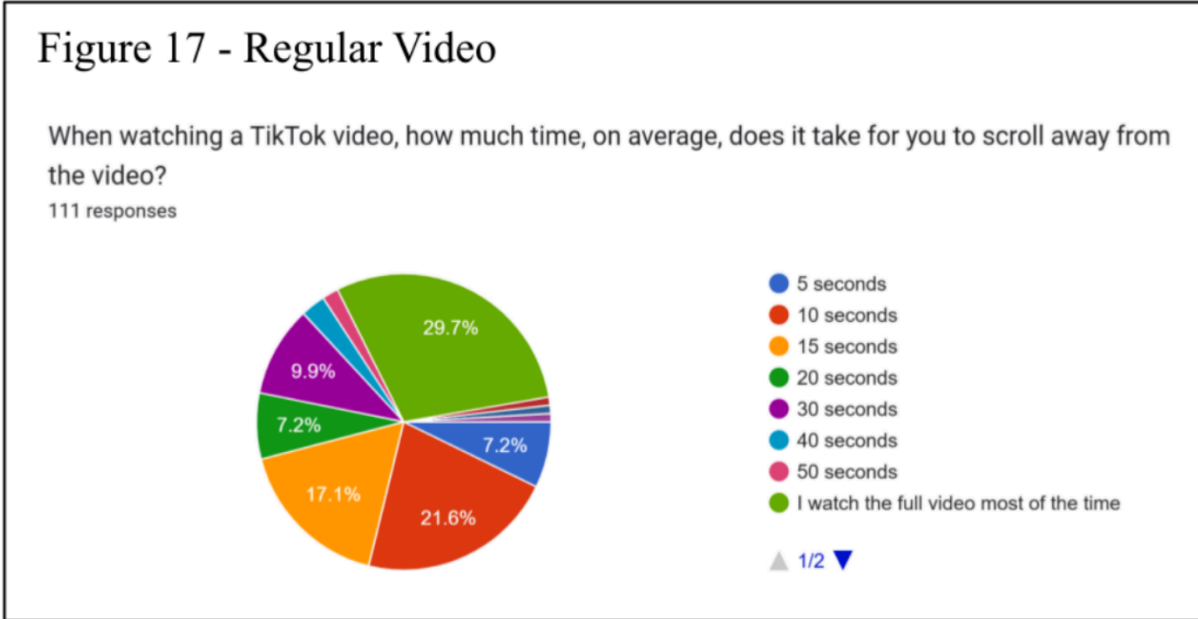


Figure 16: These results confirm the modern relevance of “Reddit stories,” also known as sludge content, as 96.4% of all student respondents have seen this specific trend. Written responses to the question “What trends/types of video do you most often come across on your For You Page?” confirmed this:

- “Subway Surfers + reddit stories, stuff about clothes, fitness stuff”

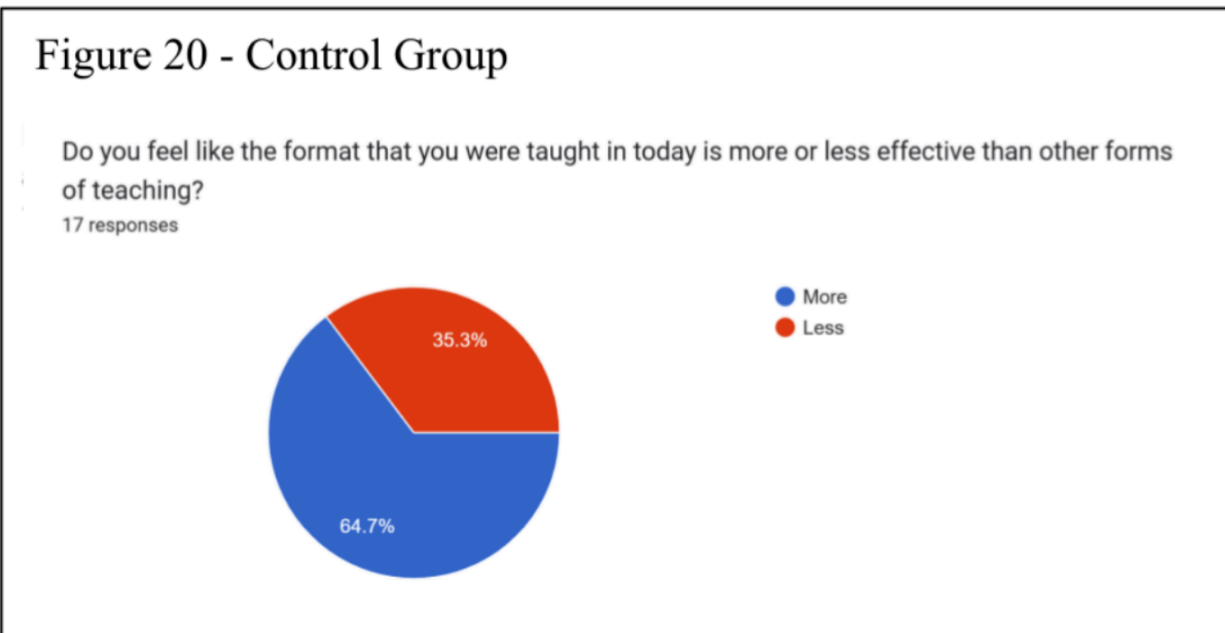
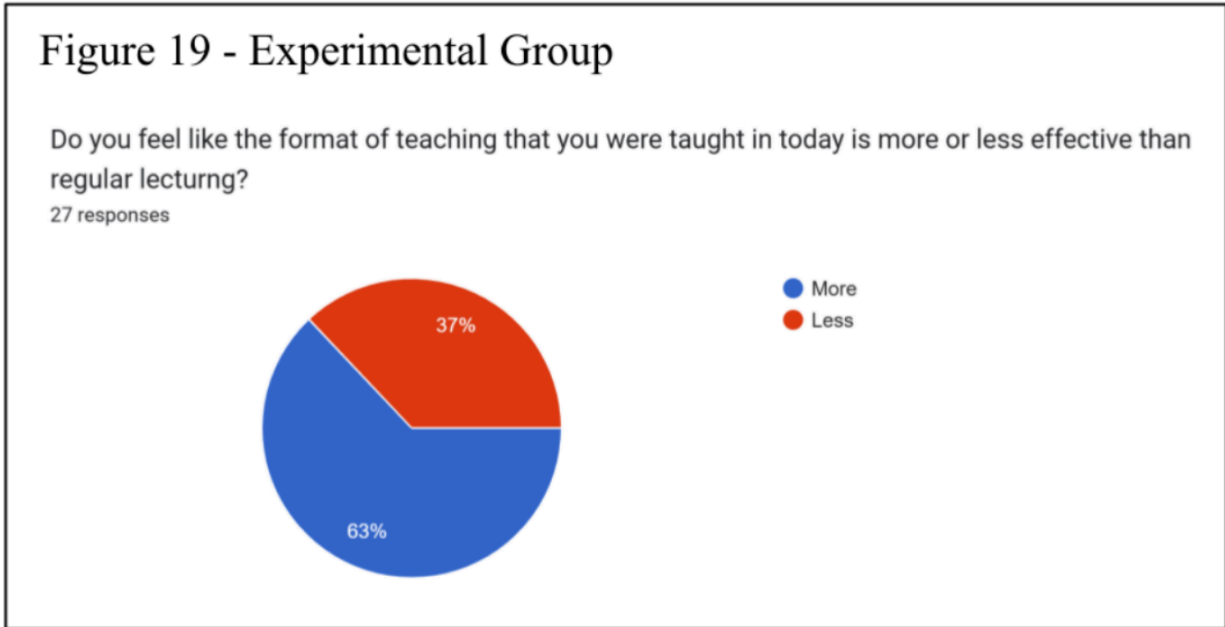


Figures 17 and 18: Figure 17 shows the results for all TikTok videos, while Figure 18 shows the results for only videos containing sludge content. Figure 17 presents the data that 29.7% of high school students who use TikTok tend to watch the full video. Figure 18 presents the data that 59.5% of high school students who use TikTok tend to watch the full video if the video is sludge content. Also, the average TikTok video is around 1 minute, while this specific content tends to be 2-3 minutes, so not only do these videos hold attention more often than regular content, but they also hold attention for longer. Therefore, I hypothesized that sludge content is more captivating than the average TikTok video and is worthwhile to be used for experimenting with attention.

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Experiment: Sludge Content vs. Regular Learning

Next, I experimented by gathering surveys and collecting assessment results from the control and experimental groups. The results of the post-experimental survey are as follows:

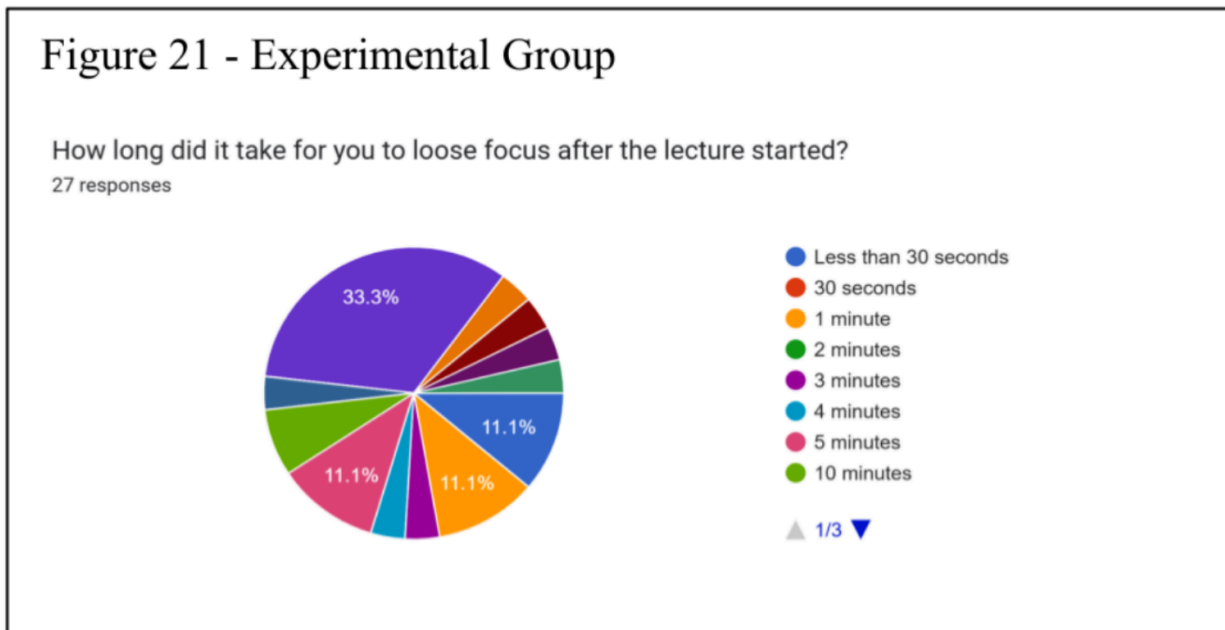


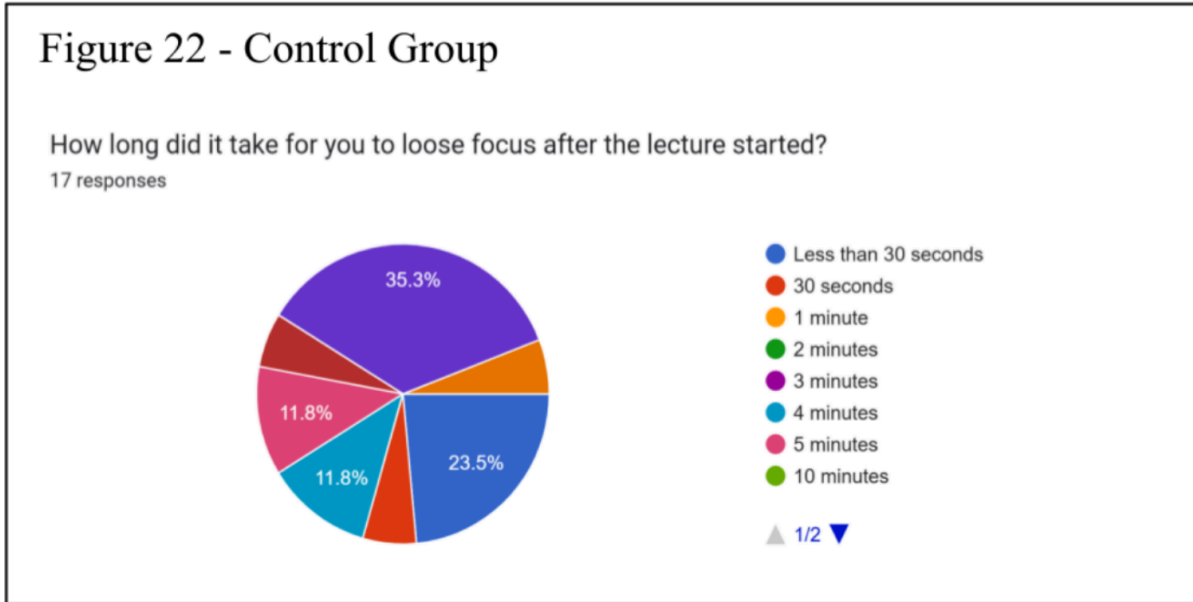
Figures 19 and 20: Results of both groups for this question remained consistent, proving that further questioning and insight are needed to discover if sludge content could be implemented into the classroom.

The follow-up request for respondents to “Elaborate on your answer” was made, allowing insight into personal thoughts about these methods. Some responses from the experimental group include:

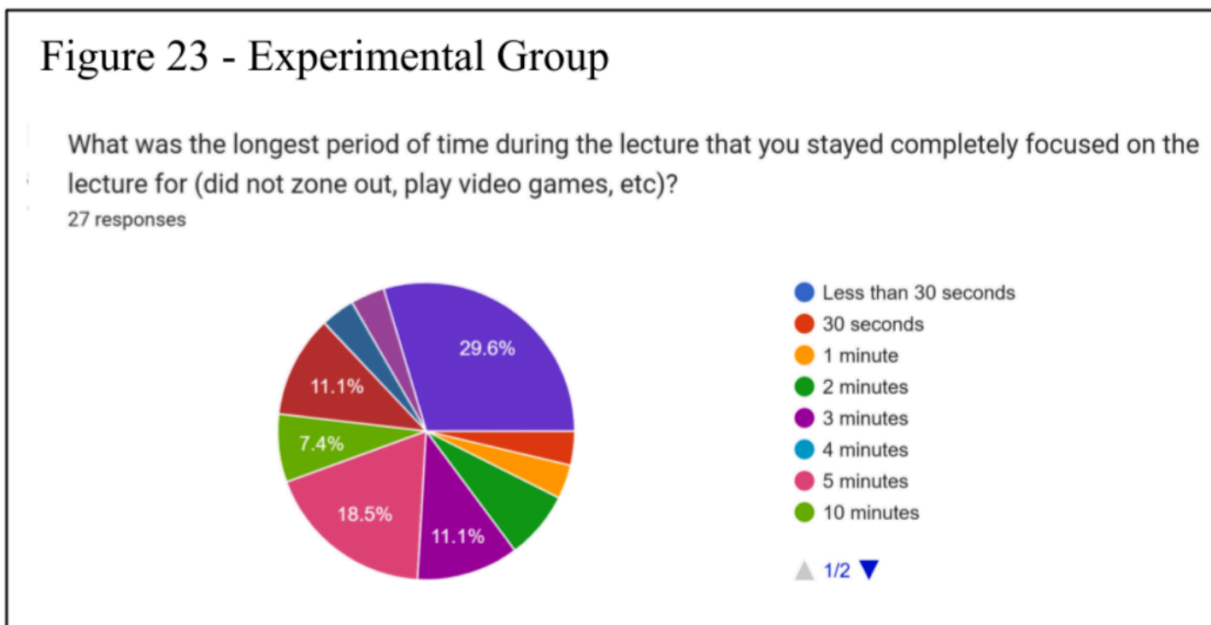
- “I personally tend to pay more attention while I'm doing two things at a time. For example– with today's lesson that included a video of someone playing Subway Surfers, watching the video and listening to the lesson helped me remember it better.”
- “The background subway surfers game somehow helped me obtain the information better.”
- “I was really distracted by the guy playing Subway Surfers because he kept messing up, and it was annoying.”

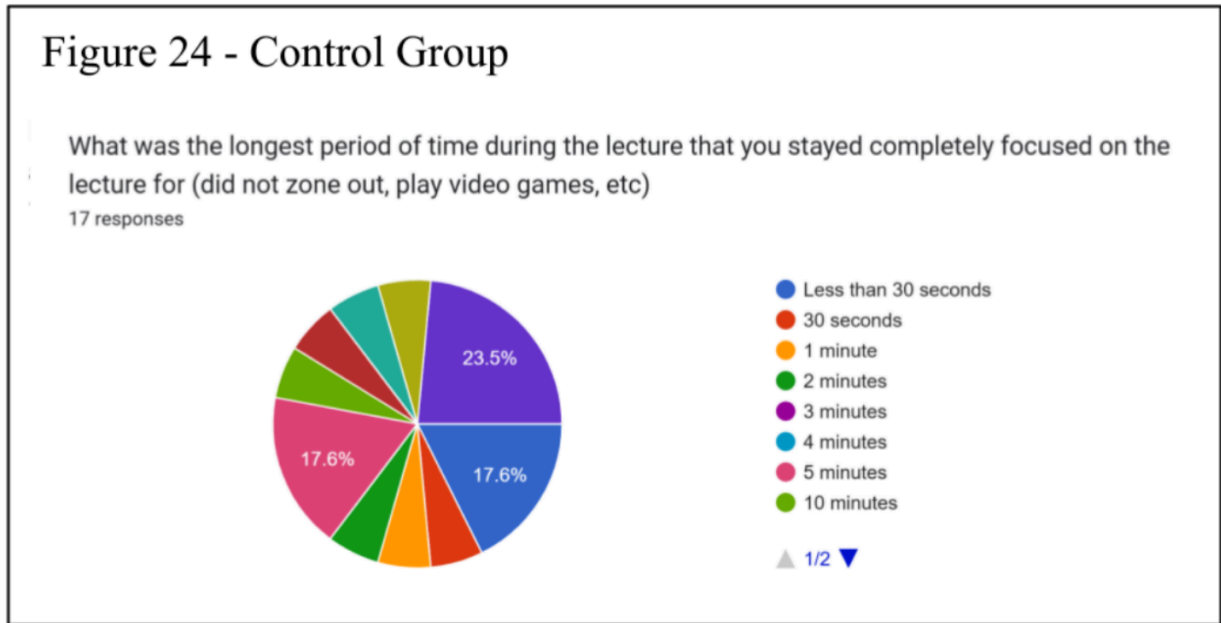
These comments imply that the sludge content within the classroom did assist with obtaining and understanding information, although some may have been distracted due to the video game.





Figures 21 and 22: Note, in Figure 21, two of the typed responses shared that they paid attention the whole time, adjusting the statistics presented in the chart slightly. In the experimental group, 44% of students paid attention the whole time. This is a slight increase from the 35.3% of students who paid attention the whole time in the control group. Also, 29.4% of people in the control group lost focus within the first 30 minutes, while only 11.1% of people in the experimental group lost focus within the first 30 seconds. This infers that the method of lecture being experimented with has the capability to increase attention span slightly due to consistently more attentive results within the experimental group.





Figures 23 and 24: When observing how quickly students become invested in regular classroom distractions, the experimental group clearly becomes distracted less quickly than the control group. Within the control group, 35.3% of the students could only focus for two minutes before becoming distracted. On the other hand, in the experimental group, 14.8% of the students could only focus for two minutes before getting distracted. The major increase in distractibility within the control group proves that sludge content has the capability to maintain attention span, and may even be more effective than regular lecturing. Also, over half of the students in the experimental group had an attention span greater than the regular classroom attention span during the study, while less than half of the students in the control group had an attention span greater than the regular classroom attention span during the study. This shows the sludge content's ability to expand attention span.

When students were questioned about their personal enjoyment of the lectures, a range of answers occurred. Many students enjoyed the entertaining aspect of the sludge content, requesting it to be used in more of their classrooms. A few other students declared the sludge content to be distracting. Overall, the entertaining quality of the content makes it appealing to the current generation of high school students, allowing a compromise to be made between teachers' preferred methods of teaching and student enjoyment.

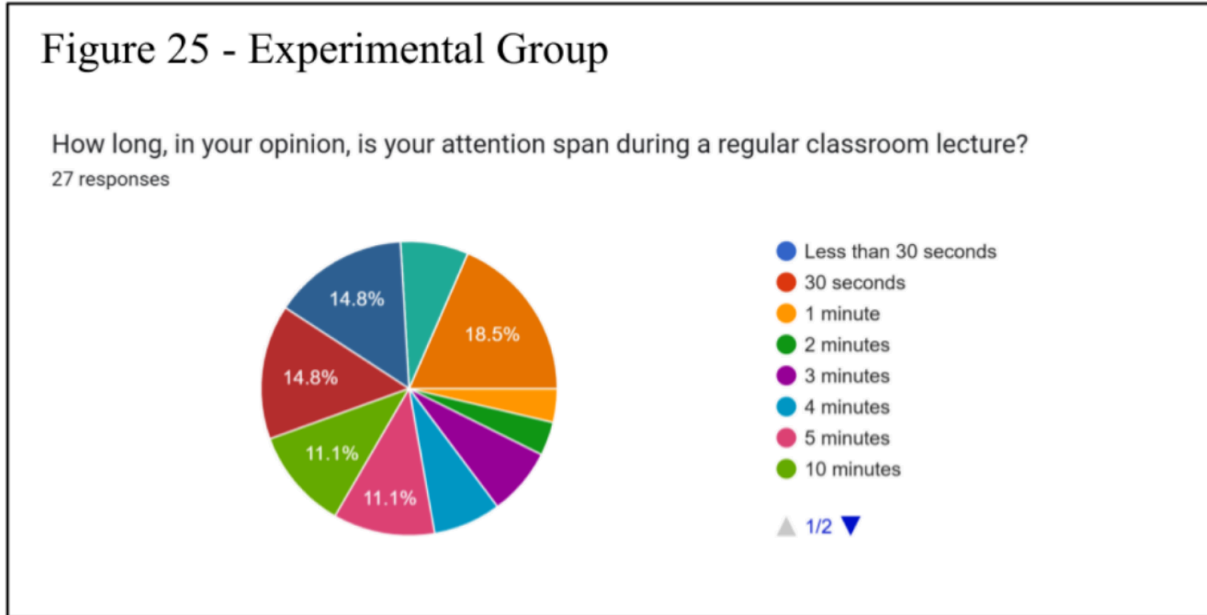
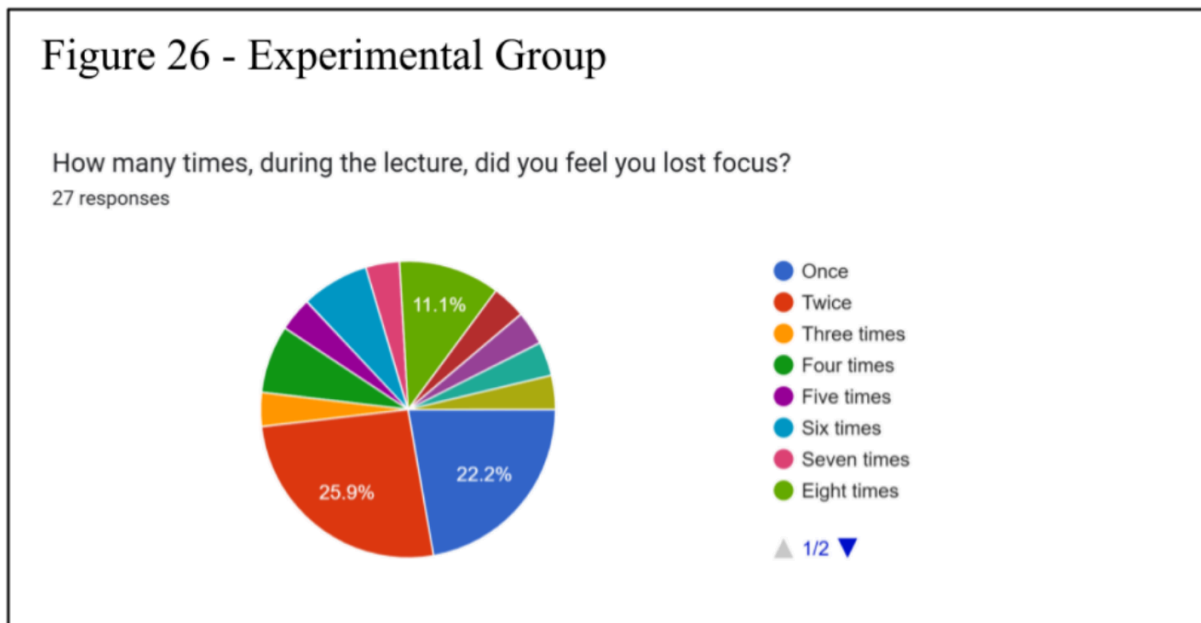
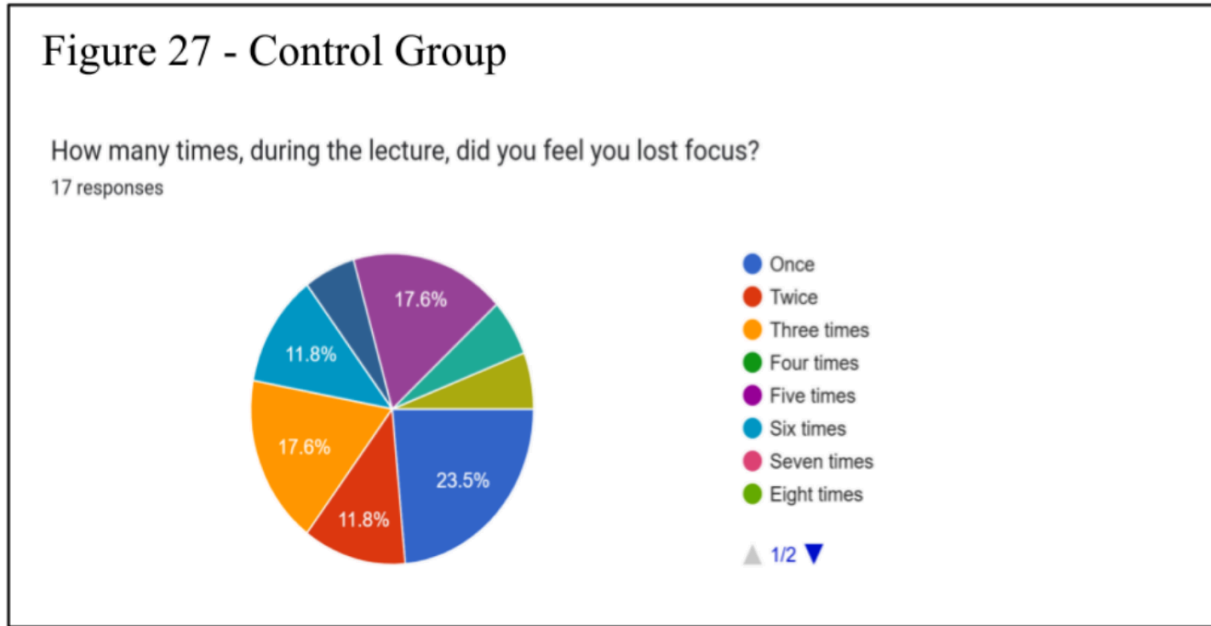
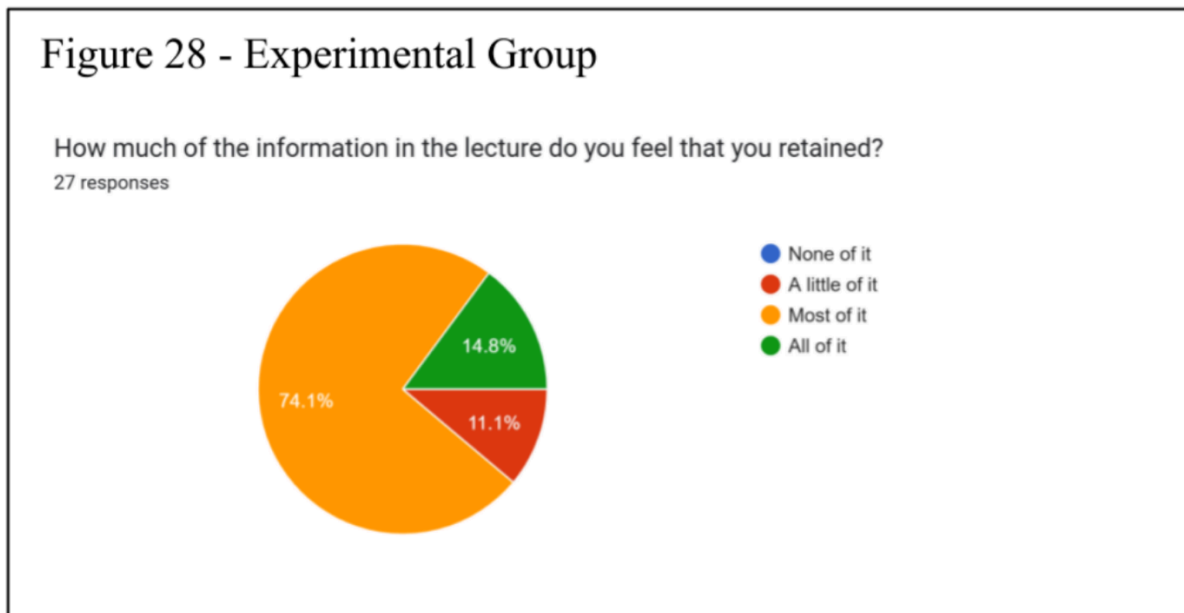


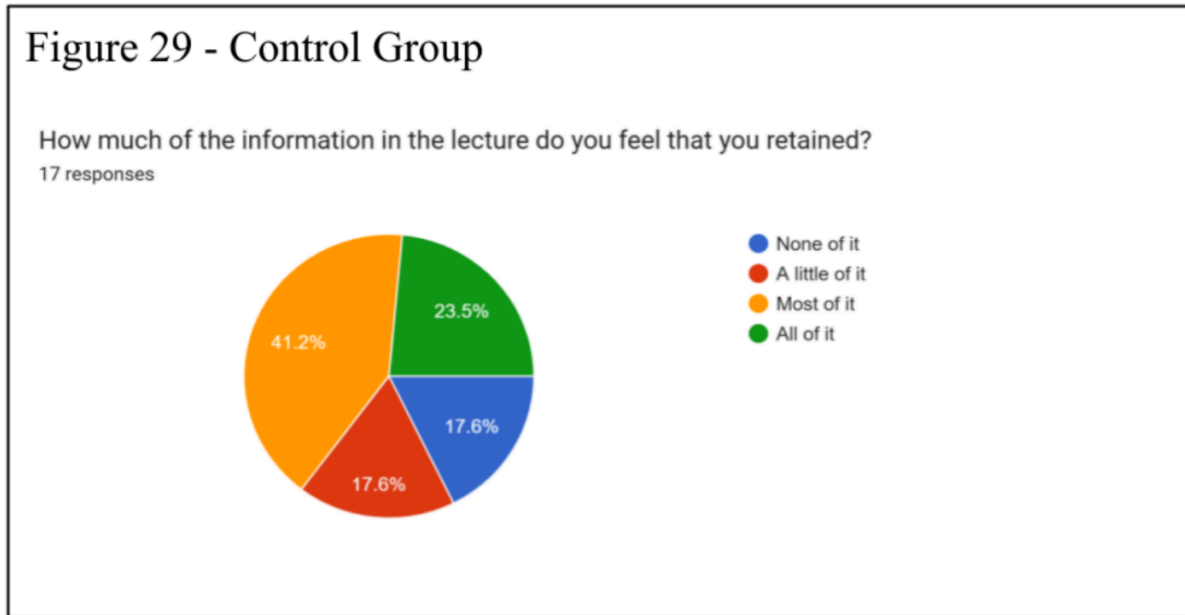
Figure 25: 18.5% of respondents stated that they regularly pay attention during the entirety of a lecture. When comparing this to the 44% of people who said they listened to the whole experimental lecture, there appears to be a 25.5% increase in the number of students who listened to the whole lecture. This clearly demonstrates how SM's methods of retaining attention can improve attention span.





Figures 26 and 27: When questioned about how many times attention was lost, 55.6% of students in the experimental group lost focus between 0 and 2 times. In the control group, 47.1% of students lost focus between 0 and 2 times. Although this difference is small, it does remain consistent with the results from the other graphs and proves that the experimental method of teaching is able to successfully hold attention.





Figures 28 and 29: These two graphs are intended to gather information about potential academic performance through gauging how much information they remembered. 88.9% of students in the experimental group claim that they retained most or all of the information, which is a 23.2% increase from the 64.7% students in the control group who claim to remember most or all of the information. Also, no one in the experimental group claimed to remember none of the information after the experiment was done, but 17.6% of the students in the control group did not remember any of the information in the lecture. This indicates that sludge content clearly improves retention and memory of information, but to confirm if academic performance can be increased, the ten-question assessment was administered.

The average grade of the students in the experimental group was 95%, which is similar yet slightly higher than the average grade of the control group, which was 93%. Since the difference in grades was small, academic performance may not be directly affected by the experimental form of lecturing. Still, a small difference was found between the results of the two groups, indicating that a study done with more students or in a different environment may produce results indicating that academic performance is positively correlated with usage of sludge content. Overall, information tends to be retained better, and attention span tends to be elongated within the experimental group, although there is no confirmed correlation between the experimental group and academic performance.

Overall Analysis

The original hypothesis was proven to be correct to a limited extent, as a clear positive correlation between sludge content-based teaching emerged, but the correlation between this teaching and academic performance was varied. As seen in Figures 21 and 22, the experimental lecture's ability to hold attention was greater than the control lecture's ability to hold attention, as proven through the percentage differences. Also, as seen in Figures 23 and 24, complete focus for over two minutes increased by over 20% when comparing the control group to the experimental group, demonstrating substantial attention

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span in accordance with sludge content. Additionally, when comparing the original attention span to the attention span in the experimental lecture, there was a 20% increase within the experimental group. Overall, this points to the capability of this new form of learning to not only maintain but increase attention span. This may be explained through the pair-type learning, occurring through Mayer's Theory of Learning, which causes deeper understanding and attention. On the other hand, academic performance demonstrated less of a clear correlation. When students were questioned in Figures 28 and 29, more students (88.9%) in the experimental group claimed to retain a good amount of information than the control group (64.7%). When the same students were given a test, the average score of the students in the experimental group was 95%, while the average score of the students in the control group was 93%. Although there is a small difference, the sample size was not large enough to determine significance. Experimentation on a larger scale is required to determine if there is a true correlation between sludge content, style-learning, and academic performance

The data collected in the preliminary survey led directly to the first correlation. The findings in Figures 8, 9, 10, and 11 demonstrated that the most commonly used methods in the classroom were also the least effective methods, according to the students. By combining the most commonly used methods with TikTok, a compromise is reached between student-preferred and teacher-preferred methods of lecturing. Also, the findings in Figure 18 demonstrate that these videos hold attention more efficiently than a regular TikTok video. By merging all of this information, the newfound teaching method used in my experimentation emerged, causing success when finding a direct correlation between sludge content, teaching, and attention span.

LIMITATIONS

Although the results of the experiment did support the hypothesis, some factors also limit the extent to which the results can be generalized. First, the preliminary survey contained a total of 143 respondents due to time constraints, and the experiment contained a total of 44 participants, which is not a large sample as compared to the entire population of teenagers in high school. Therefore, a larger sample size may have allowed the results to be more extensive and generalizable. Also, the unequal ratio of male to female caused difficulties in achieving the goal of having a representative sample. Another limitation of my experiment was the confounding variable of the time of day. Since the groups of students in each class were taught at different times of the day, variables such as natural fluctuations in mood and fatigue could have affected the results. Also, students in earlier classes may have told students in later classes about the unexpected assessment, leading to further preparation for the test in later periods and ultimately making it easier for classes later in the day to achieve a higher score. Finally, when picking participants for the experiment, I found it best to use a teacher from my school and my classes. This caused an aspect of convenience sampling, which possibly limits the types of people to whom the results of the experiment are applicable, because most participants were white Jewish psychology students who live in South Florida.

IMPLICATIONS

The results found in this experiment are valuable to modern-day teachers and students due to the current students' inability to pay attention in the classroom. Implementing sludge content through multimodal learning in classrooms around the world may allow student learning to be expedited and allow teachers to teach more with less effort. To make integrating this method into the classroom efficient, a specialized application for the standard Monitor Touchscreen should be created. For a teacher using the application, the first step would be to upload their already created PowerPoint, which the application would automatically format to fill half of the screen. After, different forms of sludge content will be offered to be chosen by the teacher. Since only gameplay was experimented with and students found skilled gameplay the most successful during this experiment, skillful gameplay would be the default selection. If other researchers repeat this experiment using other forms of content, such as ASMR, and are able to find it successful, these modes can be added for selection as well. The application could even go as far as to state which types of content are suitable for each course or lecture style if further research causes these results to come forth. After the teacher selects their content of choice, the program would automatically format this content opposite the slideshow. The teacher would then be able to manipulate the slideshow by changing slides while the content automatically plays in the background. This application would create an easy way for learning to be integrated with sludge content in classrooms worldwide, seeing that this experiment is replicated and able to be generalized everywhere. Students whose teachers implement this program may find joy and ease in learning that once seemed uninteresting. In all, creating this accessible application to be used by teachers around the world would revolutionize the teaching industry by introducing methods unheard of yet successful into the teaching world, as well as making these methods easy to enact.

CONCLUSION

This research paper initially intended to investigate whether sludge content, specifically gameplay, could be used within a common classroom lecture to enhance attention span and academic performance. This would allow for a possible reversal of the negative effects that SM produces on teenage attention span. The study proves that using gameplay through multimodal learning in the classroom causes an overall improvement in attention span among high school students in South Florida, but does not affect academic performance. SM, which was originally found to lower attention span, caused easier feelings of attentivity when used in the classroom due to the familiarity of the experimental content, as well as the entertaining quality of the gameplay. Despite some results stating that the gameplay was distracting, most students collectively felt that they retained more information and that the lecture held their attention for longer when it was in the form of sludge content rather than a plain PowerPoint. In all, the experimental group definitively reported higher levels of enjoyment, understanding, and attention span, which allowed me to determine a positive correlation between sludge content and learning outcomes in the South Florida classroom. The assessment of knowledge given at the end of each lecture showed that overall academic performance is not significantly altered by sludge content-related learning, as evidenced by similar average assessment outcomes. This could be attributed to factors such as natural proclivity to the subject

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being assessed, the assessment not being difficult enough to see a difference between the control and experimental groups, or the differences in the time of day that the assessment was given.

FUTURE DIRECTIONS

Future research could be used to determine if sludge content using other forms of background stimuli, such as ASMR or baking videos, could also influence attention span. Since this experiment only used gameplay to determine effects on attention span, further research is required to determine the sludge content's overall effect on attention span, as well as how different forms of sludge content may compare within a classroom setting. By comparing the results of this experiment with those of similar experiments using different forms of content, future researchers could determine whether the type of content influences attention span and whether there is a benefit to using one type of content over the other. Another suggestion would be to repeat the experiment with a larger sample size and ensure that it is conducted at the same time of day to minimize skewed academic results and determine if academic performance can be altered through sludge content. Future researchers could also determine differences in outcomes when using a skilled person's gameplay versus a person without skill. Many students complained about the Subway Surfer player's lack of ability within the experiment by stating that it is extremely distracting, leading me to wonder if masterful gameplay could have the potential to increase learning outcomes and attention span. An experiment similar to the one being conducted with the two groups, consisting of skilled and non-skilled gameplay, could be used to determine if there is a true difference between the two. Another concept worthy of experimentation is repeating the experiment, but implementing another preliminary survey focused on Millennials and Generation X. This survey would ask about their personal learning experiences and focus, with the intention of comparing these results with the focus of Generation Z to see how attention has evolved and declined over time. Finally, another crucial aspect of study for future researchers would be the differences in test results between high schoolers in Generation Z and Generation Alpha. All participants in this experiment were Sophomores, Juniors, and Seniors, and all were part of Generation Z. Repeating this experiment using different generations of high schoolers could be used to determine differences in impact based on age, and to determine the most effective methodology of teaching for each age group. All of the future directions listed above would be enacted with the intention of eventually bringing the most successful format of sludge content to classrooms all around the world, as determining which sludge content is the most effective would produce a true impact as a result of this experiment and all future research for high school students impacted by SM.

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