

Original Paper

Keeping Students' Attention Active

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Abstract

Students' attention during the class designs the thick lines of the learning trajectory. A good portion of the lesson's content may be perceived slightly easy with an active alertness, and the rest of it requires extended time to analyze the given material outside the classroom-homework. Active attention equips students with the necessary data and more information of an addressed lesson during a session; the key concern remains how to keep students' attention to the maximum in the classroom. The paper will elaborate various facts and observations, which might contradict each other in numerical aspects. For instance, a great number of researchers support the idea that a student's attention lasts continually for ten minutes, and then is off. Afterward, the mind wanders outside the session's frame. A certain group of researchers support the idea that attention lasts for a short period of time, it rests for a few minutes and then again is active-this process occurs periodically throughout the session. Others comply with different ideas, which are aligned with strong evidence, too. On top of everything else, the paper concerns how to keep student's attentiveness wide-awake during a learning discussion by describing the main idea in different versions and keeping high their learning trajectory that reaches its highest points.

Keywords

student's attention, the main idea, games/videogames, learning trajectory

1. Introduction

1.1 The Influence of General Factors on Keeping Attention Active during a Session

All students can learn. One of the leading issues in learning is poor students' attention in the class. In my teaching experience at different high schools and a few colleges, I came to the realization that students who pay a longer attention to the lesson get better results than those who don't. Students cannot pay whole attention throughout a session for some natural or environmental reasons. As a result, I am trying

to comprehend reasons for swaying students' attention from several standpoints. The paper will elaborate *Seizing Student's Attention* during a presentation. In the introduction will shed some light of attention span from the perspective of different books and articles including, "Design for how People Learn" *Capturing Students' Attention: How to Capture and Hold the Attention of Easily Distracted Students, During Lecture: Beyond Ten Minutes, Video Games and Attention Skills*. In addition, the paper will compare and contrast various facts to shed a little more light on the students' attention span. Moreover, there will be some tips that will be investigated intuitively, which might improve students' attention.

The book, "Design for how People Learn", gave a general scientific description on how people learn and how to design lesson plans for learners. I spent some time analyzing how to capture student's attention, and I was not quite effective. The best analogy that explains how the brain works during the attention process is the comparison between parts of the brain and rider on elephants (*Happiness Hypothesis-Jonathan Haidt*). Like many researchers in education, Julie Dirksen mentions that the students' attention lasts shortly (seven to eighteen minutes). Though, students' attention depends on several factors. Attention lasts longer if the lesson is exciting and well addressed, otherwise attention decreases. In case, students need to learn a lesson for tomorrow, the attention increases its time-duration. According to the analogy of assertion in the book, the rider signifies verbal thinking brain—the elephant signifies emotional visceral brain. Rider reasons rationally and directs the elephant in the right direction. If the elephant is not inspired to follow the instructions of the rider, the elephant will sabotage the rider. Whenever the elephant is not happy or interested to follow reason, the elephant will not obey the rider's rules. The rider can control the elephant temporarily (shortly) for a limited frame-time. Afterwards, the show belongs to the elephant. Similarly, disinterested learners in a lesson will not pay attention effectively unless the lesson is in urgency and vital. Another great significant fact in the learning process is the weight of the lesson and urgency. Urgency in learning is described by the hyperbolic discount diagram. Let's first define what is a hyperbolic discount. In the article, *Hyperbolic Discount*, indicates "Hyperbolic discounting refers to the tendency for people to increasingly choose a smaller-sooner reward over a larger-later reward as the delay occurs sooner rather than later in time". Dirksen gives some crystal-clear examples on explaining the relationship of attention and urgency. To paraphrase her example, if a person smokes cigarette and the doctor tells him/her to quit or you are going to die tomorrow, probably the person will quit smoking. On the other hand, if the doctor tells the smoker to quit smoking, or you are going to die in the near future, the person is probably not going to quit smoking because the elephant is going to think NOW (the elephant doesn't care for the future).

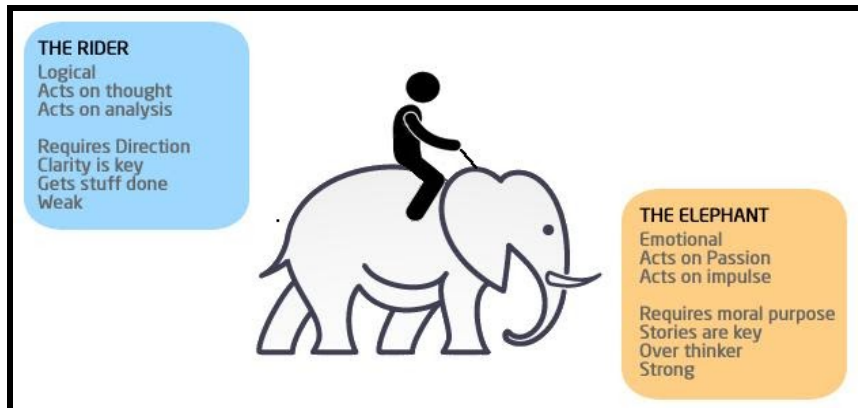


Figure 1. Talk to the Elephant (November, 2014)—Adventure in Teaching and Learning

Many researchers in education disagree on how long a students' attention span lasts in the class. Based on the article, *The Science of Attention: Capturing Students' Attention: How to Capture and Hold the Attention of Easily Distracted Students*, researchers did a study in 2010, in three chemistry classes taught by three different professors. They claim, "The study suggests that active learning methods may have 'dual benefits' engaging attention in one segment and refreshing attention in another segment" (Brigs, 2014). In general, when a person reads a book, sometimes attention goes somewhere else. After a while, the attention refreshes and works actively for a certain time. Attention is not active throughout reading a whole passage, a book, or participating in a session. Attention is active on some segments of a learning process and it is passive on other segments.

Researchers of psychology employed numerous studies concerning the student's attention; many studies resulted with evidence, which does not support the attention span during a lecture of ten to fifteen minutes. The article, "Attention During Lecture: Beyond Ten Minutes" highlights, "The ability to maintain prolonged attention is closely tied to working memory" (Wilson & Korn 2017). They recognize attention as an activity that depends on short memory; students who have an effective short memory are more likely to be more alert during a session. In addition, there are other aspects, which have an influence on students' attention such as content of the lesson and the process of delivering the lesson.

Another relevant contradicted research study deals with the relationship of students' attention and addiction to playing video games. Since all my students are a part of Generation Z who use digital technology massively and they use videogames, it is necessary to observe the negative side of videogames on students' attention. Despite the facts in the book "Everything Bad is Good for You by Steven Johnson", which supports the positive outcome of playing video games-another article *Video Games and Attention Skills* claims, "But the given implication of the Swing study, which found that kids' attention worsens over time if they played overtime more video games-the new research is worrying" (Dewar, 2012). Logically, the more students play video games, they become more addicted to playing games; therefore, their interest in education declines dramatically. A simple example, an addicted student

who loses a game gets extraordinarily upset; the same student who gets a low grade does not bother so much. The student knows he or she did not put enough effort, respectively attention in sessions (lessons); thus, the student embraces the bad grade.

Sustaining students' attention requires many steps such as motivate students extrinsically, involve students by asking random questions, make them laugh, incorporate regularly in free play, make ideas clear and involve challenging questions, ask students at least one question at the end of the class (use it as an exit ticket) what did you learn from this lesson. Most importantly, design the lesson plan that is based on the notion of the zone proximal development. The proximal zone development is the difference between what students know and what they do not know. This concept was developed by Soviet psychologist Lev Vygotsky (1896-1934). Connecting known with the unknown in the lesson belongs in a higher order thinking level. The ratio of known with unknown should be in proportion with student's readiness.

Students' attention is in correlation with the gravity of a lesson and its elucidation. Designing a lesson plan should be adequate and attracted to the audience's interest. If the lesson is too easy, learners will not put enough effort into triggering their attention. If the lesson is too hard, learners will not put enough effort into triggering their attention. Designing and interpreting the lesson plan has similarities with the Blaise Pascal expression, "If you read too slowly or too fast, you will understand nothing". The optimal rate to analyze or understand a lesson thoroughly is working/analyzing with an average rate and systematically.

2. Method

2.1 Teaching a Lesson by Expressing Main Idea in Five Different Ways

Based on the facts discussed above, there are many contradictions and reasons why students are not alert throughout a session. The paper will shed light on addressing the

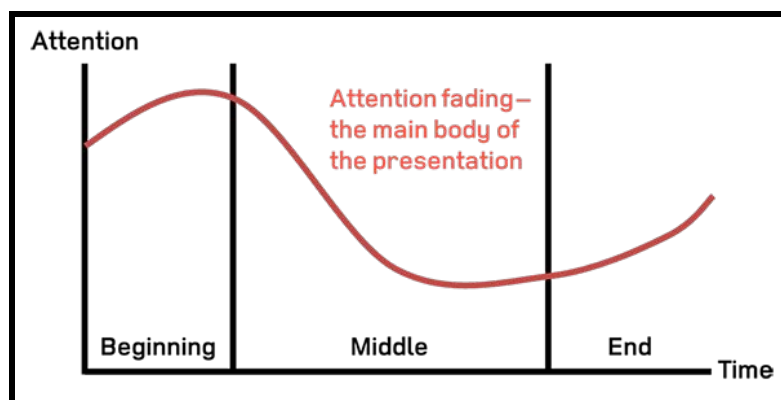


Figure 2. Attention Effectiveness during a Presentation (The figure is from the article How to write a speech to engage your audience)

presentation/teaching extremely closer to the main idea. Apparently, students' focus will resemble an increasing-decreasing periodic function in different intervals, which has different continuity for different people. In general, there is a consensus between researchers that human concentration has a higher intensity in the start, and it weakens with respect to time. The article, How to write a speech to engage your Audience states, "Research shows that attention span is greatest at the beginning of a speech, reduces considerably during the middle of your speech and picks up again towards the end when your audience knows you are about to finish" (Barnard, 2016).

Table 1. Students Prefer to Pay Attention during a Presentation (Beginning, Middle, End)

| Students: | Beginning of the presentation | Middle of the presentation | End of the presentation | Total Percentages/Total # of Students |
|--------------------------|-------------------------------|----------------------------|-------------------------|---------------------------------------|
| HS. Class # 1 | 11 | 5 | 10 | 26 |
| HS. Class # 2 | 13 | 7 | 8 | 28 |
| HS. Class # 3 | 8 | 5 | 8 | 21 |
| College Students | 6 | 5 | 7 | 18 |
| Total Number of Students | 38 | 22 | 33 | 93 |
| Percentages | 41% | 24% | 35% | 100% |

In the Table 1 are presented results from three high school classrooms consisting of 75 students at JSMA Union City Board of education NJ and a college math class at EIC Belleville NJ. Results are slightly similar with the data from the graph in the Figure 2.

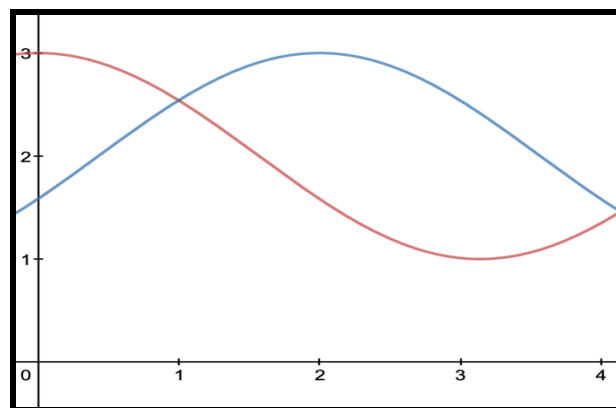


Figure 3. Mathematical Modeling of Figure 2. $A(t)=\cos(t-n)$ Let $n = 1$ spaces that signify every 10 minutes

Practically, it follows the rules of writing English composition in undergraduate courses. Introduction contains the main idea, which has the core of content, the middle of the story is covered with lots of relevant, irrelevant details and unnecessary details (reader loses the interest to absorb all extraneous information), and by the end of the story, the lector rephrases the main idea—the reader’s interest goes back to capture the essence of the story with a greater focus in the beginning and at the end of the story. Analyzing the model in Figure 3 leads to similar mathematical models which are related with trigonometric functions illustrated in Figure 3. Let observe the graph in terms of the x-axis from zero to four, and let the number one signify ten minutes, number two twenty minutes etc. The purpose of the lesson is to deliver the main idea of the story in different versions.

The main idea is usually delivered in the beginning of the story for at least ten minutes. Because the point is to comprehend the main idea of the story, it is possible to rephrase the main idea in different versions. If a session in the high school lasts for forty minutes, let present the lesson plan in four versions. Figure 4 shows the activity of the attention with the red line; when it starts to drop after ten minutes, after that starts rephrasing the main idea in a different version—the red line of the graph. Again the attention elevates higher (the blue graph picks up the next version) and repeats the previous pattern. Figure 4 shows the repeated pattern occurs four times differently; it represents a delivered lesson plan in high school class expressing main ideas in five versions with an active alertness during a period of the class or the session.

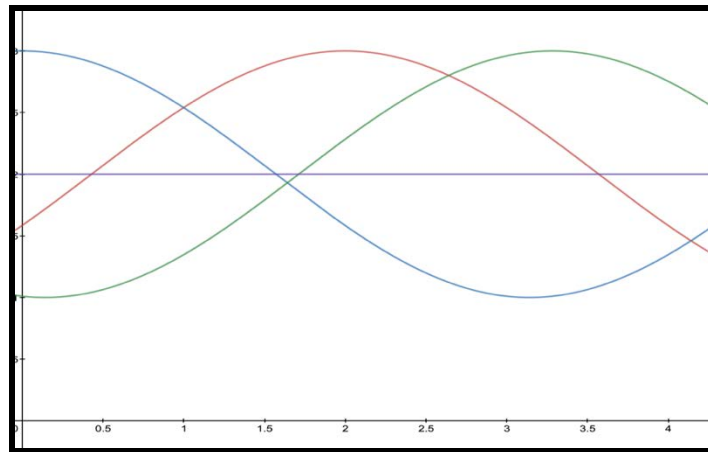


Figure 4. Elaborating the Main Idea of Figure 3 the Attention Activity during a Class

The maximum points of the graph are on the top of the turning points. The minimum points are on intersections points of the graphs on the upper side. If the straight line represents zero, points of intersections represent 50% while the maximum points represent 100%.

Then the Average-Attention of the graph would be $Aa=100\%+50\%2=75\%$. Let 100% represent the maximum attention—the highest point in the blue graph. , and 50% highest points of intersections

between the blue graph and red graph. The formula for evaluating the percentage change (Brigs, 2015): $\% \text{ change} = \frac{\text{Final} - \text{Initial}}{\text{Final}} \times 100\% = \frac{100\% - 50\%}{100\%} \times 100\% = 50\%$. The absolute change is equal to percentage change. Apparently, by calculating the formula the attention-rate would be between 70% and 80%; students would maximize learning trajectory tremendously by implementing teaching method based on the model one by five 15 which represent one-main idea, and interpretation of five-ways.

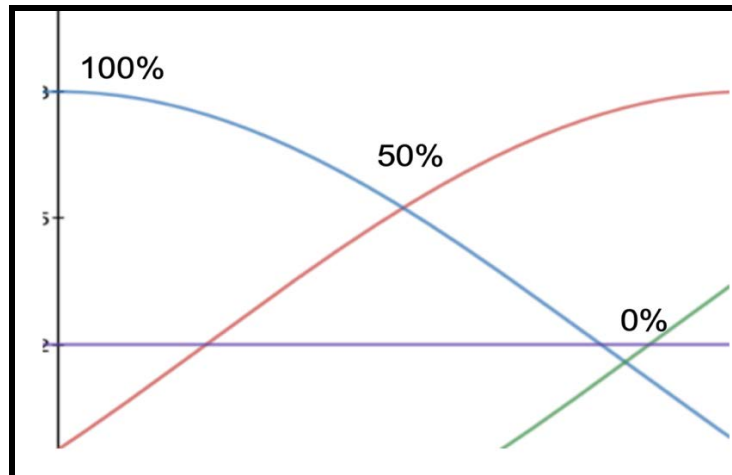


Figure 5. Describing the Students' Attention Average

The model is represented by changing the phase of the trigonometric function that describes active listening during a presentation; it has a similarity with videogames. The main idea in the video game is to win or defeat other players. The main idea (defeat the other player-win the game) keeps repeating in different stages of the game with different strategies for a long period of time; the player focus behaves extremely alert. Video games have various content. According to the article *The Benefits of Playing Video Games* says “There are millions of video games, with vastly different themes and goals. These games can be played cooperatively or competitively, alone, with other physically present players, or with thousands of other online players, and they are played on various devices from consoles (e.g., Nintendo Wii, PlayStation) to computers to cell phones” (Granic & Lobel, 2014). Clearly, video games are interactive and with different themes or goals on finishing the game. All video games have the same common goal, winning the game. The central main idea is to win the game; therefore, players are active throughout the frame time of a video game.

While the audience follows the middle of the presentation, they will listen more closely to the central details and ignore peripheral details. Central details are closely related to the main idea. and peripheral details have a minute relation to the main idea. “For example, if an instructor elevates students' arousal before a lecture, there is a higher probability that relevant, central details of the lecture material will be attended to and retained in memory” (Rosegard & Wilson, 2013). The downside of mixing relevant details with irrelevant details decreases the interest of students in the lesson because the concentration of

students is off and on. During the peripheral details the alertness is off when details transits into central details alertness still will be off. Until the attention sets up for a new start, there will be considerable material of the lesson unrecorded in the students' minds; consequently, the audience will get out of the lesson's current.

Attracting the students' focus in the lesson involves several constituents; some of them play a greater role than others, nonetheless, each one plays a significant contribution in active listening. In order to narrow the topic, we gave valuable facts on interpreting the main idea in different versions and keeping the main idea crystal clear (the same) in all paragraphs. My concept on expressing the chief theme in various ways relies on George Polya's expression, "It is better to solve one problem in five ways than to solve five problems in one way". In this case, we solve one problem in five ways means we deal with five different strategies. Making a parallelism with the main topic, it means the lesson has a tremendous application in various scenarios and it is necessary to know it. Therefore, students' interest will function with a greater flux during a delivered lesson that demonstrates the model solving a problem in many different methods.

3. Discussions

3.1 The Role of Video Games in Active Attention and Effective Learning

As I mentioned earlier in the introductory section, it is extremely hard to comprehend completely why students do not pay attention all the time during a class. The matter of fact is there are many factors that determine the students' attention in the class such as: motivation, learning environment, solid foundation—prior knowledge, working habits, brain dysfunctions in attention, students' interest in the subject, classroom management, school district policy, etc. Each factor plays a crucial role in shaping the students' engagement in the classroom; in general, interactive teaching and videogames maximize student engagement in the class. Interactive teaching and videogames have a limited application in the real world. Improvising elements resembling games may be implemented in any teaching scenario. The common denominator of all digital games or physical games is how to win the game. Winning the game impacts on players emotionally (winning the game makes them happy losing the game they get upset). Main idea of any game is win the Game. Every game has the same idea displayed in different levels with different rules. Therefore, we will reflect our interest in delivering the lesson by expressing the main idea in different versions.

Electronic video games are good models for interactive teaching, but none-educational games diminish students' academic success. According to the article, *Why Can My Inattentive Child Pay Attention to Video Games*, " In short term, there is no evidence that using electronic media offers any superior educational benefits, and it may in fact cause harm in terms of attention and impulse control (among other things)—particularly in a child who already struggles with those issues" (Dunckley, 2014). Every human activity uses energy in order to be active during a period of time. Learning, focusing, reading, watching TV, listening to the radio, singing, talking, makes us tired after a period of time because we

spend energy. When we are tired, we are inattentive in any intellectual activity until we regain energy. Therefore, students who consume a long-time playing video games are inattentive in the classroom.

A small group of students might be inattentive in the classroom as a result of brain dysfunction. Students who suffer from ADD, they experience similar behaviors with attention deficiency. Based on the article, *Students at Risk, "Dysfunctions in attention. Dysfunctional brain mechanisms and/or chemical imbalances can lead to attention deficit disorder (ADD) and other attention-related problems such as retardation and schizophrenia" (Sylwester & Cho, 1992)*. In this group of students applies different rules, thus elaborated factors on attentiveness in this paper are not valid. The paper deals with alertness activity occurring in the general population of students who are average.

Generally speaking, listening is the first step of wisdom. Even Though, people pretend to listen to the conversation, they do not absorb all the information of a particular speech. The article, *Habits of mind, claims, "We spend 55 percent of our lives listening, yet it is one of the least taught skills in schools. We often say we are listening but in actuality, we are rehearsing in our head what we are going to say next when our partner is finished" (Costa & Kallick, 2000)*. Usually, the listener is not interested in the whole conversation; consequently, he or she is going to dismiss a considerable part of the conversation. Probably the listener is going to listen to what he or she likes to hear. Another reason might be overwhelming discussion: the brain cannot process a long list of various topics.

Listening provides a great amount of information to the learning process, which might arise memorization, too. Memorization and learning are two different concepts. The book, *Human Learning and Memory states, "Learning and Memory (LM) are two distinct, but interrelated processes. Learning is associated with information acquisition and subsequent behavior change, and memory is responsible for encoding, storage, and recall of information" (Lieberman, 2011)*. Listening (attention), Learning and memorization are in correlation with each other. Listening supplies learning with acquisitions and new experiences; furthermore, learning transmits those new experiences to the memory to process them and retain in the storage and make them available when they are recalled.

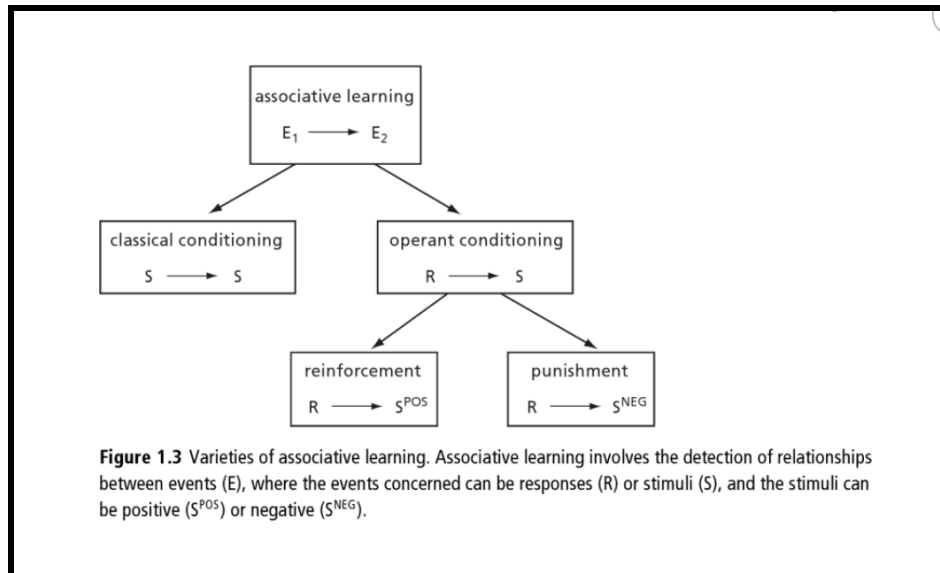


Figure 6. Varieties of Associative Learning. Associative Learning Involves the Detection of Relationships between Events (E), where the Events Concerned Can be Responses ® or Stimuli (S), and the Stimuli Can be Positive (Spos) or Negative (Sneg) (Liberman, 2013)

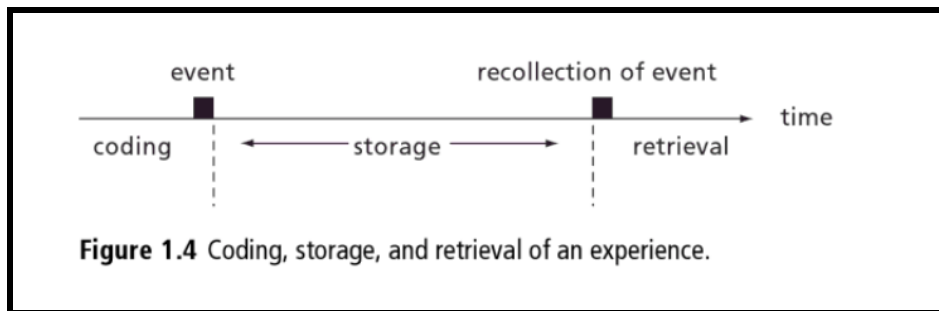


Figure 7. Coding, Storage, and Retrieval of an Experience (Liberman, 2013)

Consider the listener/student is interested in listening to the conversation respectively. During the participation in the class, students naturally pay attention outside their surroundings. The article, Students at Risk, writes, “*The external-internal shift*. In this active search, our brain frequently shifts its focus between external events and internal memories and interests” (Costa & Kallick, 2000). The internal thoughts often interfere with the external thoughts creating disconnection throughout a lesson. Similarly, it happens when you read a book. You read a book for a while, then your mind explores somewhere else (in different places and events). Afterward, you see that you feel like you are missing lots of information. You read again and you get in the truck shortly. This process repeats until you finish reading the book. Regardless, you lost lots of peripheral information from the book, you still know what is going on because the main topic is repeated in numerous paragraphs—similarly with watching a movie.

4. Conclusion

4.1 Determining the Central Idea of Video Games/Games through Various Levels and Plays

Attentiveness is a crucial part of shaping students' learning and their success. The paper described numerous factors, which plays a significant role in impacting on students' alertness. Some relevant factors might be listed as follows: mind habits, motivation (extrinsic/intrinsic), school district, management, active teaching, etc. It is hard to identify the list order of relevance from the most important to the least important factor in determining attention. Every class is different, and teachers /instructors have different preferences. Therefore, the paper will narrow its theme as follows. The central idea of the paper is expressing a lesson plan by describing the main idea in several methods. Analyzing the active teaching can be conveyed as an interpretation of the main idea in various versions. According to the article, why educational Video Games, states, "Video Games motivate learning by challenging, providing curiosity, beauty, fantasy, fun, and social recognition" (Annetta & Tzu-Cheng). The article describes "winning" with different expressions. For instance, motivating learning by challenging means you challenge someone in the game with purpose to play the game and determine who wins the game. Second, beauty and fantasy are related with the qualities of the winner. Next, curiosity is related to finding out how good you are to win the game—challenge yourself (how much you are worth?). Finally, social recognition is the quality that winners make known inside a social group that plays video games. We provided several arguments proving the main goal of the video game is to defeat your rivals—become better than others (effect of ego). Active learning by using video games cannot be applied all the time because usually, lesson plans and subjects do not have relationships with video games. Elements of active learning can be applied in teaching the lesson with a central topic in five different ways. Based on the article, Reclaim Classroom attention with Active Learning, claims "Researchers noted fewer attention lapses during times of active learning. They also found fewer lapses in attention during a lecture that immediately followed a demonstration or after a question was asked, compared to lectures that preceded active learning methods" (Kim, n.d.). Addressing the lesson with the main idea conveying in various versions allows asking questions to students and assessing their learning. Teaching by asking questions increases attentiveness in class because students are interested to understand questions well and hopefully, they will answer the questions. Asking questions during the delivering lesson is applicable in all teaching styles. In addition, asking questions is a supplementary factor on keeping students awake. Let's elaborate on playing chess (physical game), between two players surrounded by a few friends. They might play ten different games with different strategies. All games have in common the main idea—who is the winner? All characters that follow the game will watch/play the game extremely concentrated all the time. Likewise, teaching the lesson with the main topic distributed in various scenarios maximizes students' learning trajectory tremendously.

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