

Application of amplified reality to the cognitive effect of children with attention deficit hyperactivity disorder(ADHD) – An example of Italian Chicco-app interactive building blocks

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Abstract

For children with attention deficit hyperactivity disorder (ADHD), most are mixed symptoms, such as Asperger syndrome (AS), Tourette's syndrome (TS), Anxiety disorders, and so on, just collectively known as ADHD, but the most obvious symptoms are inattention, learning disabilities, emotional disorders, sensory integration abnormalities. Therefore, this research focuses on building blocks and Augmented Reality (AR) links, using the building blocks of animals as the theme, coupled with the operation of building blocks to enhance patience, touch, construction and other capabilities, through the interaction of AR and dynamic performance can attract attention to ADHD children's eyes and attention. There are two objectives in this study: Firstly, is to have a positive interaction with AR for children under six years of age who have ADHD. Secondly is to increase the difficulty of interaction, improve the continuous response to designed AR and attract; Not only use the building blocks to interact, but also through the AR increase in children's patience, initiative, associated with the combination of AR and tablet. From this trend, it can increase the child's touch operation action. Finally, through interviews, experimental teaching, observation and evaluation, this study explores the effects of APP interactive blocks on the learning of ADHD children.

Key words: ADHD Children, Augmented Reality, Interactivity, Building Blocks

Introduction

With the advent of society and medicine, the issues of

special education has always been a matter for people to take note of. ADHD is the most common mental illness in children. According to the system, about 8% of children with ADHD in Taiwan[1], about 200,000 children meet the diagnostic standard of ADHD, and are disturbed by the disease. The study found that ADHD began to develop during childhood, and that some people during adolescence will improve due to correct behavior and slowly recover. If you don't pay attention in infancy, it can cause learning disabilities and the emotional barriers and human relationships that are caused by the conflict, which can affect their self-confidence, and at present[2], the most effective treatment methods of ADHD are mainly drugs and behavior [3].

In recent years, the rapid development of science and technology, the expansion of the reality in various aspects of the development of rapid, learning is no longer equator limited to traditional teaching, but more and more mobile devices are added to the learning method, in addition to the use of mobile devices, using AR, Not only adds entertainment and fun, but also improves children's learning motivation[4].

Augmented Reality

According to the reality of Milgram's Reality-Continuum proposed by Milgram and Kishino (1994). The real environment and the virtual environment are employed as the two ends of the continuum, namely, Mixed Reality. Among them, augmented reality is close to the real environment, and virtual reality is close to the virtual environment [5].

The AR is mainly based on "Head-Mounted Display" (HMD) displays, as well as "handheld" or "fixed" displays. Display devices can be classified into the following categories: "Optical Perspective" and "Visual Perspective."

In education, the expansion of the reality of the application is mainly:

1. Exploratory education Concept
2. Multiple media methods are more expressive
3. New interactive experience

The idea of inquiry-based education is mainly to attract children to participate in teaching, to improve their interest in things, and to explore and study deeper contents in an interactive way.

Many media forms getting are more powerful, mainly in the form of enhanced reality, and in many ways, such as graphics, video, animation, and so on, the content is more understandable. The new interactive experience is mainly to enhance the unique interactive experience, so that children with eyes, ears, hands to do, with the brain, the real reality of pluralistic education.

ADHD

According to the American Psychiatric Association's criteria for the Diagnostic and Statistical Manual of Mental Disorder (DSM-5), ADHD is divided into three groups: inattention, impulsivity, and hyperactivity. Symptoms [6].

1. Concentration of Attention (ADD) - Concentration can't be concentrated, easy to distract symptoms
2. Impulse/Dragging (HD) - Unable to refrain from own actions
3. Mixed type (ADHD) - At the same time has the ability to concentrate on the symptoms, easily distracted and unable to restrain themselves

Behavioral characteristics and influence of ADHD children:

ADHD is one of the emotional disorders. Some children with ADHD suffer from inattention, learning disabilities, mood disorders, and sensory abnormalities. The difficulties they face may be multiple, and they may have difficulties in cognitive functioning, living, learning, and working. There are also many problems and problems in human relations, and it is prone to irregularities, accidents, poor interpersonal relationships or academic performance [7].

Teaching methods for children with ADHD:

1. Clear to create distracting areas
2. Arrange priority seats
3. Establish a good visual contact
4. To guide and draw children back
5. Decomposition of long instructions into short statements

5. Confirm children's understanding
6. Allow children to leave the seat [6].

Cognitive theory

4. Formal thinking period- 11 years older

The famous developmental psychologist, Piaget (1896-1980), has been recognized as the most authoritative theory in development psychology in the 20th century.

Piaget divided the course of cognitive development into four stages, and the development process is gradual and continuous. Each stage will result in differences due to personal factors.

The behavior patterns of each stage are as follows:

1. Sensory-motor period - 2 years old

This stage Kerdong to understand the outside world, often using a sense system and taking actions to recognize the environment around him, solve problems, or achieve goals.

2. Previous operating period - 2 to 7 years

Is also called the pre-thought period, and is divided into two stages, in particular, the early and the intuitive.

A. Early thinking

- (1) Self-centered
- (2) physical
- (3) intuitive inference
- (4) focus on
- (5) Non-logical thoughts

B. Straight period

- (1) about 4 years old ~7, intuition or past experience reasoning, it is easy to distort
- (2) symbol system has begun to form

3. Concrete operations period - 7 to 11 years of age-the Kerdong has been able to think logically with a body of experiences or objects.

A. Features

- (1) with logic
- (2) Multiple thinking
- (3) and the concept of asymmetry
- (4) to the self-centered
- (5) has the concept of retention
- (6) Reversibility, identity, and complementarity

4. This stage Kerdong has entered the adolescence stage, the ability to think is gradually maturing, using complex symbol analysis, organization, abstract and logical reasoning, and activity in order to solve the problem[8].

Research method

This study is based on the use of augmented reality in

cognitive-assisted sensory dysregulation children's cognitive effectiveness - using the Italian CHICCO-APP interactive building block as an example, based on augmented reality in educational applications and references to relevant literature. The research object of this study is mainly for children aged 3-6 years of the development center as an example. Through previous interviews, teaching, actual measurement research, and post-test questionnaires, it is known whether it is helpful for ADHD children.

In response to this research, we visited the Boqun rehabilitation clinic and conducted a preliminary interview with Ye Hao, a functional practitioner at Taipei Boqun rehabilitation clinic.

Pre-interviews:

1. What are the typical building blocks for ADHD children?

Functional division: Generally building blocks can promote their thinking patterns and increase their creativity and thinking patterns for ADHD children.

2. Can the effects of AR-based building blocks enhance the interest and concentration of children with ADHD?

Functional division: The combined effect of constructive building blocks and AR can enhance the interest and concentration of children with ADHD. However, after all, it is a 3C product. Therefore, attention must be paid to the time of use so as not to cause children's vision problems.

3. Does AR help children with ADHD?

Functional division: AR really helps children with ADHD. The AR is mainly for the auxiliary function, but for the ADHD children, AR is more toward the reward part.

4. How to enhance the interaction of AR, such as touch, can improve the learning effect of ADHD children?

Functional division: Enhance the interaction of AR, can improve the learning effect of ADHD children. For children with ADHD, AR is more biased towards rewards, such as spelling out shapes on a single map and using the smart device to see the AR after spelling. For children with ADHD, seeing the AR effects and interacting with the results, the mood is not only exciting, but also attracts children's attention and generates interest.

Teaching method:

Divided into control and experimental groups. The control group used traditional teaching methods to discuss their spatial concepts, stereo concepts, hand-eye coordination and conservation concepts in the form of general graphs. The experimental group explored their spatial concepts, stereo concepts, and hand-eyes using the Italian CHICCO-APP interactive building block teaching method. Coordination and conservation concept. The study period was 3 months. The research method was to use questionnaires to collect experimental data. However, due to the small age of the study, when the questionnaire was surveyed, there was a functional division next to it to assist

Teaching content:

1. Motivation: What is it?

Use mystery bags to touch three-dimensional animals

A. Introduce the names of the five animals and emit the animal's voice.

B. Teacher: "Would you like to see what animal it is?" Send the animal's voice to let the child guess what the animal is.

C. Knowing the animal's voice can connect the animal's appearance

2. Introduce building blocks

A. Present one of the animals that have been put together for children to see.

B. Take out the tablet and show the dynamic AR operation to the children.

C. Divided into five groups, each mimicking the building blocks of animals. (The less able kids have the bottom figure to imitate the stack.)

D. Take turns putting the blocks in front of the tablet and let the children watch the animation presented by the APP

E. Lead the kids how to interact with the APP.

F. You can hear animal sounds and connect animals and build animals to interact with the APP.

G. Can introduce animals and imitate animal calls.

3 Discussion

A. The sound of animals can correctly determine what animal they are.

B. Can know the way of animal interaction and imitation of APP.

C. Can imitate animal movements.

4. Extending activities - drawing animals

Conclusion

This research was the first phase of the research by the researchers. Through the analysis of relevant literature collection and preliminary interviews, the authors explored the cognitive effectiveness of children with augmented reality-assisted attention deficit hyperactivity disorder - with the Italian CHICCO-APP interactive building blocks. Based on this we have drawn the augmented reality part of the CHICCO-APP interactive building blocks in Italy that can attract the attention of young children. By means of adding some more courses, we can make young children identify their animals in the context more quickly. Through the process of interviewing, experimenting, teaching, observation and evaluation, young children can understand the appearance, color, and howling of animals through games, and learn how young children know their animals through the way of painting.

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