



EFFECTS OF GAME-BASED LEARNING ON LEARNING MOTIVATION  
OF FIRST-YEAR TOURISM STUDENTS



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EFFECTS OF GAME-BASED LEARNING ON LEARNING MOTIVATION  
OF FIRST-YEAR TOURISM STUDENTS



A Thesis Submitted in Partial Fulfillment of the Requirements  
for the Degree of MASTER OF EDUCATION  
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THE THESIS TITLED  
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BY  
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The purpose of this study is to investigate the effects of game-based learning on the learning motivation of tourism students. The sample was 20 first-year students, majoring in tourism at Guizhou Mechanical and Electrical Vocational and Technical College, were selected from students who have low learning motivation by purposive sampling, then they were divided into two groups, experimental and control groups by match-pair technique. Research instruments included 1) A game-based learning program consisted of three steps:(1) Course introduction; (2) Game implementation process; and (3) Conclusion. and 2) Learning motivation scale (reliability 0.975). The data were analyzed by mean, standard deviation, t-test dependent, and t-test independence. The findings showed that the learning motivation of students who participated in game-based learning were significantly increased than before the experiment at .01 level. And the students who were exposed to game-based learning were significantly increased of learning motivation than the controlled group at .01 level.

Keyword : learning motivation, game-based learning, tourism students

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Here, I express my most sincere thanks and respect to all those who have helped me.

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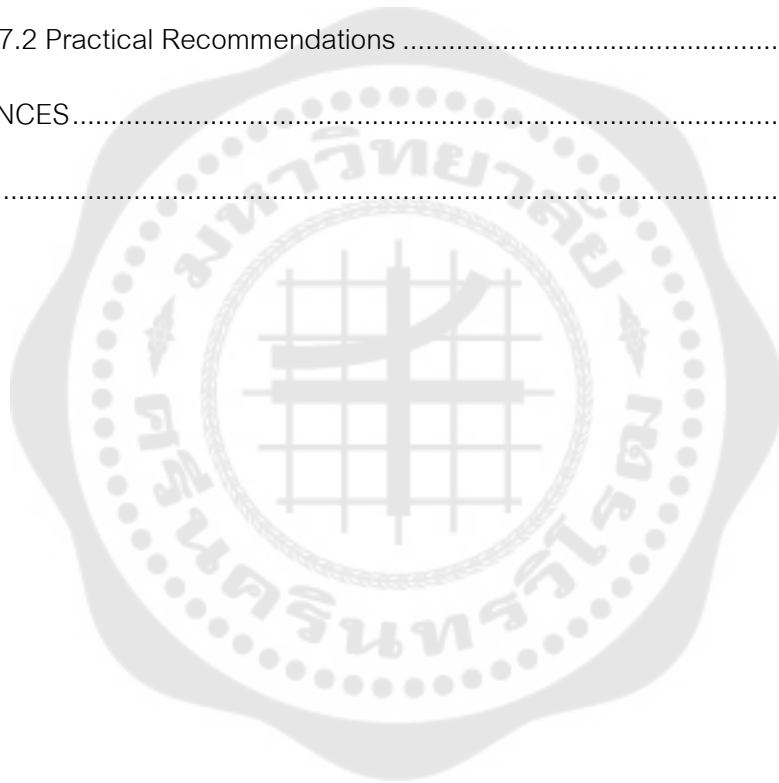
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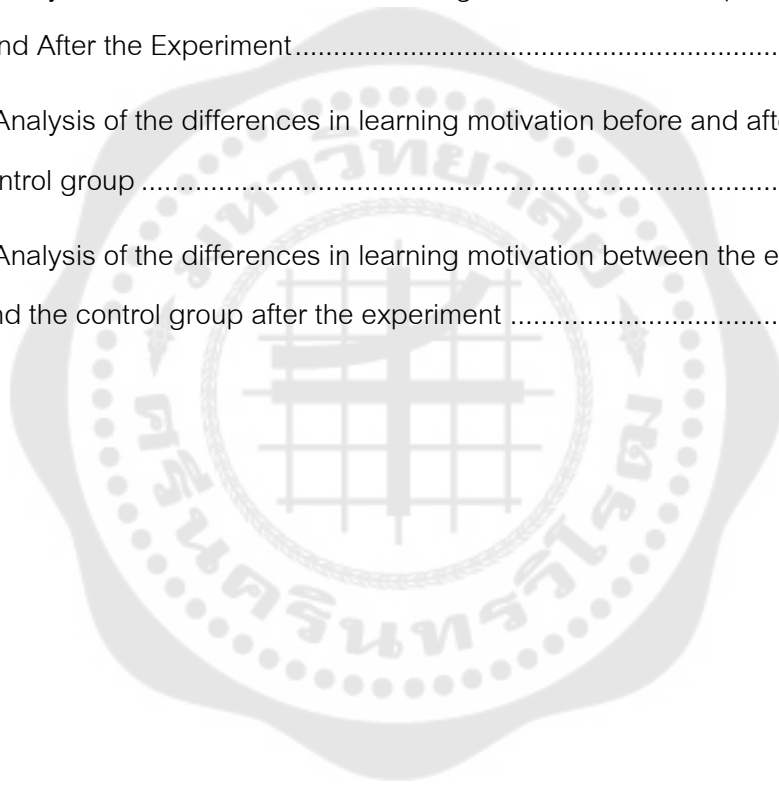


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# CHAPTER 1

## INTRODUCTION

### 1.1 Background

Learning motivation as a psychological concept suggests individuals' willingness to put effort into achieving educational goals (West et al., 2001). Learning motivation is what propels students to comprehend the direction of their learning and engage in learning activities consistently in order to meet their predetermined learning objectives (as stated by Isman et al., 2023). According to Filgona et al. (2020), a student's motivation to learn is essential as they learn best when they recognize the need and develop the desire to learn. Motivation stimulates learners to think, concentrate, and learn effectively. Similarly, Deci et al. (2008) also believe that motivation to learn is significant for students. By having learning motivation, students will be encouraged to follow the ongoing learning process (Green, 2002).

Learning motivation refers to a learner's perspective on matters, and their knowledge acquisition needs may vary based on their individual opinions (Lin et al., 2017). Koff and Mullis (2011) define learning motivation as a student's intention or desire to engage in and put effort into a specific learning activity of their choosing. Ryan and Deci (2000) classify learning motivation into two categories: intrinsic and extrinsic. Intrinsic motivation is driven by an individual's personal interest or internal drive to acquire knowledge or skills, while extrinsic motivation is influenced by external rewards or incentives for learning a particular subject or skill.

According to my many years of teaching experience in higher vocational colleges, the actual teaching activities of higher vocational colleges. Students choose majors unthinkingly, do not understand the personnel training standards, curriculum plans, employment directions, and employment prospects of the majors they study, and do not have career plans that meet their conditions. Students do not have a good understanding of this significance and think that knowledge and skills are relatively simple and not challenging. Even elementary or junior high school students can quickly find employment in the tourism and hotel industries.

Going to school to study, thinking it is just to get a degree certificate and there is no need to learn professional knowledge and skills. It is considered that they will not be employed in this major, so professional skills are not required for employment. Not previewing before class, not bringing books, paper, pens, and other learning tools during class, no investment, no motivation, and no formation is more common. Sleeping in class, playing with mobile phones, chatting, and not reviewing or doing homework after class. Not carefully reviewing the knowledge points before the exam, cheating during the exam, or simply failing the exam. In their spare time, most students never go to the library. Mostly sleeping, playing with mobile phones, and going to Internet cafes to surf the Internet. Indulge in games, fall in love, or engage in other recreational activities daily.

The influence of family education. The family believes that tourism management primarily needs young and beautiful employees, and it is not suitable for long-term study. Employment in the hotel requires little knowledge and skills, and simple training can be employed. The family's limited cognition leads to the students' cognitive bias; they think this major is useless. Some parents even cut off the student's financial resources because the student chose this and did not support the student's studies,

which induced the student to drop out of school and go to work. Over time, it has led to a decline in students' learning motivation and a weariness of learning.

Based on the above performance, it can be seen that students' learning motivation is insufficient, resulting in students not learning fundamental knowledge and skills during the school stage. Some cannot graduate, while others cannot meet the employment standards of enterprises after graduation and cannot find employment. Learning is the primary task of vocational college students, and learning motivation is a type of internal drive that encourages students to engage in learning activities. It is necessary to motivate and guide students to learn. It manifests as a form of intention, desire, or interest in learning, which plays a driving role in learning. A lack of motivation will directly affect learning outcomes. More and more educators are aware of this issue and believe that to enhance the standard of education, the first step is to change students' learning attitudes and assist in improving and boosting the user's drive to learn.

Sarwinda et al. (2020) improved students' learning motivation through the learning process using audio-visual learning media based on the context-based teaching (CTL) method. González Vargas et al. (2020) improve student motivation by implementing AR in learning. The goal of Rakasiwi and Muhtadi (2021) is to create educational games that can serve as learning tools for students during their math classes, with the aim of boosting their motivation to learn. Mobile assessments have been found to have a positive impact on the learning motivation of elementary school students who are studying online. Herwin et al. (2022) have confirmed this finding. The research conducted by Apriani et al. (2019) highlights the potential of game-based learning to revolutionize the way we approach education. I wholeheartedly support this approach and believe that it can significantly improve the learning outcomes of students. The empirical evidence supporting game-based learning is overwhelming. Studies such as the one by Pesare et al. (2016) demonstrate how game-based learning

can promote motivation in medical learning contexts. Furthermore, the research conducted by Hsieh et al. (2015) shows that games can consistently increase students' involvement in a game-based learning environment. This provides valuable insight and encourages us to explore the possibilities of game-based learning further. According to Apriani et al. (2019), game-based learning is a modern approach that helps enhance learner motivation. Chen & Law (2016) and Jong et al. (2013) also support this view. Setiawan and Soeharto (2020) have taken this approach a step further by using a game-based learning to improve the mathematical learning motivation of elementary school students. Researchers have implemented game-based learning in different educational levels and materials to promote a positive learning environment and enhance learners' learning motivation.

In short, game-based learning is an emerging education method that integrates game elements and mechanisms into education to improve student motivation and make students participate more actively in classroom learning. The purpose of this research is to investigate how game-based learning affects the motivation of first-year tourism students, and to suggest new strategies and concepts to enhance their education. At the same time, this research will also help to promote the application of game-based learning in other disciplines and the innovation and development of education and teaching.

## **1.2 Research Objectives**

The research is conducted for the purpose as follow:

1.2.1 To compare the differences of learning motivation scores in the experimental group before and after participating in game-based learning.

1.2.2 To compare the differences of learning motivation scores between the control and experimental groups after participating in game-based learning.

### 1.3 Research Questions

1.3.1 Does game-based learning develop the learning motivation of first-year tourism students?

1.3.2 After participating in game-based learning, does learning motivation scores of students in experimental group are higher than students in control group?

### 1.4 Research Significance

With the continuous development and application of game-based language learning, more and more educators have begun to explore its application in professional tourism education. This study aims to explore the effects of game-based learning on the learning motivation of first-year tourism students and to provide new educational methods and ideas for improving their learning. At the same time, this research will also help to promote the application of game-based learning in other disciplines and the innovation and development of education and teaching. This study has practical implications in many ways.

For example, this study can be carried out in schools to improve the learning motivation of all students in the school, improve students' academic performance, and at the same time, improve the school's learning atmosphere and build a learning campus. For Subject teaching, this study can be used to draw on the elements of games to help students understand and master subject knowledge in an exciting way, improve students' learning efficiency and academic performance, and stimulate students' interest in learning. For teachers, this study can help teachers better grasp students' learning motivation, use various teaching techniques, teach more effectively, and improve their teaching efficiency and quality. For students, this study can help students better understand and master subject knowledge, improve their learning motivation, cultivate their independent thinking abilities, expand their horizons, and improve students' learning enthusiasm and learning efficiency. For other researchers, it



is helpful to deeply understand and improve the game's effective design methods and learning efficiency.

### 1.5 Research Scope

#### Population:

This study is mainly aimed at first-year tourism students in Guizhou technological college of machinery and electricity, with a total of 153 students.

#### Participants:

The participants in the study were first-year tourism students at Guizhou technological college of machinery and electricity. The samples of the study were 20 students that were chosen by purposive sampling. They were randomized equally to the experimental and control groups (10 students in each group).

#### Variable:

The study involved two variables.

The independent variable is game-based learning.

The dependent variable is the learning motivation.

#### Definitions of the terms:

1. learning motivation refers to the cognitive and emotional forces or internal beliefs that activate, initiate, guide, maintain, and guide participatory behavior. It is the desire or willingness to drive individuals to achieve the learning objective, induce consistent striving to learn about behavior, strengthen cognitive history, and enhance and improve learning outcomes. It consists of two components:

1.1 Intrinsic motivation refers to an individual's intrinsic motivation or interest in learning a specific subject or skill. Internally motivated students vigorously participate in learning due to their unique interests or satisfaction or to achieve their academic and personal goals.

1.2 External motivation refers to the external rewards or incentives an individual receives for learning a specific subject or skill, such as receiving rewards or avoiding punishment.

2. Game-based learning is an emerging educational method that utilizes students' curiosity about games. It integrates game elements and mechanisms into education, combines game activities with teaching content, and makes knowledge and information transmission more vivid through games. The program has three steps:

2.1 Course introduction: The researcher introduce a concept related to the class topic using various methods such as pictures, stories, videos, and questions to clarify and engage students. The well-designed course introduction will stabilize the students' emotions, attract their attention, and stimulate their interest in the topic.

2.2 Game implementation: The researcher teach the course content, organize students into game groups based on learning characteristics, observe their performance, and provide them with feedback. The process is to promote cooperation, interaction, and systematic reflection.

2.3 Conclusion: The researcher will summarize the course, evaluate whether the students have achieved the learning goals and absorbed the knowledge, and examine the changes in learning motivation through game-based learning. The eventual assessment will be as varied as the teacher's assessment, the student's self-assessment, and the students' mutual assessment.

## 1.6 Conceptual Framework of Research

This study aimed to explore the effects of game-based learning on the learning motivation of first-year tourism students. The image below illustrated the research's conceptual framework.

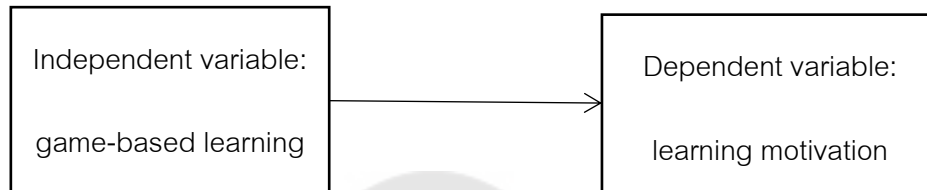


Figure 1 The relationship between game-based learning and learning motivation.

## 1.7 Research Hypotheses

For the study, the researcher used the following assumptions:

1.7.1 After attending game-based learning, the experimental group's mean scores on learning motivation were higher than before.

1.7.2 After attending game-based learning, mean scores of learning motivation in the experimental group were higher than those of the control group.

This section reviews the literature on learning motivation and the research foundation of game-based learning. It is about learning motivation, mainly including:

1. The definition of learning motivation
2. The importance of learning motivation
3. The components of learning motivation
4. Measurement of learning motivation

It is about game-based learning, which mainly includes:

1. The definition of game-based learning
2. The importance of game-based learning
3. The design principles of game-based learning
4. The characteristics of game-based learning
5. The design steps of game-based learning
6. The framework of game-based learning
7. The advantages and uses of game-based learning
8. The relationship between game-based learning and learning motivation

## **2.1 The Research Foundation of Learning Motivation**

### **2.1.1 Definition of Learning Motivation**

Motivation is a complex psychological process influenced by internal and external factors that drives an individual's behavior toward their goals. Learning motivation is a crucial aspect of education that can impact a student's learning journey. Scholars like Reeve (2011) and Green (2002) have defined motivation as an internal force that initiates, sustains, and directs engagement behaviors. It arises from an individual's experiences, perceptions, and interpretations. Kleinginna and Kleinginna (2012) viewed motivation as an internal state or condition that energizes behavior and

provides direction, often described as a need, desire, or want. Motivation is a powerful force that activates, guides, mobilizes, and directs a learner's attitudes and behavior.

Depending on the viewpoint, motivation can be described in a variety of ways. It is relevant to the classroom because Brown (2001) defines it as the expectation of reinforcement. Brown divided motivation into three types based on his cognitive theory. The first is predicated on the drive theory, which contends that inspiration derives from irrational desires. The second is based on the hierarchy of needs, which holds that a person's needs motivate them. The third is based on self-control theory, which contends that motivation develops when people are free to decide what to pursue.

According to Rahardjo and Pertiwi (2020), learning motivation is the underlying idea that directs individual learning objectives, encourages learning behaviors, reinforces cognition history, strengthens and improves learning outcomes, and requires students' ongoing learning and efforts toward the learning objectives set by teachers. According to Koff and Mullis (2011), the student's purpose or willingness to engage in and put forth effort in learning depends on their decision to engage in a particular learning activity and their actions on that activity. According to Ryan and Deci (2000), learning motivation is the primary factor that initiates or sustains students' learning behavior. It also represents a learner's perspective on current events, and learners' varied perspectives necessitate diverse information acquisition needs (Lin et al., 2017).

Motivation to learn is an attitude variable (Harand, 2015) that produces, ensures, and directs learning activities to meet the anticipated learning goals in the theory of planned behavior (Wardani et al., 2020). The internal forces that push a person to learn, such as the desire, readiness, and willingness to pick up new information, skills, and talents, are learning motivation. It is the reason students participate in educational

activities and keep trying to succeed academically, and it is influenced by personal variations, environmental circumstances, and cognitive and emotional processes (Schunk & Pajares, 2002).

Learning motivation favors cognitive responses, such as students' propensity to complete worthwhile and fruitful academic tasks and try to benefit from them (Brophy, 2004). A vital element of an effective educational strategy is encouraging student motivation (Kim & Frick, 2011).

In summary, learning motivation refers to the cognitive and emotional forces or internal beliefs that activate, initiate, guide, maintain, and guide participatory behavior. It is the desire or willingness to drive individuals to achieve learning goals, induces continuous efforts in learning behavior, strengthen cognitive history, and enhance and improve learning outcomes. The overall driving force guides participation in learning, acquiring new knowledge, skills, and abilities, and making efforts toward learning.

### **2.1.2 The importance of Learning Motivation**

Over the years, psychological and educational research has moved from a peripheral to a critical position regarding the significance of student motivation. The study of student motivation is at the heart of research in educational settings (Pintrich, 2003). Learning motivation is the most significant factor influencing learning behavior (Isman et al., 2023). It assists students in comprehending the direction of their learning and regularly engages them in learning activities to complete assignments and meet predetermined learning objectives. The major components of effective learning are learning habits and motivation; education can encourage students' capacity for innovation and improve learning efficiency (Brinkman, 2010; Brettel & Cleven, 2011). Learning motivation is one component that affects how effective learning is, and if learning motivation is present, pupils will learn well (Lao et al., 2021). Many factors affect the learning motivation of a student. It is significantly essential for a student to believe

that he can succeed in his motivation. Additionally, if a learning activity or a course is beneficial to the student, then the student may consider this activity or course valuable and try to achieve it.

The relevance of comprehending students' motivations in teaching is emphasized by Filgona et al. (2020). Effective learning is most likely to happen when students feel the need and desire to learn, which is fueled by motivation. Motivation is crucial in stimulating learners to think, concentrate, and actively engage in learning. It impacts the speed of learning, retention of information, and eagerness to learn. Moreover, motivation helps students work efficiently and provides the drive to achieve their goals. It also helps learners focus on their tasks, directs their behavior towards specific goals, and encourages them to persist in their learning activities. Motivation enhances cognitive processing, leading to a deeper understanding of the material. Continuous motivation is essential for learners to concentrate on their lessons and find fulfillment in their progress. When students are motivated, they are more likely to develop positively.

One of the key elements in reaching learning goals is motivation to study (Green, 2002). According to Bakar (2014), motivation improves learning outcomes. Motivation affects whether students achieve their goals at high or low levels in school (Brown, 2000). Motivation has a direct impact on how frequently learning tactics are used. The importance of learning, goal-setting, and persistence will also be covered. Academic achievement and student learning motivation were significantly positively correlated (Kitjaroonchai & Kitjaroonchai, 2012). Chou et al. (2012) further demonstrated that although students preferred to solve issues alone on some tasks (the behaviors were motivated by intrinsic motivation), they would seek assistance from teachers to address particular learning challenges (the behaviors are motivated by external stimulation). The success of learning activities depends on the pupils' motivation.

Through learning motivation, students will be driven to follow the ongoing learning process (Puspitarini & Hanif, 2019; Green, 2002).

According to Kitjaroonchai and Kitjaroonchai (2012), highly motivated students (integrative and instrumental) will feel like they have bright futures regarding their employment, educational prospects, and communication in fast-paced globalization. Using motivation as a "smart processor" helps meet the needs of students, improves learning outcomes, and achieves curriculum goals. Additionally, it assists students in identifying the knowledge they already possess, the abilities they possess, and the language skills they still need to acquire (Menggo, 2018). Students' motivation to learn is crucial (Deci & Ryan, 2008). The importance of student motivation is to inform them of their position at the start, middle, and end of learning, about the strength of their learning efforts in comparison to their peers, to guide learning activities, to foster learning enthusiasm, and to inform them of the existence of a learning journey before they start working. Students driven to learn will concentrate on the lessons being taught, read the material so they can comprehend it, and employ helpful, targeted learning techniques (Bakar, 2014).

In summary, learning motivation is the most vital force in the learning process, which affects the effectiveness of learning and determines the success or failure of learning. It helps learners recognize their goals, generate positive learning enthusiasm and continuous efforts, improve the speed of learners achieving goals, provide motivation and energy for learning activities, guide learners to take appropriate learning paths, focus their attention and patience on learning, and establish a good learning attitude. It also encourages initiative and persistence in learning, stimulating learners' potential. Enable students to fully experience the emotions of goals, processes, and outcomes in their learning, clarify the level of learning, guide learners' behavior, actively stimulate learning enthusiasm, and make learning a fun-driven journey of interest. With learning motivation, students will actively accept courses, carefully study



materials, and persist in using learning strategies to gain more understanding.

### 2.1.3 The Components of Learning Motivation

Ryan and Deci (2000) classified learning motivation into two categories: intrinsic and extrinsic motivation. Intrinsic motivation refers to an individual's internal drive or interest in learning a particular subject or skill, while extrinsic motivation refers to the external rewards or incentives that individuals receive for learning. Similarly, Rahardjo and Pertiwi (2020) also divided student motivation into intrinsic and extrinsic. Intrinsic motivation is when a student is motivated from within, driven by their unique interests and personal goals. Intrinsically motivated students actively engage in learning and prefer challenging strategies that allow for deep processing of information. On the other hand, extrinsically motivated students put in minimal effort to achieve the maximum reward. Intrinsic learners do not require extrinsic motivators and can make independent decisions, finding fun and a feeling of accomplishment in the learning experience. Extrinsic motivation, on the other hand, is driven by external rewards or punishment and conformity to specific behavioral values.

According to Isman et al. (2023), motivation was categorized into internal and external. Internal motivation comes from within an individual, driving them to achieve their goals, while external motivation is derived from an outside source. When it comes to learning, students who are intrinsically motivated study because they find the content interesting and valuable. On the other hand, extrinsically motivated students may study solely to get a good grade on a test. External motivation is not necessary for students who find learning exciting and meaningful. Teachers should understand their students' needs and apply external motivation accordingly. Additionally, Chou et al. (2012) distinguished between intrinsic and extrinsic orientations in learning motivation.

According to Gopalan et al. (2017), internal motivation referred to doing an activity purely for personal satisfaction without any external expectations. Factors like challenge, curiosity, control, and fantasy play a crucial role in triggering this type of

motivation. In education, maintaining motivation requires a positive attitude and a lot of willpower. Studies also show that internal motivation has a significant and positive impact on academic achievement. When students are internally motivated, they participate in educational activities for the sake of fun, challenge, and uniqueness, without any external pressure or rewards. Attitude towards learning is considered essential and influences academic achievement. Internal motivation can spread positivity and help retain knowledge for a long time. On the other hand, external motivation involves external factors like rewards, punishment, and pressure. Students are extrinsically motivated when they receive rewards or are under compulsion. While extrinsic motivation can be cultivated at the initial stage, it can transform into intrinsic motivation as the learning process deepens.

According to Puspitarini and Hanif (2019) identified six indicators of learning motivation: 1) A drive to succeed, 2) a need to learn, 3) optimism about the future, 4) a love of learning, 5) engaging activities, and 6) a supportive atmosphere. Additionally, Sardiman (2012), as cited by Puspitarini and Hanif (2019), outlined various methods to increase motivation in learning, including: 1) assigning numbers to efforts, 2) offering gifts as rewards, 3) creating competition, 4) emphasizing the importance of learning and tasks, 5) providing tests to prepare for high scores, 6) tracking learning outcomes, 7) giving praise for positive reinforcement, 8) implementing punishment for negative reinforcement, 9) encouraging a desire to learn, 10) incorporating interest into the learning process, and 11) establishing clear learning goals.

In summary, most researchers believe that learning motivation consists of internal and external motivation. Internal motivation refers to a person's underlying motivation or interest in learning a specific subject or skill, which may come from their curiosity, interest, values, or satisfaction with unique things or in order to achieve their academic or personal goals. At this point, students will strongly participate in learning, and the key lies in the stimulation of challenges, curiosity, control, and fantasies. In

addition, external motivation refers to the learning motivation caused by others' evaluation and reward of a certain behavior avoidance of punishment and pressure, such as obtaining external rewards or incentives when learning specific subjects or skills or avoiding external punishment.

#### **2.1.4 Measurements of Learning Motivation**

Self-report questionnaires are commonly used to measure learning motivation. These questionnaires usually consist of items that ask students to rate their motivation level on a scale. The Academic Motivation Scale, created by Vallerand et al. (1992), is a frequently used self-report questionnaire. It measures three types of motivation: intrinsic, extrinsic, and amotivation.

Huizenga et al. (2009) employed a quasi-experimental approach to study students' participation in the game and their motivation for history, dividing 458 students from 20 classes in five schools into two groups, 10 of which played the mobile history game while the other 10 classes received a regular project series of lessons. The games were observed through volunteers who filled out observation forms. The observation form included items about the frequency of occurrence of a particular game activity or the motivation of the elementary school students to participate in a particular game activity (on a 5-point Likert scale, with 1 meaning "not at all" and 5 meaning "= very often/very strongly"). The results yielded no significant differences between the two groups in terms of medical history motivation and midlife motivation.

To determine differences in motivation for high school students using game-based classroom learning versus classroom learning using traditional methods. Rizka et al. (2019) adopted a quasi-experimental design and divided the samples into two groups. The experimental group used game-based learning, and the control group used conventional methods for learning. Research tools use study design and test questions. As for testing, there are two issues, namely pre-testing to ensure that the two classes are of equal ability and post-testing to measure the learner's ability. A second question in

the form of an objective test (multiple choice). Validity of Measurement t Instrument Test Validity. The results show a rapid increase in learning outcomes using game-based instructional learning.

Pesare et al. (2016) To study participation and motivation in sustaining the learning process in a healthcare setting. Using 8 items specifically designed to measure motivation (using a Likert scale), pre-test and post-test, the results of some user tests showed that the games enhanced students' motivation. Liu and Chu (2010) employed a quasi-experimental design to investigate how ubiquitous games affect English learning motivation through a context-aware ubiquitous learning environment. They divided the two classes of students into the experimental group and the control group, and used the method of quantitative analysis to evaluate the students' learning motivation. Tools using interviews (recorder records the in-depth interview process) and developed an English learning motivation scale, including four subscales: attention (group A), relevance (group R), confirmation (group C) and satisfaction (group S) A total of 23 questions, the answers to all questions are on a 5-point Likert scale, from 5 to 1, "5" means strongly agree and "1" means "strongly disagree".

Jianfeng et al. (2018) in order to explore the correlation between learning motivation and language ability in the Chinese English context. Using cluster sampling method, 458 non-English major students from a university in Henan Province, China were selected as the research subjects. Using questionnaire as a research tool, English Learning Motivation Questionnaire (ELMQ) (Gao et al., 2003) was used to measure the learning motivation of Chinese English teaching students. Respondents were asked to develop their views on a five-point Likert scale ranging from "1: Never be true to me" to "5: Always be true to me." The results suggest that motivation to learn is a better predictor of differences in language ability than learner autonomy.

Rahardjo and Pertiwi (2020) Research on learning motivation. Using a simple random sampling method, 84 students were selected as the research sample.

The authors used Likert scales and descriptive statistics via SPSS. The data analysis results show that the correspondence ratio between the learning motivation and English performance of the second-grade students of Xidu Azuo Vocational School is 0.22. Through the Pearson correlation table, it can be seen that the students' explanatory ability is low. The range of the table is 0.200 – 0.400. Based on the statistical analysis, the authors concluded that there is a significant correlation between motivation and academic performance.

Lin et al. (2017) studied the impact of digital learning on learning motivation and employed an experimental study with a non-equivalent pretest-posttest control group design for a quasi-experimental study. A total of 116 students in 4 classes were selected as the research objects, of which 2 classes (58 students) in the experimental group were engaged in digital learning, and the other 2 classes (58 students) in the control group still maintained the traditional teaching method. 3 hours of taught research per week (total 96 hours). The computer statistical software SPSS is used for data analysis, and various hypotheses are tested by factor analysis, reliability analysis, regression analysis and variance analysis.

Puspitarini and Hanif (2019) sought to gain insight into the implementation of the learning process in the classroom and the level of motivation among students. They used a qualitative research method and collected data through observation and interviews. To analyze the data, they employed Miles Dan Huberman's interactive model, which involved summarizing and graphing the data before drawing conclusions.

Khan et al. (2019) examined the impact of AR technology on students' learning motivation. The research followed the data collection procedure used by Di Serio et al. (2013). The study involved collecting quantitative data through pre-use and post-use questionnaires, which were in the form of a five-point Likert scale. The results revealed that using an AR mobile app had a positive effect on the learning motivation of undergraduate health science students at the University of Cape Town.

Rakasiwi and Muhtadi (2021) conducted a pilot test, an initial field test, and a field test using a questionnaire in order to observe the increase in learning motivation after the use of educational games. In the field test, assessments are made using student-response questionnaires and hands-on field tests. Ten questions on cube and block materials and five descriptive questions were used for the pretest and posttest to observe improvements in student learning outcomes. Once the students completed their learning activities, they were asked to fill out a questionnaire regarding their motivation to learn. The findings indicated that the use of educational games had a positive impact on the students' learning motivation.

Herwin et al. (2022) studied the impact of mobile assessment on the learning motivation of primary school students in online learning was investigated. The study utilized a pretest-posttest design and randomly selected 50 students from Class Five of Primary School as participants. To measure students' motivation to learn, the authors used a questionnaire that focused on five indicators: attention to course schedule, participation in online meetings, active engagement in discussion activities, willingness to do homework, and encouragement to participate in assessments. The data collected were analyzed using a paired-sample t-test, and the results indicated that mobile assessment has a significant positive impact on primary school learning motivation.

In summary, the test of learning motivation can adopt a quasi-experimental research design, and use questionnaires, observations, interviews, and other methods to collect data, such as a 5-point Likert scale. Inferential statistical procedures, such as the paired sample t-test, factor analysis, reliability analysis, regression analysis, variance analysis, etc., are used in data analysis along with SPSS statistical software, descriptive statistical analysis, and statistical methodologies.

## 2.2 The Research Foundation of Game-based Learning

### 2.2.1 Definition of Game-based Learning

Game-based learning (GBL) is an effective strategy that promotes learning, improves critical thinking, and enhances problem-solving skills (Bilik et al., 2020). The primary goals of GBL are learning and behavioral modification (Ilhan & Oguz, 2019). GBL utilizes an actual game to transfer knowledge and skills, with an independent unit that has a defined start, gameplay, and ending states (ZOHARI et al., 2023). Learners engaged in the game are encouraged by receiving awards for completing tasks, overcoming challenges, and earning points (Stiller & Schworm, 2019).

Innovative and educational, GBL utilizes the potential of video games, specifically severe games, to enhance training processes and motivate learners (Kaldarova et al., 2023). GBL allows students to learn and engage in a complex story with rules through playing a game. It achieves students' goals by attaining them. Subgoals make decisions based on their autonomy, receive feedback on their outcomes, and, if necessary, additional attempts will be made (Burke, 2014).

Game-based learning is when teachers use games or similar designs for educational purposes instead of just for entertainment. This pedagogical process has been studied by Krath et al. (2021), Yamani (2021), and Noemí (2014). According to Denham et al. (2016), game-based learning refers to activities that revolve around a game, either as the main activity or as a way to prompt other related activities, with learning being either an intended or unintended outcome. According to Steinmaurer et al. (2019), game-based learning makes it easier for students to understand complex concepts by tailoring them to their individual needs. Additionally, Wahidah et al. (2020) explain that game-based learning involves using game-like features to influence students' behavior in non-game activities. Game-based learning is a teaching method that aims to engage and excite students, leading to better retention of concepts, knowledge, and skills. The learning process is still the focus, but in this format, students



participate in interactive games that facilitate learning. Research has shown that playing and exploring digital games can positively influence attitudes towards game-based learning (An, 2018).

According to Squire (2005), game-based learning is the use of digital or non-digital games, simulations, and virtual worlds to create engaging and immersive learning experiences. Digital game-based learning (DGBL), as referred to by Perini et al. (2018) and Chen et al. (2020), is another term for this approach, which involves using educational digital games to solve problems or complete tasks through computers, mobile phones, or tablets. Digital game-based learning includes elements such as fun, play, goals, competition, and problem-solving (Sandberg et al., 2014). The aim of DGBL, as stated by Pivec (2007), is to provide learners with the opportunity to acquire skills and competencies required in the business world while addressing new ways of ICT-based instructional design. DGBL is a novel approach in universities and lifelong learning, and it is becoming a new form of interactive content worthy of exploration in the ever-changing education setting (Deterding et al., 2011).

Digital game-based learning (DGBL) refers to using digital games for educational purposes (Prensky, 2001). DGBL includes two important elements - entertainment and education. There are two types of games in DGBL - special purpose games developed for education and Commercial-Off-The-Shelf games developed for entertainment but used in education (All et al., 2016). According to Juul (2010), a digital game is a formal system with rules, a variable and quantifiable outcome, different values assigned to different outcomes, the player's effort affecting the outcome, attachment to the outcome, and optional and negotiable consequences.

According to the author, game-based learning is defined by Shaffer et al. (2005) as a type of gameplay that has specific learning outcomes. Plass et al. (2010) also support this definition. In their study, Plass et al. (2015) proposed a theory-based approach to games and learning. They considered various perspectives on learning and



game design foundations. Meanwhile, Ke et al. (2016) explore and conceptualize the engagement of game-based learning through a two-stage analytical process.

Game-based learning involves using gaming principles and applying them to real-life settings to engage users (Trybus, 2015). This approach to learning involves incorporating educational games into classroom instruction and self-directed learning, enabling students to acquire knowledge and skills through immersive experiences (Plass et al., 2015). Deterding et al. (2011) define game-based learning as applying games or related elements, concepts, mechanisms, or designs into learning.

Game-based learning is a comprehensive and ongoing process that progresses from affective engagement fueled by the right amount of challenge, cognitive engagement embedded in playfulness, to potentially game action-based content engagement (Perrotta et al., 2013). Using video games to support teaching and learning is commonly known as game-based learning, as described by Perrotta et al. (2013). The author came across an interesting approach to learning called game-based learning. Apparently, this method involves using video games to make learning more enjoyable and effective. According to some experts, including Pivec (2007), game-based learning emphasizes key principles and mechanisms such as intrinsic motivation, authenticity, self-reliance and autonomy, and experiential learning. By promoting learning through doing, game-based learning encourages passion and interest in the subject matter, specializes the learner, and ultimately makes learning more engaging and fun. Pesare et al. (2016) define game-based learning (GBL) as a teaching approach that utilizes interactive digital games to facilitate student learning. This approach encourages active learning by providing an immersive environment for students to acquire knowledge and skills. According to Perrotta et al. (2013), game-based learning involves experiential engagement where students learn through trial and error, role-playing, and treating a subject as a set of rules or a system of choices and consequences rather than just content. According to Tang et al. (2009), games-based

learning is a unique way of learning that involves the use of computer games and software applications to provide educational value. This approach is aimed at enhancing teaching, providing learning support, evaluating learners, and promoting experiential learning through a fun, interactive virtual environment that uses gaming technologies. Tang et al. (2009) build on the ideas of Baker et al. (2005) and Cook & Hazelwood (2002), suggesting that game-based learning can include non-digital games like card games and casino chips. These games can be used to keep learners engaged during lessons by encouraging active participation through gameplay.

In summary, game-based learning is an innovative educational approach that leverages students' curiosity about games. It integrates game elements and game mechanics into educational teaching content, simplifies learning goals into multiple sub-goals, and enables students to achieve the overall goal by achieving sub-goals, using students' autonomy to make decisions, obtaining feedback on decision-making results, and continuously attempting, and obtain an immersive learning experience with spiritual or material rewards. It uses real games to transfer knowledge and skills, enabling students to engage from the best challenge-driven emotional and cognitive engagement in the game to potential content engagement based on game actions. It is a way to promote effective learning and improve thinking. Process and learning strategies to improve problem-solving skills.

### **2.2.2 The Importance of Game-based Learning**

The use of game-based learning (GBL) is common in many fields, including education, military, marketing, and advertising (Ariffin et al., 2014). GBL attracts a lot of attention from researchers and practitioners, such as educators, businesses, military personnel, and healthcare providers. GBL is an innovative learning and training method that motivates and trains the new generation (Prensky, 2003). It utilizes exciting technology to encourage users to participate in desired behavior, solve problems, and engage in a game-like environment. According to An (2018), using a technique that

makes boring work more fun can encourage people to complete it. For math homework, game-based learning can be a helpful approach. In this method, the activities are redesigned to include manufactured rivalry and game rules, making them more captivating and fascinating (Shaffer et al., 2005). According to Von Wangenheim and Shull (2009), game-based learning is seen by many educators as an effective teaching method. Educational games can make learning more accessible, engaging, and effective by placing the learner at the center of the learning process (Cheng & Su, 2012).

Over the past few years, many educators have adopted game-based learning (GBL) as a way to make learning more engaging and motivating for students (Ketelhut & Schifter, 2011). GBL involves using games as a supplement to traditional learning activities in order to immerse learners more deeply in the subject matter (Codish & Ravid, 2015). To achieve successful GBL, high levels of engagement from participants are key. GBL components can consist of both individual and group-based activities, typically including features such as scores (Poole et al., 2022). Games have the ability to engage a diverse group of people and provide various individual and social activities. As a result, many proponents believe that games are an optimal tool for learning. Researchers such as Plass et al. (2015), Gee (2003, 2007), Prensky (2003), and Squire (2005) have all expressed support for this perspective.

The purpose of research on game-based learning is to maximize the educational benefits of games. This involves incorporating theories of learning and game design principles to create a holistic approach that considers various perspectives (Plass et al., 2015). Universities are exploring new approaches to digital learning, and game-based learning is becoming a popular option. Games offer a new form of interactive content that can be highly valuable in interdisciplinary education. This approach is helping universities adapt to the changing educational environment and find a new position in the field of lifelong learning. According to Pivec (2007), game-

based learning concepts and methods have a high learning value in interdisciplinary topics. Molin (2017) explains that game-based learning aims to create a balance between the subject matter, the content to be learned, the gameplay, and the user's future ability to remember and use the information in the real world.

Game-based learning is unique because it should feel natural to participate in and be driven by a sense of enjoyment and value in the content or academic field. The results of this analysis can help shape the design and evaluation of Play process models based on theory. Features can be used to encourage and maintain engagement in play-based learning, according to Ke et al. (2016). The Department of Defense (DoD) is striving to enhance the effectiveness, efficiency, knowledge, and flexibility of Warfighters by adopting technology-based solutions. To achieve this, the DoD is increasingly focusing on the use of Commercial Off Shelf (COTS) game-based learning in the armed forces. Recent studies have provided conclusive evidence of the efficacy of digital game-based learning in improving combat readiness. One such study, conducted by Blunt in 2007, has helped validate the use of game-based learning in the DoD. Studies have shown that GBL is more effective than conventional methods of instruction (Van Staalduinen & De Freitas, 2011). Students are motivated and encouraged by incorporating game elements into situations that are not games (Poole et al., 2014). GBL proponents contend that the reason for its effectiveness is that it provides efficient learning paths through augmented activities that enhance learner attitudes and behavior (Landers, 2015). According to some professionals, game-based learning enables students to safely explore, problem-solve, and learn from their mistakes in a protected environment (Mead, 2011). Since making mistakes in a game doesn't have serious consequences, students tend to be more engaged and improve their learning when participating in GBL (Hakulinen et al., 2015; Lehtonen et al., 2017). Research has shown that GBL (game-based learning) can increase the amount of time and effort students put into their learning activities, which can have a positive effect on

levels of participation and motivation (Linehan et al., 2011). In addition, studies demonstrated that engaging games, like those used in the perfumery industry that incorporate olfactory sensory-based material, can increase respondent recall and retention (Covaci et al., 2018).

Poole et al. (2022) founded that game-based learning (GBL) is an effective educational approach that can boost motivation and engagement among students. Specifically, the research discovered that GBL helped students learn regarding recognizing wine aromas in a fun and antagonistic social environment, resulting in higher levels of performance and positive perceptions of the learning experience. Overall, the findings suggest that GBL can provide a more engaging and effective way for students to learn.

Based on the point of view of Tang et al. (2009), games-based learning incorporates effective and desirable learning methods, such as active, experiential, and situated learning. It requires active participation from the user and encourages them to practice and experiment with different solutions to challenges in a safe virtual environment. Games-based learning also employs experiential learning during gameplay and allows for interactive experiences within the game world, governed by the rules of play. This type of learning can simulate highly realistic environments and permits social and collaborative interactions with other learners and non-player characters through online networking capabilities.

In summary, game-based learning is a successful approach that encourages students to become more involved in their learning process. By incorporating fun elements and providing a virtual environment for practice and experimentation, GBL makes it possible for learners to enjoy themselves while achieving their goals. This innovative learning technique offers a safe space for students to challenge themselves without real-world consequences, allowing them to develop their

skills. Furthermore, GBL is an excellent way to foster social and collaborative activities that enhance learning and make it more enjoyable.

### **2.2.3 The Design Principles in the Game-based Learning**

According to Robberts (2019), when designing a game for learning purposes, it's important to consider the distinctive qualities of the student population, the necessary prerequisites for both hardware and software, and how to fit the game into the learning environment. The game should be contextualized and developed with mechanics, dynamic interplay, and keeping the participants' emotional experiences in consideration, while retaining passion and engagement components. To ensure success, there should be a congruence between the students' perception of achievement and the degree of challenge. The game should also provide opportunities for individual and incidental learning through student choice, clear rules, success criteria, rewards, and communication. Feedback on every element of the game should be provided, and a safe environment should be created with seamless logistical execution. Additionally, prior knowledge of the game should not be necessary, and better transfer-ability of abilities can be supported by intermittent practice of evaluation in the learning environment.

According to Baker et al. (2005), the game's design should adhere to the following guidelines: firstly, it should impart both general and specific lessons about the software engineering process. Secondly, it should encourage proper software engineering practices. Thirdly, it should be easy and quick to learn. Finally, it should be enjoyable. The authors believe that games should be both practical and fun, and teach good lessons and practices. The rules of a game vary depending on its genre. These rules determine the actions or moves a player can and cannot make, where they can and cannot go, and how they can win the game. The goals and objectives of a game determine its rules of play and the criteria for winning. Games can be competitive in different ways. Some games have a clear winner and loser, while others involve

interacting with competition or enemies, and making various motions and actions. Interactivity refers to how the player interacts or acts within the game world. The way a player jumps, shoots, or dunks, interacts with opponents, and the range of movements and actions they can perform are all important factors to consider (Blunt, 2007).

The psychology of video games was explored in one of the earliest books by Loftus and Loftus (1983), who concentrated on what makes them enjoyable for players. They found that good games strike a balance between being too easy, which leads to boredom, and too difficult, which leads to frustration. The ideal game is challenging enough to create a "flow" state, where players feel both successful and challenged (Csikszentmihalyi, 1990). In terms of learning, games should be designed to fit the "area of proximate growth" of a player, a concept introduced by Vygotsky (1980). Vygotsky (1980) believed that play is a crucial factor in a child's development and creates a zone of proximal development. Genuine play begins at age three and is social and symbolic at all times (Nicolopoulou, 1993). The four functions of games, as described by Plass et al. (2015), can be used as a heuristic to determine the extent and learning goals of game content.

Preparing for future learning can be achieved through certain types of games that don't necessarily have specific learning objectives. Instead, these games provide shared experiences that can be used in future learning activities, such as class discussions. Certain games are created to impart new knowledge and skills, while others provide a chance to hone and strengthen already acquired knowledge and physical and cognitive abilities. Lastly, some games offer chances to enhance advanced socioemotional abilities such as teamwork, collaboration, problem-solving, creativity, communication (Plass et al., 2015).

Many didactic games maintain their essential characteristics, which include combining game and educational tasks. These tasks are solved simultaneously through certain game actions and regulated by game rules, resulting in a game outcome.



Multimedia effects such as sounds, color changes, and object movements on the screen are used to maintain interest. However, games created by teachers without IT specialists have simpler structures, containing only one task, and lack story-lines and multiple gameplay elements. The gameplay consists of specific interactive methods between the player and the computer program, along with a set of rules and mechanics to ensure its implementation (Kaldarova et al., 2023).

To sum it up, when developing game-based learning experiences, it's important to keep in mind the following design principles: 1) Design according to the needs of specific guidance objects; 2) Make it clear that the game is for educational purposes and allow learners to play the game to gain experience; 3) Maintain the simplicity of rules, scoring, and upgrading the system; 4) Make sure to offer chances for students to adjust to the rules and gameplay; 5) Limit the game beyond "victory" and focus on making it enjoyable to experience; 6) To enhance learning, it is important for games to offer ample chances for learners to group together; 7) Try to match game cognitive activities with learners' current cognitive activities as much as possible; 8) Repetitive, covering different courses; 9) Interactive and focused on player activities; 10) Determine measurement standards before designing the game; 11) Make the player's acquisition of knowledge or creativity a 'victory' outcome.

#### **2.2.4 The Features of the Game-based Learning**

Games have various characteristics that make them enjoyable and engaging. Firstly, they are a source of fun and pleasure. Secondly, they involve intense and passionate play. Thirdly, they have structured rules, providing a sense of order. Fourthly, games have goals that motivate us. Fifthly, they are interactive, allowing us to participate. Sixth, games are adaptive, providing a sense of flow. Seventh, games offer outcomes and feedback, allowing us to learn. Eighth, they have winning states that gratify our egos. Ninth, games involve conflict, competition, challenge, and opposition, giving us an adrenaline rush. Tenthly, games require problem-solving, stimulating our



creativity. Eleventh, games provide social interaction and group participation. Lastly, games have representation and story, evoking emotions, (Robberts, 2019) enjoyable, engaging, and mutually beneficial for all involved (Tundjungsari, 2020).

GBL has several features that support competence, including scaffolding, rewards, and learning tools. According to Abdul Jabbar and Felicia (2015), GBL has key elements and features that include: 1) AR and multimedia elements for interactive and enjoyable learning. These characteristics are typically used in GBL, particularly in simulation-based and role-playing games. 2) Challenges and conflicts to motivate gameplay. Studies have shown that challenges inherently motivate players (Allen, 2011). The purpose of difficulties like hurdles and riddles is to test players and help them develop their skills and knowledge. Overcoming these challenges gives players a sense of achievement (Fullerton, 2014). Students can concentrate on learning targets and enjoy the game by having clear objectives, unequivocal feedback, and a strong sense of control. 3) Control and choices allow gamers to become more invested in the tasks they choose to carry out (Calvert et al., 2005). 4) Scaffolding is critical to support gameplay and learning (Peng et al., 2012). Instructional games ought to offer quick feedback, advancement toward objectives, and game-state feedback (Killi, 2005). 5) Learning tools and gaming aids promote competency support. The GBL's efficient teaching aids are crucial in supporting learning. These tools could include simple worksheets and workouts (Ke, 2008; Panoutsopoulos & Sampson, 2012).

Games are often cited for their ability to motivate learners, according to Plass et al. (2015). The argument is that games can offer various features like stars, points, leader-boards, badges, and trophies that incentive learners to stay engaged for extended periods of time. These games can also include mechanics and activities that learners find interesting and enjoyable, creating exceptional environmental significance (Hidi & Renninger, 2006; Rotgans & Schmidt, 2011). Digital games for learning offer a variety of methods for involving students, with design decisions tailored to the particular

learning objective, student traits, and environment. These games can be adaptive, customizable, and personalized, facilitating learner engagement (Andersen, 2012; Leutner, 1993; Plass et al., 1998). Game-based learning also allows for graceful failure, where failure is not seen as a disappointing result but rather an anticipated and perhaps required stage in the process of learning (Kapur, 2008; Kapur & Bielaczyc, 2012). Games include goals, rules, competition, and interaction, offering the potential to change education by enabling learners to think creatively and innovatively, just like innovators in the real world (Ifenthal et al., 2012). In addition to providing contextual situations where players are involved in challenging problem-solving tasks, interactive games also encourage characteristics like individual control, trial-and-error, and continuous evolution (Birnbaum, 1982; Squire et al., 2005).

In summary, the importance of games is 1) Games are an interesting vacation activity that brings great fun and enthusiastic participation to people. 2) The game has clear rules and objectives, bringing structure and motivation to people. 3) The game is adaptive, allowing participants to have liquidity and acquire problem-solving abilities. 4) Games can solve problems and interact, allowing people to cultivate and maintain social groups. 5) Games have results and feedback, which can bring people learning opportunities and a sense of self-satisfaction. 6) Games have conflicts, competition, challenges, and confrontations, which can give people a sense of climax. 7) The game provides participants with a representative and storytelling virtual world, allowing them more emotional experiences.

### **2.2.5 The Design Steps in the Game-based Learning**

When designing an educational game, it's important to consider the following steps for creating an engaging and effective learning experience: 1) Determine how you believe learning takes place; 2) Create a model world to situate the task in; 3) Detail the specifics; 4) Incorporate supporting educational content; 5) Learning activities are mapped to interactions.; 6) Connect learning principles to user interface elements.

It's also important to reflect on the didactical approach and related topics. (Pivec et al., 2003).

The design of GBL involves several steps, including defining learning objectives, creating game elements, and developing learning activities (Perrotta, 2013). Research in educational game analysis & design has focused on three main topics: player-game interaction, game mechanics and narrative, and game design elements. Kaldarova et al. (2023) outline the steps involved in game design, beginning with creating a platformer game and selecting a main character for the user to play. The next step involves implementing terminology training functionality, followed by testing and releasing the game for general use. The rules of a game are determined by its genre and define the actions and movements a player can or cannot make, where they can go, and how they win. The goals and objectives of a game establish the criteria for winning and the rules of play. Games can be competitive in different ways, with some having clearly defined winners and losers. Interactivity refers to how the player interacts with the game world, including actions like jumping, shooting, dunking, and interacting with competition or enemies (Blunt, 2007).

In order to create educational games that could help students overcome difficulties in learning mathematics - specifically, the concept of two-dimensional geometric shapes - the development process followed the ADDIE model, starting with the Analysis stage. This involved observing and interviewing fifth-grade students to determine the most suitable games for their needs. The next stage was Design, which included creating flowcharts, storyboards, and assessments for the games. Development was carried out by a team of media experts, material experts, and fifth-grade teachers, who validated the designs. Implementation involved testing the games with a pilot group of 3 people, a field group of 10 people, and an operational field group of 36 people to assess user response. Finally, the Evaluation stage involved assessing the games' effectiveness through feedback from material experts, media experts, and

respondents. The entire process resulted in the successful development of mathematics educational games (Rakasiwi & Muhtadi, 2021).

The definition of a game is often debated, but most agree that games consist of game mechanics, visual aesthetics, narrative, incentives, musical score, and learning objectives for educational games. Game mechanics involve the essential gameplay activities that are repeated by the learner throughout the game. (Plass et al., 2015). In gaming, visual aesthetic design encompasses not only the characters in the game as well as its general aesthetic but also the presentation of vital information within the game. This design dictates how game mechanisms and features are displayed, how cues are given, and how feedback is communicated to the player, both from a cognitive and aesthetic perspective. Meanwhile, a game's narrative refers to its storyline, which can be advanced through conversations, voice acting, in-game activities, and scenarios. Games allow players to shape the storyline through their choices, unlike traditional movies and novels, which have predetermined plots. These narratives connect gameplay rules, personalities, tasks, events, and rewards to give context-rich knowledge for learning. Last but not least, a game's incentive structure has a variety of motivating components. Aimed at encouraging players to keep going and providing feedback designed to modify their behavior accordingly (Kinzer et al., 2012). In a game, the musical score plays a crucial role in directing the player's attention towards important events, indicating danger or opportunity, evoking emotions, and acknowledging successes or failures. The topics and abilities a game needs to teach also influence various design elements, such as the learning mechanics, visual and orchestral score, incentive scheme, and story structure (Plass et al., 2015).

It's important to note that didactic games often combine both educational and game elements, with tasks that are solved simultaneously through certain game actions that are regulated by rules. This ultimately leads to a game result or winning, and multimedia effects like sounds and color changes are often used to keep players

engaged. However, teacher-created games tend to have a simpler structure, often with only one task and without a storyline or multiple levels. Additionally, gameplay itself is a set of interactive methods between a computer program and player that includes game mechanics and rules to ensure proper implementation (Nigmatova, 2022; Kaldarova et al., 2023).

In summary, the three key factors of game-based learning are challenge, response, and feedback. The design steps of GBL include defining learning objectives, creating game elements, and developing learning activities. Developing educational games includes several steps: analysis, design, development, implementation, and evaluation. Firstly, the analysis step aims to determine the correct educational game suitable for students' learning needs, including observation and interviews. Secondly, entering the design phase, the design of educational games requires writing design flowcharts and storyboards as needed and conducting corresponding evaluations. Next is the development phase, which needs to be designed and validated by media experts, material experts, and teachers. Then comes the implementation phase, where the game must collect user feedback through pilot and on-site testing. Finally, there is the evaluation process, which uses media experts, material experts, and the actual situation of the respondents to evaluate the quality of educational games.

### **2.2.6 The Framework in the Game-based Learning**

Three main components are important when designing games for learning: challenge, response, and feedback. A design framework has been created to ensure effective learning, including game mechanics, visual aesthetics, narrative, motivation, and musical score. It's essential for learning games to have clear goals and teach relevant skills and content. Additionally, it's important to continuously assess learners' knowledge and abilities accurately. Experts used the Delphi method to develop a technology-enhanced model to address the difficulties of incorporating game-based learning in China. A panel of 29 professionals was consulted to explore implementing

game-based learning in smart classrooms, particularly emphasizing learning goals, procedures, assessment, and teacher competence (Plass et al., 2015).

The use of design models in instructional technology can be a topic of debate. While there are similarities between the lessons from the games-for-learning movement and e-Learning, there are also new insights. Serious game participants have identified seven important themes in game design, including managing expectations, providing a comprehensive model of the product for clients, using iterative design, getting feedback from early users, emphasizing the role of visual designers, exploring new business models, and dividing instructional design tasks among different roles (Squire, 2005).

The three-dimensional model for educational game analysis and design is based on three topics. This model can help game designers create effective and engaging educational games by providing a better understanding of what works. According to Degens et al. (2015), the model consists of a challenge, a response, and feedback.

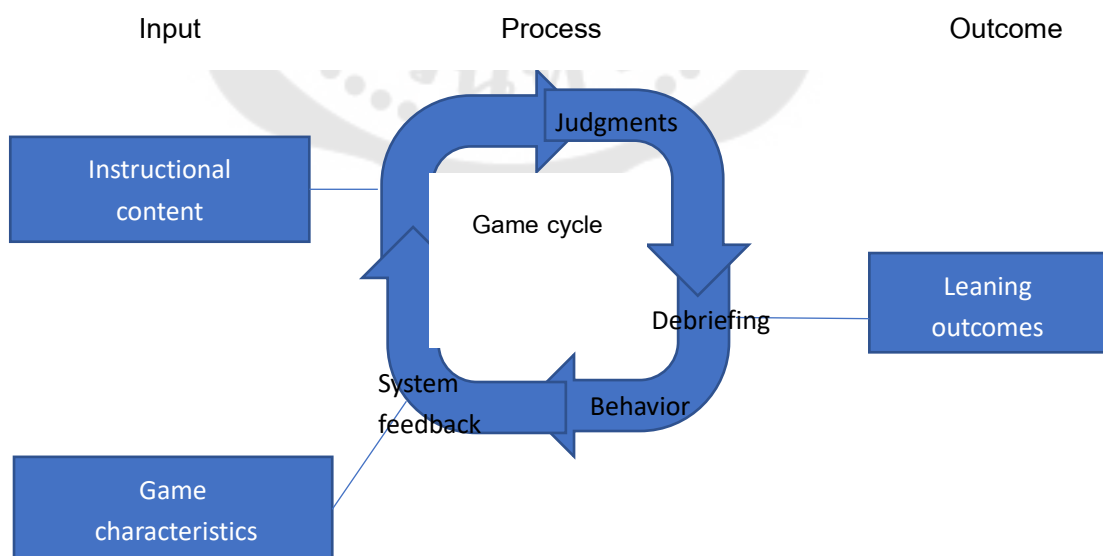


Figure 2 model of game-based learning. (Garris et al., 2002)

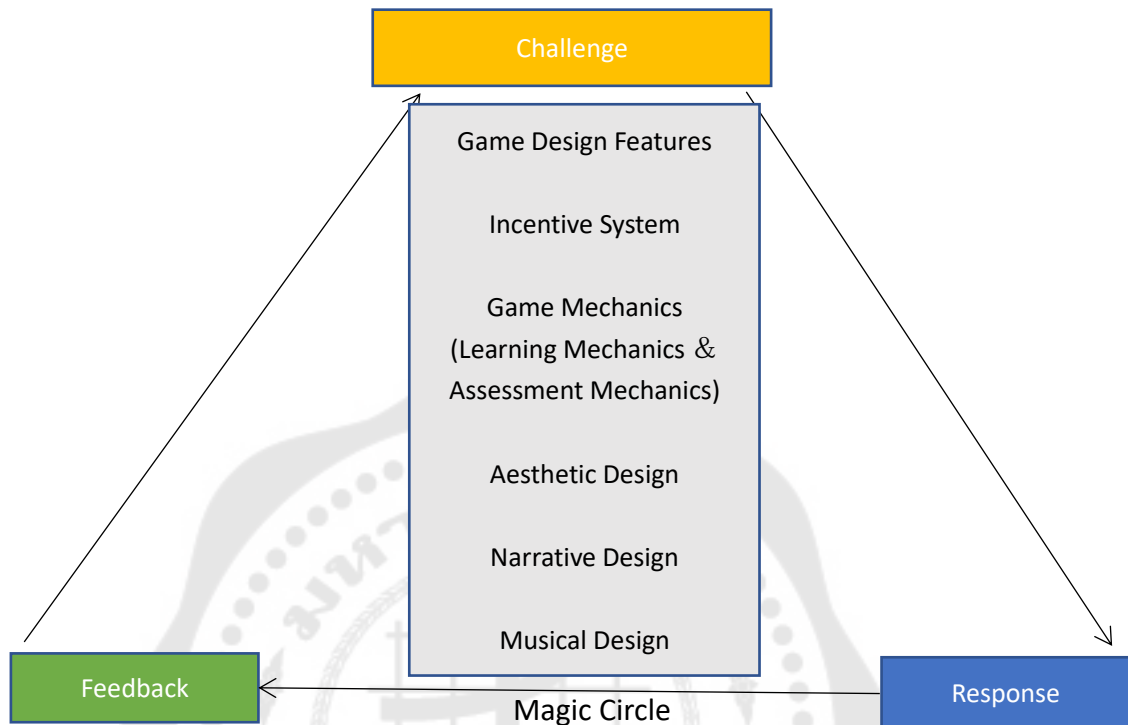


Figure 3 Model of game-based learning. (Gentile et al., 2014)

In order to create a game-based learning model, it is essential to develop a comprehensive paradigm of instruction that includes various current models and a single model of meta-theory. Previous attempts to create a model for games (Gentile et al., 2014) were not tailored specifically for gaming. Instead, a more effective approach would be to use a straightforward model that encompasses the fundamental elements of games, such as a challenge, a response, and feedback.

In "Emerging Models: Designing for Experience" by Squire (2005), it is suggested that learning game designers can create successful games by emphasizing five crucial aspects: making scenarios personally meaningful, constructing problems to enhance comprehension, taking into account the users' pre-existing beliefs, designing with the user experience in mind, and situating facts and knowledge in context.

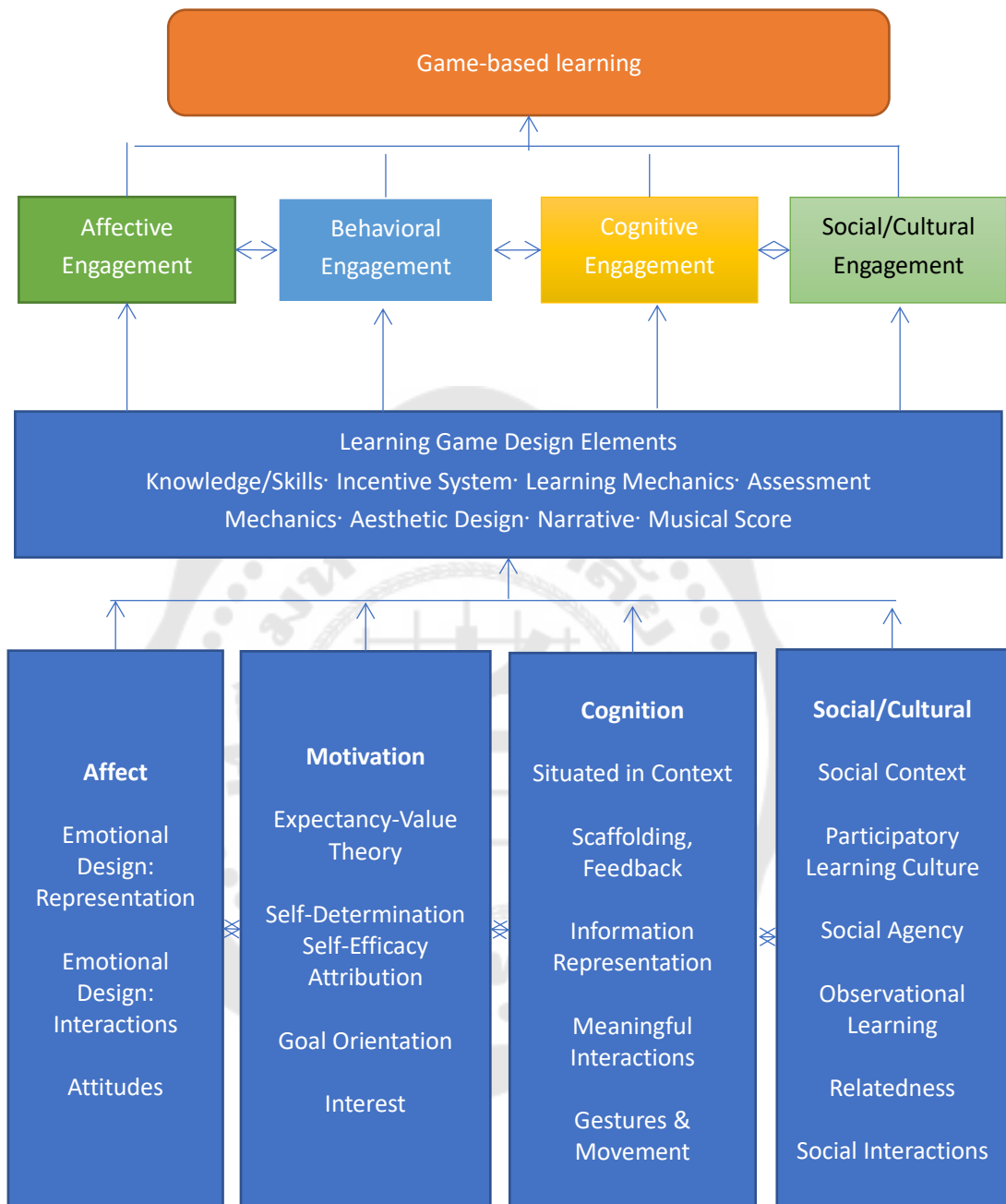


Figure 4 Integrated design framework of game-based and playful learning. (Plass et al., 2015)



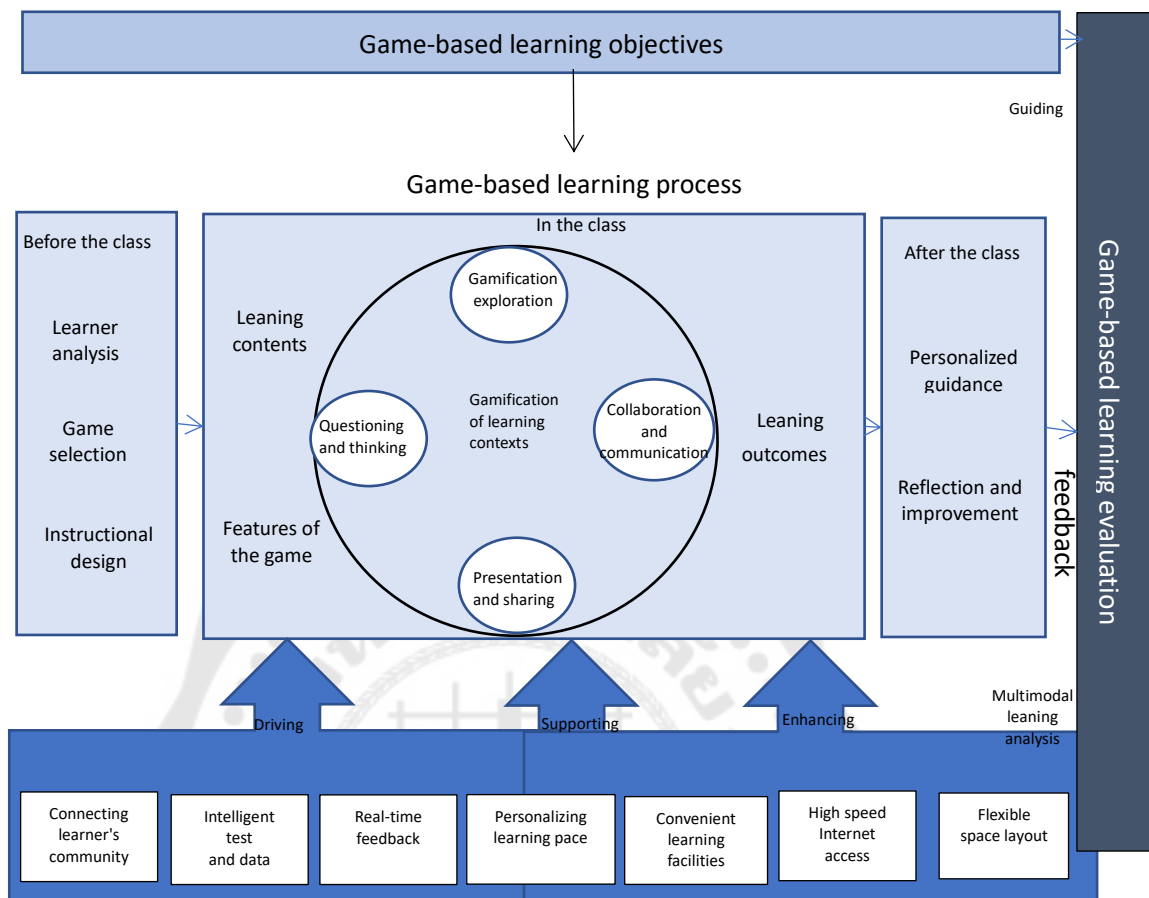


Figure 5 The technology-enhanced GBL model by Pan et al. (2021)

A new learning model called technology-enhanced game-based learning (GBL) has been introduced by Pan et al. (2021). This model explains the three stages of the GBL process: before, during, and after class. By using this model, teachers have the option to select suitable games and create activities. Before class, create engaging and interactive learning environments. During class, learners can participate in immersive GBL experiences that encourage learning, exploration, collaboration, and communication skills. In the smart classroom, learners can share their results through various presentation methods. Lastly, teachers can oversee the online learning process. after class to improve their teaching and enhance learning outcomes. Educators have the capability to review and assess the data collected from students during their

learning journey. This allows them to offer personalized support to individuals who may be experiencing challenges with their studies. Additionally, teachers can reflect on their teaching effectiveness and redesign and improve the deficiencies to enhance their teaching ability. This reflection can become the basis for future improvements in teaching.

Squire (2005) stated that that participants in serious games have identified seven distinct and crucial themes that must be adhered to when designing games. In order to improve product development, it is important to focus on several key themes. These themes involve setting clear expectations, presenting a complete picture of the product to clients, utilizing an iterative design approach, taking into account early user feedback, acknowledging the growing significance of visual designers, considering new business models, and delegating instructional design responsibilities across different roles. Failure to adhere to these fundamental principles may result in the failure of the game design process.

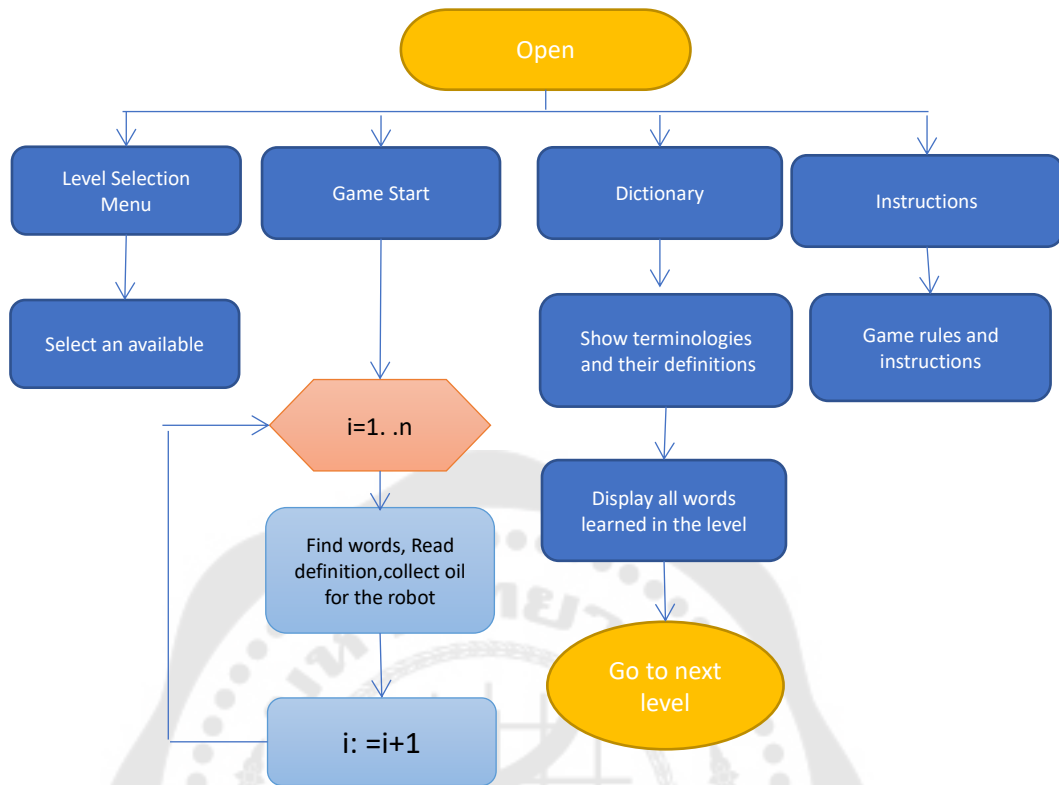


Figure 6 Flowchart of the game-based learning process (Kaldarova et al., 2023).

In summary, the framework for game-based learning is made up of four components: game design, game mechanics, game dynamics, and game aesthetics. Game design involves creating stories, characters, and scenes. Game mechanics refer to the rules and procedures that manage gameplay, including ratings, feedback, and rewards. Game dynamics involve the emotional and psychological reactions that players experience, such as challenges, curiosity, and a sense of achievement. Game aesthetics refer to a game's visual and auditory elements, such as graphics, sound effects, and music. Before class, teachers gather learners to analyze and select appropriate games and design teaching strategies. During class, the teacher combines the learning content with the game's characteristics, guides students to question and think critically, allows students to explore the game-based activities, and enables collaboration and communication to achieve learning outcomes. After class, teachers

provide personalized guidance to help students reflect and improve. Additionally, they provide immediate feedback to students.

### **2.2.7 The Advantages and Uses of Game-based Learning**

Game-based learning (GBL) is a fantastic way to make learning more fun and effective, according to recent research. By engaging in authentic learning environments and experiencing and applying knowledge in a challenging and interactive way, learners can acquire and construct knowledge in a fun and focused learning atmosphere (Chen et al., 2018; Pan et al., 2021). According to Yang and Lu (2021), incorporating digital games with engaging story-lines, defined objectives, and problem-solving tasks can help enhance teaching and learning. This approach can make the learning experience more varied and efficient, raising enthusiasm among students and enhancing learning effectiveness. Additionally, GBL offers students a customized learning atmosphere that caters to their unique needs as learners (Sykes & Dubreil, 2019). In general, GBL can provide an enjoyable and focused learning environment that enables the acquisition and construction of knowledge (Pivec, 2007). Incorporating game elements in education, known as GBL, can boost students' drive to learn and facilitate their learning process (Zimmerling et al., 2019). According to Jagušt et al. (2018), games can motivate learners to win, feel accomplished, and develop a strong desire to learn by incorporating features like competition, scoring, and ranking. Incorporating gaming features like levels, points, leader-boards, and competition can enhance students' external motivation and have a positive impact on their behavior. These features can also boost internal motivation, especially when it comes to challenging subjects and concepts, (Kalogiannakis et al., 2021). According to Wang and Zheng (2021), GBL has a positive effect on students' learning and boosts their self-efficacy. GBL, or game-based learning, not only involves learners in the learning process but also enhances their comprehension of textbook content, allowing them to tackle more intricate problems (Perini et al., 2018). GBL promotes the development of

creative and critical thinking skills by encouraging learners to explore games and discover various solutions to problems (Nadolny et al., 2020; Amory et al., 1999).

Digital educational games provide an effective platform for learners to apply factual knowledge, learn on demand, and gain experience in virtual worlds that can shape their behavioral patterns and thinking (Pivec, 2007). However, a more coordinated approach to staff development and opportunities to explore existing tools and game spaces is needed to fully support the potential of game-based learning (De Freitas, 2006). This innovative approach also allows learners to create their own materials, share experiences, and practice skills in immersive virtual spaces, which can benefit their real-world experiences (Denham, 2016). Overall, game-based learning presents unique opportunities for rethinking traditional learning methods.

According to Gee (2003), computer and video games can be beneficial because they provide an opportunity for people to immerse themselves in new environments and learn at the same time. A study analyzing the data showed that the classes using the game had higher average scores compared to those that did not use it. Gender did not seem to play a role in the scores achieved, but both males and females performed better when using the game compared to not using it (Blunt, 2007). YaYa Media, a company specializing in advergaming, has been exploring ways to use its platform for training purposes. Meanwhile, Root Learning, a business strategy company, is incorporating gaming principles into its training simulations. These two companies demonstrate how gaming principles can be utilized in innovative ways to enhance the effectiveness and engagement of learning (Squire, 2015). Learning math through games is more engaging than traditional homework activities that use points and stars. By incorporating artificial conflict and rules of play, game-based learning can make math more exciting and effective. Psychologists have recognized the benefits of play in enhancing cognitive development and learning. Play is an essential part of a child's cognitive development stages, according to Piaget (2013). Children's play

becomes increasingly metaphorical, abstract, and societal as they mature. Playing activates children's schemes, allowing them to go beyond their immediate reality (Plass et al., 2015). Kaldarova et al. (2023) revealed that 90% of students found game-based learning beneficial for their academic studies, particularly in retaining computer science terminologies. The study's participants, children, expressed their satisfaction with the ease and practicality of the system. Fadda et al. (2022) found that digital games can be an effective learning tool if they incorporate important factors like learning, the learner, and game design, based on a meta-analysis of qualitative indicators.

According to Zohari et al. (2023), beginning in the 1960s, the use of games or game components in education has a long history (Çiftci, 2018; Martí-Parreño et al., 2016). Games can be used in education to offer learning materials (Al Fatta et al., 2018). Unlike traditional learning, where students may passively learn from teachers, Playing games can provide more engaging ways to learn, enhance learning outcomes, and encourage active participation in the learning process (Lin et al., 2020), Improve cognitive abilities by developing decision-making, cooperation, and problem-solving skills (Gorbanev et al., 2018).

Game-based learning has utilized various interactive techniques, including "learning from mistakes," where failure serves as a feedback point (Prensky, 2003; Pivec et al., 2003). In this approach, making mistakes and trial and error are essential for learning and motivate players to keep trying. Feedback in games comes in the form of action, unlike instructional materials' text explanations. It is crucial to establish clear goals that match the skill level higher than the mean and enable students to evaluate their decisions/actions and assess their performance. The close link between action and feedback is essential, and the introduction of novel events should keep students engaged with the learning material. Constructivist learning theory can lead to successful learning opportunities by adopting an exploratory approach to learning. This approach emphasizes interaction, problem-solving, and understanding the entire concept.

Learners play an active role in knowledge acquisition by restructuring, manipulating, re-inventing, and experimenting to make the knowledge meaningful, organized, and permanent.

In summary, the advantages of game-based learning include: 1) motivating learners to adopt problem-solving methods; 2) Provide timely feedback and correction to help form concepts and improve understanding of a specific topic; 3) Promote effective retention of information; 4) Provide necessary cognitive abilities that cannot be formally taught; 5) Provide young learners with the information and communication skills needed for the 21st century workforce; 6) Promote collaboration among peers; 7) Build confidence in helping learners and help children with Learning disability learn; 8) Stimulate curiosity and enhance deep learning; 9) Transforming entertainment games into productive games and expanding learning into games; 10) Promote learners' knowledge in an exciting and focused learning environment; 11) Enable learners to immerse themselves in learning through an engaging, interactive, and challenging learning environment; 12) Provide contextualized and personalized learning experiences to meet the needs of different learners; 13) Participate in games, develop creativity and Critical thinking; 14) By providing feedback in the form of actions, learners can occur through trial and error, including making mistakes.

### **2.2.8 The Relationship between Game-based Learning and Learning**

#### **Motivation**

The use of games in education, also known as game-based learning, has become a popular approach to increase students' motivation to learn. This method has been shown to have a positive impact on students' engagement, motivation, and overall learning outcomes, as noted by experts such as Gee (2003) and Prensky (2001). Our focus here is on reviewing the literature that explores the effects of game-based learning specifically on students' motivation to learn. Studies have found that game-based learning can enhance students' intrinsic motivation - that is, their desire to learn for the



sake of learning rather than for external rewards or pressures. Ryan and Deci (2000) have also noted the positive impact of game-based learning on students' motivation to learn.

One reason for this is that games provide a sense of challenge and control, which can increase students' sense of competence and autonomy. As a result, students are more likely to be engaged and motivated to learn (Deci & Ryan, 1985). In addition, games often provide immediate feedback, which can help students understand their progress and identify areas for improvement. This feedback can be motivating, providing a sense of accomplishment and progress (Malone, 1981). Furthermore, game-based learning can also enhance students' social motivation, which refers to the desire to interact with others and be part of a community. Games often involve collaboration and competition, which can foster a sense of social connection and engagement (Gee, 2003). Overall, game-based learning has the potential to enhance students' motivation to learn, which can lead to improved academic performance and achievement. However, it is essential to note that the effectiveness of game-based learning depends on several factors, including the quality of the game design, the relevance of the content, and the level of challenge provided (Prensky, 2001). Therefore, careful consideration should be given to selecting and designing game-based learning activities to maximize their effectiveness.

Studies have shown that digital games like video games or computer games can be a helpful educational tool for improving students' motivation and performance in math education (Byun & Joung, 2018). This approach, known as digital game-based learning (DGBL), is viewed as an effective way to engage students and enhance their learning and motivation. There is much debate surrounding the advantages and disadvantages of gaming for students' academic performance, motivation, and scientific aptitude. More research is needed to provide conclusive evidence, as current results are mixed (Hussein et al., 2019). However, some studies



suggest that digital game-based learning can increase students' motivation to learn (Su, 2016; Lin et al., 2018; Chen et al., 2021). For instance, a study showed that a card game significantly improved students' knowledge of energy and transportation (Partovi & Razavi, 2019), as evidenced by pretest and post-test results. Previous studies have shown that digital games are effective tools for game-based learning. Additionally, using card games to promote game-based learning has also been found to increase motivation and effectiveness (Byun & Joung, 2018). Research data on the use of game-based learning as a learning media for senior high school students has led to the conclusion that instructional game-based learning leads to significant improvements in learning outcomes (Apriani, 2019). According to Liu and Chu (2010), using ubiquitous games during English learning can lead to better learning outcomes and motivation than non-gaming methods. The evaluation results for learning outcomes and motivation supported this finding. Research has shown that incorporating ubiquitous games in the process of learning English can yield better learning outcomes and motivation compared to non-gaming methods (Liu & Chu, 2010). The evaluation results also reveal a positive correlation between learning outcomes and motivation (Hussein et al., 2019). In summary, game features have the ability to spark learners' motivation and offer them authentic learning experiences, making it a popular topic in education.

Pesare et al. (2016) have created two educational games that utilize game-based learning to help medical students stay interested and inspired while they learn. These games involve patients learning about their disease and making responsible choices, as well as medical and paramedical staff learning about diagnostic procedures, therapeutic interventions, and patient follow-up. User testing has shown that the games improve student motivation, which also leads to better knowledge acquisition (Liu & Chu, 2010). Teachers can use various methods to motivate students to learn, such as using challenging learning strategies like games and providing fresh and

interactive material. Puspitarini and Hanif (2019) suggest that these methods can stimulate students from within.

According to a study by Hung in 2019, combining flipped classrooms, MOOCs, and game-based learning can increase students' motivation and learning outcomes. The study found that students with low or medium self-confidence in mathematics showed greater improvement in overall motivation compared to those with high self-confidence. Additionally, the study discovered that "soldiers" (students with lower academic achievements) benefited more than "generals" (students with higher academic achievements). Lastly, eighth-grade students showed more significant progress in academic performance than seventh-grade students (Pesare et al., 2016).

The relationship between game-based learning and learning motivation is inseparable. Game-based learning effectively attracts learners to participate in learning, increases interest in learning, and simultaneously makes the learning process more exciting and interesting, thereby stimulating learning motivation. In addition, game-based learning can encourage learners to complete various tasks, increasing learning motivation.

While writing the literature review, the author collected 1225 literature related to the research topic through the school library, CNKI database, Google Academic, and other channels. After reading, screening, and classifying the collected literature, the author found low relevance and low-quality literature and referred to 164 pieces of literature. A literature review provides this study's theoretical and empirical basis and clarifies the research direction.

## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1 Research Design

This study adopts a quasi-experimental design, with the independent variable being game-based learning and the dependent variable being learning motivation. The research design divides the samples into two groups: experimental and control groups. After the pretest, the experimental group adopts game-based learning, while the control group adopts traditional teaching and then compares the post-test results. The aim is to investigate the impact of game-based learning on the learning motivation of first-year tourism students.

The study compared the total mean scores of the pretest and post-test to examine the student's learning motivation. The program took one week, including the pretest and post-test sections.

#### 3.2 Populations and Participants Selection

##### **Population:**

This study is mainly aimed at first-year tourism students at Guizhou technological college of machinery and electricity, with a total of 153 students.

##### **Participants:**

The participants in the study were first-year tourism students at Guizhou technological college of machinery and electricity. The samples of the study were 20 students that were chosen by purposive sampling. They were randomized equally to the experimental and control groups (10 students in each group). These 20 students were selected from 153 students come from three classes: 44 in Class 1, 53 in Class 2, and 56 in Class 3. The researchers conducted a learning motivation level test on three classes of students and selected 20 students with similar learning motivation levels from the lowest level class as the research sample. The researcher conducted a pretest on

the level of learning motivation among students in three classes and then selected 20 students with similar levels of learning motivation from the class with the lowest level of learning motivation as research samples to ensure the representativeness and reliability of the samples. Sample students with basic computer skills must agree to participate in this study and sign an informed consent form.

The experimental group was provided the game-based learning, but the control group was not; the control group continued to learn according to the traditional teaching method. There were no significant differences in gender, age, or academic performance between the two groups of students to ensure the comparability and reliability of the experiment.

### **3.3 Research Instruments**

To gather research data, the instrument consists of two parts. Game-based learning (GBL) and pre and post-tests of the Learning Motivation Scale were used to obtain quantitative data. The impact of GBL on learning motivation was measured using an expert-reviewed learning motivation scale.

#### **The game-based learning (GBL)**

The researcher has developed a program and received feedback from three experts to facilitate game-based learning. This program will be utilized in the study as an experimental tool. The plan is divided into three steps: 1) course introduction, 2) game implementation process, and 3) conclusion.

##### **Step 1: Course Introduction**

The teacher introduces a concept related to the topic of this class. This concept can be directly taken from the topic itself or related to the topic or other concepts that are easily confused to help students clarify the teacher's teaching content, learning purpose, and learning style. The course introduction must be carefully designed as an essential part of the opening. The design has concept import methods,

picture import methods, story import methods, video import methods, and question import methods. In order to stabilize learning emotions, attract students' attention, stimulate students' interest in the topic, and mobilize students' enthusiasm and initiative in learning, teachers can cut into the topic well.

#### Step 2: Game Implementation Process

First, the researchers taught the teaching content of this course to the students, and the students learned the knowledge and took notes. Second, the researchers choose the appropriate game mode according to the learning characteristics of the students and the teaching tasks, announce the steps and rules of the game and organize the students into groups. Students are divided into game groups, discuss the game's rules, make a game implementation plan, and cooperate. Third, the researchers organized the students to carry out game activities and observed the students' performance. Students play games, discover problems, recognize problems, and solve problems. Fourth, the researchers provide feedback on the results of the game. Students share experiences and display learning results to enrich and develop cognition and strengthen the emotional experience. In this process, learn to cooperate and interact, combine learning and thinking, and promote systematic reflection.

#### Step 3: Conclusion

It mainly tells about what knowledge has been learned in this course, whether the students have achieved the learning goals, learned knowledge, and the changes in learning motivation through game-based learning. For example, by participating in game activities, students not only complete the learning goals well but also enhance the interaction between students, strengthen their sense of unity, cooperation, and competition, get a good learning experience, and stimulate their learning. Enthusiasm improves students' learning motivation.

Then, the teacher gives evaluations based on the classroom performance of each group of students and asks the students to give written evaluations of this class, fill in the student's classroom performance evaluation form, write down their feelings about the activities, and give suggestions for improvement of this course.

#### Learning motivation scale

This study will use a questionnaire survey as a measurement tool to understand the effects of game-based learning on the learning motivation of first-year tourism students. The questionnaire will adopt a self-designed structured questionnaire, which includes two parts: internal motivation and external motivation, with 20 questions. The Learning Motivation Scale will be used to evaluate the learning motivation of the respondents. Three experts have evaluated the learning motivation scale and the reliability analysis ( $\alpha = 0.975$ ).

Table 1 Reliability statistics of learning motivation scale

Cronbach Alpha	number of items
0.975	20

#### 3.4 Procedures of the Study

This study adopts the experimental research method, divided into three stages: pretest, game-based learning intervention, and post-test. The specific process is as follows:

##### Step 1: Pretest

Before the start of the experiment, a pretest was conducted on all the students tested to understand the basic level of their learning motivation in tourism management. This study was measured using the Motivated Strategies for Learning Questionnaire (MSLQ); the design of the questionnaire was inspired by the Likert scale developed by Pintrich et al. (1991). On this basis, the researchers aimed at students'

learning motivation and designed a new questionnaire, and the students were required to rate each question according to their actual situation, with a score of 1-5. The higher the score, the stronger the learning motivation for this dimension. After all the subjects completed the pretest, they entered the next stage.

#### Step 2: Game-based Learning Intervention

In this stage, the test students will receive a game-based learning intervention to explore its impact on the motivation to study the tourism management professional course "Basic Knowledge of Local Tour Guides." This study will use classroom games as an intervention tool for game-based learning, including "Knowledge Formula Self-created Game," "Intellectual Adventure," "Guizhou Folklore Knowledge Folk Song Imitation Show," "Guizhou Cultural Tourism Knowledge Explosion," "I am the Promotion Envoy of Guizhou Specialty Products and Delicacies," "Explain Natural Heritage Sites Together," "Guizhou 5A Scenic Spot Knowledge Challenge", "Intangible Cultural Heritage Knowledge Breakthrough," through the design of game tasks and reward mechanisms, guide subjects to participate in learning and improve learning motivation actively.

The game-based learning intervention will last for one week, and the subjects need to participate in the game learning eight times a week; each learning time is 60 minutes.

#### Step 3: Post-test

After the game-based learning intervention, a post-test was conducted on all the students tested to understand the changes in their learning motivation for tourism management majors. The pretest measured the post-test using the same Motivation to Learn Questionnaire (MSLQ). The subjects were required to rate each question according to their actual situation and scored on a scale of 1-5. The higher the score, the stronger the learning motivation for this dimension.



### 3.5 Data Collection

The procedures for the experiment and data collection were employed as follows:

Firstly, The researchers used questionnaires to understand first-year tourism students' current scores of learning motivation.

Secondly, the researchers organized students in the experimental group to participate in game-based learning, and organized students in the control group to participate in traditional teaching. There were eight lessons in total, each one hour long. After participating in the game-based learning, the two groups of students were tested again for learning motivation level, and the post-test data of the two groups of students after the experiment were obtained.

### 3.6 Data Analysis

This study uses SPSS statistical software for data analysis. For quantitative data, descriptive statistical analysis and t-tests were done by comparing and analyzing the experimental and control group's learning motivation data.

Firstly, the researcher conducted an independent sample t-test analysis on the pretest data of the experimental and control groups and obtained the mean value and t-value of the two groups. After the experiment, the two groups were retested, and the data of the two groups were subjected to a t-test to obtain the average value of the control and experimental groups. The researcher compared the average values of the two groups before and after the test and found that after the experiment, the average value of the experimental group was higher than that of the control group, and the average value of the post-test in the experimental group was higher than the average value of the pretest. It was concluded through paired sample t-test analysis that the experimental group had significant differences before and after the test, and the post-test scores between the experimental and control groups had significant differences.



## CHAPTER 4

### RESEARCH RESULTS

#### 4.1 Descriptive Statistics

The study collected data from 20 first-year tourism students randomly assigned to either an experimental or a control group. Descriptive statistics for the two groups were calculated as follows.

Table 2 Analysis of the differences in learning motivation between the experimental group and the control group before the experiment

Variable	Group	N	Mean	S.D.	t	P-value
Learning motivation	Experimental	10	69.900	8.595	-1.171	0.257
	Control	10	73.900	6.540		

According to the results of the independent sample t-test in Table 1, it can be seen that the average values of the two groups before the test were 69.900 in the experimental group and 73.900 in the control group. The significance test of the difference in learning motivation between the two groups is 0.257, significantly greater than 0.05. It shows no difference in learning motivation between the experimental and control groups before the experiment.

Table 3 Analysis of the Differences in Learning Motivation of the Experimental Group Before and After the Experiment

Variable	Group	N	Mean	S.D.	t	P-value
Learning motivation	Pretest	10	69.900	8.595	-4.233	0.001**
	Posttest	10	84.600	6.835		

\*\*p < .01

Table 3 shows that after the game-based learning in the experimental group, the average value rose from 69.900 to 84.600, and the significance test of the difference in learning motivation before and after the experiment was 0.001, which was significantly less than 0.05. After game-based learning, there are differences in learning motivation between the two groups. According to the mean value, the motivation level after the experiment is higher than before. This suggests that the game-based learning intervention positively affects the learning motivation of first-year students in tourism.

Table 4 Analysis of the differences in learning motivation before and after the experiment in the control group

Variable	Group	N	Mean	S.D.	t	P-value
Learning motivation	Pretest	10	73.900	6.54	-0.097	0.923
	Posttest	10	74.200	7.208		

According to Table 4, it can be seen that after the traditional learning in the control group, the average value only increased from 73.900 to 74.200, and the significance test of the difference in learning motivation before and after the experiment was 0.923, which was significantly greater than 0.05. There is no significant statistical difference in learning motivation in the control group after traditional learning. Therefore the null hypothesis cannot be rejected.

Table 5 Analysis of the differences in learning motivation between the experimental group and the control group after the experiment

Variable	Group	N	Mean	S.D.	t	P-value
Learning motivation	Experimental	10	84.600	6.835	3.311	0.004**
	Control	10	74.200	7.208		

\*\*p < .01

According to the results of the independent sample t-test in Table 4, it can be seen that the average value of the experimental group is 84.600 after game-based learning. The mean value of the control group after traditional teaching was 74.200. The significance test of the difference in learning motivation between the two groups is 0.004, significantly less than 0.05. This shows differences in learning motivation between the experimental and control groups. It can be seen that the learning motivation level of the experimental group is higher than the control group. This suggests that the game-based learning intervention positively affects the learning motivation of first-year tourism students.

## CHAPTER 5

### CONCLUSION AND DISCUSSION

#### 5.1 Research Objectives

5.1.1 To compare the differences in scores about learning motivation in the experimental group before and after participation in game-based learning.

5.1.2 To compare the differences in scores about learning motivation in the control and experimental groups after game-based learning participation.

#### 5.2 Research Hypotheses

For the study, the researcher used the following assumptions:

5.2.1 After attending game-based learning, the experimental group's mean scores on learning motivation were higher than before.

5.2.2 After attending game-based learning, mean scores of learning motivation in the experimental group were higher than those of the control group

#### 5.3 Research Method

This study adopts a quasi-experimental design, with the independent variable being game-based learning and the dependent variable being learning motivation. The research design divides the samples into two groups: experimental and control groups. After the pretest, the experimental group adopts game-based learning, while the control group adopts traditional teaching and then compares the post-test results. The aim is to investigate the impact of game-based learning on the learning motivation of first-year tourism students.

The study compared the total mean scores of the pretest and post-test to examine the student's learning motivation. The program took one week, including the pretest and post-test sections.

## 5.4 Conclusion and Discussion

### 5.4.1 Conclusion

Hypotheses 1: After attending game-based learning, the experimental group's mean scores on learning motivation were higher than before.

The results indicate that according to the pretest results, the average learning motivation of the control group was 73.900 points, and the average learning motivation of the experimental group was 69.900. After the traditional teaching, the test was carried out again. The average learning motivation of the control group increased to 74.200, and the average learning motivation of the experimental group rose to 84.600. According to the mean, the experimental group had a higher level of motivation after the experiment than before the experiment after participating in game-based learning. This result is consistent with the previous hypothesis. After participating in game-based learning, The experimental group showed a higher average score in learning motivation than the control group before participating. On the hypothesis test results, independent samples were used to conduct the t-test, and the t-value was -4.233,  $P=0.001<0.05$ . This indicated that the game-based learning intervention positively affected first-year tourism students' learning motivation. This finding is consistent with previous research showing that game-based learning increases student engagement and motivation (Gee, 2003). The research results support the first research hypothesis.

Hypotheses 2: After attending game-based learning, the experimental group's mean scores of learning motivation were higher than those of the control group.

The results indicate that according to the mean value, after participating in game-based learning, the experimental group had a higher learning motivation score of 84.600 than the control group's score of 74.200. In line with the previous hypothesis, after participating in game-based learning, the average score for learning motivation in the experimental group was higher than in the control group. On the hypothesis test results, independent samples were used to conduct the t-test, and the t-value was

3.311,  $P=0.004<0.05$ . This means that the game-based learning intervention positively impacts first-year tourism students' learning motivation. This finding aligns with earlier studies. Game-based learning positively affects student motivation (Gee, 2003; Ryan & Deci, 2000). The research results support the second research hypothesis.

#### 5.4.2 Discussion

Hypotheses 1: After attending game-based learning, the experimental group's mean scores of learning motivation were higher than before.

In this study, after pretesting the students in the experimental group, the average value of learning motivation is 69.900. Then the researcher carried out a game-based study on the students in the experimental group and then measured the learning motivation again. The average value was 84.600, comparing the pretest and posttest average values of the students in the experimental group. The difference in the level of learning motivation shows that the experimental group improved the level of learning motivation after completing the game-based learning, which confirms that game-based learning is effective in improving students' learning motivation. The findings support the first research hypothesis.

Research has found that students' learning motivation improves after learning through games. Game-based learning fosters communication and solidarity among students. In the past, students thought group cooperation was just chatting and meaningless. However, now they are more willing to participate in group cooperation and think that group cooperation is precious so that they can realize the importance of each other and learn from each other. I used to think that playing games meant playing and resting, but now I realize that knowledge and skills can be learned from games, and games can also be a good learning tool. After completing the game tasks one after another and learning knowledge and skills, students feel a sense of accomplishment after seeing their progress. They are willing to use their brains to learn new knowledge by using existing knowledge and skills, thus improving their enthusiasm for learning and

interest. Teachers use games to create a relaxed and happy classroom atmosphere, reducing students' stress and anxiety. When students play games, due to the constraints of time and game rules, they go from intense preparations to thrilling challenges to the pride of sharing their achievements. Finally, students can release their pressure through the joy of success and become relaxed and happy. Play-based learning makes students more willing to respond, challenge themselves, try, and make mistakes. Students can explore and discover new information at their own pace, with more learning opportunities and autonomy. According to the research theory of Ryan and Deci (2000); Prensky (2001), game-based learning provides students autonomy and control over the learning experience. Allowing students to make choices and decisions within the game makes them more engaged in the learning process and more likely to be motivated to learn.

Hunicke et al. (2004) mentioned that game-based learning provides students with immediate feedback on their performance. This feedback can motivate students because it allows them to see their progress and identify areas where they need to improve. Likewise, Malone (1981) also argued that games often provide immediate feedback to help students understand their progress and identify areas for improvement. This feedback can motivate because it provides a sense of accomplishment and progress. Another study by Ryan and Deci (1985) believes that games provide a sense of challenge and control, which can increase students' sense of competence and autonomy. As a result, students are more likely to be engaged and actively learning. In addition, Gee (2003) suggested that game-based learning can also enhance students' social motivation, interaction with others, and desire to be part of a community. Games often involve collaboration and competition, which can foster social connection and a sense of engagement.

Hypotheses 2: After attending game-based learning, mean scores of learning motivation of the experimental group were higher than those of the control group.

The study's researcher tested the learning motivation of the control group students, yielding an average value of 73.900. Following the implementation of traditional teaching methods, they measured the group's learning motivation again, resulting in a slightly increased average value of 74.200. However, upon comparing the experimental and control groups' learning motivation, the researchers found a significantly higher mean value of the experimental group's posttest. Thus, the findings unequivocally support the second research hypothesis.

The study found that in the process of traditional teaching, the students in the control group had a more serious learning atmosphere, less initiative, and lower learning enthusiasm. However, the students in the experimental group were more active, active, and proactive in the game-based learning process, and their knowledge learning was more in-depth. When faced with game tasks, the students in the experimental group can take the initiative to use various methods to solve them, make independent decisions in the game, and after getting feedback and knowing that they made mistakes in their decisions, they can make corrections in time to form correct concepts. Therefore, the understanding of the teaching content is more in-depth, and the learned knowledge can be effectively retained. After the students pass the game, they will get timely rewards, so that they can build up their self-confidence in learning and become more involved in classroom learning. In the process of uniting and cooperating to complete game tasks, students enhance their mutual interaction and immerse themselves in an interesting, interactive and challenging learning environment, which not only promotes the improvement of students' knowledge and skills, but also enhances their communication and exchanges between students have created a relaxed and pleasant learning atmosphere.



The concept of game-based learning involves playing games that are intertwined with complex stories and rules. Students can attain the ultimate objective by accomplishing smaller goals, making independent choices, receiving feedback on their decisions, and persisting when necessary (Burke, 2014). Educational games make learners the center of learning, making learning more accessible, fun, and practical (Cheng & Su, 2012). Game-based learning can encourage people to take on ordinarily tedious tasks and make them more attractive (An, 2018). It can also encourage students to engage in desired behaviors, help with problem-solving, and take full advantage of participating in games.

Game-based learning offers learners a personalized and contextualized learning environment to meet their individual needs, as stated by Sykes and Dubreil (2019). Also, it provides additional learning activities to further immerse participants in the learning Medium (Codish & Ravid, 2015). Not only does it provide a fun and engaging learning atmosphere for acquiring and building knowledge (Pan et al., 2021), but learners also have the chance to engage in real-life learning environments that are both interactive and stimulating, enabling them to put into practice and fully understand what they have learned (Chen et al., 2018).

According to Zimmerling et al. (2019), game-based learning incorporates game elements and aesthetics to help students learn. Many games use competition, scoring, and ranking to inspire learners to feel a sense of achievement and contentment, leading to increased motivation to learn, as noted by Jagušt et al. (2018). Using game elements like levels, points, and leaderboards can also promote intrinsic motivation for difficult subjects and concepts (Kalogiannakis, 2021). Game-based learning allows learners to explore content in a fun and interactive way, leading to a deeper understanding of textbook material and the ability to solve complex problems (Perini et al., 2018). Additionally, this type of learning fosters creative and critical thinking skills (Nadolny et al., 2020; Amory et al., 1999).

Game-based learning is effective because it offers an emotional learning pathway through reinforcement behaviors that will improve learners' attitudes and behaviors (Landers, 2015). The second is that game-based learning allows students to experiment, work through issues, and make errors in a more secure setting (Mead, 2011). Given the minimal stakes (it's only a game) repercussions of committing errors, students who engage in game-based learning typically experience higher learning engagement (Hakulinen et al., 2015; Lehtonen et al., 2017). Furthermore, game-based learning is associated with a rise in the quantity of time and energy students devote to learning activities, directly impacting participants' engagement and motivation levels (Linehan et al., 2011). Other studies have also demonstrated the efficacy of game-based learning, showing that highly engaging games improve participants' recall and memory (Covaci et al., 2018).

According to the findings, combined with the above points, game-based learning positively effects students' learning motivation. Overall, the findings of this study suggest that game-based learning can be an effective tool for improving learning motivation among first-year tourism students. However, further research is needed to explore factors that may mediate the effects of game-based learning on motivation and to investigate the long-term effects of game-based learning on student learning outcomes.

### **5.5 Implications for Practice**

The findings of this study have several implications for practice in the field of tourism education.

Firstly, game-based learning may be a powerful tool for improving the learning motivation of first-year tourism students. Therefore, educators can incorporate game-based learning activities into their teaching methods to engage students and increase their learning motivation.

Secondly, game-based learning can create a more interactive and collaborative learning environment, increasing student participation and engagement, which may improve learning results. Educators can use game-based learning to create a more dynamic and engaging classroom environment that promotes active learning and student collaboration.

Thirdly, game-based learning can help develop essential skills such as problem-solving, critical thinking, and decision-making. These skills are essential for success in the tourism industry, and game-based learning can provide students with a fun and engaging way to develop them.

Finally, the use of game-based learning can bridge the gap between theory and practice. Using game-based learning, educators can create simulations that allow students to apply theoretical concepts practically. This can help students better understand and appreciate the relevance of what they are learning and prepare them for real-life scenarios in the tourism industry.

In conclusion, the use of game-based learning can positively impact first-year tourism students' learning motivation. Educators should consider incorporating game-based learning activities into their teaching methods to create a more engaging and interactive learning environment, develop essential skills, and bridge the gap between theory and practice.

## **5.6 Limitations of the Study**

Despite the positive findings of this study, it is essential to recognize that there are several limitations.

Firstly, the study only examined the short-term effects of game-based learning on learning motivation. It is possible that the effects of game-based learning may diminish over time or that other factors may come into play.

Secondly, the study did not explore the specific game mechanics or design elements that may have contributed to the positive effects of game-based learning on learning motivation. Future research could investigate the specific features of game-based learning that are most effective in promoting learning motivation.

Lastly, the study did not consider the potential negative effects of game-based learning, such as addiction or distraction. Future research could explore the potential risks and benefits of game-based learning in greater depth.

Overall, while this study provides valuable insights into the potential benefits of game-based learning for first-year tourism students, further research is needed to fully understand the implications of this approach for learning motivation and academic achievement.

## **5.7 Recommendations for Future Research**

Based on the findings of this study, The following are practical and theoretical suggestions for future research on the effects of game-based learning on the learning motivation of first-year tourism students.

### **5.7.1 Theoretical Recommendation**

Firstly, future research should explore the long-term effects of game-based learning on learning motivation. This study only investigated the short-term effects of game-based learning on learning motivation. It would be interesting to see if the positive effects of game-based learning on learning motivation are sustained over a longer period.

Secondly, future research should investigate the effects of different types of games on learning motivation. Future research can explore the impact of different types of games, such as adventure games, puzzle games, simulation games, and role-playing games, on learning motivation.

Thirdly, future research could investigate the effects of game-based learning on other aspects of learning, such as learning outcomes and retention. This

study only investigated the effects of game-based learning on learning motivation. It would be interesting to see if game-based learning also positively affects learning outcomes and retention.

Fourthly, future research could investigate the effects of game-based learning on different groups of learners. This study only investigated the effects of game-based learning on first-year tourism students. Future research could investigate the effects of game-based learning on other groups of learners, such as second-year or third-year students or students in other fields of study.

Finally, future research could investigate the factors that influence the effectiveness of game-based learning on learning motivation. This study did not investigate the factors that may influence the effectiveness of game-based learning on learning motivation. Future research could investigate factors such as the design of the game, the level of interactivity, and the level of difficulty, among others.

#### **5.7.2 Practical Recommendations**

Firstly, the game should be difficult enough to keep students interested and motivated, but not so difficult that they become discouraged. Adjust the difficulty level based on the students' abilities to maintain their motivation.

Secondly, the game should provide feedback as soon as possible, whether positive or negative, to let students know how they are doing. This will encourage them to keep learning and strive for better results.

Thirdly, use rewards such as points, grades, or medals to motivate students to participate in the game. This can increase their motivation, happiness, and keep them interested in learning.

Finally, encourage cooperation: Design game tasks that require teamwork and collaboration, so that students can share knowledge and resources. This will stimulate their cooperative spirit, enhance their social skills, and keep them motivated to learn.

Overall, the findings of this study suggest that game-based learning has a positive effect on the learning motivation of first-year tourism students. Future research could build on these findings to further explore the potential of game-based learning to enhance learning motivation and improve learning outcomes.



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