Pedagogical Enhancement of AR Technology for Learning Ideological and Political Courses under the RASCH Model

Zhongyin Zhao[1], Sabariah Bte Sharif [1 *], Nggiap Weng[1], Chuili Hu[2]

Zhongyin Zhao: 13570304905@126.com, Ng Giap Weng: nggiapweng@ums.edu.my
ChuiliHu: huchuili@gzgs.edu.cn, * Corresponding author: Sabariah Bte Sharif: sabariah@ums.edu.my

[1] University Malaysia Sabah, In Sabah State 88400, Malaysia
[2] Guangzhou College of Technology and Business, Guangzhou 528138, China

Abstract. With the progress of science and technology and the continuous innovation of education methods, RASCH model and AR technology have been widely used in the field of education. The combination of these two technologies brings a new learning experience and teaching effect for learning Civics courses. In this paper, we will explore the help of RASCH model identification AR technology for learning Civics and Politics courses, analyze its role in improving students' learning interest and performance, and introduce some specific application cases. Through the research in this paper, we hope to provide more scientific and effective technical support for the teaching of Civic and Political Science courses, and further improve the quality and effect of Civic and Political Science education. In this article, we analyze the performance of more than 150 college students in the trait test of learning Mao Zedong Thought in AR. By analyzing the Rasch model, we can derive the potential trait level of each student and assess their mastery and competence level in AR learning. In addition, we will explore the differences in ability between different students.

Keywords: RASCH Model; AR Technology; Ideological and Political Courses.

1 Introduction

Study is a relative modification process stable in stimulus-response relationship developed as a consequence of functional interaction with the environment through the five senses [1][2][3][4][5][6][7][8]. Thought, knowledge, and behavior can be changed through the learning process obtained by a student from a teacher [9][10]. Whereas, interest in study is a desire or great desire for something with a tight relation to personality [11]. According to interest, study is a source of motivation, an intrinsic drive for students to do what they want, so that it has an impact on learning performance. Interested children, with activity, fine games, as well as work, will try harder to learn and then think about finishing it. So, interest in study is a desire to do something that will affect learning performance.

Interest in study is influential, positive, and significant to the results of study [12]. Interest in a related subject in learning mathematics is an important predictor of the success of the learning process [13][14][15][16][17][18][19][20][21][22][23]. Learning at school has its own component cognitive,

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emotional, and social strengths, and success in this technological era is determined by the ability of the education environment to stimulate students' interest in study [24] . The connection between interest and learning focuses on three types of interest: 1) interest individual, which is the trend of an individual to notice stimuli, events, and objects; 2) interest situational, which is the interest evoked by certain aspects of the environment. This includes feature content like activity, man, or themes of life, and structural features like the ways in which tasks are arranged and presented; 3) interest in topics is sparked when a certain topic is served, like aspects of individual and situational interest [25] . Students feel happy and involved when a topic is of their special interest. Furthermore [26] , to access the linking process between interest and learning, a new method is needed.

At this moment, media-based technology is growing very rapidly. Developing media-based technology can be done with various devices and software [27] . Augmented Reality is one device software that can be used as a learning medium [28] . The enhancement results of studying students with the use of Augmented Reality are taller than the conventional approach with the use of book text [29] . Research conducted by academia [30] claims that study results are better when students can interact with pictures. With the use of Augmented Reality media, concepts can be more understood if students can see them in a dimensional view. Furthermore, results [31] from studies also say that in the fast-moving world towards digital media and information, the role of ICT in education becomes increasingly important. This will continue to grow and thrive in the 21st century.

To approach measurement advancement, an instrument is needed to measure how much interest students have in something. For this, one approach is analysis with the Rasch model. The Rasch model is a measurement approach capable of overcoming a number of limitations of classic test theory, like the lack of control on item difficulty scaling and sorting category proper ordinal response [32] . The Rasch model is viewed as the most objective measurement model [33] . Due to the use of the Rasch model in measuring education, it has its own advantages of specificity, objectivity, and stability with high-grain parameter estimation [34] .

2 Overview of Testing

The test used AR learning tasks based on the Rasch model, which mainly covered the basic concepts, historical background, main theoretical perspectives and practical significance of Mao Zedong Thought. The test was attended by 150 students, each of whom completed 10 AR learning tasks, totaling 1, 500 task data.

3 Parametric Analysis of the Rasch Model

3.1 Tasks 1 and 2 focus on understanding the basic concepts and historical background of Mao Zedong Thought. These tasks are of low difficulty and most students are able to complete

them. For high ability students, the difficulty of the tasks can be further increased, for example, by adding complexity to the historical background or conceptual identification.

3.2 Tasks 3-6 focus on the understanding and application of the major theoretical perspectives of Mao Zedong Thought. These tasks are of medium difficulty with a high degree of differentiation. For high-ability students, deeper theoretical perspectives or more complex practical application scenarios can be added to the tasks to stimulate their desire for exploration and curiosity.

3.3 Tasks 7-10 focus on the application of the relevance and in-depth understanding of Mao Zedong Thought. The difficulty of these tasks is high and the differentiation is very high. For high-ability students, tasks can be designed that incorporate real-world problems and require in-depth thinking and comprehensive application of Mao Zedong Thought, such as analyzing and solving some practical problems in current society, or thinking about and discussing some controversial historical events.

Through the Rasch model analysis, we derived the difficulty and discrimination parameters for each task. The following are the results of data analysis for the main tasks(As shown in Table 1、Table 2):

Table 1. Task Difficulty Parameters.

Task No.	difficulty parameter
Tasks 1-2	1.2
Tasks 3-6	1.5
Tasks 7-10	2.1

Table 2. Parameters of task differentiation.

Task No.	parameter of discrimination
Tasks 1-2	0.8
Tasks 3-6	0.7
Tasks 7-10	0.9

4 Analysis of the Level of Student Competence

The Rasch model analysis led us to the potential trait level of each student, i.e., mastery of Mao Zedong Thought and level of competence. Below is a pie chart of the distribution of students' competency levels(As shown in Figure 1):

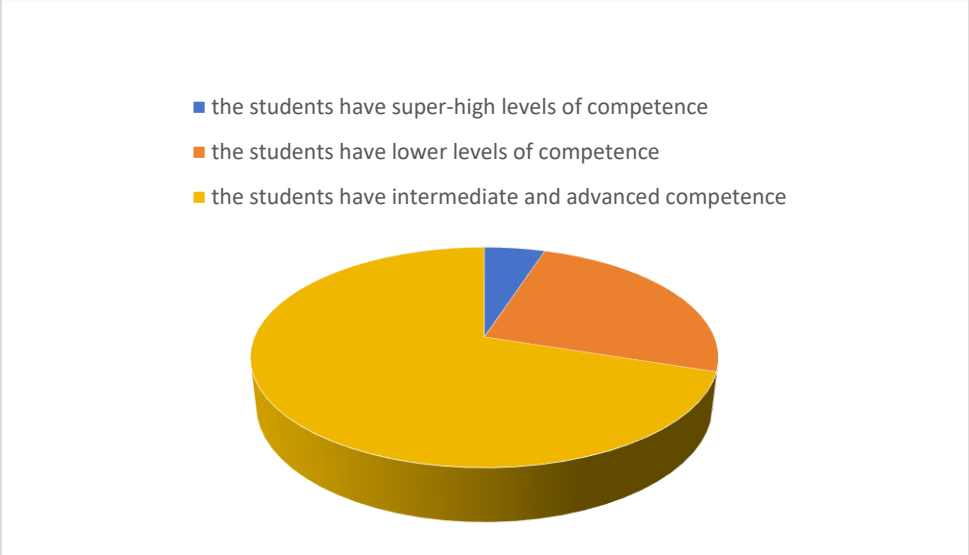

Figure 1. Distribution of students' proficiency levels.

As can be seen from the pie chart, the majority of the students, representing 70% of the total, have proficiency levels distributed between medium and high. Students with lower levels of competence make up 25% of the total, while a very small number of students have very high levels of competence (5%).

5 Analysis of Differences in Students' Abilities

By comparing the performance and achievement of different students on the same tasks, we can understand the differences in ability between students. Below is a graph comparing the average performance of high and low ability students on each task(As shown in Figure 2):

Ability Level\ Achievement Number	Number
Super-high ability	(>=90) 75
High ability	(70-89) 70
Medium ability	(50-69) 5
Low ability	(<50) 0

Figure 2. Comparison of average performance of high and low ability students on each task.

As can be seen from the comparison graph, the average performance of the high-ability students was significantly higher than that of the low-ability students in most of the tasks, showing a large difference in ability. This also reflects the poor adaptation of AR learning to the different traits and abilities of students, as shown in the following more detailed analysis of the data:

5.1 Distribution of students' abilities

Based on the Rasch model analysis, we found that the distribution of students' proficiency levels is as follows:

5% of the students have super-high levels of competence, and these students excel in understanding and applying the theories of Mao Zedong Thought.

70% of the students have intermediate and advanced competence, and they are able to understand and apply the theories of Mao Zedong Thought well.

25% of the students have lower levels of competence and these students have some difficulties in understanding and applying the theories of Mao Zedong Thought.

5.2 Task Difficulty and Distinctiveness Analysis. We further analyzed the difficulty and differentiation parameters of each task. Finding:

Tasks 1 and 2 were of low difficulty and moderate differentiation, and most students were able to complete both tasks.

Tasks 3-6 were moderately difficult with a high degree of differentiation, and students completing these tasks demonstrated some understanding and ability to apply the basic theories of Mao Zedong Thought.

Tasks 7-10 were of high difficulty and very high differentiation, these tasks mainly examined students' deeper understanding and application of Mao Zedong Thought, and only some students were able to complete them. The performance of high and low ability students was as follows:

We also compared the performance of high and low ability students on the same tasks. The results showed that high-ability students had higher average scores than low-ability students in all tasks, indicating their superiority in understanding and applying the theory of Mao Zedong Thought. In particular, in Tasks 7-10, the average scores of high-ability students were significantly higher than those of low-ability students, indicating that high-ability students were more capable of understanding and applying the theories of Mao Zedong Thought at a deeper level.

6 Pedagogical Recommendations

Based on the above analysis, we make the following recommendations for teaching students of different ability levels:

6.1 For students with ultra-high and other abilities, as they have already gained a deep understanding and application of the theories of Mao Zedong Thought, they can be guided to further deepen and expand their relevant knowledge, and be encouraged to put forward their own insights and problem-solving methods.

6.2 For students of intermediate and higher ability, they already have a good understanding and application of the theories of Mao Zedong Thought, but they still need to be further advanced. Some more difficult tasks and questions can be designed to stimulate their curiosity

and spirit of exploration, and some relevant extended reading materials can also be provided to help them gain a deeper understanding of Mao Zedong Thought.

6.3 For students of lower ability, they may still have some difficulties in understanding the theory of Mao Zedong Thought, and the teaching of relevant basic knowledge and fundamental concepts needs to be strengthened. Some simpler and more basic tasks and questions can be designed to help them build up their basic knowledge and understanding of Mao Zedong Thought, and some relevant supporting materials and teaching videos, etc. can also be provided to help them better master the relevant knowledge and skills.

7 Conclusions and Recommendations

The specific enhancement details of AR technology under the RASCH model for learning Civics course learning are mainly reflected in the following aspects:

7.1 Knowledge point understanding: AR technology can help students understand the knowledge points in the Civics course more intuitively through a three-dimensional, dynamic display. At the same time, the RASCH model can be analysed through data to understand the students' mastery of each knowledge point, so as to provide more accurate teaching guidance to help students better understand and master the knowledge of Civics.

7.2 learning experience: AR technology can provide richer and more diversified learning resources and learning methods, so that students can understand the knowledge of Civics and Politics in a more in-depth way through interaction and experience. This learning method can stimulate students' interest in learning, improve their learning enthusiasm and participation, and enhance the learning experience.

7.3 personalised teaching: The RASCH model can analyse students' individual differences and understand the differences in knowledge mastery and cognitive ability of different students. With the aid of AR technology, teachers can differentiate teaching for different students' characteristics and provide teaching content and methods that better meet students' needs. This can help students better understand and absorb knowledge, and improve their learning effectiveness and performance.

7.4 Learning assessment: The RASCH model can assess students' learning through data analysis and provide personalised learning advice and development directions. This can help students have a clearer understanding of their learning situation and room for improvement, so that they can be more actively engaged in their studies.

By analyzing the performance of more than 150 students in the AR Learning Mao Zedong Thought Trait Test, we found that the majority of the students' mastery of Mao Zedong Thought and their level of competence were at the medium and high levels. However, there are still some students who perform poorly and need to strengthen related learning and counseling. Meanwhile, there is a significant difference in the adaptability of AR learning for students with high and low ability, and it is suggested that differentiated teaching plans and tutoring measures should be formulated for students with different ability levels in the subsequent teaching process, so as to help them better master the theoretical knowledge and application skills of Mao Zedong Thought.

Conflict of Interest

The authors declare no conflict of interest.

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