

# The Effectiveness of Interactive PowerPoint on Supplemental Materials to Increase Students' Learning Motivation

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## ABSTRACT

This study aims to determine the effectiveness of interactive PowerPoint media in increasing elementary school students' learning motivation, particularly in adding material. The research method used is a literature review approach, by examining the results of previous relevant research on the use of technology in mathematics learning. The findings show that interactive PowerPoint with animations, moving images, quizzes, and other interactive elements can help students understand the material more visually and increase their learning interest. In addition, using this media is considered to create a more enjoyable learning experience and motivate students to be actively involved in the learning process. This media also allows for independent learning, supports two-way interaction, and can adapt to student needs according to learning motivation theories such as humanistic, behavioristic, and cognitive. Despite some technical obstacles and variations in student understanding levels, interactive PowerPoint remains an attractive alternative learning medium, especially if designed attractively and according to the characteristics of elementary school students. With the right design and relevant materials, this media has the potential to improve the quality of mathematics learning in elementary schools significantly. This media can help teachers create more active, engaging, and meaningful learning with the right approach..

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## 1. INTRODUCTION

In today's digital era, technology is not unfamiliar or new in the world of education—one of the tools teachers often use when teaching is digital presentation applications such as Microsoft PowerPoint. However, many teachers still use it in a fundamental way, which is to present only static text, statistics, and illustrations explained verbally. In fact, with a bit of creativity and pedagogical understanding, PowerPoint can be turned into a much more interactive, engaging, and fun learning medium, especially for elementary school students.

This condition becomes increasingly important when teaching math material, especially the addition topic. Students often lack understanding or experience difficulty when material is presented through monotonous conventional methods. Therefore, media that can accommodate the learning characteristics of elementary school students is needed, one of which is interactive PowerPoint. By inserting animations, interactive symbols, dynamic text, and visual images, PowerPoint conveys information and inspires and motivates students to learn more fun and visually.

Some recent research shows that using interactive PowerPoint can significantly increase student engagement in the learning process. The advantage of this media lies in its ability to combine visual, auditory, and interactive elements into a single unit that is easy for teachers to use and interesting for students. However, the effectiveness depends not solely on the software, but also on the learning design and the teacher's ability to implement the media pedagogically. If not designed properly, this medium can become less effective.

As such, it is essential to explore further how interactive PowerPoints work in teaching mathematics, especially on summation materials, and how these media can affect the learning motivation of elementary school students. On the other hand, learning motivation is one of the main determining factors for a student's academic success. Without strong encouragement from within, the teaching-learning process will be complicated to achieve maximum results. Therefore, learning motivation is an essential focus in education and continues to be studied by educators, psychologists, and educational researchers worldwide [1].

Learning motivation is influenced by various theories, such as needs theory, reinforcement theory, and Maslow's goal theory. These theories explain that motivation is not static, but changes over time and is influenced by various internal and external factors [1]. Interactive PowerPoint can be used as a medium that activates this motivation, for example, through gradual animations, sound effects, and interactive quizzes that students can answer immediately. For example, the application of this media in learning the sum of numbers 1 to 20 shows that material that previously didn't feel easy becomes easier to understand, while increasing students' enthusiasm for learning [2].

The use of interactive PowerPoint also has many advantages. One is its ability to create an engaging, meaningful, and contextual learning atmosphere. Features such as interactive links for quizzes, animations, audio, and videos can make the material delivery feel more creative and innovative. This can certainly encourage students to be more enthusiastic about participating in learning [3]. However, behind its advantages, interactive PowerPoint also has several limitations. For example, animations that are too fast or not explained clearly can confuse students. Therefore, control of the flow of the presentation and the clarity of the text must remain the primary concern for the learning process to run effectively [4].

## 2. METHOD

This study adopts a literature review approach as the primary method. The selection of this method is based on the fundamental purpose of the research, which is to explore, analyse, and summarise various previously published findings systematically and comprehensively related to the effectiveness of implementing interactive PowerPoint on supplemental materials to increase students' learning motivation. Thus, this study's primary focus is the in-depth observation of secondary data from relevant literature sources and the critical interpretation of the information contained therein, aiming to present a synthesis of the latest knowledge.

It is essential to underline that this study did not involve collecting primary data through direct surveys, conducting experiments in a classroom setting, or interviews with participants. On the other hand, all data on which the analysis is based comes from various secondary sources that have high scientific credibility and have gone through the publication process, including but not limited to reputable scientific journal articles, reference books, conference proceedings, and advanced scientific works such as theses and dissertations. The data collection process is carried out in a structured and systematic manner. It starts with identifying relevant keywords (e.g., "interactive PowerPoint", "student learning motivation", "basic mathematics", "technology-based learning design", and "educational media effectiveness"), which are then used for searches on leading scientific databases. The databases used include, among others, Google Scholar, Scopus, Web of Science, and Dimensions, to ensure a wide and representative coverage of the literature. After the initial identification process, a strict article selection stage is carried out. Selection criteria include substantial relevance to the research focus, quality of the methodology used in the original study, novelty of the publication (priority in the last five to ten years, except for seminal works), and availability of full access to publications.

The next stage is data analysis, which involves critical steps. These steps include synthesising information from various sources, identifying research patterns, trends, and gaps, comparing findings across studies to identify consistency or discrepancies, and drawing logical conclusions supported by empirical evidence that has been analysed in depth. Through this methodological approach, the research is hoped to produce a holistic and comprehensive literature review, identify theoretical and practical implications, and provide direction for future follow-up research.

## 3. RESULTS AND DISCUSSION

This section presents an integration and synthesis of findings from various relevant studies, focusing on the effectiveness of interactive PowerPoints in increasing students' motivation to learn, particularly on supplemental materials. Before presenting an in-depth analysis, this section first summarises various perspectives on the interactive nature of PowerPoint as a teaching tool, the characteristics of teaching in elementary schools, and its mutual relationship to student learning motivation. Through a thematic analysis of the existing literature, this section provides a comprehensive overview of how these media can effectively enhance students' intrinsic and extrinsic interest and motivation during learning.

### 3.1. Interactive PowerPoint as a Learning Media

Optimising the learning process often requires diversifying the use of media by teachers. Learning media not only functions as a tool for information transfer, but is also crucial in reducing the potential for learning boredom that students often experience. The proper use of media in learning activities is expected to facilitate the teaching of material by teachers to students, making it easier to digest and remember.

Interactive media is generally recognised as the most interesting type of educational media, so it is very relevant to integrate it into the learning process to support students in mastering the material. As a learning instrument, interactive media focuses more on delivering a clear and concrete understanding, minimizing ambiguity, and increasing information retention [5].

As a facilitator in the learning process, a teacher must have competent abilities in mastering Information and Computer Technology (ICT). In this rapidly evolving digital era, an educator must adaptively use engaging and interactive learning tools to spark and encourage students' enthusiasm for learning during the educational process [6]. Especially in the context of mathematics learning, technology-based mathematics learning media have become a common practice and have proven to be effective.

Microsoft PowerPoint has long been known as a widely used computer program for helping students learn math. Specifically, it is a program developed by Microsoft that allows users to create interactive learning media with various supporting features [5].

Furthermore, Microsoft PowerPoint is a very popular interactive learning application and is often used by computer users, especially to create engaging presentations. The app can seamlessly integrate media elements such as text, images, sound, and even video and animations, making it a dynamic and engaging learning medium. PowerPoint Interactive goes beyond functionality as a regular presentation tool [7]. If well designed, this medium can bring a large number of benefits, help students understand concepts more deeply through visualization and clear logic structures, increase students' enthusiasm and active participation in the learning process, encourage higher engagement, have a strong potential to improve academic achievement as well as hone students' critical thinking skills, making the teaching process more enjoyable and effective for teachers, create a conducive learning environment.

Interactive Microsoft PowerPoint can be a handy tool in learning if implemented with the right strategy and a planned design. The fundamental effectiveness of interactive PowerPoint in the learning process can be described through several crucial aspects:

In other words, if used correctly, interactive PowerPoint can be a handy tool in the learning process. The effectiveness of interactive PowerPoint in the learning process is as follows:

- 1) Visualisations and Animations That Support Addition

PowerPoint Interactive has a variety of visual elements such as animations, images, and attractive graphics. These features help transform supplemental

material that initially feels abstract for elementary school students into easier-to-understand and more fun to learn. Based on the study's results, interactive PowerPoint media has been proven to significantly increase students' focus, enthusiasm, and understanding, especially in learning mathematical concepts such as addition and multiplication. This is inseparable from the attractive visual appearance and interactive presentation of material that can visualise abstract concepts to be more concrete and accessible [8].

#### 2) A Motivation to Increase Student Motivation

Using gamification elements such as interactive quizzes, point systems, and leaderboards in PowerPoint makes learning more enjoyable and sparks a healthy competitive spirit among students. A study shows that interactive PowerPoint-based games can effectively improve elementary school students' motivation and learning achievement. [9].

#### 3) Two-Way Interaction and Self-Paced Learning

Interactive PowerPoint encourages two-way communication, for example, by utilising hyperlinks, automated feedback, or custom slides for student responses. This makes the additional learning process more responsive and able to adapt to the needs of each student. In addition, these features also help students learn independently, as they can explore the material at their own pace and gain an understanding. [10].

### **3.2. Addition-Focused Mathematics Learning in Elementary School**

Mathematics learning at the elementary school level often faces various obstacles that result in suboptimal results. One of the leading causes of this problem is the common perception among students that mathematics is a complex and less interesting subject. This negative perception often leads to many students disliking this subject, even making it one of the most avoided subjects. The phenomenon of difficulty learning mathematics among students is a fact that is consistently found at various levels of schools [11].

Specifically in the context of learning mathematics in elementary school, it was found that, in addition to the complexity of the material itself, many students still experience fundamental difficulties in understanding the concepts. This condition is exacerbated by learning methods that tend to be monotonous and less varied, so they often cause students boredom. Field observations show that many students struggle to learn mathematics, especially regarding addition materials. These difficulties are not only limited to counting operations, but especially when they have to understand the basic concept of addition itself. Not a few of them memorise the procedure without really understanding the meaning behind the process of adding two numbers. These difficulties usually arise due to a lack of conceptual understanding from the beginning, coupled with learning methods that tend to be monotonous and less actively involve students. Students' lack of active involvement in building understanding is a crucial factor that needs to be addressed.

### **3.3. Strategies to Increase Learning Motivation through Interactive PowerPoint Media**

To overcome these pedagogical problems, teachers need to innovate and be able to explain the material provided in a varied and interesting way. One approach that has proven effective is the development of learning media to support and develop students' enthusiasm in the mathematics learning process. Interactive PowerPoint media can make it easier for students to learn mathematics, especially in supplemental materials [12].

The practical implication of these literature findings is that teachers need to focus not only on the delivery of the material but also on how the material is presented. We as teachers must be able to create interactive PowerPoint presentations with themes that are interesting and relevant to the world of students and add illustrative images that spark curiosity. For example, presenting a picture of an apple with a total of 5 and an orange with a total of 3 will help students visualise the concept of addition concretely. Students can learn addition more interestingly from these concrete images and are intrinsically more motivated to study diligently.

In addition to using these visualisation and contextualization methods, several other ways can be integrated to improve the effectiveness of interactive PowerPoint:

- 1) Use of Attractive and Age-Appropriate Designs: Choosing a slide design or visual elements appropriate to the characteristics of cognitive development and the age of elementary school students is essential. A cheerful, colourful, and not too information-dense design will attract more attention.
- 2) Meaningful Interactivity Integration: Includes interactive elements such as quizzes, educational games, or icebreaker activities that can actively engage students in interacting with the media. This interactivity encourages active participation rather than just being passive recipients of information.
- 3) Accurate Material Adaptation: The materials must be tailored to the applicable curriculum and the student's ability level. These adjustments ensure proportional relevance and difficulty level.
- 4) Evaluation of Media Effectiveness: After implementation, it is essential to conduct a comprehensive evaluation of the media used. This evaluation aims to measure whether the media is effective and appropriate to support the learning of additional materials and identify areas for future improvement.

By integrating these principles, interactive PowerPoint can be a powerful instrument for addressing challenges in math learning and significantly increasing students' motivation to learn.

### **3.4. Concepts and Theories of Learning Motivation**

Learning motivation is a fundamental psychological construct that drives students' internal energy, encouraging them to be more enthusiastic about participating in learning activities. In this context, motivation reflects the psychological condition of students who are the central dynamo in the learning process. Various factors can affect this level of motivation, including interest in the material, the learning goals to be achieved, and the atmosphere or environment in which learning takes place [13]. Motivation can be classified

into two main types: intrinsic and extrinsic. Intrinsic motivations arise within a person, such as a desire to master a specific skill or curiosity. Meanwhile, extrinsic motivation comes from external factors, such as the urge to learn because they want to get rewards, praise from others, or avoid punishment [14]. Each type of motivation plays a vital role in shaping student learning behaviour.

The definition further asserts that learning motivation is all the forces or impulses within the student that motivate them to carry out learning activities. This encouragement plays a role in maintaining the continuity of the learning process and provides a clear direction for students to achieve their desired learning goals effectively and efficiently [15].

In the learning process, motivation can be manipulated and enhanced. This can arise due to the student's self-motivation and can often be stimulated by the facilities or aids used, such as using media during the learning process. Using relevant and engaging media during ongoing learning can keep students motivated and significantly make it easier for them to understand the material [16]. In line with this argument, using interactive PowerPoint in learning can effectively encourage students' motivation to learn. This media presents material more visually appealingly and can respond directly to student involvement. Features such as animations, sound effects, and instant feedback also help foster curiosity and a passion for learning, especially for students at the elementary school (SD) level who have strong visual and kinesthetic characteristics.

### **3.5. Review of Motivation Theory in Increasing Learning Motivation**

The effectiveness of interactive PowerPoint in increasing students' learning motivation can be explained through several relevant motivational theories.

#### **3.5.1. Theory of the Humanities (Abraham Maslow)**

The motivational theory proposed by Abraham Maslow plays a vital role in supporting mathematics learning activities. The application of this theory can help increase the spirit of learning, have a positive effect on the learning process, and contribute to the achievement of student results and achievements in mathematics subjects. Therefore, applying Maslow's theory is very relevant to be integrated into the mathematics learning process. Its application in the context of learning is as follows, referring to the hierarchy of needs:

- 1) **Physiological Needs:** According to Abraham H. Maslow, physiological needs are the most basic in the Hierarchy of Needs. These needs are related to a person's physical condition, such as the need for food to relieve hunger and drinking to overcome thirst [17]. In the classroom context, this means ensuring students are not hungry or thirsty and that the learning environment is physically comfortable.
- 2) **Need for Safety:** This includes protection from threats, both physical and emotional. This need encourages individuals to seek tranquility, comfort, and an orderly and stable environment [17]. Safe, structured, and bullying-free classes meet this need.
- 3) **Social Needs:** These needs include the desire to be loved, cared for, feel accepted, and be part of a group. This need can be seen in learning from the importance of positive

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interaction between students and teachers and a harmonious relationship between students and their classmates [18]. Interactive PowerPoint can facilitate group collaboration and positive teacher-student interaction.

- 4) Need for Rewards: This reflects a person's drive to gain a clear and consistent assessment of themselves. These include confidence, self-esteem, and a desire to be recognised and appreciated by others [19]. The instant feedback and recognition features of achievements in interactive PowerPoint can meet this need.

Self-Actualisation: Once the need for appreciation is met, a person will be motivated to achieve self-actualisation, which is an effort to realise their best potential and achieve their aspiring life goals. At this stage, a strong desire arises to keep growing, learning new things, and completing the best version of himself [20]. Challenging and relevant learning facilitated by interactive PowerPoint can propel students towards self-actualisation in learning.

The Hierarchy of Needs Theory put forward by Abraham Maslow explains that human behaviour, including learning, is influenced by the fulfilment of needs, which are divided into five levels in order. When these five needs are met, ranging from physical to psychological, students' motivation to learn tends to increase, so the learning process becomes more optimal. Learning media such as interactive PowerPoint that is attractively designed can help create a comfortable and supportive learning atmosphere, as well as answer these needs, so that it can comprehensively encourage students' enthusiasm for learning

### **3.5.2. Theory of Behaviourism**

Behavioristic theory is one of the approaches in educational psychology that focuses on changing student behaviour due to the learning process. This theory emphasises the importance of the relationship between stimulus and response, where expected behaviour can be formed through reinforcement from the surrounding environment. In interactive PowerPoint, reinforcement forms can be sounds like "Right!" or "Great!" followed by an entertaining animation when students answer correctly. This kind of reinforcement can encourage students to repeat positive learning behaviours because they feel happy and rewarded for their efforts and successes [21]. This principle is particularly relevant in the design of interactive quizzes and educational games.

### **3.5.3. Cognitive Theory**

The cognitive approach helps us understand that learning motivation will arise naturally when students feel that learning is essential, challenging, and aligned with their interests. Interactive PowerPoint is not only a visual medium but can also be a tool that encourages students to think actively and construct their understanding. When students are mentally and emotionally involved in understanding the material, their motivation grows momentarily. It can last long as they see the relevance and meaning of what is being learned. This makes the learning process more meaningful and effective [21].

Therefore, applying the concept of learning motivation through interactive PowerPoint media reflects a combination of various motivational theories that focus on internal motivation (humanistic and cognitive) and external influence (behavioristic). By presenting engaging, relevant, and interactive media, PowerPoint can significantly help increase students' enthusiasm for the learning process and outcomes, especially in supplemental materials often considered challenging.

### **3.6. Advantages and Disadvantages of Interactive PowerPoint Media**

While interactive PowerPoint media offers many advantages in the learning process, it also has some limitations that must be considered. A deep understanding of these two aspects is essential for optimising the use of these media.

#### **3.6.1. Advantages of Interactive PowerPoint Media**

Several significant advantages of using interactive PowerPoint media include the following:

- 1) **High Visual Appeal:** The presentations become more visually appealing because they utilise a variety of colours, typefaces, and animations, both in the form of images and photos. This visual aspect is crucial in attracting students' attention, especially at the elementary school level.
- 2) **Stimulating Curiosity:** This media can stimulate students' curiosity so that they are more motivated to understand the material presented in depth. Embedded interactivity effectively triggers self-exploration.
- 3) **Ease of Understanding Visual Information:** Information conveyed visually through PowerPoint tends to be easier for learners to understand. Abstract concepts can be visualised to be more concrete, supporting students' cognitive processes.
- 4) **Teacher Explanatory Efficiency:** The teacher does not need to explain too much, as the material is presented clearly and structured on the screen. This allows teachers to focus more on facilitating discussions or handling complex questions.
- 5) **Flexibility of Use and Reusability:** Presentation materials can be printed, duplicated, and reused whenever needed, offering time and resource efficiency.
- 6) **Digital Data Portability:** Presentation files can be stored as digital data on optical and magnetic media, making them easy to carry and access anywhere [24]. This storage flexibility supports the mobility of teachers and students.
- 7) **Encourages Active Engagement and Independent/Collaborative Learning:** Through interactive PowerPoint, students are invited to engage directly with the material displayed on the screen, creating an active learning atmosphere. They can also learn independently whenever needed and have the opportunity to work together on activities such as quizzes or group discussions [25]. It supports the development of 21st-century skills such as collaboration and self-paced learning.
- 8) **Improved Teacher Professionalism:** The process of developing interactive PowerPoint media also encourages the improvement of teachers' professional abilities. This includes improving teaching skills and utilizing technology to compile

more interesting teaching materials according to students' needs [26]. The use of this technology encourages pedagogical innovation.

### 3.6.2. Limitations of Interactive PowerPoint Media

Despite its various advantages, the use of interactive PowerPoint also comes with several drawbacks that are worth looking into:

- 1) Time Consumption in Development: Creating an interactive PowerPoint can take quite a long time because the design process requires precision and creativity. This initial time investment is an essential consideration for teachers.
- 2) Screen Size and Viewing Distance Constraints: If the screen is small, students sitting in the back row will likely have difficulty seeing and understanding the material presented. This highlights the importance of adequate supporting infrastructure.
- 3) Teacher's Technical Control Needs: Teachers need a control method to run this program so the presentation can go smoothly without technical constraints. Teachers' technical ability is a prerequisite.
- 4) Device Mobility: Using devices such as computers or laptops can sometimes be a hassle, especially when they have to be transported and installed in different learning places. Logistical and portability aspects can also be a hindrance.
- 5) Interface Adaptation Learning Curve: When the appearance or features of PowerPoint undergo drastic changes, users need to readjust and learn them until they get used to them. It demands the user's adaptability to software updates.
- 6) Complexity of New Interface Design: New interface designs are often difficult to understand and take time to adapt. The *user experience* aspect can affect the efficiency of initial use.
- 7) Potential Distractions from Advanced Features: Several features, such as contextual tabs and gallery styles, can distract from focus when delivering material, instead of supporting learning [27]. Excessive design can be counterproductive.
- 8) Technology and Infrastructure Dependency: Dependence on technological devices can also be an obstacle, especially if the tools used are incompatible or if there is a disruption to the internet network [28]. It emphasises the importance of infrastructure availability and stability.
- 9) Restriction of Individual Interaction and Collaboration: Individual use of PowerPoint tends to limit interaction between students and does not encourage collaborative learning as much, unless specifically designed for it [29]. Individual-centred design can reduce the potential for social learning.
- 10) Overall, interactive PowerPoint is one of the media with great potential to make it easier for users to access information and learn material. *Slides* designed interactively allow students to be more active in understanding the material's content. If made with good planning, interactive, and not excessive in visual effects, this media is very effective in increasing students' enthusiasm for learning, clarifying the concept of addition, and assisting teachers in developing their competencies. However, the

presented content needs to be updated regularly so that it not only relies on an attractive appearance, but also remains relevant to the evolving learning needs [30].

#### **4. CONCLUSION**

Based on the results of the research that has been conducted, it can be concluded that the use of interactive PowerPoint in mathematics learning in elementary schools, especially in supplemental materials, has been proven to be significantly effective in increasing student motivation and understanding. Various features, such as attractive visual displays, dynamic animations, gamification elements, and live feedback, support this. These features can create a learning process that is more interesting, interactive, and easy for students to understand. Furthermore, the implementation of interactive PowerPoint not only supports independent learning but is also in line with theories of learning motivation, such as humanistic, behavioristic, and cognitive, which consistently emphasise the importance of psychological comfort and active involvement of students in the teaching and learning process.

While interactive PowerPoint has several substantial advantages, such as ease of access, high visual appeal, and flexibility, it also presents some challenges. These challenges include dependence on adequate technology and the need for time and effort in manufacturing. However, when designed in such a way that it is creative and carefully tailored to the needs of students, interactive PowerPoint has excellent potential to be a very effective learning tool. This tool can help teachers create a more active, collaborative, and fun learning environment while improving teacher competence in the digital age. Therefore, despite the challenges, the benefits are much greater, making them essential educational innovations.

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