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Research and design of game-based teaching based on maslow's hierarchy of needs

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ABSTRACT

The Maslow's hierarchy of needs theory is introduced in education, a new model for game-based teaching is proposed. The model divides game-based teaching into five needs from physiology to psychology, and design a detailed game-based teaching process on the basis of the model. The research aims at students as the teaching subjects. By gaining gaming experience while learning, learning enthusiasm and initiative to participate in classroom teaching are fully mobilized. Thus, the effect of teaching will be improved.

KEYWORDS

Maslow; Game-based teaching; Psychology; Teaching model, Engineering education.



INTRODUCTION

In the traditional teaching process, teachers tend to be dominant throughout the course, students are passive learning and have some interaction with teachers on simple language, they did not integrate into the curriculum in the true sense. The situation requires us to find a new pattern motivates participation, communication and interaction of learners and insure them learning knowledge and skills effectively^[1-2]. In 1952, the great psychologist for education and development, Jean Piaget, derived the gaming theory from his cognitive development theory^[3]. Since then, gaming theory has begun to extend to pedagogy; however, the gaming theory was mainly applied on the research of children development education^[4-5]. Over the next few decades, scholars have proposed many games teaching theories and methods. Kristian Kiili^[6] proposed experiential gaming model which integrates game designing into teaching theory successfully. However, the model provided only game-based teaching theory and did not provide the specific design of teaching process. Alan Amory et al.^[7] regarded computer game as teaching tool and researched the relationship between game element and teaching. Fan Liang-Chen^[8] constructed a RPG electronic educational game designing model which could attract students with unique storytelling and interaction. Wu Yi-Wei et al.^[9] built a game-based learning environment for software engineering courses which can reflect certain properties of real world in order to inspire learners' curiosity.

However, in the above researching process, it usually regard the game-based teaching as a tool or method in the part of conventional teaching for the sake of the research and application. The frame of teaching activities and the strategic system of teaching process based on the game theory hasn't been formed scientifically. Therefore, the article put forward the model frame of game-based teaching through the research and exploration of game and informative teaching. Also design every process of game-based teaching in detail and wish to take advantage of this new teaching model for improving the traditional education.

PROPOSETHE GAME-BASED TEACHING MODEL

This teaching model research is based on Maslow's Needs-Hierarchy theory^[10], which divides the needs of human beings into five levels, physiology, security, social activity, respectable and self-actualization. And the needs of the five levels are gradually progressive. Only when the needs of the lower levels are met, the higher-levels are needed. Meanwhile, the study issued 500 questionnaires, and investigated the 18-24-year-old college students, asking them to list out the most hopefulfunctions in video game. After filtering out invalid questionnaires, the statistics is shown in Figure 1.

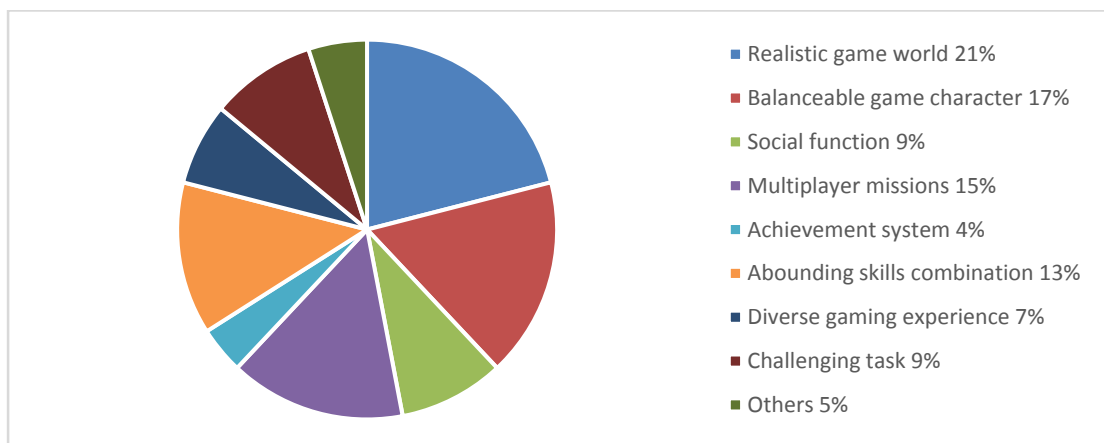


Figure 1 : The percentage of wishing to experience features in video game

As seen from the figure, realistic game world and balanceable game character is the two games feature accounted for the largest percentage, which shows a true, fair and safe gaming environment is the most basic needs of game-based teaching process. Further, The need for a higher level is considered such as Social function, multiplayer missions, abounding skills combination and so on. Thus, according to Maslow's Needs-Hierarchy theory, the game-based teaching can be divided into the following five categories.

- **The need of physiology**

In the context of game-based teaching, players are given an identity, which indicates a virtual post, the relevant virtual salary and points. They engage in this job and make the related teaching tasks. By spending money or exchanging points, they can acquire teaching props or rewards.

- **The need of security**

Formulate the rational game rules to ensure all the players can participate in gaming orderly. Players should be qualified for specialty literacy and ethics. Their behaviors are restricted by subjective and objective factors, for example, finishing teaching tasks by cheating, using aggressive actions and interfere with the regular gaming process.

- **The need of social activity**

Not only can players observe and operate the circumstances of their own post, but also can they observe others work. In this way, they can learn from each other, make common progress by cooperating with other team members and then accomplishing the scheduled tasks. This enables every member to make self-contribution and to guide them positively to make full use of their own strong points. On the other hand, for other participants, this will form a benign competition system which arise their competitive consciousness and learning initiative.

- **The need of respectable**

At the end of game-based teaching, the effectiveness and finished tasks calculated in points accumulate gradually. After many times of teaching, part of players achieving the best result and their rating will go firstly forward. A raised rating means the relevant post promoted, a new virtual title and highly-rated virtual medal awarded. Through these virtualized awards, the best players will be approved. This can also encourage the falling behinds.

- **The need of self-actualization**

After players finish the teaching tasks as required, teachers guide them actively to spontaneously exploring potentialities and actualizing themselves. For example, they may find other effective strategies to finish tasks, reasonably optimize timing and holding a better degree in every procedure, appointing team members according to their own strong points.

THE DESIGN OF GAME-BASED TEACHING

In order to realize the dynamic integration between game-based teaching and these five levels, the design of the teaching further more to improve the whole teaching process should be researched and analyzed.

- **Select an appropriate gaming form for courses**

The goal of vocational teaching is to cultivate students from “natural men” to “social men” with vocational characteristics. Therefore, the related gaming form should be selected flexibly according to different disciplines, majors and courses. For operating courses, the highly-immersed role-playing games, for management courses, strategy games with overall-viewed quick decision-making, for basic courses, puzzle games equipped with basic knowledge and critical thinking skills, for sports activities, sports games. Furthermore, in the same course or links of teaching, different aimed gaming forms can be of variety or combined with each other, so that the whole teaching process would be abundant and varied and it will fundamentally improve the interest and initiative of students.

- **Create the relaxed game-based teaching circumstance**

Proved by massive researching statistics, with the influence of traditional thinking, students wouldn't see teachers as an equal counterpart in the traditional teaching process, instead, generally dominants of teaching. Thus, in the game-based teaching model, the status of teachers is neither “Gods” nor “referees”. They are equal to their students and play a role of “common participants” or “Non player Characters” (NPC), functioning as guiders. While communicating with students equally and ensuring students dominant position, teachers wouldn't interfere with the game and they would dig out the potentialities of knowledge and skills in the context of guiding and educating.

On the other hand, in order to integrate the vocational teaching philosophy “playing while making, making while learning, learning while teaching, teaching while playing”, teaching content need to be converted into gaming content naturally. Students can participate in teaching activities in a relative relax gaming circumstances. To achieve these goals above successfully, computer technology, multi-media technology and virtual reality technology and so forth can be applied to build a teaching circumstance which is nearly similar with the reality. Students will gain experience comfortably in this immersed, interactive teaching.

- **Set rational game tasks**

Peoples' vocational behaviors are not isolated. The self-sufficient vocational model has been knocked out of the global economic marketing. Socialized division of labors leads to inevitability of coordinate cooperative relations in vocational behaviors. Therefore, when setting rational game tasks, there isn't a single-thread task which only needs one's own efforts to achieve. There must be multi-thread tasks by team cooperation.

- **Establish fair game rules**

At game-based teaching scene, all the students should be in the fair circumstance to participate in teaching interaction. They play all a relative equal role and exert their own initiative and innovation in the relaxed and free condition.

Certain awards will be given when students follow teachers to finish preinstalled teaching task. The learning participating enthusiasm is improved. But students finish teaching tasks with another creative ways which didn't appear in teacher's tasks, on this circumstance, they would be more awarded. Through setting real-time scoreboard, the intensive-competent atmosphere will be created, so that the competition consciousness as well as professional knowledge and skills spontaneously are promoted. They will develop fast and make progress constantly in competitiveness.

- **Establish and improve evaluation system and incentive mechanism**

The evaluation system of game teaching should have succession. In other words, before students begin the game, the rate or the equipped virtual capability should be based on the points accumulated from the last teaching links. It will explicit the learning effect of last teaching links and the initial state of game teaching this time. During the task ongoing, operation process and standard should be timely given. Through evaluating and feedback, students should learn continually from the right procedures. When tasks finishing or failing, teacher should also give a final comprehensive evaluation to help students self examine, summarize and improve.

Other than a full evaluation system, the clear award and punishment incentive mechanism should also be created. Award the game-winners and encourage them to keep the studious statement and learning enthusiasm. Punish the game-losers in a degree. For example, when learning groups finish the assigned tasks in cooperating, all of them are awarded the promotion of virtual posts, skills or the unlocking of virtual props. For the groups of losers, they are demanded to replay it and through intensive training to help them review the learnt knowledge and skills.

CONCLUSION

The game-guided teaching process has been gradual in many courses in the trial, and have achieved good results. In this paper, Maslow Maslow's hierarchy of needs theory is researched to analyze students' mental activity during the game and demand conditions, and design a game-based teaching model above. The model provide theoretical guidance for the game-based teaching curriculum reform, making the game form conform to the psychological needs of the students, so that they obtain the recognition of teachers in the game, respect of students as well as satisfaction themselves, and ultimately enhance their motivation and learning outcomes of learning.

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