

The Study of Multimedia Application on Autism Students Learning

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Abstract: - In this paper, we focus our research on the Autism students' learning environment in school. In our research, we presented a new Multimedia Digital Learning Platform. We utilize the e-learning model to design an appropriate Teaching Platform for the Autism students and their teachers. Furthermore, we also design the Multimedia Application courses to make up with the lack of the CAI teaching softwares. Finally, we would promote the sharing of the Learning Platform toward the external environment and internal teaching resources. We also upgrade the teaching efficiency and open a great chance for the Autism students.

Key words: multimedia, e-learning, Autism

1 Introduction

1.1 Research Background

The government and the schools strongly promote the e-learning model in Taiwan. Many digital industries involve in the e-learning environment, too. But, there are still a special group of students who can't own the same learning rights as us in using various kinds of text books or materials. The Autism students are one type among them. The Autism students are difficult to get along with people. They limit themselves in the environment that they are used to. Therefore, the first target for the special education teachers is to help the Autism students expanding the living environment.

Most of the Autism students are fond of mechanism. They are interested in the exciting issues showed from the monitors. The computers own the multimedia attributes and characteristics and create more multi-teaching models and share all the teaching resources. The computers also can repeat the same teaching contents continuously without being interrupted by motions and outer environment affection. Therefore, widely using the computers on the Autisms teaching programs bring lots of positive evaluation by the scholars.

1.2 Research Motive

We would like to construct the Autism students the Multimedia Digital Learning Environment. We would like to provide a environment for the Autism students, special education techers, parents and specialists to teach, learn, share knowledge and resources. Through the establishment of this

platform, we sould like to gain the focus on the handicapped students. We sould like to gather more and more concentration on those handicapped students from the public.

1.3 Research Purpose

The purposes of this research are:

- i. The establishment of the Multimedia Digital Learning latform for the Autism students.
- ii. The creation of the audio recognition courses for the Autism students

1.4 Research Scope

We submitted the following research items:

1.4.1 Research Target

The target in our research is constrained on the Autism students who can operate and use the computers. This research cases include the elementary students only.

1.4.2 Research Area

All the targets are selected from the Elementary Schools of the Panchiao City in Taiwan.

2 Literature Review

The Autism field and the Multimedia field are introduced in this section.

2.1 The Autism

We would like to make an introduction about the definition of the Autism, the characteristics of the Autism and the learning model of the Autism students.

2.1.1 The Definition of the Autism

In 1913, Dr. Bleuler submitted the 'Autism'. That is used to explain the patient who owns the extremely habit to live alone and can't be communicate with others. In 1943, Dr. Leo Kanner submitted another research toward the eleven children. Those children own the characteristics described by Dr. Bleuler. But, in other to distinguish those children' behavior are born to appear these characteristics. Dr. Leo Kanner name this type 'Early Infantile Autism'.

2.1.2 The Characteristics of the Autism

The Autism is a syndrome. That is a different cluster. The Autism is so called while the following three behavior type appears:

i. The barrier of relationships

The Autism patients lack the ability of understanding themselves and the relationships with others. They also lack the social life ability. Since they are babies, they don't talk to others. They don't look at others. They lack reaction with others. They are not afraid of the strangers. They are difficult to establish the relationships with family members. They don't imitate like other children do. They can't play with other children. They can't realize other people's motion and feeling. They can't express their feeling like other people normally do.

ii. The barrier of language and communication

The Autism appears various degree of difficulty in understanding other people's language, body language. They also have difficulty in expressing their mind by language, posture and face. There are about 50% Autism students who lack the communication language. Those Autism students who own the speech ability are also appear the characteristics like imitation, giving the wrong answers and lack voice variation.

iii. The same mode of behavior

The Autism appears different habits and playing habits from the normal kids. They select the same route while they walk on the street. They have the fixed and special habits on the dress, food, living and walking. They appear narrow and special interesting. The way they choose are boring and lack variation and remains repeatedly. The decoration of their

living and learning environment are fixed. Once there is any change, the Autism children start crying and refuse to accept.

2.1.3 The Learning Model of the Autism Students

The behavior of the Autism students are fixed and refuse to change. They are difficult to accept new interesting and activity. The computers own the predictable characteristic. Therefore, the Autism students can memorize the multimedia information provided by the computers [1]. The teachers can use the computer to assist the Autism students increase the negotiation ability of their hands and eyes. They can also increase their concentration, patience. They also use the computers to stabilize the Autism students' motion and to improve the fixed behavior mode. The Autism students can also gain the enjoyment and achievement from the learning process [2].

The teaching program for the Autism students can utilize the individual work system to make the living schedule for the Autism students by analyze their ability. We can also use the visual signs to transmit the four missions to the students. The four missions are: What work should be done? What degree should be finished? How to realize the ending? What should be done next? The purpose is to help the Autism students work order by order and learn alone. The Autism students also must learn the concept of 'finished'.

2.2 The Multimedia

We would like to make an introduction of the characteristics of the multimedia, the learning of multimedia and the assisted teaching of multimedia.

2.2.1 The Characteristics of Multimedia

The multimedia displays the audio and light effects those can't be displayed by the 2D mediums. The multimedia increase the learners' learning interesting and efficiency by the high-interaction and high-feedback. The personal learning characteristics can help the learners' adjust the learning schedule by their own conditions. Therefore, the use of the computer multimedia as the learning media becomes more and more popular [3] [4].

2.2.2 The Learning of Multimedia

As to the multimedia learning, Mayer & Moreno submitted five points: multimedia, contiguity, coherence, modality and redundancy. Especially to the multimedia learning, the use of text, graph and animation would help the learners deeply understand

the learning contents. The multimedia learning can also provide more efficiency and more extending learning environment.

The multimedia learning includes the various types of contents, types, channels of learning experience exchanging, virtual learning groups and the professional network content providers. The multimedia learning makes the information sources wider, provides rapid learning channel, decrease the learning expenditures by sharing the resources, upgrades the learning quality by the professional providers and increases the participate rate by the learning-oriented programs.

2.2.3 The Assisted Teaching of Multimedia

As to the assisted teaching of multimedia, the constructivism, situational learning and game theory are introduced.

i. Constructivism

The constructivism views the learning as a dynamic process. Based on the learner’s knowledge, the activity is constructed [5]. Therefore, during the learning process, the learner uses his or her own learning strategy to connect and organize the external message and internal knowledge. And re-construct and re-model personal recognition structure [6].

The principles that [7] uses the constructivism to design the multimedia computer assisted learning environment are: to design the plenty and real environment or to rehearsal the environment; to encourage the learner explain the knowledge actively and aggressively; to authorize the learner appropriate learning control in learning order, learning content, learning speed and learning scope.

ii. Situational Learning

The situational learning and environment recognition are broadcasted by the psychologists recent years. They emphasize the learning of knowledge are constructed in the real environment and can’t break off the culture where the learning activities occur. The learners construct the knowledge and skills by the interactivity of the environment. They also realize the meaning of the knowledge in the social interaction that would help in the knowledge transfer and apply for the learners [8].

iii. Game Theory

The game plays an important role in personal recognition and social adoption. While the upgrade of recognition ability, the types of the game becomes different, too. The learner can be trained to have further understanding through the activities in the game and finally achieved the purpose of proficiency.

The concept of adapting the game to assist the learning process is widely accepted and applied in the learning activities.

The skills those are used in the game can be combined with the teaching program. The students can increase the learning motivation through the game process. And the joy of the game wouldn’t bother the students. The students can also utilize the owned knowledge and experience to strengthen memory ability and learning effect through the game [9].

3 The Research Methodologies

In this section, we would like to submit the research steps and the research methodologies.

3.1 Research Steps

The research step of this research is listed below:

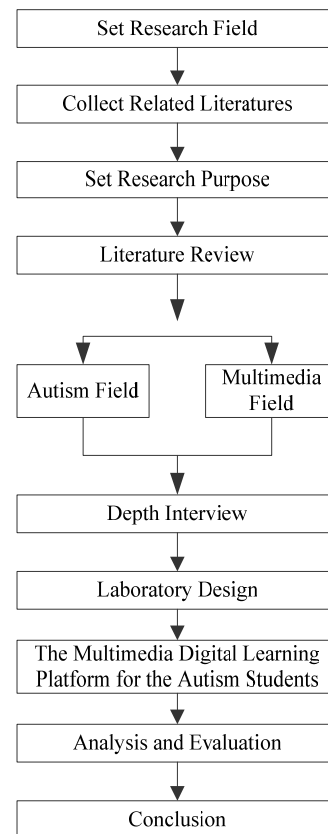


Fig. 1 Research Step Structure

3.2 Research Methodologies

In our research, we use literature analysis method, depth interview method and laboratory design method.

3.2.1 Literature Analysis Method

The sources of the literature include various kinds of books, journals, research papers, and educational publications. We use all the resources to implement analysis, comparison and compromising. The result is used as the research basic of this research. Based on the result, we can understand the conditions of the special education, we can construct the Autism students' multimedia resource platform and we can break through the problems and barriers of the special education teaching.

3.2.2 Depth Interview Method

In order to collect the Autism students real learning data, we had made several interviews with the special education teachers of the Elementary schools. We gather the precious opinions from the special education teachers and prove the multimedia resource platform appears the positive effect for the Autism students. Comparing with the CAI software, the multimedia resource platform also appears lower cost and higher learning resources value.

3.2.3 Laboratory Design Method

We design the courses for the Autism students by using the multimedia skill directly. In this part, we focus on the Autism students only. Taking the advice from the special education teachers, the courses own independent units, the content is simple and the audio is clear. The material topics focus on the daily life. That is so called the environmental teaching mode.

4 The Research Design

In this section, we would like to submit the system network planning, the system functional structure and the courses and materials for the Autism students' multimedia digital learning resource platform,

4.1 The System Network Planning for the Autism Students' Multimedia Digital Learning Resources Platform

In this section, we would like to submit the system network planning structure in Fig. 2, it includes:

i. SQL Server: used to access and query the front-end and back-end information.

ii. IIS and Fire Wall Server: used to provide the service for the front-end users and back-end managers of the main-frame connection and database access. This server is also used to connect the internal and external network.

iii. Manager Web-Pages: used to manage materials and accounts.

iv. Access Web-Pages: used for the access channel for the Autism students and the special education teachers.

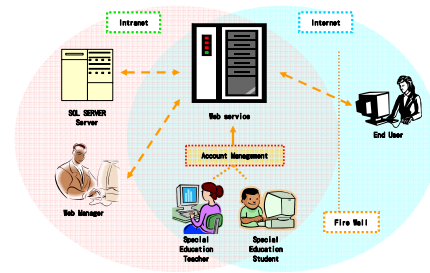


Fig. 2 System Network Planning

4.2 The System Functional Structure for the Autism Students' Multimedia Digital Learning Resources Platform Research Steps

In this section, we would like to submit the system functional structure in Fig. 3.

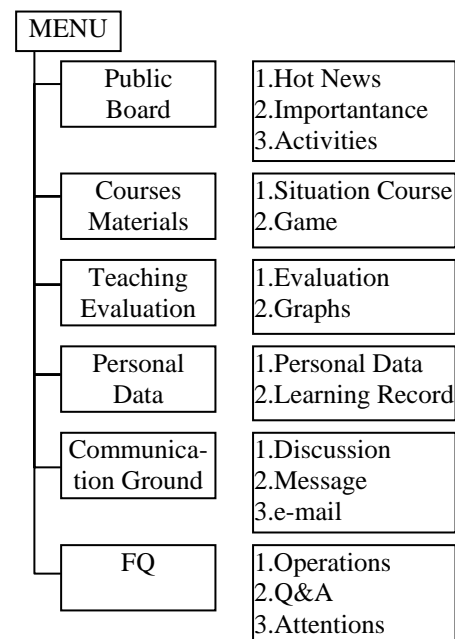


Fig. 3 Functional Structure

4.3 The Courses and Materials for the Autism Students' Multimedia Digital Learning Resources Platform Research Steps

The design of the courses focuses on daily life and use the situational teaching mode, such as transportation part, park part, etc. We use the characteristics of the multimedia and combine the Flash animations, audio and text explanation to increase the daily life understanding for the Autism students.

The courses include the situation courses and games. The detailed introduction is listed below:

4.3.1 Test Situational Courses

The designing rule is 'one-by-one'. The special education teachers or parents must assist the Autism students. The content of the courses concentrates on the daily life and then induce the Autism students recognize the sound and text.

4.3.2 Test Game Courses

The game can help the Autism students release the fear of computers and increase the familiarity of the computers. The game courses also raise up the confidence and aggressive attitude for the Autism students. The Autism students can relax their motion and the special education teachers can observe and record the Autism students' learning performance for further analysis.

5 Conclusion

We believe after the establishment of the Multimedia Digital Learning Resources Platform, all the resources can be integrated.

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