Design and Implementation of Online Gaming for Learning Motivation and Achievement Improvement in Computer Information Technology Curriculum

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Abstract. Gamification teaching conforms to the development of The Times, takes humanism as the starting point, and uses "music" throughout education and teaching to realize teachers' music teaching and students' music learning. Therefore, it is of great significance to introduce gamification teaching into higher vocational education classroom. This paper explores the influence of gamification teaching on inducing students' learning motivation and improving students' achievement. By reading and sorting out a large number of literatures, this paper analyzes the current situation of gamification teaching and research at home and abroad, and sorts out the related concepts and basic theories of gamification teaching, providing theoretical guidance for the application research of computer information technology curriculum in higher vocational schools. Under the guidance of multiple intelligences theory and constructivism learning theory, this paper carries out the gamified teaching design of computer information technology curriculum. Combined with the author's teaching practice, two classes are selected as experimental class and control class to carry out experiments with gamified teaching and traditional teaching respectively. Through the implementation of two experimental cases, the comparative data of two classes were obtained to test the effect of gamification teaching on the improvement of students' grades and stimulate students' learning motivation. It is hoped that this study can provide guidance for the development of gamification teaching in computer information technology classroom, and provide some reference for the development of gamification teaching.

Key words: learning motivation, achievement improvement, computer information technology; Online Gaming
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1 INTRODUCTION

The development of games has been accompanied by the development of human history and has gradually internalized into an important component of human culture. From 1780, when games were first introduced into formal education, until the 1950s, the value of games in education was gradually recognized and gave birth to gamified learning. Since the 1980s, with the progress of technology, especially the rapid development of computer technology, games have begun to integrate with education on a larger scale, and the birth of the Internet and various new technologies has further strengthened this trend. In recent years, the application of gamified learning has gradually developed from primary and secondary schools to the field of higher education, and has played an increasingly important role in various types of higher education classrooms. Since the cognitive characteristics of college students are significantly different from those of primary and secondary school students, it is more necessary to learn from different professional theories such as pedagogy, psychology and cognitive science when applying gamification teaching, so as to better promote the achievement of higher education goals.

In this paper, the connotation of games and gamification teaching is deeply studied and analyzed, and then the cognition and status quo of games and classroom teaching are investigated, and the basic knowledge framework of computer information technology is analyzed: basic commands, color commands, nested graphics. Based on constructivism learning theory, multiple intelligences theory, immersion theory, experiential learning and other theories, based on the different characteristics and teaching objectives of these three types of knowledge, the corresponding gamification teaching application model is constructed: gamification teaching of scenario-based learning, gamification teaching of new knowledge exploration, and gamification teaching of consolidation practice, and three types of internal learning mechanisms are analyzed. Finally, the general model of gamification teaching application is analyzed and summarized in the experiment, and the effect of gamification teaching is evaluated.

2 RELEVANT BACKGROUND

Prominent contributors to the theory include well-known American game designers and education experts Marc Prensky, Garris, and Bramucci. Marc Prensky has always emphasized the construction of pleasant atmosphere in teaching, and the purpose of teaching reform is to make students learn happily and realize the value of "learning in entertainment" and "learning in entertainment" in educational games [5]. Garris et al. put forward a learning model based on games as a system or learning environment. Garris believes that educational and entertainment are essential features of educational games. He defined the phenomenon of the connection between game experience and learning generated by learners after games as reporting [15]. Bramucci and other scholars mainly study how to use games or educational games in teaching. They regard games as a kind of teaching media and believe that game-based learning is a form of learning for the purpose of learning. At the same time, the market operation and operation process of educational games are also very professional and formal [10]. Fabricator points out that learning tasks are indispensable for the ideal integration between games and education, and in order to make the combination of the two more perfect, learning tasks must be perceived by learners in gamified teaching. At the same time, relevant learning principles and learning outcomes are also indispensable in game design, so that the game and the learning task are naturally connected [3].

"Three Kingdoms", developed by a Korean game company, is a role-playing game with the theme of learning historical knowledge, and players learn by acting as historical figures [6]. The Massachusetts Institute of Technology in the United States hosted and developed the Games-to-Teach project, which designed educational Games for college students and developed dozens of educational games [1]. In addition, the MIT Media Lab also developed MakeyMakey, which is not a

game itself, but can make boring things interesting like a game, and any object connected to the computer can completely replace the mouse to control the computer [11]. In recent years, Arizona State University and E-Line Media and other game companies have conducted close cooperation and developed a number of games, among which Quest2Teach, which won the President's Innovation Award of Arizona State University in the spring of 2014, is a 3D role-playing game specially designed and developed for teachers. Young teachers starting out in education can practice how to teach effectively [7].

The gamification of early education is embodied in the gamification of forms, which means that the game has transformed the appearance of education, but its core mechanism remains unchanged. This stage is reflected in: the traditional education form of answering questions and reading materials, with the game's picture, music, drama, background, people, challenges, and interaction methods. But the nature of education has not changed at all. Many products of education.com, starfall, pbskids, sesamestreet (Sesame Street) in the United States and NHK for school in Japan are based on this model [12].

The gamification of the mechanism has removed the form of the appearance, and the mechanism of the game has also transformed the educational product. These mechanisms include MEDALS, quests, level cards, item systems, currency systems, especially with the popularity of social games, a variety of social game factors such as ranking, PK, team, competition and other educational products have been transformed. Educational products have not only become better looking, but also more fun. Representative products in this stage include Hujianghappy Word field and homework box in China, Duolingo, Classdojo, Codeacademy in the United States, and スタディサプリ English language, スタディサプリ English conversation in Japan [9].

3 GAMIFICATION TEACHING DESIGN

Teaching is a very complex social activity system, including learners, teaching content, teachers, teaching objectives, teaching media, teaching environment and many other elements. Through teaching design, teachers can arrange these elements reasonably and form an optimized teaching process implementation plan.

3.1 Learner Analysis

Learner analysis and learning content analysis are collectively referred to as front-end analysis. The concept of the new curriculum reform is teacher-led and student-oriented, and the design of gamified teaching is all for the learning of learners. Whether the teaching goal is achieved or not should be reflected in the learners' own cognitive level and development. As the subject of learning activities, learners learn with their own characteristics. Therefore, it is necessary to analyze whether gamification teaching is suitable for learners.

The Swiss psychologist Piaget believes that games are a form of intelligence, and the development stage of games should be commensurate with the development stage of intelligence. Piaget divided play into three stages according to children's stage of cognitive development and their corresponding performance, as shown in Table 1.

Age	*Game Categories*	*Primary Form*
-2 years old	*practise*	*Repetition of learned movements to achieve functional pleasure*
2-7years old	*Symbolic*	*Imitate and imagine, role-play*

7-years old	*Regularity*	*The game is subject to the rules and order of the real world, regardless of the specific plot*

Table 1: Piaget's play stage theory**.**

It can be seen from Piaget's third stage of games that regular games can last until adulthood, and the age of college students is mainly distributed in the age group of 18-25 years old, so regular games are more suitable for the cognitive level of college students.

1) To meet learners' social needs in games

College students have been equipped with social communication ability and behavior, showing strong autonomy in psychology and behavior, and increasingly active participation in social activities. In learning, we hope to have competitors and partners, and games can precisely meet the needs of students. Gamification teaching requires students' participation and interaction, and healthy competition with other students through cooperation in games not only meets the needs of students for games, but also cultivates the ability of communication and cooperation.

2) Arrange different levels of games for different age groups

Computer information technology course is a professional elective course for college students in the first year. The form and content of the game are determined by the students' cognitive level. College students are more inclined to theoretical abstract logic in thinking logic, and strive to make theoretical regularity explanation to the things around them; Dialectical thinking gradually replaced formal logic thinking and began to occupy a dominant position in thinking structure. Therefore, teachers can consider adopting gamified teaching strategies that meet the cognitive characteristics of freshman students.

3) Grasp the way of the game

According to Piaget's stage of play, regular play can last from the age of 6 or 7 to adulthood. For the age group of college students, rules are regarded as a kind of fun. Without rules, the game will lose its interest. Therefore, the use of teaching games with clear rules and "jumping" to pick the fruit is inseparable from the autonomy and cognitive level of participants, so it is necessary to have a certain degree of understanding of the audience.

3.2 Selection of Gamification Teaching Content

3.2.1 Classification of computer information technology course content

Teaching content refers to the sum of knowledge, skills and behavioral experience that students acquire in order to achieve teaching goals. Modern cognitive psychologists generally divide knowledge into two categories: declarative knowledge and procedural knowledge. The classification of knowledge in modern cognitive psychology is shown in Table 2.

<table>
<tr><td colspan="2">classification</td><td colspan="2">implication</td></tr>
<tr><td colspan="2">declarative</td><td colspan="2">Answer the world "What is"</td></tr>
<tr><td rowspan="2">procedural</td><td>skill-oriented</td><td>Handle external affairs</td><td rowspan="2">Answer the world "How?"</td></tr>
<tr><td>multi-strategy</td><td>Adjust your cognitive processes</td></tr>
</table>

Table 2: Classification of knowledge in modern cognitive psychology.

Declarative knowledge is mostly memorized content, and this kind of knowledge can be carried out through competitive games with interactive functions. Procedural knowledge focuses on the

cultivation of students' skills. For procedural knowledge, we can use role-playing games and puzzle games to stimulate students' interest in learning, so as to easily learn knowledge in games, improve learning efficiency and increase their emotional experience. The computer information technology course is divided into two semesters. According to the classification of knowledge in modern cognitive psychology, the author classifies the contents of the computer information technology course in secondary vocational schools in the first semester into the following categories, as shown in Table 3.

knowledge point	*concrete content*	*type of knowledge*
rudimentary knowledge of computer	*Understand computers*	*declarative*
	Anatomical computer	*procedural*
	Build computers and common equipment	*declarative*、*procedural*
	Familiar with keyboard	
	information safety	*declarative*
operating system	*Realize unix*、*Linux*、*windows*	*declarative*
	resource administration	*declarative*、*procedural*
	General Settings	
	maintain	*procedural*
	character input	
text processing	*Input and edit*	*procedural*
	Format Settings	
	tabulation	
	Text & Graphic	
	layout	
table handling	*Understand table processing software*	*declarative*
	Format setting	
	Formula, function	
	Analysis management data	*procedural*
	pivot table	
	graphical	

Table 3: Knowledge points and types of computer information courses.

1) Knowledge and skills

Knowledge and skills are the two basic contents of learning. It is generally believed that knowledge learning needs to go through three stages: acquisition, retention and reproduction. At this stage, knowledge is not only knowledge learning, but also skill learning. Here, the knowledge objective mainly refers to the subject knowledge that students learn in the textbook, the understanding knowledge in production and life, and the information knowledge obtained through various information channels.

2) Process and method

The so-called process is the process of comprehensively cultivating and developing students' knowledge, emotion, intention, behavior, morality, intelligence, body and beauty on the basis of their cognition and intellectual education[2]. The so-called method refers to the method that students learn and use in the learning process, including basic learning methods, such as independent learning, cooperative learning, etc., and specific learning methods, such as discovery learning, group learning, etc.

3) Emotional attitude and values

Emotion is the subjective experience produced by people according to the degree of satisfaction of their needs. There are three types of emotions: moral sense, emotional experience about whether an individual's behavior conforms to social moral standards, such as admiration, praise, etc.; Sense of reason, the emotional experience produced by an individual in the process of understanding and exploring things and truth; Aesthetic feeling refers to the emotional experience that occurs when an individual evaluates things according to aesthetic standards, such as the emotional experience of nature, art, etc. Attitude, not only refers to learning attitude, learning interest, learning responsibility, but also refers to a tolerant attitude to life, optimistic attitude to life, rigorous scientific attitude. Values emphasize the unity of personal value and social value, human value and natural value, scientific value and humanistic value, so as to enable students to establish the value pursuit of truth, goodness and beauty in society, life and nature.

3.2.2 Gamification teaching objectives and characteristics

1) Gamification teaching objectives

The gamified teaching objectives follow the three-dimensional teaching objectives proposed by the new curriculum reform. The gamified teaching objectives pay more attention to what effect the game activities produce on the learners, what skills, knowledge and abilities the learners improve, and what emotional experience the game links bring to the learners. In gamified teaching, all teaching activities revolve around the teaching purpose, and games are a means to achieve the teaching purpose. Teaching objective is the standard to measure the effect of teaching activities, and also the basis of teaching activities. Teaching objective determines the form and content of games.

In the classroom teaching, all the teaching activities are carried out around the teaching objectives. The teaching goal clarifies the learner's behavior, and the teacher is the organizer and designer of the teaching activity. Gamification teaching is a kind of teaching method and a manifestation of teachers' organization of classroom teaching. In gamification teaching, teachers use games to organize the teaching process and achieve the teaching goal invisibly. Game is a means to implement classroom teaching, its purpose is to create a relaxed and pleasant entertainment environment, the teaching goal is implicit in the game activities. The use of games makes the classroom lively and active, and also extends the effective learning time of students. If the teaching goal is to focus on knowledge and skills, then arrange some simple and manageable games. The goal of gamification teaching should be determined according to the teaching content, and the function and characteristics of games should be emphasized in the teaching goal "process and method".

For example, in the fifth unit of the application of spreadsheet processing software, task "Preliminary use of Excel2010", based on primary and secondary school learning, students generally have some memory of Excel2010, but they are not very clear about its specific functions, most students think Excel knowledge is cumbersome, and there is a fear of learning this software. In order to improve this situation, let students truly feel the powerful function of Excel software and overcome psychological fear, teachers can adopt gamification teaching, design game activities to stimulate students' learning interest and stimulate students' thirst for knowledge in this section. Therefore, the gamification teaching objectives of this section can be stated as follows.

Knowledge and Skills: Understand the concepts of workbooks, worksheets, cells, cell contents, etc.

【 Process and method 】 Stimulate students' learning interest through Excel version of "Three Kingdoms Kill" game; The teacher explains and demonstrates, allowing the students to accept new knowledge.

[Emotions, Attitudes and Values] Further stimulate students' interest in learning other functions and roles such as worksheets and cells, and cultivate students' self-exploration and hands-on skills.

2) Characteristics of gamified teaching objectives

First, goal setting is interdisciplinary and comes from a variety of sources. Many gamified teaching activities are set in real situations, which come from real life experience, and students often need to use the experience, knowledge and skills of other disciplines to carry out smoothly. Gamification teaching is often carried out in the form of task-driven, and pays attention to students' participation and interaction in game activities. Therefore, in this process, students' learning and feelings may exceed the requirements of the syllabus. Therefore, teachers can not only determine the teaching objectives according to the syllabus, but also obtain the teaching objectives according to students' real experience and practical problems.

Second, the educational purpose is hidden in the game activities, and the students' main position is reflected. In gamification teaching, the educational purpose is often not obvious, but subtly hidden in the game activities, and the process of students participating in the game activities is the process of achieving the teaching goal. Teachers implicitly convey the educational purpose through the teaching games organized and carried out, and this intention is completely hidden in the game activities. In the game, students' dominant position and autonomy will be maximized, while teachers' dominant position will be further hidden and only serve as the instructor and observer in the game to guide students to the expected direction.

3.3 Formulation of Teaching Strategies

Teaching strategy refers to the means and strategies used to achieve different teaching results in the interaction between teaching and learning [14]. Gamified teaching embodies the position and role of students' main body and teachers' leading role, and is the embodiment of the organic combination and flexible application of teachers' "teaching" and students' "learning" [8]. The gamification teaching strategy is formulated as follows.

1. Analyze the teaching content and find out the related elements between teaching and games

Before the design of game teaching activities, the first thing to be clear is what information to convey and what effect to achieve through game activities, that is to say, the teaching content should be interpreted and the teaching objectives should be clear. Gamification teaching is a process of disassembling and reorganizing teaching content, the breakthrough point of which is to associate teaching content with appropriate games. The elements associated with the teaching content and the game act as a bridge between the whole activity.

For example, in the knowledge point "Initial Use of Excel 2010", the curriculum standard describes the teaching objectives as follows: "Understanding the concepts of workbooks, worksheets, cells, cell contents, etc.; Learn to create and keep workbooks by making sales and product list worksheets." It can be seen that to choose games related to the basic knowledge of Excel 2010, it is bound to be associated with basic concepts such as "cells" and "worksheets", so "cells" and "worksheets" become relevant elements of teaching and games. When designing a game activity, you must include entry and editing of cells and worksheets. We can think of a lot of small games if we just grasp the relevant elements.

2. Preliminarily determine suitable games for learners according to relevant elements

As mentioned above, after finding out the relevant elements of teaching and games, we should combine the characteristics of learners in various aspects and selectively carry out game activities. Take the "initial use of Excel 2010" as an example, if the first year students only learn the concept of cells, worksheets, workbooks and simple ways to use, they may lose interest in learning because

it is too easy; On the other hand, if students are exposed to games that are particularly complicated and complex, even beyond their cognition, then they will feel stressed. Therefore, it is important to choose games that are suitable for learners.

3. Further integrate games with teaching content so that games can be adapted to the classroom

The educational games we are going to carry out always have to be implemented in the classroom, so the teaching games have to adapt to the classroom environment and the classroom schedule. For example, using Excel 2010 to calculate the average, if you want to use the game data to explain the average algorithm, you can finish the game in extracurricular time, so that the data collection and statistics will not occupy the class time, the game process can be recorded by video or other ways, and the relevant knowledge can be explained after entering the class. The recorded video helped students recall the game.

4. Provide teaching resources for gamified teaching activities

Teaching resources not only provide students with learning materials, but also include play equipment and opportunities to experience practice. In gamification teaching, games are closely integrated with learning, and are accompanied by students' experience and emotional needs. Therefore, it is very necessary to provide teaching resources such as environment and equipment for the development of game activities.

3.4 Learning Environment Design

Learning environment refers to the interaction process between students and learning resources [13]. The learning environment mainly includes facilities, resources and platform tools. Secondary vocational school infrastructure mainly includes computer, campus network, computer room and so on. Infrastructure is the basis of the implementation of gamified teaching and the material guarantee for the successful completion of teaching. Learning resources are multimedia materials that run on computers and can be used by learners, which can stimulate students to solve problems through cooperation and communication. Platform tools mainly refer to educational game software, such as "I am the Big Winner", "Speed" and so on.

3.5 Teaching Evaluation

The evaluation of gamified teaching takes the gamified teaching classroom as the research object, and adopts certain methods to evaluate the teaching process and effect in terms of quality and quantity. In this paper, the teaching evaluation is obtained by means of level test and interview. Evaluation is a mirror, which can reflect the real ability level of learners. The purpose of evaluation is to find out the gaps and fill in the gaps, test the effect of gamification teaching, and adjust the defects and problems in gamification teaching in order to improve the teaching design. Problems needing attention in gamification teaching evaluation.

1) Respect students' current life value, people-oriented

It is generally believed that teaching evaluation is a means of teaching management. Based on the "people-oriented" management thought, teaching evaluation is not a simple "causal" linear relationship, but a reflection of the interaction between teachers and learners. It should not only look at the result without looking at the person, but should pay more attention to the process and attach importance to the role of learners. Learners are members of society with independent personality and should be respected by teachers. In the game, teachers should make evaluations without harming students' self-esteem and dignity, and have equal dialogue with students in the game [4].

2) Pay attention to the multi-orientation of evaluation criteria and angles

Teaching evaluation often attaches importance to the uniformity and quantification of standards. However, in actual teaching practice, learners have their own characteristics and individual differences, so there is no way to achieve uniformity. Moreover, gamified teaching evaluation may vary from person to person due to factors such as the selection of teaching content and the use of different game software. Therefore, the evaluation of gamified teaching should not be confined to learners' external behaviors and attitudes, but should pay attention to the diversity of values, that is, to pay attention to the multi-orientation of evaluation standards and perspectives, and fully consider learners' inner spiritual temperament such as emotion, character and way of thinking.

3) Appropriate handling of contingencies

Accidental events are unexpected behaviors that occur in teaching practice. These behaviors are right and wrong. Teachers should praise and encourage correct behaviors in time, correct and criticize wrong behaviors in time, and prevent one-sidedness and simplification. The occurrence of accidental events can test the feasibility and rationality of teaching games to a certain extent, and education combined with accidental events has certain pertinence, and the effect is good, timely and profound. Teachers should seriously sum up the experience of dealing with accidental incidents, improve the level of education and teaching, and perfect the daily teaching work. The purpose of gamified teaching evaluation of computer information technology curriculum is to promote the common development of teachers and students, and teachers and students shoulder the task of realizing the teaching goal. The teaching effect of teachers is mainly reflected in the learning results of students. On the one hand, the feedback information from evaluation can help teachers adjust the teaching design in time, improve the feasibility of teaching practice and enhance the effectiveness of teaching. On the other hand, it is helpful for teachers and students to find problems in teaching practice, analyze the drawbacks and advantages of gamified teaching, summarize teaching experience, improve teaching deficiencies, and improve learners' teaching skills to a certain extent.

4 ANALYSIS OF EXPERIMENTAL RESULTS OF GAMIFICATION TEACHING

In this paper, 300 computer students and 50 computer information technology teachers in a university are taken as subjects to carry out the computer information technology course. Before the experiment, the consistency of the subjects is tested. The 300 students were divided into two groups of 150 students, 75 boys and 75 girls in each group. The two groups were given traditional teaching (traditional group) and gamified teaching (experimental group) respectively, and 6 online unit tests were carried out in 16 weeks.

According to the teaching practice in the early stage, it can be seen that the two groups had the same interest in learning before the experiment, and there was no significant difference. After the experiment, the two groups were tested, and the distribution of learning achievement was shown in Table 4, Table 5 and Figure 1. Learning interests are shown in Table 6, 7 and Figure 2.

Fractional interval	*[90,100]*	*[80, 90]*	*[70,80]*	*[60,70]*	*[0,60]*
number of people	*25*	*70*	*35*	*15*	*5*
Downward accumulation of the number of people	*25*	*95*	*130*	*145*	*150*
frequency	*16*	*47*	*23*	*10*	*4*
Downward accumulation of frequency	*16*	*63*	*86*	*96*	*100*

Table 4: Distribution of learning performance of experimental group.

Fractional interval	[90,100]	[80, 90]	[70,80]	[60,70]	[0,60]
number of people	15	55	30	30	20
Downward accumulation of the number of people	15	70	100	130	150
frequency	10	37	20	20	13
Downward accumulation of frequency	10	47	67	87	100

Table 5: Distribution of learning performance of control group.

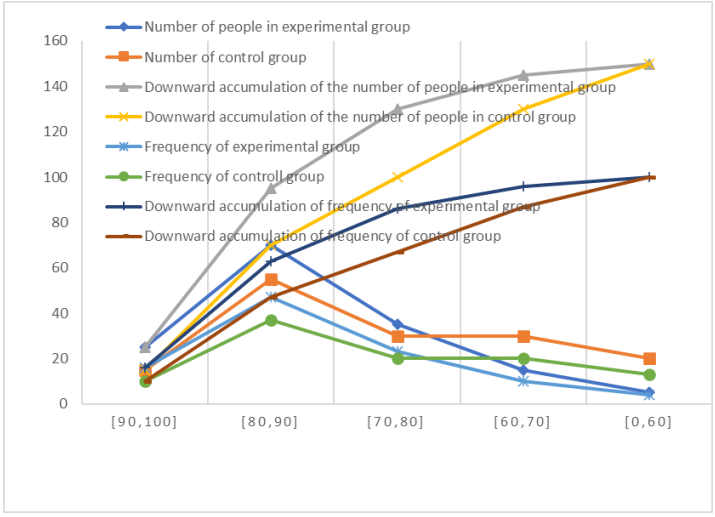

Figure 1: Analysis diagram of achievement distribution.

From Table 4, 5 and Figure 1, it can be clearly found that the adoption of gamified teaching can significantly improve learning performance. The number of students in the experimental group with high scores is significantly higher than that in the control group, and the number of students in the experimental group with scores above 80 is 16 points higher, which is a very significant result. The number of people in the low segment of the experimental group is also significantly lower than the number of people in the low score segment of the control group, and the number of people below 60 points is 9 points lower in the experimental group.

	very interested	*interested*	*ordinary*	*disinterest*	*very disinterest*
number of people	*43*	*64*	*27*	*13*	*3*
Downward accumulation of the number of people	*43*	*107*	*134*	*147*	*150*
frequency	*27*	*43*	*18*	*9*	*3*
Downward accumulation of prequency	*27*	*70*	*88*	*97*	*100*

Table 6: Distribution of learning interest in experimental group.

	very interested	interested	ordinary	disinterest	very disinterest
number of people	28	33	50	27	12
Downward accumulation of the number of people	28	61	111	138	150
frequency	19	22	33	18	8
Downward accumulation of frequency	19	41	74	92	100

Table 7: Distribution of learning interest in control group.

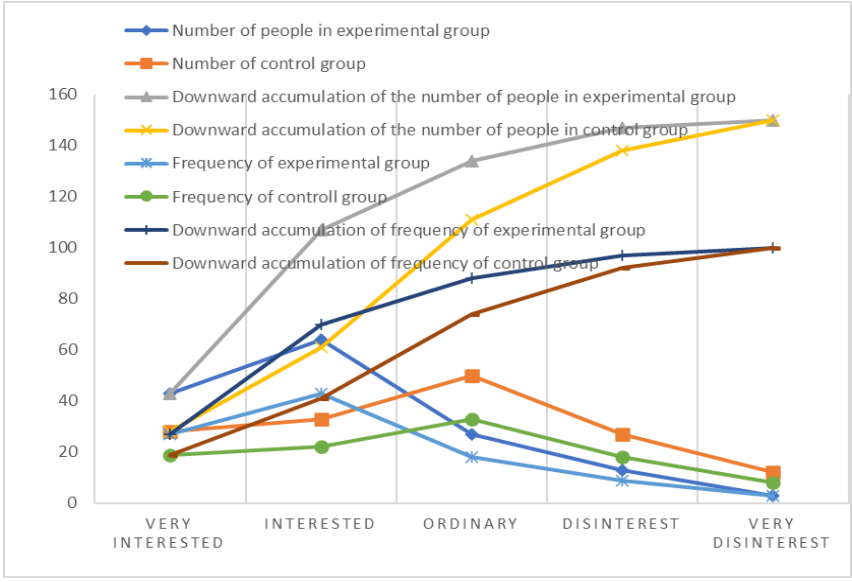

Figure 2: Analysis diagram of learning interest distribution.

As can be seen from Table 6, 7 and Figure 2, the learning motivation of the experimental group is significantly higher than that of the control group, and the frequency of interest in learning of the experimental group is 29 points higher than that of the control group. The frequency of disinterest in the experimental group is 14 points lower than that in the control group, which shows that gamification teaching can stimulate students' learning motivation and improve students' learning interest.

5 RESEARCH CONCLUSIONS

Based on the university, this paper carries out the gamification teaching research of computer information technology course. In order to better understand the current situation of the curriculum and students' subjective experience, a variety of investigation methods are adopted. Statistical analysis was made on the acquired data, so as to carry out targeted gamification teaching design, and two classes were selected as the experimental group and the control group to carry out comparative experimental research. After the experiment, questionnaires and interviews were conducted to understand the subjective experience and learning experience of students in

experimental class in gamification teaching. The research results of this paper are summarized as follows.

Combining with the current research situation at home and abroad, this paper analyzes the current situation of gamification teaching of computer information technology courses in Chinese colleges and universities, and finds the shortcomings in teaching; The current situation of the curriculum is further sorted out by means of questionnaire, and some students and teachers in a university are selected to carry out a survey, and the survey results are statistically analyzed to find a breakthrough point for gamified teaching design.

Under the guidance of multiple intelligences theory and constructivism learning theory, the gamified teaching design of basic computer application courses is carried out from five aspects: front-end analysis, teaching objective elaboration, teaching strategy design, learning environment design and teaching evaluation design, and applied to classroom teaching.

Taking two groups of a university as the research objects, gamified teaching and traditional teaching were respectively adopted to carry out comparative experiments. Through the implementation of two experimental cases, the comparative data of two classes are obtained to test the effect of gamification teaching. Through questionnaire survey and interview, this paper aims to understand students' learning experience and teaching suggestions in gamification teaching, and further improve the gamification teaching of computer information technology courses, in order to provide certain references for the research and practice of gamification teaching in universities.

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